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Engineering

COAL AGE

With Which is Consolidated The Colliery Engineer

DEVOTED TO COAL MINING AND COKE MANUFACTURE

ISSUED WEEKLY

VOLUME XV

January 1 to June 30, 1919

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COAL AGE

With Which Is Consolidated
The Colliery Engineer

INDEX TO VOLUME XV

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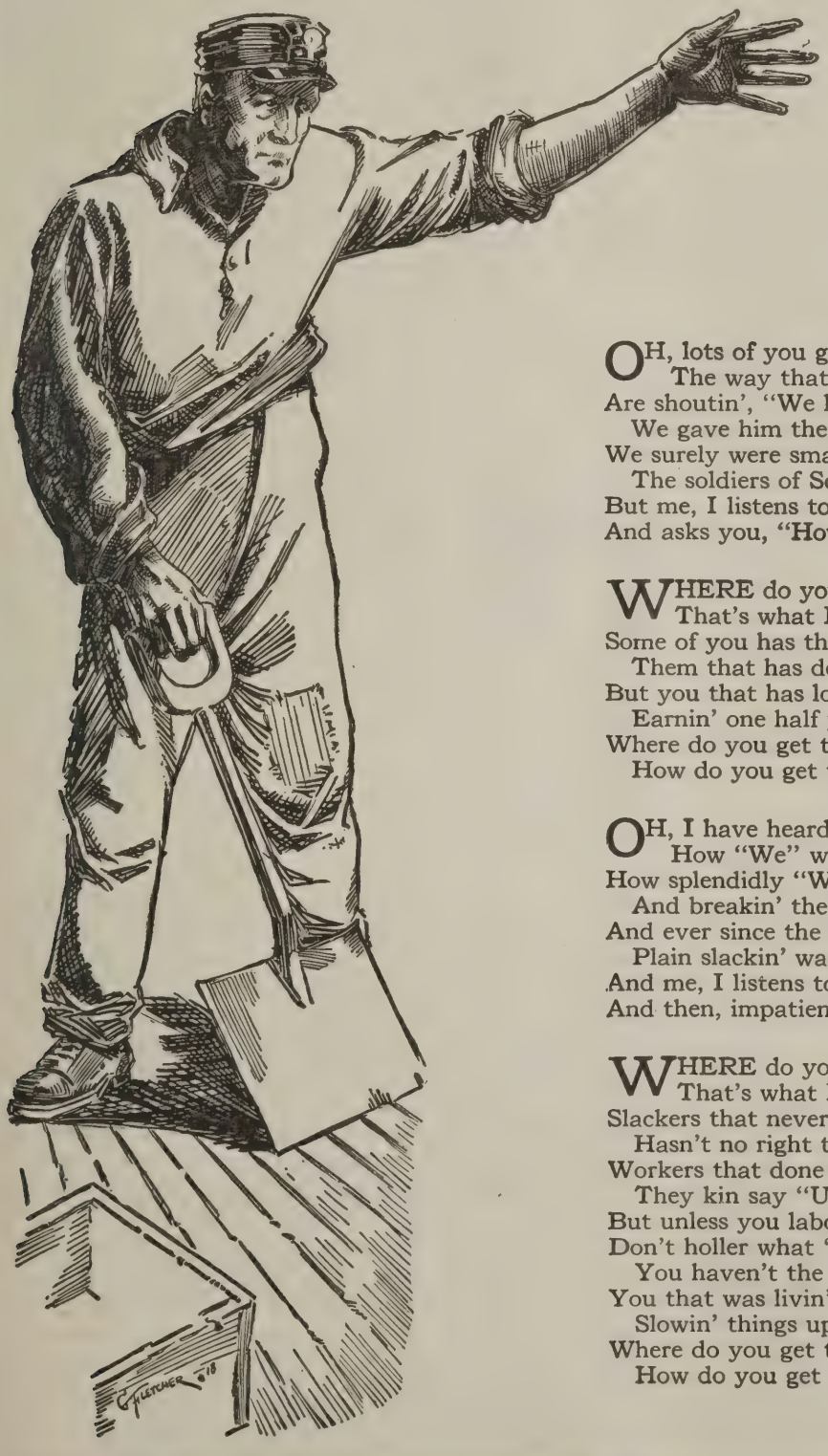
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COAL AGE

Volume 15 — New York, January 2, 1919 — *Number* 1



The Question

Written expressly for *Coal Age*
By BERTON BRALEY

OH, lots of you guys discussin'
The way that our soldiers fight,
Are shoutin', "We licked the Prussian,
We gave him the gaff, all right.
We surely were smashin' an' crushin',
The soldiers of Schrecklichkeit."
But me, I listens to what you say
And asks you, "How do you get that way?"

WHERE do you get that "We" stuff?
That's what I want to ask.
Some of you has the right to talk,
Them that has done their task.
But you that has loafed and loitered,
Earnin' one half your pay,
Where do you get that "We" stuff?
How do you get that way?

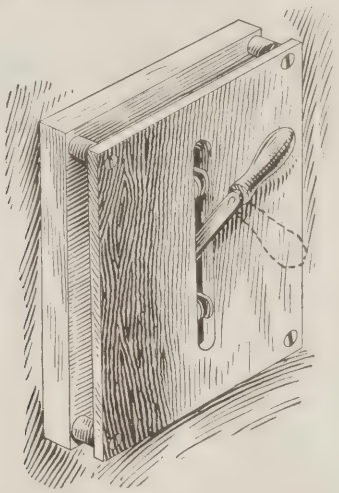
OH, I have heard fellers chinnin'
How "We" were a-pushin' through,
How splendidly "We" were winnin'
And breakin' the Boche in two.
And ever since the beginnin',
Plain slackin' was all *they'd* do.
And me, I listens to what they spout
And then, impatient, I hollers out—

WHERE do you get that "We" stuff?
That's what I want to know.
Slackers that never had done their job
Hasn't no right to blow.
Workers that done their duty,
They kin say "Us" and "We,"
But unless you labored and saved your share
Don't holler what "We" did over there,
You haven't the right, you see!
You that was livin' easy,
Slowin' things up each day,
Where do you get that "We" stuff?
How do you get that way?

IDEAS AND SUGGESTIONS

Safety Switch Shield Protects Against Electric Shock

The accompanying illustration shows a protection against electric shock, which is liable to occur to those handling knife switches located in dark places. To avoid such occurrences a board of suitable dimensions



with a slot cut in it long enough for the travel of the switch blade, is fastened to the switch plate by means of four screws passing through insulating distance pieces. The hinged handle facilitates the motion of the blade in both directions.

Construction of a Bell-Ringing Transformer for Signaling Apparatus*

BY GEORGE F. DESILVER
St. Louis, Mo.

It is now generally appreciated that in places where 110-volt alternating current is available a bell-ringing transformer makes the most satisfactory device for furnishing current for the operation of signaling apparatus such as call bells, annunciators and alarm signals. A

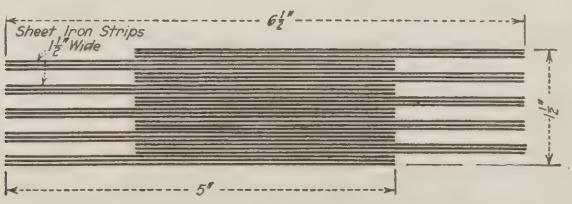


FIG. 1. METHOD OF MAKING CORE OF STRIPS

transformer which, when 110 volts is impressed on its primary will deliver either 3, 6, 9, 12, 15 or 18 volts at its secondary, can be constructed as shown in Figs. 1, 2 and 3.

The core is built up of sheet-iron strips. The softest sheet iron available should be used, and it should be as thin as it is possible to secure. To insure that the sheets will be thoroughly annealed they should be heated to a red heat and then cooled very slowly. Cut from this sheet-iron material a sufficient number of strips *A*, Fig. 3, 1½ x 3¼ in., to make a pile 3 in. thick. Also cut enough strips *B*, 1½ x 5 in., to make a pile 3 in. thick. The strips *B* should then be piled into a core in the manner illustrated in Fig. 1. After being assembled into this core, the strips should be clamped securely and wrapped with three or four layers of friction tape, so that they will be held in a compact mass.

The core should be wound as follows: On each leg, as shown in Fig. 2 for the secondary, wrap about 2½ lb. of No. 12 double cotton-covered copper wire. There

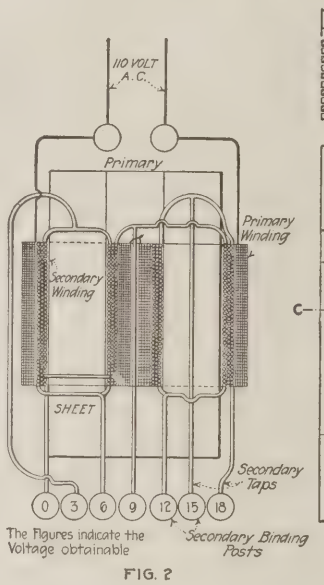


FIG. 2

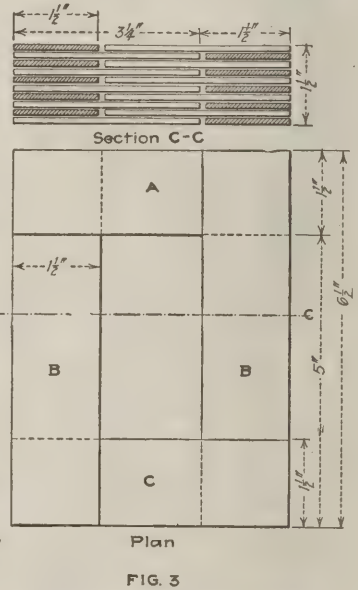


FIG. 3

FIGS. 2 AND 3. HOW TO MAKE THE WINDINGS

should be three layers of 25 turns to the layer. This secondary is connected to the binding posts as follows, and as shown in Fig. 2. As each layer is completed a tap is carried to one of the binding posts. The wire with which the secondary winding starts is connected to post 0. From the end of the first layer a tap is carried to post 3. From the end of the next layer, a tap is carried to post 6. Taps are carried to the posts systematically in the manner suggested, and as shown in Fig. 2. The secondary winding is of course in one continuous length on each leg, and the connections to the binding posts are taps soldered thereto. The windings should be in such direction that they will correspond to those shown in Fig. 2.

The primary winding, upon which 110 volts is impressed, is wound over the secondary. It consists of about 6 lb. of No. 22 single cotton-covered copper wire. There should be about six layers with 67 turns to each layer. For insulation between the primary and secondary there should be used a stiff strong paper. Good bond writing paper will suffice. As each primary and

*Copyrighted.

secondary layer is completed it should be thoroughly soaked with shellac, so that when the winding is complete it will set into a compact mass.

After the windings on the legs are completed, the 3¼-in. strips *A* (Fig. 3) can be inserted, as shown in that illustration, between the ends of the strips *B*, to complete the magnetic circuit. To hold the *B* strips in position on the legs and to clamp the transformer to a back board, wooden straps can be utilized. These straps should be so arranged parallel to the iron strips *A* that they will bind the whole transformer down against a wooden base block. Small machine bolts are inserted in the wood straps to effect the clamping action necessary.

Cautions To Be Observed When Testing Dry Cells

In testing dry cells, small-diameter wires should not be used for the ammeter leads. These conductors should be not more than 12 in. long and of a cross-sectional area equivalent to at least that of No. 12 wire.

The ammeter leads should not be held on the binding post of the cell under test for more than 2 or 3 sec. at a time. An ammeter connected directly across the terminals constitutes an almost "dead short-circuit" and will therefore quickly "exhaust" and spoil the cell. Always hold the ammeter lead terminals on the brass binding posts of the cell; it is not good practice to hold the end of one ammeter lead on the upper end of the carbon and the other on the edge of the zinc casing.

Finally, be certain that the ammeter or battery tester which you are using is correct. The value of your test depends wholly on the accuracy of the testing instrument. Hence, the ammeter should be compared often with a standard instrument which is known to be absolutely accurate.

Electric Signal System That Eliminated Collision Troubles

By Orin Kelly
Columbus, Ohio

The accompanying illustrations show a signal system designed by myself for one of the large mines in Ohio where considerable trouble was occasioned by collisions

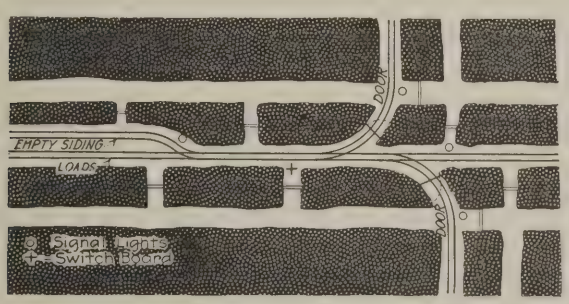
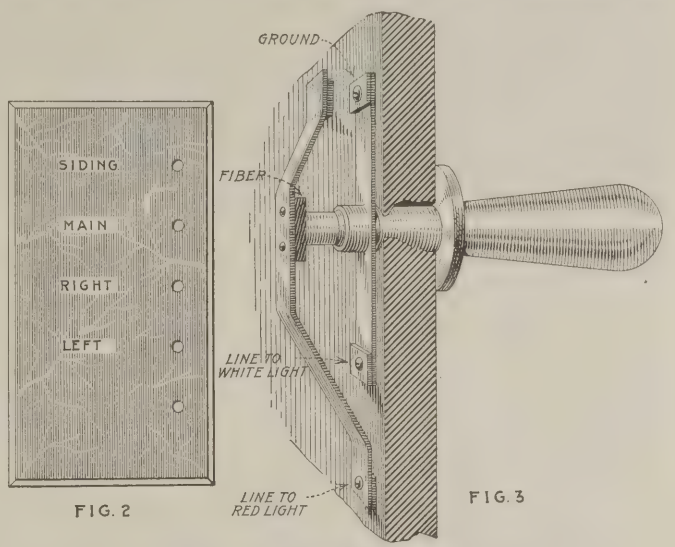


FIG. 1. SHOWING POSITION OF SIGNAL BOXES

between haulage locomotives. These took place at a point where three motors gathered the coal to a common siding by an arrangement of switches, as shown in Fig. 1.

Doors were provided at the entrances to the right and left entries, and a boy was stationed here to attend to them and to flag for the motors. It was found, however, that a better system was needed, and that shown in the sketches was designed.

Four wooden boxes were made, each provided with two electric lamps, one red and the other white. The boxes were painted white inside and had wire netting over the front to protect the lamps. These signal boxes were placed at the points marked by circles in Fig. 1, these points being such as to give the motorman a clear view of the signal in time to stop his trip before passing the signal box. The motormen were instructed not



FIGS. 2 AND 3. CONSTRUCTION DETAILS OF SWITCHBOARD

to pass any signal station unless the signal light then burning was white. These signals are operated by the trapper from a switchboard placed at the point marked with a cross.

Figs. 2 and 3 show the construction of the switchboard. The circuit to the red light is kept closed by a spring contact until it is opened by the insertion of the switch plug which, while it opens the circuit to the red lamp, closes that to the white. As only one switch plug is furnished it is impossible to give a clear signal at more than one place at one time, all others showing red. It will be seen that each motorman moves through this common meeting point only on positive signal, and when this shows clear. No other motor can get through without running by a red block, in which case the position of the signals fixes the blame at once and without question.

In order that the men engaged in rescue work at a mine following an explosion or accident may render most efficient service they must have a comfortable place for rest and sleep. While men are sleeping they should not be disturbed by those who are off duty and awaiting their shift. Hence sleeping quarters should be provided to accommodate half of the total number of men employed in rescue and recovery operations, as at no time will more than half the men be off duty. The rest room should be separate and apart from the sleeping quarters so that men who are sleeping will not be disturbed.—*Rescue and Recovery Operations in Mines.*



Mine Bathhouses in Utah

By A. C. WATTS
Salt Lake City, Utah

SYNOPSIS — *Bathing facilities at mines were formerly decidedly crude and inadequate. In a mountainous country many considerations besides the water supply and necessary heating arrangements enter into the design of a bathhouse. These have been solved with a fair degree of satisfaction, and many miners now refuse to work at a mine that has no washhouse.*

MANY years ago, after coming out of a coal mine for the first time in my life, I solemnly vowed never to go into another. It was not because of being afraid of the dark, or of the many dangers present in all coal mines; for there were many lights, and there was also an entire lack of knowledge of the dangers. But the resolution was due to the dirt which soiled everything and the black hands and faces and sooty nostrils of all the workmen.

We were a party of students, members of the graduating class of a famous Western mining school, and we were making an inspection trip. With us was our professor of metallurgy, who, because of a cherished beard of fiery hue, was called "Pink Whiskers." On our way out we passed through a door which was guarded by a vicious trapper, sporting an enormous oil lamp on which had accumulated a luxurious growth of oil and soot. Seeing a bunch of greenhorns coming, he carefully anointed his hands from his lamp and then proceeded to wipe them on the faces of the unwary students, not omitting "Pink Whiskers," whose pride and dignity were much hurt thereby. A poor trapper boy is not supposed to know a learned professor on sight anyway. It made a great impression on one young mind, more particularly because there was no means of getting clean until we had reached our hotels at night.

A short time after, through one of the ironies of fate, I found myself earning (or trying to earn) my living as a surveyor in that same coal mine and others operated by the same company. Then was acquaintance begun with miners' bathhouses. The remembrance of those rough board sheds, drafty, generally dirty and lighted by small oil lamps or often by the smoky pit lamps carried by the miners, is still vivid.

The water was heated on an old kitchen stove that also served to heat the building, and we bathed in round washtubs, standing up in them and using strong laundry soap. We had to commence with the top of our heads, and the strong lye soap suds from the shampoo would get into our eyes and blind us. By the time our knees were reached, the water was some dirty. Our backs generally remained shady unless some kind buddy lent a helping hand, and then he often took advantage of our innocence and used a broom or scrubbing brush. When bathing was finished, we dumped the water through a wooden trough out onto the ground and let the next man have our tub. If he was fastidious, he rinsed it out with hot water before bathing—but each man for himself. After getting out of the tub, one would get his feet all dirty again on the floor.

Looking back on it all, it does not appear strange that some miners feared the ordeal of washing their back and legs above the knees, because of the belief that it made them weak.

There were unauthenticated rumors of metal mines somewhere in the state that had steam-heated washhouses with porcelain bathtubs, lockers, etc., but though we longed for them, never a one did we see. When the time came that partly through demands of the men and partly because of the desire of operators to make working and living conditions for the men and their families as attractive and hygienic as possible, we were called upon to design and erect bathhouses, the task was undertaken with considerable appreciation of what it would mean to the employees.

Unfortunately, plans and descriptions of bathhouses were few and meager. There had appeared in the col-

umns of *Coal Age* from time to time descriptions of the elaborate bathhouses in France, Germany and Belgium, and one or two American installations. The cost of structures as built in European countries would be prohibitive in the mountain states, but by way of comparison a table was made up showing the main features (see Table I). The Utah Fuel Co. adopted a standard design for its main bathhouses, and in 1917 built three of them at an average cost per man of about $33.

There are many conditions to be met in the design of such structures. The location is the first question to be solved, for upon it depends many features of design. In the mountains space for buildings is often quite limited, and as it is essential to have the bathhouses close to the mine mouths, both because of convenience and to protect men in cold weather when they come out of the warm mines, the shape of the building must be made to conform to the topography of the country.

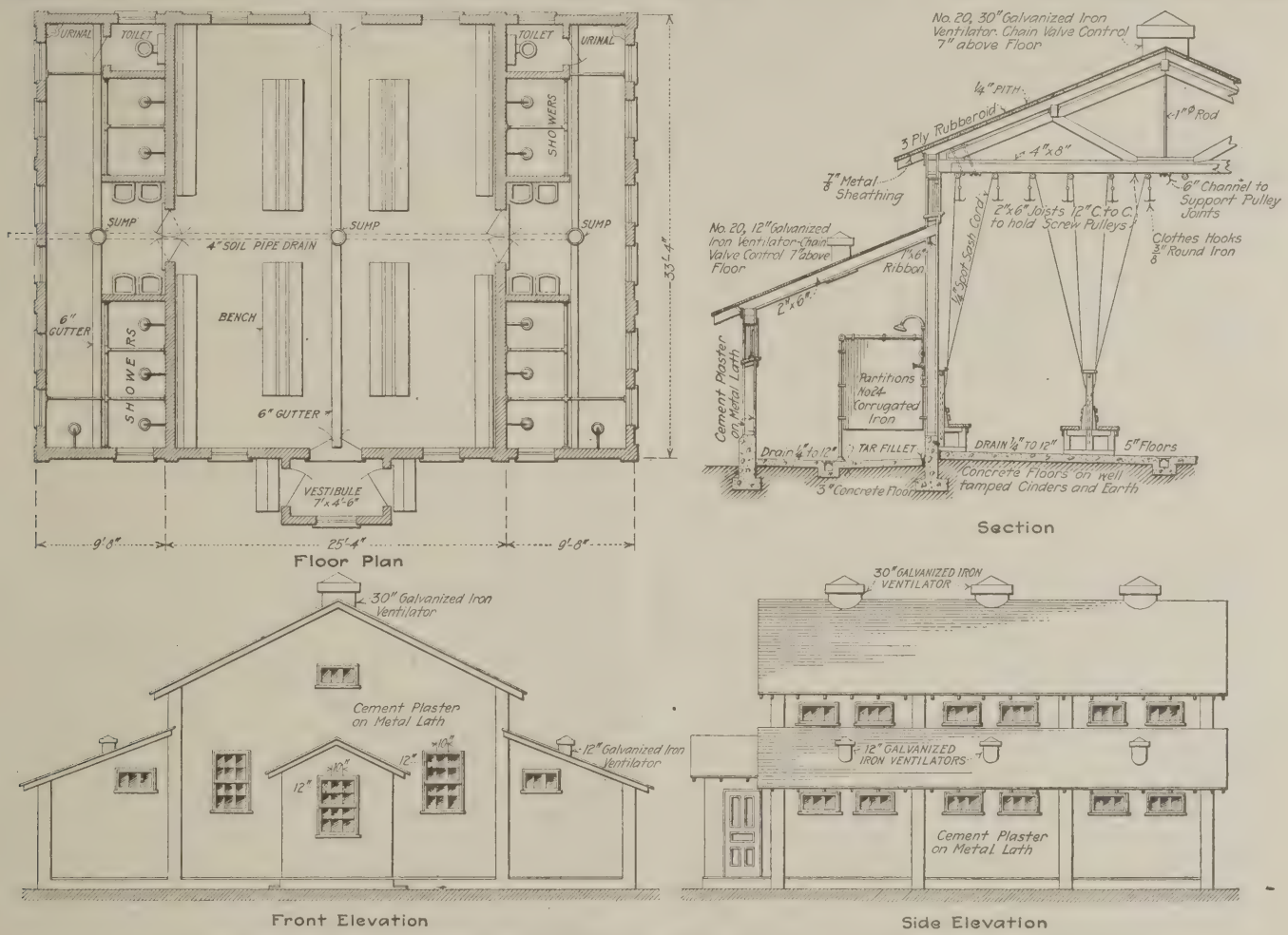
Usually the building must be long and comparatively narrow. In the design adopted, 45 ft. was about as wide as ground space in canyons usually permits. The building should either be located near the lamp- and checkhouses, or be combined with them. By so doing it is often possible to effect saving in attention.

The powder distributing magazine should also be located at a convenient distance from the bathhouse. Furthermore, the landing or stopping stations for man trips must be considered when deciding on a location. Fortunate indeed is the mine at which all these considerations can be satisfactorily taken care of and still have the bathhouse close enough to the power house to be supplied with steam heat and hot water without long, wasteful pipe lines.

Being thus of necessity close to the mine mouth, the building must be practically fireproof. With common brick at $25 per M., cement at $4 to $4.50 per barrel, sand $3 per yard, steel almost worth its weight in gold and wages from $6 to $8 per 8-hour day, it takes some figuring to prevent the costs running up. The design adopted was a wood frame building covered on the sides with expanded metal lathing and cement mortar, the outside wall being back-plastered. This gives an air space which aids in the heating and prevents condensation of moisture.

One of the buildings was given a pebble-dash surfacing on the outside, using fine coke breeze for pebbles. The result was a light grayish green color very pleasing to the eye. Exposed woodwork was painted brown. The other two buildings were smooth-finished. With such finish, shrinkage cracks can be easily treated. The inside walls were smooth-finish, and after thorough drying were given a rich cement wash to fill all hair cracks and render walls more nearly impervious to water. Renovation can readily be accomplished by use of suitable cold-water paints.

For roofing, galvanized corrugated iron, or some kind of asbestos prepared roofing, laid on ship lap, makes a suitable cover. Exposed iron roofing invites condensation with consequent drippings. The buildings were designed on the unit basis, so that if expansion is desired, a panel at a time can be added without undue expense and without change of plans or symmetry.



PLAN, CROSS-SECTION, SIDE AND END ELEVATIONS OF A TYPICAL MINE BATHHOUSE

Not only must the size be kept down to conform to and conserve available ground space, but the cost must be thoroughly considered; and as such buildings are essentially one-story structures, the larger the ground space the greater the cost. For this reason hangers for clothes were adopted instead of the locker system. Of great importance, also, is the sanitary question. Lockers permit the spread of vermin and disease, and Pulley hangers and ropes with means of fastening to the benches were furnished by the company, but the men are required to furnish their own locks, towels and soap. With hangers, the danger of fires is obviated to a considerable extent.

Ventilation must be carefully considered, for it must be adequate, yet without drafts. With this in mind the windows were placed high; chimney ventilators were

TABLE I. MINERS' WASHHOUSES—27 EUROPEAN MINES AND 1 AMERICAN

Colliery Location	Men Employed	Men Bathing	Per Cent. of Employees	Bath Equipment: Spray	Bath Equipment: Tubs	Bath Equipment: Basins	Change Equipment: Lockers	Change Equipment: Chain and Hook	Men per Spray	Cost per Man	Size, Description, Etc.
Bois du Lac, Belgium	420	420	100	80	..	..	...	800	10	$19.50	Men use approximately 8 gal. water per bath. Time per man approximately 10 min. Temperature of water 95 to 100 deg. F. Bathroom floors of cement, tile or asphalt. Bath partitions corrugated iron, sheet iron, porcelain, marble, etc.
Belgium	500	250	50	22	..	..	...	500	10	*8.20	* Figures for 500 men, but only 250 use baths.
Belgium	507	330	65	23	3	..	...	600	16	11.70	Costs per bath range from ½c. to 1c. Many baths installed before compulsory law.
Belgium	334	167	50	24	4	..	384	....	20	9.10	Four buildings, one men, one women, one engineers, one superintendents. In general, bathrooms are quite private, with showers, partly partitioned off from small dressing room, though most of dressing is done in clothes rooms.
Belgium	400	280	70	24	..	..	10	400	17	29.00	
Belgium	600	425	71	50	3	..	...	600	12	17.00	Separate buildings for bath and dressing rooms.
Belgium	613	416	68	49	4	..	208	470	14	8.40	
Belgium	449	449	100	42	2	6	23	560	10	19.10	Apartments for men and women.
Belgium	440	440	100	36	8	8	...	524	15	*21.40	* Three separate buildings—one men, one women, one superintendents. Includes laundry and meals, accommodation.
Leeds, England	....	....	..	50	6	..	200	200	....	.....	Peculiar zig-zag arrangement of showers saves floor space. Small dressing rooms opposite each shower (*Coal Age*, 2-10-12).
Belgium and France	800	800	100	124	4	..	...	800	7	.....	Dressing room 130x40x24 ft. high; only eight double benches in dressing room. Each bath compartment is divided into the shower room and a small dressing room. Shower walls enamel brick.
	1735	1215	70	146	..	..	...	1905	13	10.70	*Coal Age* gives average cost $124.58 per bath.
	620	395	64	40	..	..	...	400	13	14.60	10.22 per man.
	575	525	91	38	..	..	...	400	10+	12.30	Maintenance 1.22 each bath per mo.
	700	490	70	40	..	..	...	500	12+	13.80	.005 one bath
	760	525	70	50	..	..	...	550	11	11.05	
	980	800	82	105	..	..	...	1200	11+	11.03	Capital costs vary from $9.73 to $17 per man.
	700	450	65	44	..	..	...	....	10+	*19.80	$17 will erect quite an elaborate bathhouse
	494	293	60	22	..	..	...	400	18	10.70	
	502	310	62	22	..	..	...	400	18	12.20	German installations cost $19.46 per man.
	1030	950	92	60	..	..	...	1000	17−	9.73	Men are required to bring a change of clothing once a week under penalty.
	804	200	25	36	..	..	...	500	14	6.60	
	360	270	75	36	..	..	...	300	8+	7.80	
	310	217	70	33	..	..	...	....	10	*22.20	* Figures for 310 men.
Rheims, Preussen Germany	4000 3 shifts	985 1 shift	..	144	..	..	...	4000	7	.....	Building 180x84-ft., aisles 12-ft. wide; 4,000 men three shifts; 985 maximum one shift. Men wash and dress in 15 to 20 min. Men under showers about 10 min. Steam heated to about 85 deg. F.
Quesnay, Belgium	....	500	..	80	..	..	...	800	10	20.00	Two buildings, bath 69x46x23 ft. One dressing hall 75x46x41 ft. high. Hangers arranged along walls. Twelve benches in dressing room. Cost $15,959; $20 per hanger or per man. Dressing room will accommodate 1,000 hangers.
Calais	650 2 shifts	....	..	56	..	..	...	650	6	.....	
Clinton, Ind.	200	150	75	15	..	20	...	....	13	.....	Building 31 ft., 8 in. by 62 ft., 8 in. concrete and steel. Designed by Roberts & Schaefer. Vent—Monitor sash. Showers and clothes hooks in same room. Showers 4-ft. centers. Urinal 8-ft. long. Benches 8-ft. centers. (*Coal Age*, 1-18-13.)
Totals, Average	....	....	.. ..	.. ..	.. ..	.. ..	... ...	....	329 12	$325.91 14.17	

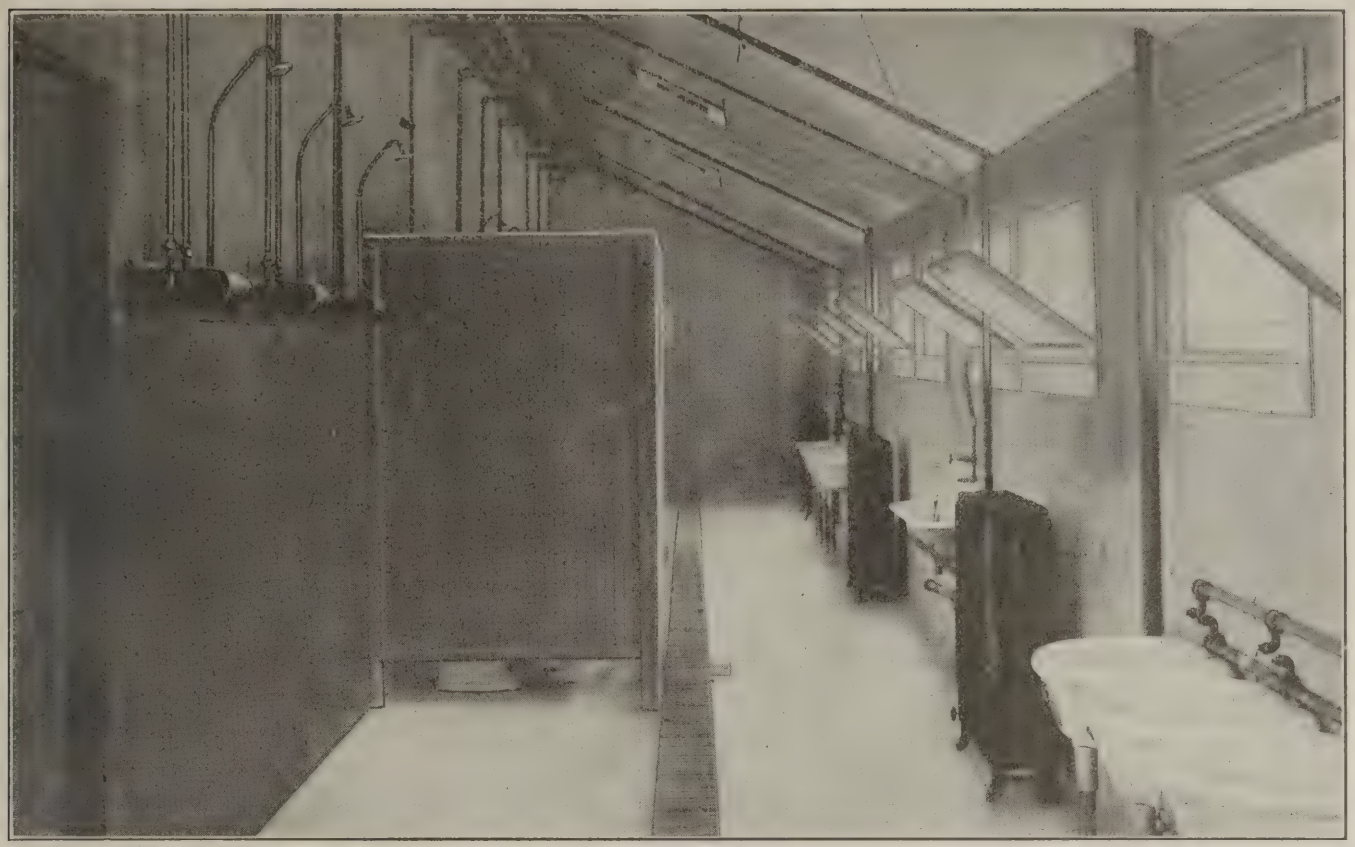
QUESNAY PIT, BELGIUM

Two Buildings—Dressing Room 75x46x41 ft; Bathroom 69x46x23 ft.

	Dressing Hall	Bath-room	Total	Per Man
Grounds	$357.00	$357.00	$714.00	$0.89+
Buildings	5,200.00	5,120.00	10,320.00	12.90
Fittings	1,415.00	3,510.00	4,925.00	6.15+
Total	$6,972.00	$8,987.00	$15,959.00	$19.94

give an unpleasant odor to the dressing room, whereas by suspending clothes near the ventilators in the roof, odor is eliminated and opportunity is given to thoroughly dry and air them. If sufficient space is allowed between hangers there is no danger from spread of vermin. It was found that at least 30 in. should be allowed between hangers, and rows should be staggered. put on the peak of the roof, with valves for opening and closing them. Vestibuled entrances with side doors and swinging doors, giving entrance to the main building, were adopted.

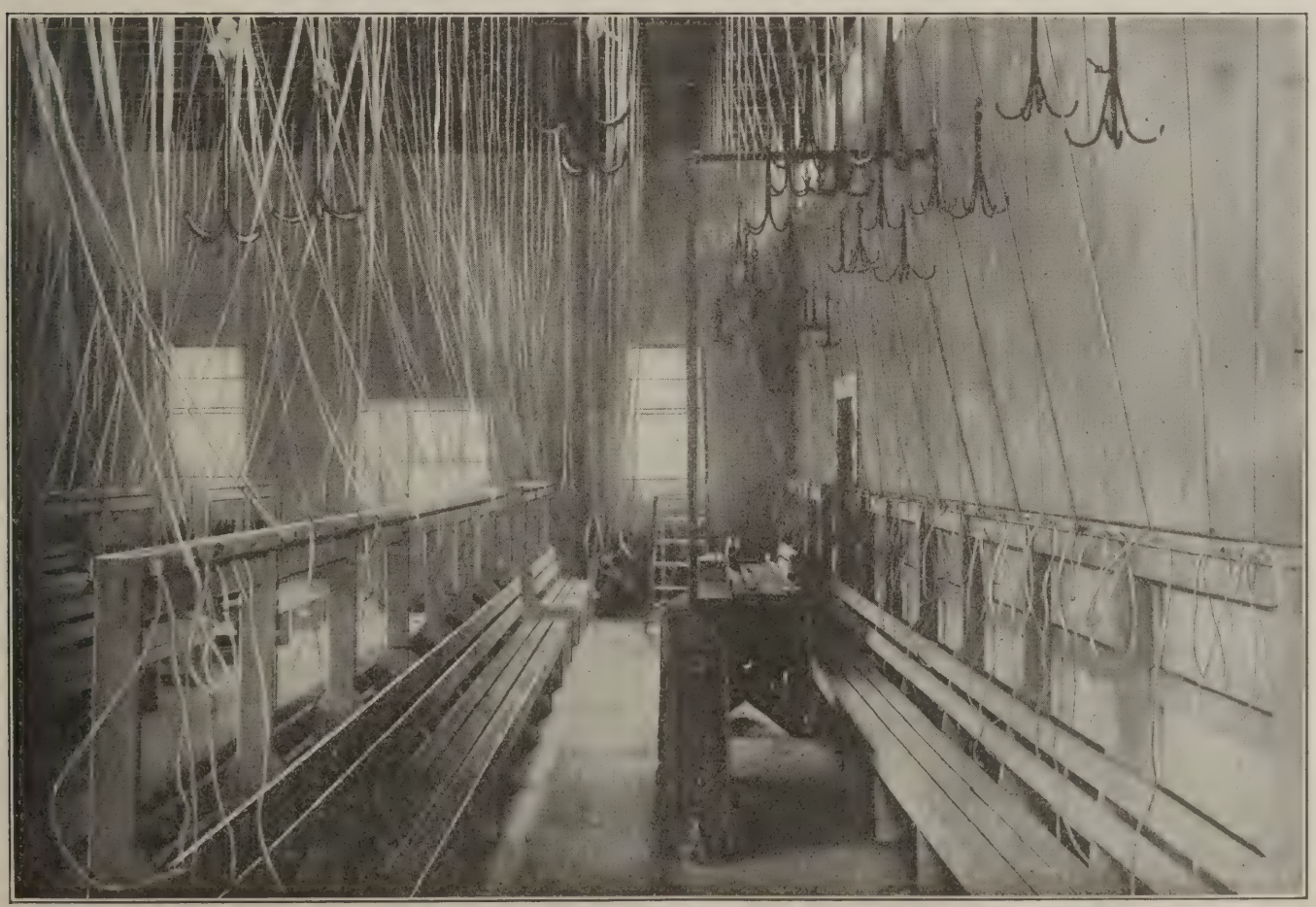
Steam heating was employed, the pipes being placed where possible overhead and away from casual contact by men. It is also desirable to place guards around



THIS MINE WASHROOM CONTAINS MANY FACILITIES FOR A GOOD SCRUB

Typical Views Inside One of the Modern Bathhouses Erected by the Utah Fuel Co. for the Use of Its Employees

CHANGEROOM IN THE BATHHOUSE—NOTE THE HOOKS FOR CLOTHES



pipes and radiators to prevent the men from being burned. There need be little hesitation over a decision as to whether tubs or showers should be adopted, for apparently the arguments of sanitation, economy of time and water are all in favor of showers.

The heating of the water was done by live steam with pressure regulated to suit the water pressure. The water is heated at the showers by special mixers which are so made that it is impossible to scald by steam. There are several good mixers on the market. When the pressure of steam for room heating is different than the pressure required for water heating, two steam lines must be used, each equipped with pressure regulators. To prevent waste of steam in the heating plant, steam traps must be provided or a return system to the boilers used. When economy of water is a requisite steam mix showers cannot always be used, but water must be heated by special heaters and showers equipped with automatic closing valves. These, however, are inconvenient because but one hand can be used in bathing and the water temperature is not easily regulated.

The floors in the change- and washrooms are of concrete. The foundation walls for the sides of the building and partitions are concrete for about 2 ft. above the floor. All floors drain to a central trench covered by wood gratings, and the drainage is properly trapped and led to cesspools or septic tanks. It may be desirable to place grease traps in these drains in some instances. Hose connections are provided at several places so that all floors, walls and benches can be easily and thoroughly washed. Using hangers for clothes instead of lockers makes this cleansing easier and more thorough.

Ample Room for Change of Clothes

The changeroom must be designed so as to allow ample room for dressing and for the passage of men into and out of the bathrooms and building. With this in view, the bathrooms were placed on each side of the changeroom with swinging doors in the middle of the partition. An aisle between ends of benches was left opposite these doors.

As shown in the plans, the washrooms are built all along the sides and are equipped with showers, washbowls, urinals and closets (the latter inclosed). The ventilation for these washrooms was kept separate from the main building, and efforts were made to keep the moist air in them from entering the changerooms. The entire building should have plenty of natural light. Light, cleanliness and health form a trinity indispensable to efficiency and happiness. The windows should be placed as high as possible. In the plans shown the windows in the washroom are hinged at the bottom.

The first design contemplated partitions between showers, but these were not put in as it was decided it was more convenient and efficient without them. Experience, as shown by compiled statistics, indicates that one shower per 12 men is sufficient. It is well to have plenty of space in the washroom, so that men may dry themselves and walk to the changeroom without being again wet from the showers. This can be accomplished by a partition when space is at a premium, or by inclosing the showers or by giving ample width to the room.

A charge of 50c. per man per month is made for the use of the bathhouse. This is hardly sufficient to pay the janitor's wages, let alone amortization, maintenance, interest, taxes, insurance, water, heat and light, but the company considers it a good investment if it lends to the health and happiness of the community.

How do the men take to the bathhouses, do you ask? Well, you know how a gang of kids act when they go down to the swimming hole for the first time in the spring. They all stand around waiting until some boy takes the first dive, and coming up to the surface, yells, "Comonin youse fellers, the water's fine." Then the rest all make haste to follow suit. So with our miners; they were a little backward at first, but now they often refuse to work in a mine which has no bathhouse, and applications have been received from outsiders for privilege to use them. The company now has bathing facilities at all its mines, and these will be enlarged as the demands grow.

Psychology of Efficiency and Fatigue

The director of the psychological laboratory at Cambridge University, England—Dr. Charles S. Meyers—is the author of a little book reecntly published entitled "Present Day Applications of Psychology." In commenting on this book, *The Colliery Guardian* states that of late years much attention has been given to the analysis of the factors governing industrial efficiency, as measured by muscular and mental work. By means of the ergograph, a muscular work curve can be obtained and certain principles regarding fatigue and recovery have thus been established.

The author illustrates the application of these principles by examining the case of 500 shovelers, employed in moving coal. Experiment soon proved that efficiency depended upon the use of a shovel weighing with its load about 21 lb. Thus, by adjusting the weight of the shovel to the material shoveled, the following astonishing results were obtained: (1) The average amount shoveled per day rose by nearly 270 per cent., or from 16 to 59 tons per man. (2) One hundred and fifty men could now perform what 500 men had previously accomplished. (3) The average earnings of the shovelers increased by 60 per cent. (4) The cost to the management was reduced by 50 per cent. (5) There was no evidence of increased fatigue of the men.

Dr. Meyers also examined the relation between the work curve and the curve of frequency of accidents; this question has often arisen in connection with the discussion of colliery accidents, and no marked periodicity has in this case been established. The statement is made, however, that in certain accident curves the number of accidents increases inversely as the output. The influence of rest periods, also, is somewhat complex and experiment seems to point to the fact that for every kind of work there is a most favorable rest period—that is, a pause in which the various factors so operate as to produce a maximum amount of work after the pause. Long unbroken spells of work are economically unsound, and systematic rest pauses lead to a great improvement in the quantity and quality of the work produced.



Coal Tipple and Washery at Lehigh, Mont.

By E. P. STEWART
Chicago, Ill.

SYNOPSIS — *The apparatus here described is designed to thoroughly clean and prepare locomotive fuel. A unique feature is the provision of efficient drying equipment, so that the washed coal may be shipped in open cars without danger of freezing.*

THE Cottonwood Coal Co. has a large coal property in Fergus County, Montana. The Lehigh Shaft No. 1, at which point the plant to be described was built, is located in the westerly end of the Judith Basin. While the field is extensive, the coal obtainable contains many impurities, such as slate, heavy bone and sulphur. Fully aware of this, the Cottonwood Coal Co., when it decided to open this field, determined to provide thorough and efficient facilities for cleaning the coal so that the best locomotive fuel possible might be produced, as the entire output is taken by the Great Northern Ry. Design and construction of the plant were accordingly intrusted to the Roberts & Schaefer Co., of Chicago.

The plant and process herein described were adopted in order to secure a coal as free from impurities as possible, and of a maximum size of 5 in.—suitable for hand-firing in locomotives.

The mine cars, at the shaft bottom, are delivered automatically to the self-dumping cages. The track grades on entering the shaft bottom are such that the loaded cars run by gravity into the caging device, which permits of only one car at a time being delivered to the cages. This dispenses with labor, delay and annoyance caused by a car getting in the sump when a car or a trip accidentally becomes uncontrollable.

The handling of the mine-run coal, preparatory to treatment of the various sizes, is accomplished as follows: The coal, after being weighed in the mine, is hoisted to the top of the tipple by means of four self-dumping cages. The pit cars discharge into a large steel hopper, from which coal is fed out uniformly by means of apron feeders onto two duplicate sets of shaker screens. The coal is accurately sized on these screens into lump over 5-in. perforations, egg through 5-in. and over 2½-in. perforations, and screenings passing through 2½-in. perforations. The lump coal is delivered to a picking table, as is also the egg size, while the screenings are deflected to the coal washery for treatment.

A method of coal handling was decided upon whereby the larger sizes in the mine-run are thoroughly picked by hand, and all rock and heavy bone eliminated as nearly as possible. The finer sizes or screenings are washed in a coal washery. All sizes after they are cleaned, dried and properly treated are finally collected in a shipping bin and transported to the various coaling stations on the line of the Great Northern Railway.

The plant is designed for a maximum, eventual output of 3500 tons per day. The present mine output is between 1000 and 1200 tons daily. Rock and bone rejected approximates 12 per cent. of the mine output. The Lehigh plant is of considerable general interest through its features for efficiently removing rock and bone from coarse as well as the finer sizes; its ample and well arranged facilities for accomplishing these results by human and mechanical means, and particularly for its facilities for thoroughly drying the finer sizes, thus removing entirely any tendency of coal to freeze in railroad cars during severe winter weather with consequent loss of time and embarrassment to railroad op-



VIEW OF THE PICKERS AT WORK IN THE WELL-LIGHTED TIPPLE BUILLDING

eration. Special precautions also had to be observed in properly housing the plant and equipment to secure the comfort and protection of the operatives.

The slack coal coming from the screens is approximately 45 per cent. of the mine output. The mine shaft is 208 ft. deep from ground surface to bottom of coal, and has five compartments—four for cages and one for pipes. A lengthy description of this shaft will not be entered into here, as the subject was covered by J. W. Powell in his article in *Coal Age* for Mar. 11, 1916. The total hoist is approximately 280 feet.

Hand-picking of the lump and egg is accomplished in a large, comfortable, well lighted room in the tipple structure. All rock picked out is deposited in chutes which lead to a large rock-and-refuse bin in the tipple below the picking-room floor. Bone coal, as picked, is deposited in similar chutes which lead to a conveyor that transports this material to a crusher. The crusher reduces the bone to a maximum size of 2½ in. and delivers the crushed material to the same equipment that conveys the screenings to the washer. It will thus be seen that the washer not only handles and cleans the screenings, but recovers combustible material as well from the bone picked from the tables. The picked egg coal is delivered by the table to a conveyor leading to the final shipping bin. The lump coal is also delivered to this conveyor, but is first crushed to a maximum size of 5 in. by a Jeffrey single-roll crusher.

The tipple is equipped with local trade facilities so that miners and the townspeople may always have a supply of cleaned coal available. This coal, when required, is conveyed from either lump or egg picking table to a bin in the tipple, from which it is drawn out into wagons.

The operation of the coal washer proper is as follows: The screenings, together with the crushed bone, is conveyed to a large storage bin in the plant, from which it is fed out uniformly by means of reciprocating feeders into three Stewart jigs. These jigs remove the slate, rock and heavy bone and deliver the clean, washed product directly to the screening and drying apparatus. The refuse or reject material is elevated and either discharged into a refuse conveyor leading to the rock bin in the tipple above referred to, or into an Elmore type of rewashing jig. When this latter jig is employed, the recovered bone from the refuse is delivered into the stream of washed coal and water from the Stewart jigs and the final refuse into the conveyor leading to the rock bin in the tipple.

The jigs and washing apparatus are contained in a well lighted and comfortable room set aside in the plant for the purpose, and all equipment is readily accessible and adjustable.

Economical Water-Circulating System

The water-circulating system is that commonly employed in Stewart-type washers and is quite economical in fresh-water requirements. The circulation of the main volume of water is continuous. The water overflows the jigs with the washed coal into a sluice leading to a settling tank. The water in turn overflows the settling tank into a pump tank, from which it is pumped at the rate of 3000 gal. per minute into a supply tank immediately in rear of the jigs. Water flows from this latter tank periodically into the jigs and jig tanks and thence, as first described, into the washed coal sluice with the clean coal. The only fresh water required to renew loss is that actually absorbed by the washed coal and refuse in the washing process.

The method employed in drying the coal and preparing it for shipment is unique. It is desirable that washed coal be freed entirely from surplus moisture at all times and that in the severe winter weather it be thoroughly dried to prevent freezing. The process adopted is as follows: Washed coal and water flows from the jigs first to a revolving screen with a jacket having ¾-in. perforations. The fine coal, together with the water from this screen, is sluiced to a large settling tank wherein the coal has an opportunity to settle. It

is then elevated from this tank and delivered to a centrifugal dryer. This machine operates at a high speed, and the coal is freed entirely of surplus moisture by centrifugal force. This dried coal, together with the oversize or pea coal from the revolving screen, is collected in a suitable hopper and elevated to the shipping bin. At the top of the shipping bin chutes are so arranged that crushed lump, egg and washed screenings are thoroughly mixed in the original proportions as mined, minus the rock and bone which have been rejected by the cleaning process. This assures a superior railroad fuel and for most months of the year a sufficiently dry product.

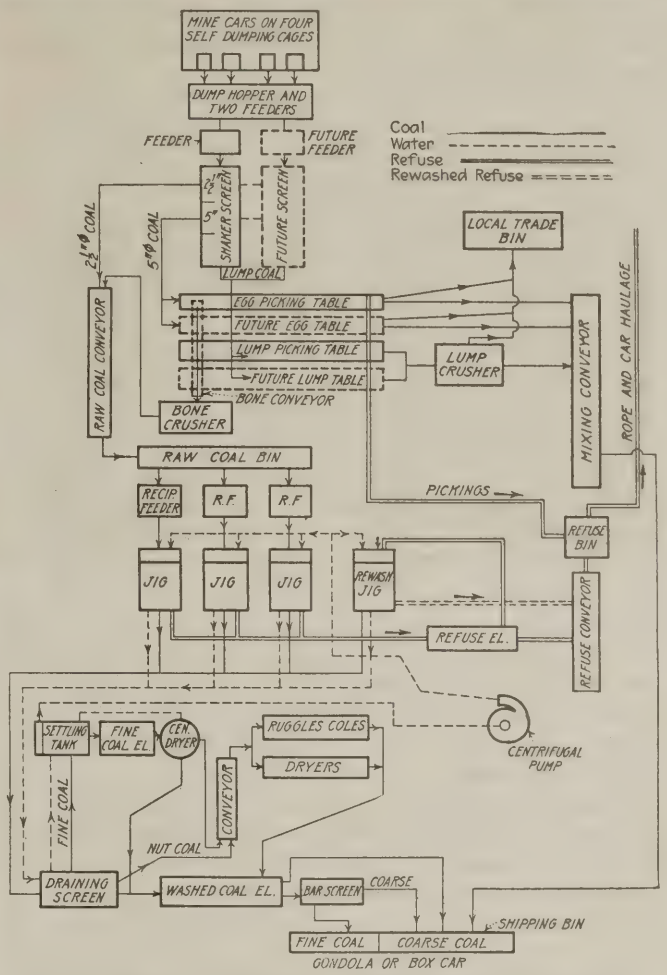
In extreme weather the pea size from the revolving screen, together with coal from the centrifugal dryer, is collected in a conveyor and delivered to two large Ruggles-Coles furnace dryers. These machines through the proper employment of heat thoroughly dry the coal and return it to the plant even dryer than that originally mined. After leaving the Ruggles-Coles dryers the coal is delivered to the elevator described above, and elevated to the shipping bin. It will be noted that use of the Ruggles-Coles drying system is entirely optional, depending wholly on weather and shipping conditions.

The washed coal is all ordinarily mixed with the cleaned egg and crushed lump, but at times it is desirable to ship some washed slack. A large bin adjacent to the shipping bin was built to contain this slack, which is obtained by discharging washed coal over a bar screen located above the bin.

The cleaned product is ordinarily loaded out from the shipping bin into gondola cars, but a box-car loader is installed which permits occasional loading of box cars.

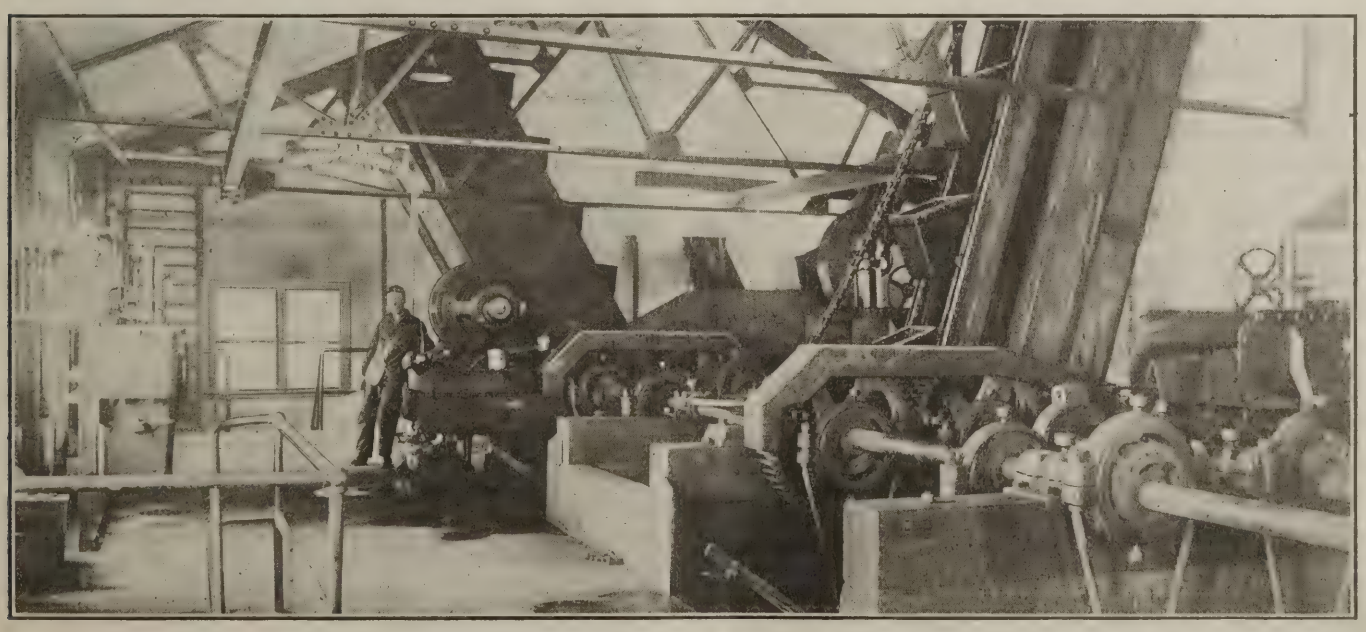
As previously mentioned, rock as picked from the tables in the tipple is discharged through chutes into a rock bin. This bin also receives the refuse material such as rock, heavy bone and sulphur rejected by the washer. This waste product is all deposited in a large valley about a quarter of a mile from the plant. A rope haulage and large car transports the refuse to the edge of the valley, from which point the material is distributed by an aërial tramway system.

It will be noticed from the illustrations that the entire plant is fireproof and of permanent construction. All tanks and equipment supports are concrete and all other structures of steel. Housing consists of corrugated



FLOW SHEET, SHOWING OPERATION OF WASHERY

metal on outside and asbestos mill board on the inside surfaces. All equipment is electrically operated and all units of the plant are carefully arranged with a view to economy in design and easy accessibility.



PART VIEW OF THE INTERIOR OF THE WASHERY BUILDING, SHOWING CONVEYING MACHINERY

Fusibility of West Virginia Coal Ash*

By WALTER A. SELVIG

Chemical Laboratory, U. S. Bureau of Mines, Pittsburgh, Penn.

SYNOPSIS—*Method of preparing ash for fusion tests and determining initial softening temperature and interval of fusion. A tabulation of tests on West Virginia coals is included.*

INFORMATION concerning the fusibility of coal ash has become of considerable interest to the consumer of coal during the last few years, principally in connection with the troublesome formation of clinker which results from the melting of the ash constituents of the coal when subjected to heat.

The growing interest for such data has led the Bureau of Mines to make a general survey of the "fusing" or "softening" temperatures of the ash from well known American coals. It is hoped that this information when used together with the large number of coal analyses made available by the publications of the Bureau of Mines[1] will be of help to the consumer of coal in comparing the different coals and in the selection of the coal best adapted for his purpose.

This paper gives the results obtained for West Virginia coals, among which are found some of the purest fuels of the country.

The method employed for the fusibility tests was the standard gas furnace method[2] of the bureau. In order better to interpret the results given in the table of fusibility this method is briefly summarized here.

Preparation of Cones

The coal samples are ground to 60 mesh, with crusher, rolls and ball mill. This 60-mesh material is then placed in shallow fireclay roasting dishes and completely ashed in a muffle furnace at a temperature of 800 deg. C. to 900 deg. C.

The resulting ash is ground in an agate mortar to pass a 200-mesh sieve. To make sure that the coal has been completely ashed, the ash after grinding is placed in fused silica capsules and ignited at 800 deg. C. for two hours, a current of oxygen gas passing through the furnace during the ignition period. This ignition is made to insure complete and uniform oxidation of the ash.

A portion of the ash is transferred to an agate mortar, moistened with a 10 per cent. dextrin solution and worked into a plastic mass with a spatula. The ash is then molded into solid triangular pyramids ¾ inch high and ¼ inch wide at the side of the base. These cones are removed from the brass cone mold, dried and mounted in a vertical position in a refractory base made up of a mixture of two parts of kaolin to one part of calcined alumina. Usually five cones are mounted in the same base. The base with the cones is dried carefully over the hot plate until all water is driven off, then the dextrin is burned out of the cones by igniting the mounted cones in a muffle furnace at a dull red heat, after which the cones are ready for use.

Description and Operation of Furnace

The furnace used was the No. 3 melter's furnace (Fig. 1) of the American Gas Furnace Co., natural gas and air pressure of from 2 to 3 pounds to the square inch being used. The cones, supported by a suitable mounting, are placed within a covered fire-clay crucible in the furnace. A 2-in. hole is drilled through the furnace jacket and fire-clay crucible for observation purposes, a fused silica tube carrying a thin glass window being placed in the observation hole. At right angles to the observation hole a ¼-in. hole is drilled through the furnace and crucible. Through this hole a platinum-rhodium thermo-couple, protected by a glazed porcelain tube, is inserted. By proper adjustment of the gas and air a reducing atmosphere is maintained within the furnace, this being accomplished by using the minimum amount of air necessary to attain the desired temperature. Under these conditions, the iron in the ash is

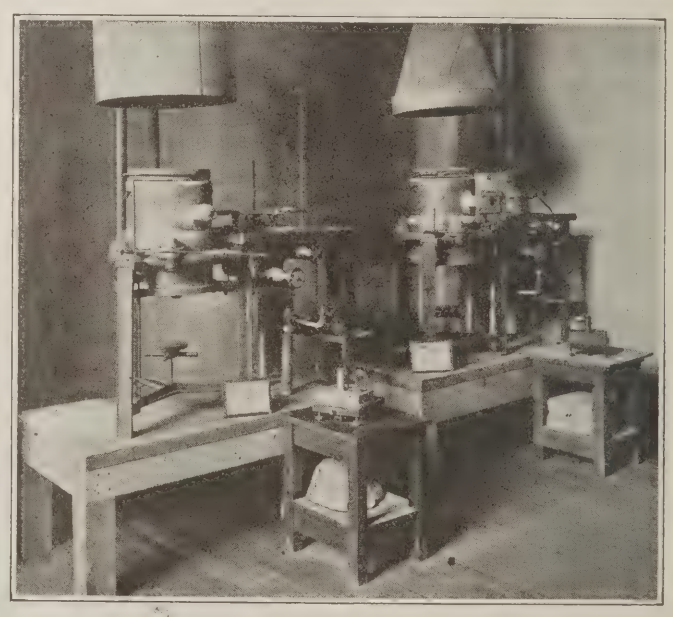


FIG. 1. NO. 3 MELTER'S FURNACE AND ACCESSORIES

reduced to the ferrous state, which condition gives the lowest melting points and therefore gives the lowest temperature at which clinkering may result. The temperature is gradually increased to 800 deg. C., when the rate is slowed down to not less than 5 deg. C. nor more than 10 deg. C. per minute, this rate being maintained until the end of the test, when a maximum temperature of 1500 deg. C., or 2732 deg. F., is attained.

In some instances with coal ash of an especially refractory nature the cones which did not fuse at the

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[1]Lord, N. W., and others: Analyses of coals in the United States, with descriptions of mine and field samples collected between July 1, 1904, and June 30, 1910: Bull. 22, Bureau of Mines, 1913, 1200 pp. (In two parts.)
Fieldner, A. C., and others: Analyses of mine and car samples collected in the fiscal years 1911 to 1913: Bull. 85, Bureau of Mines, 1914, 444 pp.
Fieldner, A. C., and others: Analyses of mine and car samples collected in the fiscal years 1913 to 1916: Bull. 123, Bureau of Mines, 1917, 456 pp.

[2]For detailed description of this method and discussion of the influence of various factors on the fusibility of coal ash see Fieldner, A. C.; Hall, A. E., and Feild, A. L.: The fusibility of coal ash: Bull. 129, Bureau of Mines, 1918. 146 pp. (In press.)

highest temperature attained in the gas furnace, were further heated in a molybdenum wire resistance furnace[3] in an atmosphere of hydrogen gas. Under these conditions temperatures as high as 3010 deg. F. and in some instances slightly higher were attained. However, a coal whose ash fuses above 2730 deg. F. should give very little trouble due to clinker formation.

The temperature readings taken were:

(1) *The initial deformation temperature.* The temperature at which the first rounding or bending of the apex of the cone takes place as shown in cone 1 of Fig. 2.

(2) *The softening temperature.* The temperature at which the cone has fused down to a spherical lump as shown in cones 2 and 3 of Fig. 2.

Only the average softening temperature is reported, together with the softening interval, which is the difference in degrees between the softening temperature and the initial deformation temperature.

Interpretation of Fusibility Table

According to the West Virginia Geological Survey there are 102 known coal beds in West Virginia, of which 52 are minable. The table contains samples representing nearly one-half of these minable beds, those listed being among the most important in the state.

The various beds are arranged according to their geological succession, from information supplied by courtesy of the West Virginia Geological Survey together with information taken from the Keystone Coal Catalog,[4] the uppermost coal beds being listed first.

It will be noted that the uppermost series given is the Monongahela series, there being no samples representing the overlying Dunkard series, which top out the highest beds in the Appalachian field; however, these coals are of very little commercial importance at the present time.

The results for each mine show the lowest softening temperature, the highest softening temperature and the average for the mine. The softening interval is tabulated in the same manner. In addition to these values the per cent ash and sulphur, on the dry coal basis, is given.

The average values given for each bed provide a means of comparison of the different coals; however, of course, the average values are averages of the mines which are listed under each bed, consequently the greater the number of mines sampled the more representative the values are of the bed. In some instances only a few mines are listed under the bed. In these cases the average values given are only representative of the mines sampled, and do not constitute a fair average of the bed. Beds such as the Pittsburgh, Sewell, Beckley and Pocahontas No. 3, from which a large number of samples have been tested and the softening temperature values for the various mines are uniform, the average values given may be taken as representative of the bed.

It will be noted that the softening interval values given in the table vary to a considerable extent. These values, as already explained, give the number of degrees interval between the temperature at which the tip of the cone fuses or bends and the temperature at which the cone has fused down to a spherical lump, which temperature is recorded as the softening temperature. The point at which the tip first fuses or bends is rather difficult to obtain exactly on account of the phenomena of warping and shrinking of the cones which sometimes result when the cones are subjected to heat. The softening interval is interesting mainly as a study of the viscosity of the melting ash. The softening temperature values given are the values which are used in comparing the different coals. This is the most definite and easiest point to check in the tests.

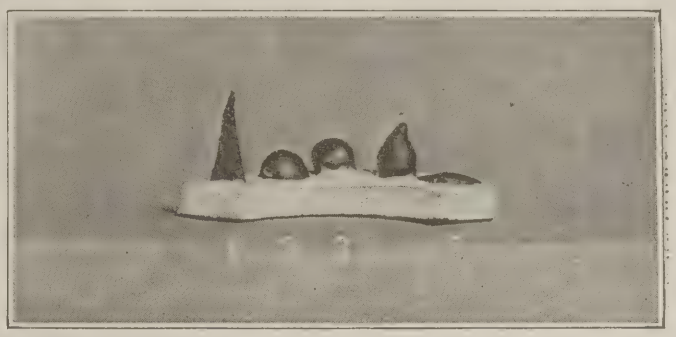


FIG. 2. TYPICAL FORMS OF CONES FUSED IN THE NO. 3 MELTER'S FURNACE

Under the Monongahela series the Sewickley, Redstone and Pittsburgh beds are listed. Not sufficient mines are represented to give representative average values for the Sewickley and Redstone beds. The Pittsburgh bed, which is the most important coal bed in the northern part of West Virginia and contains one of the most valuable fuels of the country, is fairly well represented. This bed varies considerably as to sulphur content in different regions. It will be noted, however, that the softening temperatures as given are fairly uniform, but are lower than many of the other beds listed.

Discussion of Coal Beds Tested

The mines listed under the Conemaugh series are all coal banks from the Mahoning bed, which is of no commercial value but is mined for local use. The average softening temperature from these coal banks is practically the same as that of the Pittsburgh bed.

In the Allegheny series the lower Kittanning or No. 5 Block bed is a very important coal. This bed varies from a high volatile coal in the southwestern half of the state through an ordinary bituminous type of coal in Randolph and Barbour counties to a semi-bituminous coal in the North Potomac basin.[5] As might be expected from a coal varying so much in composition, the values given for this bed vary over a wide range, but no doubt the mines listed give representative values for their immediate districts.

The coals listed under the Kanawha group of the Pottsville series are coals giving ash having a uniformly high fusing temperature. The No. 2 Gas is the most important and valuable bed of this group and is widely known commercially. This bed as well as others of this group contains coals giving ash having a high fusing temperature.

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[3] Fieldner, A. C., and Feild, A. L.: "A New Method and Furnace for the Determination of the Softening Temperature of Coal Ash Under Fuel-Bed Conditions," *Journal of Industrial and Engineering Chemistry*, Vol. 7, No. 10, 1915, pp. 829-835.

[4] "The Coal Catalog, Combined with Coal Field Directory," for the year 1918, Keystone Consolidated Publishing Co., Pittsburgh, Penn., pp. 579-588.

[5] (a) West Virginia Geological Survey, Bull. II, "Levels and Coal Analyses," 1911, p. 296.

TABLE OF SOFTENING TEMPERATURE OF COAL ASH FROM WEST VIRGINIA COALS

Locality, Bed, Etc.	Number of Samples from Mine	Softening Temperature, Deg. F.			Softening Interval, Deg. F.			Average Analysis of Dry Coal, Percentage of	
		Lowest	Highest	Average	Lowest	Highest	Average	Ash	Sulphur
1	2	3	4	5	6	7	8	9	10
MONONGAHELA SERIES									
Sewickley (Mapletown) Bed									
County — Town — Mine									
Marion — Montana Station — Parker Run	5	2050	2120	2080	50	110	80	9.61	3.99
Redstone Bed									
Harrison — Lost Creek — Calif	4	2000	2140	2060	70	220	120	8.08	2.24
Harrison — Lost Creek — Righter No. 1	5	2030	2370	2180	70	360	170	6.07	1.66
Average Redstone Bed	9	....	....	2120	....	....	150	6.96	1.92
Pittsburgh Bed									
Braxton — Braxton — Braxton	1	....	....	2090	....	....	60	8.93	3.50
Brooke — Colliers — Lewis Finley No. 1	2	2070	2600	2340	110	180	150	6.28	1.75
Marion — Chiefton — Consolidation No. 47	6	2040	2170	2090	30	200	100	7.41	2.97
Marion — Fairmont — Consolidation No. 38	3	2100	2150	2130	100	190	140	6.97	2.29
Marion — Farmington — Consolidation No. 87	4	2010	2330	2230	30	70	50	6.61	1.23
Marion — Hutchinson — Consolidation No. 84	6	2010	2310	2230	10	330	120	7.12	1.98
Marion — Monongah — Consolidation No. 43	6	2170	2350	2270	30	120	70	6.27	1.07
Marion — Monongah — Consolidation No. 63	6	2200	2330	2270	40	100	60	5.84	1.07
Marion — Watson — Consolidation No. 26	5	2000	2260	2110	10	80	40	6.65	1.87
Marion — Worthington — Consolidation No. 86	4	2240	2410	2340	20	60	40	6.15	0.80
Marion — Worthington — Hutchison	3	2070	2170	2130	40	120	80	7.70	2.25
Marshall — Benwood — Hitchman	6	1940	2000	1970	50	80	60	8.33	4.65
Marshall — Moundsville — Mound	2	2020	2130	2080	120	230	180	12.44	6.09
Marshall — Moundsville — Panama	2	2070	2090	2080	110	140	130	7.29	3.33
Putnam — Black Betsey — Black Betsey No. 3	7	1930	2370	2140	70	250	130	7.39	1.94
Average of Pittsburgh Bed	63	....	....	2170	....	....	90	7.20	2.24
CONEMAUGH SERIES									
Mahoning Bed									
Hancock — Chester — Allison Coal Bank	1	....	....	2130	....	....	90	6.94	1.88
Hancock — New Cumberland — Martin Coal Bank	1	....	....	2300	....	....	260	4.13	1.46
Hancock — New Cumberland — McNeil-Harrin Coal Bank	1	....	....	2140	....	....	120	6.13	2.15
Hancock — New Cumberland — Wern's Coal Bank	1	....	....	2080	....	....	40	5.28	2.05
Average of Mahoning Bed	4	....	....	2160	....	....	130	5.62	1.89
ALLEGHENY SERIES									
Upper Freeport Bed									
Grant — Henry — Henry or No. 22	1	....	....	2190	....	....	220	6.17	1.97
Lower Freeport Bed									
Brooke — Steubenville, O. (opp.) — LaBelle	1	....	....	2100	....	....	130	7.12	1.98
Hancock — Chester — Sprout's Coal Bank	1	....	....	2070	....	....	90	12.55	4.29
Average of Lower Freeport Bed	2	....	....	2090	....	....	110	9.84	3.14
Middle Kittanning Bed									
Hancock — Chester — Line Island Coal Bank	1	....	....	2110	....	....	110	10.93	4.06
Lower Kittanning (No. 5 Block) Bed									
Clay — Widen — Rich Run	12	2430	+3070	+2730	*80	*280	+150	7.19	0.94
Hancock — Chester — Jones Coal Bank	1	....	....	2150	....	....	90	6.15	4.64
Hancock — New Cumberland — Crescent	1	....	....	2280	....	....	220	13.65	9.20
Kanawha — Putney — Putney No. 1	5	2250	+3010	+2780	*60	*250	*+100	....	....
Preston — Corinth — Wills No. 3	1	....	....	2080	....	....	120	9.55	3.15
Preston — Kempton — Kempton or No. 42	1	....	....	2430	....	....	310	5.55	0.82
Tucker — Coketon — Coketon No. 36	1	....	....	3010	....	....	120	8.76	0.90
Average of Lower Kitanning (No. 5 Block) Bed	22	....	....	+2660	....	....	+140	7.64	1.76
POTTSVILLE SERIES—KANAWHA GROUP									
Coalburg (Buffalo Creek) Bed									
Kanawha — Ward — Kelly's Creek Colliery No. 3	6	2790	+3010	+2950	*30	*130	*80	8.75	0.75
Mingo — Chattaroy — Howard	1	....	....	3030	....	....	120	9.12	0.84
Average Coalburg (Buffalo Creek) Bed	7	....	....	+2960	....	....	80	8.80	0.76
Winifrede Bed									
Mingo — Chattaroy — Buffalo	2	3010	3010	3010	110	160	140	10.27	0.96
Mingo — Williamson — Sternberger	1	....	....	2850	....	....	250	8.10	0.68
Mingo — Williamson — Winifrede	1	....	....	3000	....	....	150	5.11	0.71
Average of Winifrede Bed	4	....	....	2970	....	....	170	8.44	0.83
Cedar Grove (Thacker) Bed									
Logan — Accoville — Island Creek	6	2520	+3010	+2690	80	*130	+100	5.82	1.28
Logan — Craneco — Lorado No. 1	5	2470	+3010	+2760	20	+160	+110	5.59	0.74
Logan — Omar — Main Island Creek No. 5	5	2390	2900	2600	40	80	140	5.62	0.88
Mingo — Chattaroy — Buffalo	1	....	....	2320	....	....	200	6.05	2.10
Mingo — Matewan — Red Jacket, Jr	1	....	....	2600	....	....	280	3.51	0.68
Mingo — Thacker — Thacker No. 3	1	....	....	2620	....	....	210	7.16	1.18
Mingo — Thacker — Thacker No. 5	1	....	....	2490	....	....	140	6.24	1.04
Mingo — Thacker — Thacker No. 9	2	2410	2460	2440	50	460	260	6.35	0.73
Mingo — Thacker — Thacker No. 11	1	....	....	2520	....	....	420	5.01	1.49
Mingo — Williamson — Winifrede	1	....	....	2390	....	....	260	8.28	1.98
Average of Cedar Grove (Thacker) Bed	24	....	....	+2610	....	....	+160	5.83	1.07
No. 2 Gas (Campbell Creek, Island Creek, Upper War Eagle) Bed									
Fayette — Longacre — Sunday Creek No. 114	6	2100	2520	2360	70	190	130	5.70	1.09
Fayette — Marting — No. 1	8	2850	+3010	+2950	70	*120	+90	6.32	0.92
Fayette — Page — Ansted	1	....	....	2430	....	....	90	6.61	1.81
Logan — Accoville — Big Eagle	7	2730	2960	2830	80	270	150	6.08	0.65
Logan — Earling — Earling No. 1	4	2850	2960	2940	70	140	110	5.10	0.71
Mingo — Merrimac — White Star	1	....	....	2540	....	....	140	3.78	0.66
Average of No. 2 Gas (Campbell Creek, Island Creek, Upper War Eagle), Bed	27	....	....	+2750	....	....	+120	5.86	0.88
Eagle (No. 1, Gas, Middle War Eagle) Bed									
Fayette — Boomer — No. 2 North	3	2900	+3010	+2940	50	*230	+150	4.40	0.77
NEW RIVER GROUP									
Sewell (Davy) Bed									
Fayette — Caperton — Sewell	5	2620	+3000	+2860	90	*360	+220	2.44	0.56
Fayette — Dun Loop — Dun Loop No. 2	4	2390	2980	2620	150	210	180	2.64	0.55
Fayette — Elverton — Elverton	4	2350	2650	2500	60	350	180	2.44	0.59

TABLE OF SOFTENING TEMPERATURE OF COAL ASH FROM WEST VIRGINIA COALS—Continued

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Softening Interval, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7	8	9	10
POTTSVILLE SERIES—NEW RIVER GROUP—Continued											
Sewell (Davy) Bed—Continued											
County	Town	Mine									
Fayette	Hawk's Nest	Mill Creek	4	2370	2730	2510	20	130	90	4.01	0.63
Fayette	Kay Moor	Kay Moor No. 1	5	2310	2930	2690	90	270	210	3.17	0.56
Fayette	Kay Moor	Kay Moor No. 2	3	2430	2640	2550	80	140	110	3.57	0.54
Fayette	Minden	Minden No. 2	3	2280	2640	2450	100	280	200	3.23	0.65
Fayette	Minden	Minden No. 3	1	....	....	2600	....	....	210	2.86	0.56
Fayette	Minden	Minden No. 4	3	2270	2710	2550	100	230	160	2.57	0.43
Fayette	Minden	Minden No. 5	4	2080	2620	2340	30	220	110	3.13	0.88
Fayette	Minden	Rock Lick No. 4	3	2370	2620	2520	50	130	100	2.43	0.45
Fayette	South Nuttal	Brown	4	2580	2830	2720	30	140	70	2.62	0.57
Fayette	Sun	Sun No. 1	5	2070	2550	2250	90	290	180	6.14	1.69
Greenbrier	Richwood	Spruce Knob	1	....	....	2960	....	....	430	6.04	0.65
McDowell	Big Sandy	Big Sandy	2	2290	2370	2330	70	170	120	3.60	0.53
McDowell	Coalwood	Nora or No. 3	4	2350	2490	2420	120	230	170	2.95	0.74
McDowell	Coalwood	Thelma or No. 6	7	2300	2650	2440	80	300	200	4.32	1.03
McDowell	Davy	Blackstone	1	....	....	2430	....	....	90	3.48	0.54
McDowell	Davy	Cletus	1	....	....	2430	....	....	60	2.67	0.51
McDowell	Davy	Helena	1	....	....	2460	....	....	80	3.18	0.58
McDowell	Marytown	Marytown	2	2520	2670	2600	80	110	100	8.95	0.75
McDowell	Roderfield	Davy or Pocahontas No. 2	3	2430	2980	2770	90	250	150	6.43	0.89
McDowell	Twin Branch	J. B. B. No. 1	1	....	....	2440	....	....	170	3.10	0.55
McDowell	Twin Branch	J. B. B. No. 2	1	....	....	3010	....	....	360	4.40	0.55
McDowell	Twin Branch	J. B. B. No. 3	1	....	....	2540	....	....	140	5.27	0.76
McDowell	Twin Branch	J. B. B. No. 4	1	....	....	2550	....	....	210	5.20	0.85
McDowell	Twin Branch	J. B. B. No. 5	2	2450	2550	2500	220	360	290	3.00	0.55
McDowell	Twin Branch	Maher or No. 4	9	2500	2730	2620	40	150	100	4.41	0.71
Raleigh	Cranberry	Cranberry	2	2460	2480	2470	130	150	140	....	....
Raleigh	Oswald	Oswald No. 3	3	2190	2590	2380	260	270	260	4.07	0.80
Raleigh	Tamroy	Tamroy	3	2540	+3010	+2850	*190	*190	*190	1.97	0.50
Randolph	Mill Creek	Tolbert and Spiker	1	....	....	+3010	....	....	....	11.43	0.52
Randolph	Spruce	Hopkins	1	....	....	+2730	....	....	....	13.85	0.99
Average of Sewell (Davy) Bed			95	....	....	+2560	....	....	+160	3.93	0.72
Welch (Tug River) Bed											
McDowell	Hemphill	Welch	5	2720	2970	2840	90	270	180	7.41	0.62
Beckley (War Creek) Bed											
McDowell	Roderfield	Davy Pocahontas No. 1	3	2520	2960	2720	60	140	100	11.31	1.82
McDowell	Susana Station	Yukon Pocahontas	4	2400	2620	2450	40	90	70	8.50	0.57
McDowell	War	John's Branch	4	2650	+3010	+2860	110	+160	+130	8.99	0.63
McDowell	War	War Creek	3	2730	2750	2740	40	80	50	8.62	0.72
Raleigh	Affinity	Affinity	7	2690	+3090	+3000	*40	*70	*60	4.19	0.56
Raleigh	Big Stick	Big Stick	11	2700	+3010	+2900	10	*220	80	4.36	0.53
Raleigh	Eccles	Eccles No. 5	5	2550	+3010	+2920	....	....	*200	6.44	0.78
Raleigh	McAlpin	McAlpin	2	2730	+3010	+2870	*240	*240	*240	2.65	0.65
Raleigh	McQuade Station	Blue Jay	3	2730	+3020	+2830	*160	*180	*170	4.38	0.75
Raleigh	Raleigh	Raleigh No. 1	2	2540	+3010	+2780	+110	+330	+220	3.49	0.67
Raleigh	Raleigh	Raleigh No. 3	5	2620	2900	2720	70	170	130	3.82	0.74
Raleigh	Slab Fork	Slab Fork No. 1	1	....	....	2580	....	....	210	2.87	0.61
Raleigh	Slab Fork	Slab Fork No. 2	8	2480	+3010	+2740	*150	*270	*180	3.69	0.50
Raleigh	Slab Fork	Slab Fork No. 3	7	2370	+3010	+2740	*120	*360	*190	4.03	0.54
Raleigh	Slab Fork	Slab Fork No. 4	1	....	....	2960	....	....	230	2.39	0.55
Raleigh	Slab Fork	Slab Fork No. 5	8	2520	+3010	+2760	*160	*320	*230	3.49	0.50
Raleigh	Tams Station	Tams	3	3010	+3010	+3010	*220	*220	*220	4.67	0.55
Raleigh	Winding Gulf	Lynwin	7	2620	+3010	+2860	*100	+*230	*+160	4.27	0.71
Raleigh	Winding Gulf	Winding Gulf No. 1	3	2730	+3020	+2920	140	*160	+150	3.05	0.47
Raleigh	Winding Gulf	Winding Gulf No. 2	2	2960	2990	2980	140	270	210	2.78	0.51
Raleigh	Wood Bay	McAlpine No. 1	8	2560	+3010	+2850	40	320	+140	3.66	0.60
Wyoming	Alpoca	Alpha	4	2120	2540	2360	210	340	270	4.45	1.05
Average Beckley (War Creek) Bed			101	....	....	+2800	....	....	+150	4.76	0.65
Fire Creek (Quinnimont) Bed											
Fayette	Layland	Layland No. 3	11	2480	2850	2660	*30	*280	*130	6.99	0.87
Fayette	Thayer	Ephraim's Creek (Buffalo)	3	2180	2580	2270	50	130	110	6.90	0.87
Fayette	Thurmand	Rock Lick No. 2	3	2210	2730	2390	100	170	140	4.90	0.68
Average Fire Creek (Quinnimont) Bed			17	....	....	2540	....	....	130	6.60	0.84
POCAHONTAS GROUP											
Pocahontas No. 6 Bed											
Mercer	Simmons	Buckeye No. 2	6	2290	2760	2400	60	190	120	2.88	0.70
Pocahontas No. 5 Bed											
McDowell	Faraday	Crockett Pressliz	1	....	....	2350	....	....	60	3.09	0.55
McDowell	Lex	Central West	2	2730	+3010	+2870	+110	+130	+120	7.80	0.65
Average Pocahontas No. 5 Bed			3	....	....	+2700	....	....	+100	6.23	0.62
Pocahontas No. 4 (Thin Vein Pocahontas) Bed											
McDowell	Big Four	Cirrus No. 2	1	....	....	2770	....	....	220	3.85	0.57
McDowell	Coalwood	No. 1	5	2100	2220	2170	50	120	70	5.29	0.67
McDowell	Coalwood	Olga	3	2030	2140	2080	50	100	80	6.43	0.77
McDowell	Huger	Middle States	6	2190	2730	2390	60	180	100	6.04	0.63
McDowell	Vivian	Carswell Shaft	3	2850	+3010	+2920	60	120	+80	6.81	0.61
McDowell	Welch	Oregon No. 2	2	+2730	+2730	+2730	....	....	....	7.52	0.53
McDowell	Welch	Oregon No. 3	3	+2730	+3010	+2900	*190	*190	*190	7.92	0.63
Average Pocahontas No. 4 (Thin Vein Pocahontas) Bed			23	....	....	+2480	....	....	+110	6.31	0.64
Pocahontas No. 3 (Pocahontas, Thick Vein) Bed											
McDowell	Algoma	Piney	7	2180	2300	2240	30	100	50	4.79	0.56
McDowell	Arlington	Arlington	3	2450	2630	2520	120	360	240	3.80	0.43
McDowell	Bear Wallow	Roanoke	4	2190	2330	2270	140	230	210	6.38	0.44
McDowell	Berwind	Berwind No. 1	3	2280	2450	2360	200	320	260	5.17	0.90
McDowell	Berwind	Berwind No. 2	3	2170	2340	2250	70	190	140	7.54	0.87
McDowell	Berwind	Berwind No. 3	3	2380	2510	2460	140	350	210	5.90	0.88
McDowell	Berwind	Berwind No. 4	2	2300	2340	2320	160	260	210	5.30	0.95
McDowell	Big Four	Cirrus No. 2	4	2200	2340	2290	60	100	80	4.56	0.63
McDowell	Cooper	Tug River	4	2320	2690	2480	90	380	200	2.90	0.46
McDowell	Crystal	Crystal No. 1	2	2590	2610	2600	120	180	150	4.30	0.53
McDowell	Crystal	Crystal No. 2	4	2410	2520	2480	150	330	270	4.50	0.64
McDowell	Crystal	Godfrey	3	2370	2580	2490	130x	180	150	3.88	0.73
McDowell	Eckman	Pulaski No. 2	16	2240	2500	2300	20	230	100	4.56	0.59
McDowell	Eckman	Pulaski No. 3	4	2170	2270	2210	20	130	60	4.31	0.63

TABLE OF SOFTENING TEMPERATURE OF COAL ASH FROM WEST VIRGINIA COALS—Continued

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Softening Interval, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7	8	9	10
POTTSVILLE SERIES—POCAHONTAS GROUP—Continued											
Pocahontas No. 3 (Pocahontas Thick Vein) Bed											
County	Town	Mine									
McDowell	Eckman	Shawnee	3	2300	2380	2330	20	90	60	5.67	0.52
McDowell	Elkhorn	Delta	1	....	....	2390	....	....	150	....	....
McDowell	Elkhorn	Houston No. 1	2	2190	2240	2220	70	110	90	4.60	0.48
McDowell	Elkhorn	Houston No. 2	3	2120	2730	2330	50	100	70	5.00	0.45
McDowell	Elk Ridge	Elk Ridge	2	2410	2430	2420	150	210	180	5.48	0.61
McDowell	Gilliam	Gilliam	4	2180	2300	2250	120	140	130	6.09	0.48
McDowell	Hartwell	Berwind No. 5	3	2190	2410	2290	110	310	190	4.17	0.83
McDowell	Havaco	Havaco	5	2190	2640	2350	50	150	90	5.66	0.74
McDowell	Havaco	Havaco No. 41	1	....	....	2240	....	....	170	8.19	0.81
McDowell	Huger	Lake Superior No. 1	6	2280	2370	2310	40	60	40	4.66	0.73
McDowell	Huger	Middle States	1	....	....	2420	....	....	90	8.78	0.85
McDowell	Jenkinjones	Pocahontas No. 6	11	2170	2390	2240	40	220	90	4.92	0.51
McDowell	Jenkinjones	Pocahontas No. 6-B	2	2220	2280	2250	20	60	40	5.68	0.48
McDowell	Jenkinjones	Pocahontas No. 7	9	2120	2490	2270	20	170	110	5.62	0.53
McDowell	Jenkinjones	Pocahontas No. 7-A	1	....	....	2450	....	....	210	4.99	0.49
McDowell	Jenkinjones	Pocahontas No. 8	9	2190	2450	2320	40	300	140	5.16	0.59
McDowell	Kimball	King	4	2160	+3010	+2420	*80	*150	*120	4.83	0.44
McDowell	Leckie	Leckie No. 1	6	2510	2830	2710	100	180	140	3.32	0.57
McDowell	Leckie	Leckie No. 2	5	2510	2790	2640	80	160	120	3.39	0.55
McDowell	Lick Branch	Delta	3	2190	2230	2210	80	140	110	4.30	0.45
McDowell	McDowell	McDowell	3	2420	2490	2450	40	290	150	3.93	0.43
McDowell	Maybeury	Norfolk	2	2690	2730	2710	120	140	130	10.33	0.55
McDowell	Newhall	Berwind No. 6	2	2540	3070	2810	220	290	260	4.90	0.63
McDowell	Newhall	Berwind No. 7	3	2520	2730	2610	110	250	190	4.27	0.63
McDowell	Newhall	Berwind No. 8	3	2520	2970	2690	90	320	190	4.43	0.65
McDowell	North Fork	Rolfe	6	2220	2640	2400	40	250	120	4.42	0.52
McDowell	Vivian	Tidewater	3	2240	2300	2270	70	180	110	5.63	0.55
McDowell	Welch	Standard Pocahontas	2	2430	2470	2450	70	100	90	7.36	0.97
McDowell	West Vivian	King No. 98	1	....	....	2280	....	....	70	4.53	0.58
Mercer	Coaldale	Coaldale	3	2300	2540	2410	140	190	160	4.07	0.70
Mercer	Goodwill	Goodwill	4	2540	2710	2620	60	130	90	3.37	0.58
Mercer	Goodwill	Louisville No. 1	1	....	....	2410	....	....	100	3.43	0.59
Mercer	Goodwill	Louisville No. 2	4	2490	2710	2640	100	160	130	3.82	0.53
Mercer	Goodwill	Louisville No. 3	1	....	....	2690	....	....	140	3.25	0.55
Mercer	McComas	Sagamore No. 1	3	2430	2600	2540	80	190	140	4.47	0.50
Mercer	McComas	Sagamore No. 2	3	2460	2520	2490	160	220	200	3.87	..43
Mercer	Matoaka	Pawama No. 1	2	2450	2580	2820	80	300	190	3.85	0.77
Mercer	Matoaka	Pawama No. 2	3	2580	2660	2620	60	80	70	4.34	0.79
Mercer	Motoaka	Thomas No. 1	5	2440	2610	2520	40	440	240	5.30	0.54
Mercer	Motoaka	Thomas No. 2	4	2650	2960	2750	80	260	170	4.95	0.52
Mercer	Mora	Crane Creek No. 1	2	2390	2620	2500	130	300	220	3.88	0.59
Mercer	Mora	Crane Creek No. 2	3	2530	2730	2600	100	360	240	4.80	0.55
Mercer	Mora	Pinnacle	5	2350	2530	2470	120	400	240	3.48	0.54
Mercer	Mora	Sagamore No. 1	3	2410	2530	2460	170	190	180	3.93	0.56
Mercer	Mora	Sagamore No. 2	4	2470	2510	2490	40	230	140	4.10	0.59
Mercer	Simmons	Booth-Bowen	3	2470	2540	2500	40	250	140	4.40	0.58
Mercer	Simmons	Buckeye No. 1	3	2370	2530	2480	40	210	140	3.40	0.60
Mercer	Springton	Modoc No. 1	4	2600	3050	2740	40	170	90	3.66	0.59
Mercer	Springton	Modoc Nos. 2 and 3	4	2510	2720	2640	50	120	80	3.67	0.57
Mercer	Weyanoke	Weyanoke No. 1	9	2450	3010	2690	80	340	190	4.40	0.59
Mercer	Weyanoke	Weyanoke No. 2	1	....	....	2570	....	....	100	4.05	0.60
Mercer	Widemouth	Piedmont	4	2690	2890	2800	60	120	80	5.73	0.52
Average Pocahontas No. 3 (Pocahontas Thick Vein) Bed			246	....	....	2440	....	....	140	4.70	0.59

NOTE—A plus sign (+) placed before a given value denotes that the true value is above that indicated. An asterisk (*) placed before a given value denotes that the values given are those actually observed; however, a temperature high enough to fuse all of the samples was not attained, therefore the true value might be either greater or less than the indicated value.

The New River group of the Pottsville series contains some of the best known coals of the country, coals having a low ash and sulphur content, also giving an ash with a high fusing temperature.

The Sewell bed, which is the most important of the New River group, is very well represented in the table. The mines tested give a very uniform fusibility of ash value, and the average value for the bed is good. This coal, which is semi-bituminous in character, is one of the famous steam-producing coals of the country and at the present time is the most extensively developed of the New River coals.

The Beckley bed, which is a very important member of the semi-bituminous coals of the New River group, shows some remarkably high fusibility values. The ash from this coal is of a specially refractory nature and this bed gives fusibility values higher than any other of the beds of West Virginia that were tested. This coal should prove of interest to consumers demanding a high grade coal giving an ash of an exceptionally high fusibility.

The last group listed and the oldest and lowermost of the West Virginia coals is the Pocahontas group, which contains the famous Pocahontas No. 3 bed of Mercer and McDowell counties. This seam produces the well known Pocahontas semi-bituminous coal, which is one of the purest coals of the country and is being used extensively as a steaming and coking coal. The average values given for this bed represent 246 samples, so they should be considered to be representative of this celebrated coal.

As is seen, the figures representing the different mines are very uniform. Although the average softening temperature of this bed is not as high as some of the others, especially the Beckley bed, it is uniformly high and little trouble should therefore be experienced because of clinkering.

Grateful acknowledgment is made to A. C. Fieldner, chemist, formerly of the Pittsburgh Station of the Bureau of Mines, under whose supervision most of the tests were made. Many of the tests were made by Messrs. A. E. Hall, V. C. Allison, C. R. Locke, C. S. Purcell, W. C. Ratliff and O. C. Brown, all of the chemical laboratory of the Bureau of Mines.

Science and Research in Coal Mining

By GEORGE W. HARRIS
Editorial Staff *Coal Age*

SCIENCE in coal mining is an old expression with a new significance. Research work along technical lines has been encouraged and fostered by the Consolidation Coal Co. for years. Consulting Engineer Frank Haas has been guiding the company's able assistants of the laboratory and engineering forces in their efforts to develop something practical. No expense has been spared, and it was mainly through the patient coöperation of these technical workers in the field of science that such satisfactory results have been achieved—of practical benefit to operator and miner alike. Notable among these achievements is the application of gas analysis to the scientific control of mine ventilation; the idea of the gas test being the immediate safety of the miner and the mines.



LABORATORY OF CONSOLIDATION COAL CO. AT FAIRMONT, W. VA.

This method of gas control is peculiar to the Consolidation Coal Co., and the same system is in vogue in all the fields in which coal is mined by this company. Conceived by Mr. Haas, the method has been fostered by him for many years; all field and laboratory reports on gas and ventilation details are submitted to him, and his judgment dictates the policy of the company in such matters. The ventilation problems differ somewhat in the various fields. For example, the situation in the Fairmont-Clarksburg region of West Virginia is the most critical, as here gas is met with in appreciable quantities—methane or firedamp especially being present in some sections. The numerous natural gas wells throughout this field also tend to complicate matters materially. On the other hand, in the Georges Creek region in Maryland, blackdamp and mine fires claim especial attention.

The Consolidation mines are classified, as regards the gas test, into three groups. Those that yield no gas, moderate gas producers, and mines that make more than an average amount of gas. A regular force of men is detailed to collect samples of gas in the mines and to look after the ventilation. Such men also act as a first-aid corps and as fire fighters; they are thoroughly experienced in the use of oxygen apparatus and so on. However, it is only occasionally that they are called upon for fire or first-aid service. Nevertheless, at least five men are always immediately available should the occasion come up for their use. All Consolidation mines are tested once a month; those of the second or medium class once a week, and mines which produce more than an average amount of gas are tested daily.

The field gas-testing forces report to Mr. Haas daily, so that no critical situation fails to be brought quickly to his attention and his judgment is final in all such matters. The field forces have no authority in themselves, but tney are independent of the operating department. However, being on the ground they naturally confer with local officials. When changes in ventilation are necessary they are promptly made. There is practically always sufficient coöperation between the two departments so that there is no difficulty to get the results desired. If at any time a conflict of opinion should occur, the matter is settled by a higher authority—Mr. Haas or a division manager. There is no friction. The percentage of gas is kept strictly to less than five-tenths of one per cent., and quick action is secured in critical cases. Also 100 per cent. humidity is aimed at to keep down the dust in the mines.

The corps taking gas samples are entirely separate from the ordinary inspection and safety men. Each man on the corps is made capable of handling the ventilation proposition in the field; each man is equally responsible, but naturally the oldest man in the service takes the lead. Corps are interchanged from time to time in each division. Also men are brought from other divisions for a limited time so that they may learn something about conditions different from those encountered in their own field. The result of this system is the decidedly lessened tendency to explosions and fires.

A person traveling about any of the fields in which the Consolidation operates can hardly fail to notice men going from mine to mine with their copper cans. Often about a dozen cans are carried at a time. Each can holds something over a quart or a sufficient amount of gas for two or three analyses. On reaching a mine the cans are filled with water, and when a sample of mine air is to be taken the stopcock at each end of the can is opened—as the water runs out of one end the air enters the other. At this time the can is not necessarily placed in any special part of an entry—usually where a man would naturally hold it. Ordinarily the sample is taken in the moving air where the mixture is complete. When gob gases are to be tested it is a different matter, and the sample of air is taken close to the gob where there may be little or no ventilation.

In addition to the samples of gas considerable other information is obtained by the gas inspectors on their daily rounds, which is entered on the gas report. Continuous barometric readings have been taken by the Consolidation company for the last 15 years, and it has not been noticed that changes in barometer have an appreciable effect on the flow of gas in their mines. This is a matter about which doctors disagree. The evidence on this point by a company which operates a large number of mines in the four principal fields of the Appalachian coal basin is valuable. Furthermore, the observations cover a long period of time.

One of the large anthracite coal companies in Penn-

sylvania gives contrary evidence. This latter company notes carefully every change in the barometer at its main office. On a decided drop in barometric pressure, warnings are at once sent to all the company's mine foremen notifying them of the fact. Thus warned they watch for danger signs in their mine air. It is a matter of record with this anthracite company that practically all their mine explosions, for the time under observation, have occurred during falling barometer or at times of low barometric pressure. It may easily be that these apparently diverse opinions may not be antagonistic in the face of more complete details covering each case. The matter is considerably more than technically interesting, for it has an important practical bearing on mine operation. The Consolidation company takes the readings of an instrument on the top of its office building in Fairmont and assumes this barometric pressure to be correct for the whole Fairmont-Clarksburg field. This matter was investigated for several years before the plan noted was adopted.

By referring to the accompanying reproduction of the gas report sheet used by this company, it readily will be seen what information the gas inspection corps must secure. On this report illustrated, a cross (X) indicates information which must be obtained in the field; from these data the "Dew Point," "Relative Humidity" and "Gal. (of moisture) per 1000 C.F." (cu.ft.) are calculated in the office; the percentages of CO_2 (carbon dioxide) and CH_4 (methane) are determined in the laboratory. In further explanation of the report it should be added that gas samples are taken on the main intake and return; this gives the condition of the air for all splits collectively. In addition a sample is taken on the intake and return of each split; these samples are taken close to the main entries. Thus the exact condition of each portion of the mine is determined.

THE CONSOLIDATION COAL COMPANY, INC.

GAS REPORT

Mine.....x.....

Weather....x.... Temp.....x..... Humidity.....x..... Bar.....x..... Fan. W. G ....x..... Date .....x.....

Location	Time	Split	Area	Vel.	Cu.Ft.	Dry Bulb	Wet Bulb	Dew Point	Relative Humidity	Gal. per 1,000 C. F.	Per Cent. CO_2	Per Cent. CH_4	Lab. No.
Intake	x	Main.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Return	x	Main.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Intake..	x	First split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Return	x	First split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Intake	x	Second split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Return	x	Second split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Intake	x	Third split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x
Return	x	Third split.....	x	x	x	x	x	Calculated	Calculated	Calculated	From analysis	From analysis	x

Ascertain and Note:—Speed of fan (r.p.m.) blowing or exhausting; putting steam into air or not; mine working or idle; total volume air entering mine and exhausting from mine; volume of CH_4 (methane) produced in 24 hours.

In the matter of temperatures, the outside temperature is taken before entering the mine and again on coming out. The main intake temperature and bulb readings are taken just inside the point where the air is humidified by exhaust steam (within 150 to 200 ft. inside) or at any point on the main intake between the point noted and the first split on the main headings. Suspended moisture is not indicated by the bulb.

In the laboratory two samples are taken from each can and the gas is analyzed by the Hesse method—a titration process which gives result within $\frac{1}{100}$ of one per cent. One of the gas samples taken is analyzed for CO_2 and the other one for CH_4. When a complete analysis of gas is desired, the Burrell apparatus is used. This latter method is employed in the case of special investigations and gives results for CO_2, O, CO, H, CH_4 C_2H_6 and heavy hydrocarbons. In its investigations, this company reports that it has never found any hydrogen in the mine air of its operations. The special investigations in which the Burrell method is used include analyses of gas in the case of mine fires, gob trouble, gas feeders, and so on. In the case of a mine fire, the mine is sealed off and pipes are placed in the stoppings so that samples of gas can be taken at intervals for analysis. The analyses of such samples show the condition of the mine air in the isolated section and are a reasonably safe indication of what is happening in the fire area. As long as any oxygen is found in the air, combustion can be supported and it would not be safe ordinarily to assume that the fire had died out.

In connection with mine fires and gas analysis there would seem to be a particularly profitable field in Illinois for the safety method employed by the Consolidation. In portions of this state the mines are quite gaseous and the coal contains more or less sulphur. Added to these conditions is the customary practice in many sections of not robbing any pillars. In mines where unsystematic or loose methods of mining are in vogue there have been many squeezes and much loss of coal. These are ideal conditions for just what has happened in many instances—gob fires. From this start, pillars have been fired and oftentimes serious loss of time and money have occurred before the mine could again resume operations. These conditions have been so familiar throughout many portions of the state as to breed contempt in some cases. It would seem that the larger companies at least in Illinois could to advantage adopt a system of gas analysis and inspection, which would practically insure their mines against ordinary fires. If a gob fire is taken in hand in its early stages little trouble should be experienced. Many of the mines in this territory are dry. Gob fires, dust and gas furnish ideal conditions for trouble.

In the Consolidation practice the complete gas reports are regularly handed to Mr. Haas, who thus keeps in close touch with ventilation conditions throughout the mines of his company. The ventilation is changed in individual mines from time to time as the tests of air are interpreted to show this necessity. The rate of flow of gas may increase or decrease in various parts of a mine or in the mine as a whole.

About the first of October a change from wet to dry condition of the mines generally occurs in West Virginia. As the temperature of the atmosphere de-

creases less moisture is carried into the mines and the dust tends to dry out. Now is the time to use extra precaution to see that the humidity of the mine air does not drop with the temperature. Most of the dust explosions occur in the winter.

When the percentage of methane (CH_4) closely approaches five-tenths of one per cent., the gas is further diluted to render mine conditions safe. Furthermore, the mine air is kept saturated with moisture as far as practicable and the reports usually indicate a humidity of nearly 100 per cent. in the mine air. When the degree of humidity drops, more moisture is turned into the workings—either the exhaust from a fan or other engine or by means of occasional sprinkling.

This company keeps records of the flow of gas in its mines in graphical form. Curves show conditions of gas flow of mines from year to year; being platted on a small scale, daily variations are not prominent. Monthly increase or decrease is well brought out, however, and much interesting data are presented. Some workings show a rapid and regular increase of gas flow from the time shipments of coal start at a plant until considerable development has been secured. After a time the curve has less fluctuation and then settles down to a steady and uniform flow for years. A vast amount of instructive information has been accumulated by Mr. Haas on gas control and mine ventilation.

Recently the company has opened a number of new mines which are planned to be big producers. These workings seem to have tapped a particularly gassy section and their development has been watched with the greatest care. Mine maps of these workings were tacked up on the walls of an office at headquarters; they were drawn to a scale sufficiently large to show all necessary details. In the early development stage the ventilation of the workings was most critical. The gas inspectors went to each and every working face each day, following the entire air current to investigate exact conditions. The inspectors reported at night at headquarters and the information was actually placed on the mine map. The exact condition of the ventilation was shown by a thread which was carried from point to point around pins placed on the map at turns of the ventilation current. All brattice was marked and the map showed that every face was ventilated. The mine workings were extended daily from measurements of inspectors or engineers. If any face was shown ahead of ventilation the matter was investigated at once. This was done until the mine was opened up sufficiently to have conditions stabilized, after which the work was not carried out in such exact detail.

Most detail work carries with it a certain amount of drudgery, but the men on the gas corps have an unusual opportunity. They must have both technical and practical experience on this work. Often they are practical men trained in the technical line of their work by the head of the department. These men go to all parts of the company's mines in a region and at intervals they are sent to the plants of other divisions. Thus they have fine opportunities to become thoroughly acquainted with ventilation, methods of mining, conditions of seam occurrence and the thousand and one details connected with coal mining. An ambitious fellow would have every opportunity to satisfy his desire for information along coal lines.

After following the details of this system of gas analysis and control, it would be amiss not to enlarge on some of the other and more or less related activities of the Consolidation laboratory. The same guiding hand has to do with all such interests; in the laboratory, Mr. Haas is assisted by W. D. Barrington, assistant engineer of tests.

The chemistry and physics of coal are most important adjuncts of the field of mining. An interesting description of the laboratory of the Consolidation Coal Co. appeared on page 235 of the Aug. 11, 1917, issue of *Coal Age*. As the organization of this establishment was perfected its activities broadened. Here all materials and supplies purchased are analyzed and a great deal of other work is done. Coal is tested frequently enough to keep track of all changes and conditions of seam in the mines. In this way the company maintains a high standard of preparation of all coal shipped. Government regulation of coal distribution is supreme; each shipper disposes of his product to points designated, different grades of coal being diverted to the trade best served by coal of certain characteristics. The Consolidation sometimes takes the initiative in such matters, being guided by its complete knowledge of coal leaving its mines—a discretion concurred in by the authorities.

Considerable bacteriological work is done in this laboratory on the water being used for drinking and domestic purposes, as well as a complete chemical analysis of water in connection with boiler feed-water supplies. The drinking water is given especial attention; its use is stopped at once when it is found to be unfit for such purposes. The wells are cleaned out and sterilized with a chloride of lime treatment. Immediately after cleaning, another sample of the water is taken for bacteriological analysis and results determined before the people are permitted to use the water again.

The laboratory at Fairmont is not duplicated in the other regions, but each division of this company has a laboratory equipped to handle minor analyses of gas. Delay in receiving the results of gas analysis for ventilation control would rob the system of most of its benefits. The main laboratory is equipped to carry out complete analytical work on coal and also to make calorimeter tests for heating value. The company able to run a laboratory of this kind is fortunate indeed. In addition to the routine work of an establishment of this kind, there is opportunity for considerable original research. All of this information is valuable to a company beyond the interest on the investment the establishment represents and the money paid out in salaries to employees and for materials used. The moral effect on the progressive foremen and others connected with the company should act as an incentive to further effort along technical lines. If some of the information obtained was presented in a popular way, it might incite an interest among the motor and machine runners and many others to improve themselves in scientific matters.

The greatest deposit of lignite known in the United States lies in Texas. A strip of territory from 50 to 100 miles wide and over 500 miles long runs diagonally across the eastern section of the state. Under this area there has been estimated to lie about 30 billion tons of lignite.

New Apparatus and Equipment

New Electric Safety Lamp Possesses Many Valuable Improvements

The Koehler Manufacturing Co., of Marlboro, Mass., will shortly place upon the market a new type of miner's lamp, named after its inventor the "Wheat" electric lamp. This lamp differs in many details from preceding lamps of this general type. It is designed for use in gaseous mines, powder magazines, gas or oil vapors, and in fact wherever explosive mixtures of gas or dust and air may occur. Furthermore, since the material of which the lamp is made is chemically inert, it is also an excellent illuminant for use around salty or sulphurous waters, in acid vapors or other places where corrosive atmospheres are encountered. Under such conditions these lamps, because of their non-corrodibility, retain their appearance and perform their intended functions indefinitely without the use of paint.

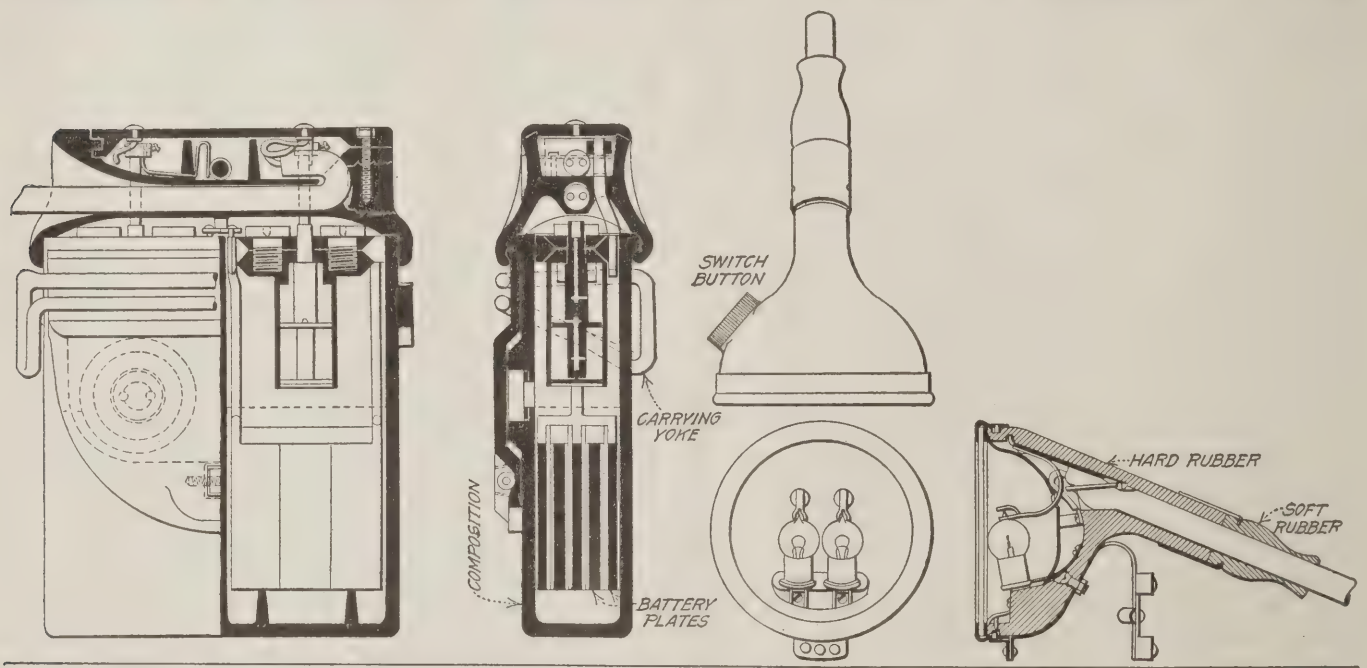


FIG. 1. BATTERY AND HEADPIECE OF THE WHEAT ELECTRIC SAFETY LAMP

The battery, which is of the lead-acid type and of rugged construction, is composed of two cells. These are placed in a hard rubber composition container of heavy construction and held in place by a soft compressible rubber gasket. The electrolyte is of course suitably gas-vented, but as may be seen in Fig. 1 the arrangement is such that no liquid, even under extreme circumstances, can escape. Turning the battery upside down and violently shaking for some time will not permit so much as one drop to leave the container.

Electrical connections to the cap cable are made in the upper portion of the battery case. This portion may be separated from the lower portion, but its removal requires the use of a special key spanner. The storage battery consists of two cells each having two positive and three negative plates. The rated capacity is 6 amp.-hr., but in practice it considerably exceeds this rating.

The conductor connecting the battery and cap lamp proper is of a twisted or spiral cable type properly insulated and covered. In this construction short-bending or kinking of the cable is not injurious. The cable leaves the battery, as may be seen in the cross-section, through a coned opening. It is so securely anchored in the battery that the battery may be safely handled by means of the cable. The cable may be grasped at any point in its length and the battery case shaken violently without injury to anything. The cap lamp might of course be treated in like manner, but being lighter the actual stress upon the cable would be much less.

The cap lamp or hemispherical reflector contains two lamp bulbs instead of one, as is usually the case. A suitable switch permits turning the current upon either bulb (but not both simultaneously) at will. Thus should one filament burn out or one bulb break, current may be immediately switched to the other. The possibility of the miner being left in darkness or of two men being compelled to make a long trip to the lamphouse to renew one bulb is thus obviated.

The two lamp bulbs in the cap piece are each held in place between two springs, one clasping the base while the other bears upon the upper end of the bulb. Should either bulb at any time be fractured regardless of whether the lamp is burning or not, these springs instantly flip the bulb or what remains of it out of place, breaking the electrical contact. This is a safety feature of no small importance.

The cap piece is inspected at the charging station and the lamps tested by turning the switch button that lights them in succession The case is sealed with a small lead seal bearing the lampman's or inspector's mark or initial. This seal may be readily cut should access to the interior of the case be desired, but cannot be replaced by any unauthorized person without detection. The cap piece and reflector are so designed as to spread the light rays over a 7-ft. circle at a distance of 20 in. No spots or shadows are made. The light strength is 22 lumens and the rating of the lamp and battery is 12 hours continuous burning when using a 4-volt, ½-amp. bulb. About once in two weeks it is necessary to add distilled water to the electrolyte until it reaches the level of the filling plug on the back of the battery case.



FIG. 2. BATTERY, CAP, LAMP AND BELT

One feature of this outfit that will appeal to some operators is the ease and safety with which it may be used to fire shots. The charging contacts are on the top of the battery case and almost flush with it. Connection between these terminals and the battery proper is made through an inclosed switch operated by a special key spanner. When it is desired to use the battery for shot-firing the procedure is as follows: The firing fuse wires are brought to and pressed upon the charging terminals. The special key is next inserted in the switch and turned. After a slight rotation of the switch the cap lamp goes out, while a further rotation connects the charging terminals with the battery and fires the shot or shots. A reverse rotation of the switch key first disconnects the charging terminals and then connects the battery to the cap lamp, relighting it. It is practically impossible for any person not holding a switch key as above described to manipulate the switch and fire shots in this way.

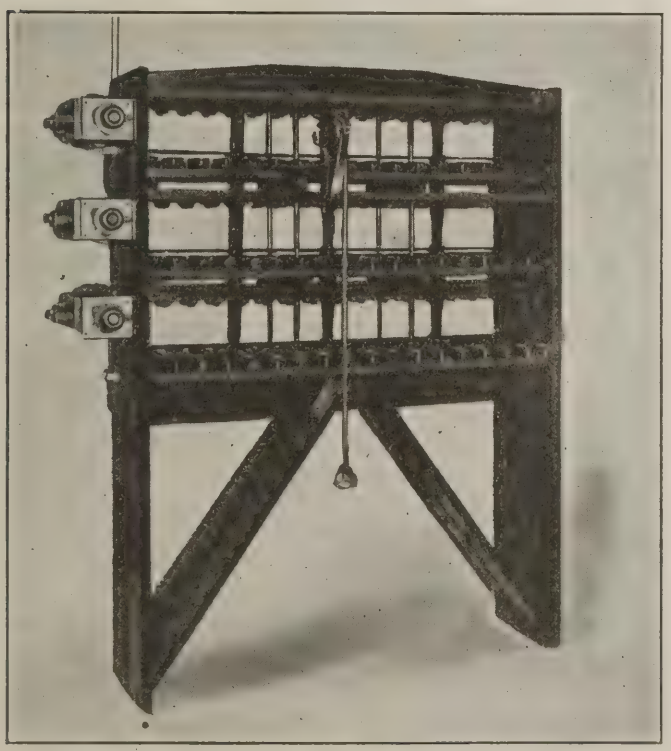


FIG. 3. CHARGING RACK FOR NEW LAMPS

This outfit is worn in the ordinary manner, the battery being carried on the belt and the cap piece fitting the lamp bracket on the ordinary miner's cap. The battery, as may be seen in Fig. 2, is attached to the belt by means of a double welded steel or aluminum rod that embraces the battery case on three sides. The weight of the battery thus comes upon the belt at two points separated by the full width of the case. The cap piece is so made as to clamp securely to the sides or edges of the lamp bracket on the cap. It can be attached readily but cannot be shaken loose.

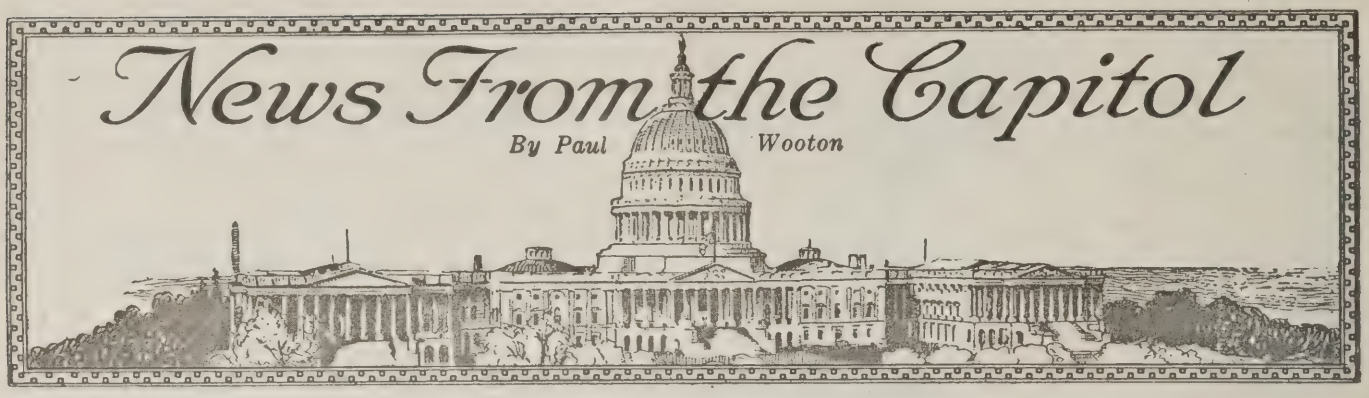
The total weight of the entire outfit is slightly over 4 lb. The battery alone weighs 3 lb. 8 oz., and the cap piece complete weighs 11 oz. This lamp is now in everyday use at a large anthracite colliery.

Moving Pictures as an Aid to the Salesman of Mine Machinery

The Manierre Engineering and Machinery Co., of Milwaukee, Wis., has introduced the "movies" into the field of salesmanship in order to help sell its coal-loading machinery. The company's salesman carries a moving-picture outfit in his hand, as the ordinary salesman does his "grip," and if he can get 15 min. of a coal operator's time he gives him an interesting movie entertainment on the spot.

The prospective buyer, if he is a large operator, with mines, docks or storage plants, in this manner can see the different varieties of loading in which he is interested at one sitting. He does not have to travel out of his office to see a machine in operation. He is saved time, trouble and much discomfort, and withal he sees more than he could if a machine were actually operating before his eyes, because the views taken of the company's loader working inside a box-car make it unnecessary for one to stick his head inside a box-car filled with fine coal dust in order to view the operations. When taking the pictures the camera was set in an open car, and the coal travels before one's eyes, in clear daylight. The views show the coal coming down the chute from the tipple, into the hopper, thence traveling the length of the belt, or steel apron. The coal is first delivered to the floor, the conveyor rising as the pile grows, backing up, and turning round as the car fills.

A moving-picture man who can show so much in a short time can interest his prospect and gain an audience, where a busy operator would otherwise be inaccessible. The "movie" show may be made to cover the company's complete line of machines—those for loading lime, gravel and other materials—as well as coal. The Manierre moving-picture salesman, it is stated, is at the service of all those interested, and it is believed that the performance is worth the careful consideration of operators who have a coal-loading problem.



Anthracite Distribution Committee Gets Excellent Results

One effect of the Senate coal investigation has been a searching probe of the affairs of the Committee on Anthracite Distribution. It has led the members of that committee to throw open the record of the entire work to all interested. As a consequence, the committee has been given a clean bill of health, not only by officials but by others who have looked into their affairs. Not only has the conduct of the committee been entirely wholesome, but the investigation of its affairs has shown that a remarkable degree of efficiency was maintained. The degree of efficiency is shown by the fact that at Christmas time not a single city in the United States reported a serious need for anthracite with the single exception of Elizabeth, N. J. Emergency supplies were rushed to that point to substitute for a delayed consignment.

Questions asked during the coal hearings inferred that as evidence that improper motives existed on the part of the anthracite committee is the fact that it paid its own office expenses for some clerk hire. The truth of the matter is that the Fuel Administration paid the salaries of some thirty of the employees attached to the anthracite committee. In view of the fact that dozens of men, with far less worldly goods than have the members of the anthracite committee, made important sacrifices to serve the Fuel Administration, the anthracite committee did not feel justified in charging the Government for office rent when they had ample office room of their own which could be used. By using members of their own office forces, a considerable portion of the clerical work at the committee's headquarters was discharged without cost to the Government, but the committee relied upon the paid employees of the Fuel Administration to conduct the work outside of the headquarters of the committee. Even a portion of that work was done by help employed by the Government.

The criticism that anthracite distribution should be conducted from the Fuel Administration's offices in Washington, as was bituminous distribution, is answered easily. The anthracite industry centers in Philadelphia. Practically all of the producers maintain offices there. All the records pertaining to distribution are easily available at that point. The thousands of orders which it was necessary to issue quickly could be given over the local telephone exchange. To have accomplished the same work in Washington, which would have necessitated a duplication of records and distribution machinery, would have cost the Government dearly. In addition, it would have led to endless trouble and confusion from the fact of its geographical position.

The fact that much of the anthracite moved in normal channels has no untoward significance. By keeping it in these channels, confusion is avoided and efficiency secured. There are hundreds of examples to prove that there was no hesitancy in making changes where it was necessary to accomplish the greatest good.

Government's Maximum Coal Prices May Be Relinquished Before End of Coal Year

Probabilities point to the abandonment of the coal-price schedule before the beginning of the next coal year. It is believed that a period should intervene so as to allow any readjustment which may take place to assert itself. Some are of the opinion that the prices may be abandoned Feb. 1, while others think that Mar. 1 will be a better time to remove the maximum prices. The price schedule, of course, means nothing in many districts, even as it is.

It may be decided to allow the zones to stand after the price schedule has been abandoned. While some are of the opinion that prices and zones are interdependent, the majority view is that they are not. The need for transportation continues great, and since the zones have been responsible for increasing the car supply by a considerable per cent., it is argued that the barriers should be kept up for some time to come.

New Zone Changes Enlarge Fields to Which Soft Coal May Be Shipped

Two new zone modification orders, permitting the further shipment of bituminous coal from parts of West Virginia, Maryland and Pennsylvania and into sections of Maryland, the District of Columbia and New England, were made public on Dec. 24 by the United States Fuel Administration.

One order, modifying Bituminous Coal Zone P-1, permits the all-rail shipment of bituminous coal on the Baltimore & Ohio, the Western Maryland and the Coal & Coke railroads in West Virginia, Maryland and Pennsylvania to all points in New England.

The other order, modifying Bituminous Coal Zone P-2, provides for the shipment of bituminous coal from all districts of Pennsylvania to Baltimore and vicinity and to the District of Columbia.

Sweden Offers Permanent Market for American Coal

A cablegram from the American consul general at Stockholm, Sweden, says that, according to a report made by the largest coal importers in Stockholm, there is an unusual market for American coal and that permanency of trade is promised.

Special Fuel Commission Returns from Tour of Investigation Abroad

The Special Commission of the United States Fuel Administration, consisting of Walter E. Hope, S. Brinckerhoff Thorne and James H. Allport, sent abroad to study fuel conditions, returned on the Cunard liner "Mauretania" on Monday of this week. The commission spent two months investigating the fuel situation in France, England and Italy, and before sailing from abroad made a report to President Wilson.

In a cablegram received by Dr. Garfield on Nov. 25 from the members of the Commission, the damage done by the Germans to the coal mines at Lens, France, was said to be so great that production cannot be resumed for periods ranging from eight months to three years.

Mr. Hope joined the Fuel Administration forces in September, 1917, as Director of the Bureau of State Organizations, and was mentioned for appointment as State Fuel Administrator of New York when Albert H. Wiggin resigned early last summer; Mr. Thorne is president of the Temple Coal Co., and of Thorne, Neale & Co.; Mr. Allport is a consulting engineer.

The members of the Commission stated upon their arrival here that before the war England had mined 287,000,000 tons of coal a year, and that last year but 230,000,000 tons of coal had been mined. The situation in France and Italy they said was serious. The members of the Commission also stated that England is releasing 5000 coal miners from the army each day so that they can return to the mines.

May Be a Market in France for Large Tonnage of American Coal

Shortage of coal throughout Europe will make it possible for the United States to have that coal market during 1919, according to information reaching the Department of Commerce. The Department's representative in Paris is authority for the following discussion of the situation in France:

The post-war position of France with respect to coal supplies may make it possible to sell American coal in France during the year 1919. However, until there is some certainty regarding ocean freight rates, it is impossible to say whether American coal can compete with English coal delivered f.o.b. French ports.

Before the war the annual consumption of coal in France was over 60,000,000 tons, of which 40,000,000 tons were produced in the country. It is estimated that the consumption of France proper during 1919 will be in the neighborhood of 55,000,000 tons. Allowance is made in this figure for the reduced consumption of coal by reason of the destruction of thousands of manufacturing plants in the north of France. To this figure should be added, however, 8,000,000 tons, which is the quantity of coal required to feed the iron, steel and textile industries of Alsace-Lorraine, now in French occupation. This makes a total estimated consumption for France of 63,000,000 tons for the year 1919, or about the same as before the war.

It is hoped that French mines during the year 1919 will produce at least 30,000,000 tons of coal. This is slightly in excess of the quantity of coal mined in the year 1917. While there may be a slightly greater production for the year, as mines in the devastated regions gradually resume operations, it must be remembered that the labor needed to mine this coal will in all probability have to be taken from mines in the center of France, with a consequent reduction in the output of that section. There is also included in this estimate of 30,000,000 tons the coal that will be obtained from that portion of the Saar Basin lying in Alsace-Lorraine. The remaining 33,000,000 tons must be imported.

France hopes that England will be in position to export hither during 1919 close to 15,000,000 tons of coal. It is also expected that approximately the same quantity of coal can be imported from Germany during the year. However, if England is not able to export this quantity of coal to France next year, and if conditions in Germany should be such that a corresponding quantity cannot be delivered to France, the French will have to look to the United States for whatever quantity is still lacking. Under the circumstances, it might be worth while for American coal exporters to look into the French situation a little in order to be in position to assist France in case of necessity.

District of Columbia Fuel Administrator Explains Coal-Storing Order

In reply to the request of the Senate for information as to the authority on which he issued his storing-coal order, the Fuel Administrator of the District of Columbia stated:

Upon the issuance of the order referred to the same was given wide publicity through the newspapers of the District of Columbia, and up to the present time there has not been called to the attention of the Fuel Administration any violation of the same by any of the retail dealers in said district. Said order was issued under the authority of the so-called "Food and Fuel Control Act," approved by the President Aug. 10, 1917, which, as I am advised, authorizes the President through the agency of the United States Fuel Administration, to fix the price of coal wherever and whenever sold either by producer or dealer, and to establish rules for the regulation of and to regulate the method of production, sale, shipment, distribution, apportionment, or storage thereof among dealers and consumers.

The order, which apparently does not meet the approval of the Senate, reads as follows:

In order to prohibit the excessive charges heretofore demanded by individuals for the storing of coal in customers' bins, it is hereby ordered by the Director for the District of Columbia, United States Fuel Administration, that on and after this date no person shall charge a sum greater than 75c. per ton for the storing of coal. All retail coal dealers are hereby directed from this day to arrange for and store all coal delivered by them to residences whenever requested by the purchaser, at a cost not to exceed 75c. per ton.

United States Coal and Coke Exports During October

An analysis of the exports of anthracite and bituminous coal and coke during October, 1918, made by the Statistical Division of the Bureau of Foreign and Domestic Commerce, will be found on the last page of the market department in this issue.

All restrictions on the sale and delivery of coke for export were removed by the Fuel Administration as of Dec. 24.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

All is not well with the union in the anthracite region. While the operators are getting reconciled to the chastening of the union the mine workers are rising in rebellion against its discipline and rebukes. Of the 170,000 men in the anthracite region, probably barely one-half are now in the union. And many that are in seem to value membership mostly for the opportunity it gives for factional fights. Membership has all the appeal and furnishes all the opportunity of the celebrated Donnybrook fair; only be it remembered times have changed since that celebrated fair was suppressed in 1855. Eloquence and the rules of debate have almost entirely replaced as modes of action physical strength and the rules of effective shillalahing.

John T. (Jack) Dempsey, of Scranton, is, as said last week, no longer district president of No. 1 District. He was charged with several undue abstentions from his duties. At the time the charge was made, he was suffering from influenza. Nevertheless, Joseph Yanis, of Pittston, the vice president, was placed in the presidential chair. The miners regarded the frequent absences of Jack Dempsey as occurring for a less well justified reason than could be furnished by the grippe.

COMPANY GRIEVANCE COMMITTEES RECOGNIZED

At last the union is recognizing the formation of company grievance committees, those *imperia in imperium* which they have long dreaded in District No. 1. The employees of a large company form themselves into a super local, and they can readily sway the affairs of a whole union district. "Divide and rule" was at one time, and in places still is, the rule of the operator. "I deal with my men unorganized," says the operator. "I deal with the locals unorganized," similarly says the union. "Divide and rule." The Delaware, Lackawanna and Western R.R. Co. Coal Department's employees have already succeeded in establishing such a company organization. Now the Delaware & Hudson Co. mine workers have formed, under the direction of the executive board, a general grievance committee which will represent all the employees of the company. The union attitude has evidently changed, or has had to change, under pressure from within the union. The new grievance-committee chairmen will doubtless often find themselves in conflict with the district presidents. But the board of District No. 1 is committed to the new order, and a campaign will be inaugurated to form such general grievance committees for all company operations.

COMPANY COMMITTEES MAY PERHAPS DO GOOD WORK

No one knows what this will portend. The grievance committee may conceivably be able to do a great deal to pacify unreasonable locals. The heads of the large grievance committees may well be men who will acquire large vision, just as the district presidents soon do. Formed in opposition to the union and to combat its rulings, they might work immense harm to its authority and influence. Formed by the union they may be immensely helpful to that organization.

A meeting, to prepare the way for the new company grievance committee, was held recently, the district executive board and representatives of 18 locals of the Delaware & Hudson Co. being present. There were only three locals that were not represented.

On Dec. 21, 2000 mine workers of the Storrs and Diamond collieries of the Delaware, Lackawanna & Western R.R., Coal Department, went on strike because their payday was not advanced so as to permit them to do their Christmas shopping sufficiently early. The men had served a notice on the company some time ago that they would not work if they were not paid on the Saturday preceding Christmas Day. When a bulletin notice was posted on Friday to the effect that payment would be made on Monday they prepared to go on strike on the day following. On Monday, Dec. 23, the men were paid according to schedule and accordingly they returned to work Dec. 24.

WEST VIRGINIA TROUBLES ARE BEING COMPOSED

Generally speaking, labor troubles are at a minimum just at the present time in West Virginia, although two strikes of a rather serious nature have just been settled or are approaching settlement. It is quite generally thought that there will be no serious disagreements before spring and there will probably be none even then. President Keeney of District 17 has repeatedly stated, both publicly and privately, that the treatment accorded officials and men of the mine workers' organization in the Fairmont region is in every way conducive to friendly relations, every consideration having been shown the miners. In that region at any rate controversies are unlikely to arise in the near future. Many meetings of miners are being held throughout the Fairmont region, but such meetings have to do with details of organization and with other matters concerning the union administration.

There are signs of growing unrest in the Illinois fields, due to the stop which was put to the miners' remarkable prosperity by the signing of the armistice. With mines in the Standard field operating only a day or two a week and those in the Mt. Olive district not doing much better and a general slackening through Central Illinois, and the Carterville district not working more than four days a week, the indications are that the miners will soon be asking another increase in wages. True, they have a joint agreement with the operators, which runs until April, but that has been broken a couple of times and may again prove to be only a scrap of paper. Cutting of prices by the operators is placing a weapon in the hands of the miners, who say that if the operators can afford to make such reductions in price they can also afford to pay more wages.

Coal production in Central Illinois was considerably curtailed recently by a street-car strike which tied up the Illinois Traction System, which traverses the field. The miners who depended upon the traction company for transportation to and from the mines were unable to get to work. But this was not the only trouble, for the traction company does a big coal-hauling business. Many of the mines in the Springfield section, particularly some of the small ones, depend entirely upon the traction company for the hauling of their output. Others are dependent upon the company for transportation of supplies necessary for operation. When the cars stopped running the mines had to close down. The strike has been settled and the line is again in operation.

ILLINOIS MINES ARE RUNNING IRREGULARLY

Independently of the traction strike, there was a marked falling off in employment at the mines in Illinois in November, caused by the influenza in mining towns, the overstocked condition of railroad coal bins, factories, stores, public institutions and residences, by the modifying of Government fuel orders and by the slump in war work.

The mine workers' election is stirring up much trouble in Illinois. John H. Walker, candidate for international president of the United Mine Workers, and Freeman Thompson, president of the Springfield subdistrict, have issued statements charging that there has been tampering with the election machinery, which tampering has gone the length, Thompson says, of stealing and altering ballots.

EDITORIALS

La Ingenieria Internacional

REALIZING the value of internationally exchanging information regarding engineering ideas and accomplishments, the McGraw-Hill Co. on Mar. 1 will begin the publication of a magazine devoted to that purpose. The publishers expect eventually to publish editions in several languages, but the first issue, being planned for circulation in Latin America and Spain, will be published in Spanish and will be known as "La Ingenieria Internacional."

The publication of this new magazine has been under consideration for some years. Its purpose is to afford a medium for the presentation of those developments in American engineering which may be of value to engineers, contractors and manufacturers in other lands. At the same time, following the practice of the present McGraw-Hill publications, a far-flung editorial organization will be developed that will draw into the paper the best of engineering practice in Latin America, in Spain and in other countries where Spanish is spoken. Aside from its performing this function, the new magazine will greatly develop international goodwill and will be a medium whereby American manufacturers engaging in export trade can carry their message to prospective buyers in foreign lands.

It may be a cause of surprise that the McGraw-Hill Co., whose specialized papers circulate so widely overseas, should establish a magazine to serve the foreign field. The reason, however, is not hard to find. The present highly specialized papers appeal only to those who are situated where engineering enterprise has made such progress that there is room for the specialist and need for the last refinement in equipment and design. But everywhere the world over are territories newly developing, where the engineer, the contractor and the manufacturer must each turn his hand to many lines. It is to serve the general practitioner so situated that the new magazine, and its later companions in other languages, will be started. The specialized papers in English will still hold their place as the recorders of the best in the advanced practice of American engineering.

Now the Tune Changes

DURING the war the call came for a large tonnage with only a few men available. Now we are seeking rather low cost and high quality. While the conflict lasted we ushered out, alas too often, the man who promised us less coal breakage and a better prepared coal. He comes back now with a stronger plea, and the promise that quality will assure the operator of steadier work.

But principally does high cost of operation perplex us. No longer are we able to say that every ton of coal, however expensive, will add to our earnings. All that is mined must be cheaply mined, and only by a generous use of machinery can that end be accomplished. We now have time to install these devices. When the stress of conflict and the daily round of work confronted us, we had no time, labor or material to build nor moments or inclination to contrive. It is different now, and like prudent captains of industry we have sensed and evaluated that difference.

The pernicious cost sheet, now again enthroned, demands hourly consideration, and its perusal sharpens our wits and makes keener than during the war our search for ways and means of reducing the unnecessary employment of labor. We cease tabulating our tonnages, and we commence again to chart our costs, for perhaps they will count as much as 90 per cent. of all considerations, toward the close of the coming year. We are already beginning to fear that a large tonnage will soon only serve to make us money by keeping down the cost per ton. Dextrous we have been in increasing output; we shall not fail when our work is the decreasing of costs and the improving of product.

States' Rights and Mining Education

ILLITERACY in the United States reaches a higher percentage figure than in any other of the great nations of the world. We pride ourselves on our school system, and on the whole we have good reason; for, averaging conditions, we have schools that will show most favorable comparison with those of any other nation. Our city schools and most of our rural schools surpass those in other countries. But there are other schools, a few of them in mining communities, that are a discredit to our high standard.

The trouble is that our schools are under local control and supported largely or wholly by local finance. The result is that the school boards are typical of the communities they represent. If those communities have no education, they desire none for their children; and if they have little literacy they are anxious to expend but little on the training and development of their youngsters.

As a result, while a cultured community readily sustains good schools, any community that is but little educated has poor schools and often, when seeking teachers, calls on the graduate scholars of these same schools, without any outside training, to take up that burden. The schools therefore tend to get less efficient rather than more efficient year by year. Nepotism is rife. The schools are filled with "the sisters, the cousins and the aunts"—to say nothing of the daughters—of the school directors.

Some improvements have arisen from state interference. In areas with arrested development, or where the educational status has even moved backward, the school management is being toned up by the action of the state boards of education. Still the progress is

slow and halting. The political control in some states is deplorable. In some others the interest of the whole state population in education is only lukewarm.

As a result we have areas of some states that are unsafe for citizens of long residence and positively dangerous, even deadly, for outside strangers such as coal operators and their agents, however honest and even helpful may be their intent. More education that will open the eyes of the people in these remote districts to the fact that matters are better handled elsewhere is badly needed. So long as the people are ignorant they will make poor mechanics and even poor laborers. They will continue to be suspicious and clannish, and their first thought will be of secret violence and not of mediation and discussion.

Not only that. So long as rural communities are content with inefficient schools for the native-born, there will be no night schools for our foreign workmen. Americanization may go ahead—in the courts—but will stand still in the hearts and the homes of the foreign-born. The foreigner will remain a foreigner, though in his hand he may hold a gaudy piece of paper—a certificate of naturalization—that will in no way direct and guide his life. It will give him the power to wreck our governmental machine; it will not prove that he possesses, nor will it grant him, the ability to run it.

The condition is made the more deplorable because the burden of better education in a mine village falls largely on the operator. If he is progressive and forces the local officials to become active and provide good schooling, he has to pay the greater part of the bill out of his dividends. It is right that he should, but it is not right that while the operator in one place pays this heavy tax the operator in another place is permitted not to do it because the people in that particular community are too ignorant to call for such an expenditure. The result of the discrimination is that the man who has good schools at his mine village is by that fact, at a period of close competition, apt to find it harder to run his mine than his neighbor finds it where adequate schools are not being built and, when built, are not being properly sustained.

No wonder that there is talk of turning the matter over to the Nation, as is the practice abroad. The Federal authorities would then have directive power. The help to the local schools would be evenly distributed, not only between operators in one state but between operators the Union over. All the mechanical aids that contribute to successful teaching could be put into every school. Films and phonographs would teach English, mining, safety, history and hygiene, and wonderful would be the results.

But there is a "nigger in the woodpile" in regard to national assistance to local education. And that "nigger" is the negro. Federal authorities will stress racial coeducation to its last consequences, while certain states will emphasize the sacred right to resist the mixing of white and black. National assistance, if given, will be predicated on a disregard of the color line. As a result the states with colored folk—the most backward of any and the most needful of help—will refuse the Federal aid. There will be no bettering of conditions where betterment is most needed.

The outcome, if Federal assistance is provided, will be that the states where education is needed most will pay for the education of those where it already is most generously supplied, and the states which already have good educational establishments will pay nothing to those that have only indifferent schools.

Federal aid is thus unlikely and perhaps undesirable. The states' desire for "self-determination" will, as often before, work to their individual disadvantage. Yet there does not seem any other solution of the problem than state control and state support of local education. All we can hope is that the states which have done badly in the past can be induced by educational propaganda to take heed to their ways and to do better hereafter, thus spreading enlightenment into the Nation's darkest corners, and lightening the financial burden resting on any individual by the fact that all must bear a like impost no matter where their operations may happen to be located.

Why Not Attack the Big Items?

NIBBLING is characteristic of mice rather than of men. When therefore you look over your cost sheet, as you may have occasion to do many times during the coming year, do not figure on the way in which you can nibble at the small items but how you can bite deep into, and divide in two or three, the costs of the larger items, namely, loading and mining coal.

If you are content merely to nibble at the smaller charges, you may gain therefrom some sustenance but not a full meal. The big items are those which are not under day-labor rates but under a tonnage schedule. For years you have left them alone. You reasoned that they were irrevocable, but since the war you have learned how tonnage per man could be increased if only you were willing to put a little more into the other costs and to put a little faith into your business, relying on greater production to prevent those other costs from increasing per ton when they were increased per plant.

One reason for low production has been a fear on the part of the miner that the rate per ton would be lowered if he put out a large tonnage or yardage. Another has been that the operator did not back his men with adequate power, equipment and supervision. He pared the variable costs to the quick and thus coöperated so poorly with the miner that, despite the fair and even generous tonnage rate, the miner could not hope to make a good living.

Mine coal by the day and back up the miner by the support of everyone—the superintendent, the foreman, the driver, the tracklayer, the bratticeman, the pumper, the blacksmith, the car repairer, the dumper and the trimmer, and see if, while paying a good day wage to the mining force, a large reduction cannot be made in the loading cost. Even more; put in every loading device that will increase individual output. Accept the coal loose in the car and not methodically built up: if coal is not topped so generously less will be spilt on the road.

Of course, this day-wage plan cannot be started when work is good and men are scarce and little disposed to work steadily and industriously. But when the tonnage wage appears likely to be inadequate and steady work impossible under a day wage, your men may favor the change and the scale may be made generous enough to make them render you not merely compliance but generous coöperation.

DISCUSSION BY READERS

Wage Adjustment

Letter No. 2.—Since reading the interesting letter of W. E. Joyce, on the subject of wage adjustment following the cessation of the war in Europe, *Coal Age*, Oct. 17, p. 752, I had hoped to see a further expression of opinion from readers in this regard.

It is my belief that wages will decline when the peace treaties have been signed, although I do not think they will return to what they were in 1914, the year that the war started. Personally, I have little faith in the hope that there will be such an adjustment of wages as referred to in the letter of Mr. Joyce.

The chief reason for the low state of wages before the war is to be found in the fact that European labor coming to this country was cheap. It is true that these immigrants were paid more, here, for their labor than they had received in their own country where the wages were low and the cost of living was correspondingly small.

To illustrate my thought, let me say that, about 1913, I saw an account in a newspaper of a German mechanic, who had been getting $2 a day in Germany. On coming to this country, however, he was paid $4.50 a day for his labor. He stated that, at home in Germany, he could save money, but here it took all he could make to live. He did not explain why that was the case. It may be that he incurred unnecessary expenses, wasted his money, or lived at a higher rate than that to which he had been accustomed at home.

Again, I know of a man who is making $6 a day, here in Canada. He tells me that, for the same work in New York, he would receive $10 a day; but says it takes more to live in America than in Canada.

Reasons for High Cost of Living

It is, of course, hard to give a good reason for the higher cost of living in one place than in another. It seems to me that the increase of large cities, such as are found in the United States, and the relative scarcity of food-stuffs and other necessary supplies, are largely responsible for the high cost of living. When it costs more for men to live it is natural that they should demand higher wages.

In an address, not long since, President Wilson stated before the American Federation of Labor that "nothing should be done to interrupt labor." He emphasized the fact that strikes and lockouts are as great a disadvantage to labor as to operators, and he is correct. However, it is often quite impossible to satisfy labor, whose demands are generally based on the knowledge that industry cannot go on without their aid.

It is hard to tell to what extent wages may decline, or whether they will decline now that the war is ended. Many people think that business will be dull for some time and that labor will be scarce, owing to the work of reconstruction in France and Belgium, but the scarcity of labor in this country and the export of material and supplies for the work of reconstruction should make business good here.

On the other hand, when peace terms have finally been settled, many things will happen to reduce wages here. The return of men from the front and the closing down of munitions factories will throw many out of employment and no one can foretell the ultimate effect.

Rawdon, Canada. C. McMANIMAN.

Ventilating Power Excessive

Letter No. 1—In an able and interesting article, entitled "Elimination of Power Losses," *Coal Age*, Dec. 5, p. 1021, Graham Bright makes the following statement: "The ventilating system does not lend itself to changes which will improve the load factor. The fan must obviously operate at full speed during the day when there is the greatest demand for other power."

To this statement, some exception may be taken. The fact that the fan motors are constantly running makes them nearly the greatest source of power consumption there is about a mining plant. For instance, at one large company in this state where central power is being used, the fan motors consume 16.2 per cent. of the total horsepower supplied from the power house. They require more power for their operation than the mining machines and are only exceeded by the locomotives, which take 20.2 per cent. of the total consumption. Any saving that can be made in the power required for ventilation will greatly improve the load factor.

Installation of Meters Proved a Revelation

When central power stations were first installed in this state some of the coal companies had meters attached to their different classes of machinery, including their fan motors. The first and second months' readings of the fan-motor meter almost threw the management into a panic. They found that, at some of their mines, it far exceeded all of the other power consumed, both inside and outside of the mines.

With current costing in the neighborhood of 1c. per kw.-hr., and with good producing mines, the ventilating power was costing as much as 7c. per ton of coal mined. The management had been giving the closest attention to the transmission system and the upkeep of machinery; but, the high cost of ventilating power seemed to be something that had escaped their notice, and they now realized that something would have to be done inside of the mines, to reduce the power required for ventilation.

Work was immediately started to put the airways of the mines in such shape that the same or a greater amount of air could be circulated through them with less power. By cleaning up the airways in use, driving additional ones and stopping up leaks, they reduced the charge for ventilating power from 7 to 2 and even 1c. per ton, which was a vast inmprovement.

What Mr. Bright has said about costly transmission losses of power within the mine could well be said of the costly transmission of air within the mines. But, in conclusion, it will not be amiss to advise the operator who uses power, especially if the power bill is rendered from the reading of one main meter, to look with suspicion on his fan motor, it may be consuming more than all of the other motors combined, and let him look for the reason thereof.

Sharples, W. Va. P. A. GRADY.

Freezing of Shaft in Winter

Letter No. 5—Referring to the inquiry of "General Superintendent," *Coal Age*, Nov. 28, p. 1004, it appears to me that he is much like the rat caught in a trap by reason of its taking the bait. When proper provision is made for draining a wet shaft, there should be no difficulty from the shaft freezing in winter; but when this provision has been neglected, one must suffer the consequences. If we stop to compute the expense of from three to five days when the mine must lie idle because of a frozen shaft, the need of providing against such occurrence is apparent.

However, in this case, the trouble is there and must be met at once. As a makeshift, let me suggest that an opening be made in the shaft, at the point where the water enters, and a sump or box be placed there to catch the water, which should then be piped to the bottom of the shaft and pumped to the surface. Or, if the flow of water is not too great, a small pump can be set in., at that point in the shaft, and the water pumped at once to the surface. In any case, care must be taken to drain the column pipe when the pump is not in operation, to avoid the freezing and bursting of the pipe.

EXHAUST STEAM SHOULD BE USED IF AVAILABLE

Where the mine fan is run by steam, it is always a good plan to turn the exhaust steam into the downcast shaft. This plan will often prevent the freezing of a wet shaft, although it presents the disadvantage of filling the shaft with dense clouds of steam. If it is required to make an examination of pipes, steps or ladderways in the shaft, it is necessary, of course, to shut off the steam when so doing.

While these suggestions will probably make it possible to pull through the winter, as soon as suitable weather comes, work should be started on water-rings, constructing them at those points where water enters the shaft, as has already been suggested in the reply to this inquiry. If one can afford the expense, it is a good plan to cement a wet shaft so as to keep out the water. The suggestion of installing steam coils for heating the intake air, and the use of salt or brine to prevent the formation of ice in a shaft are, in my opinion, only makeshifts; and, like the wolf in sheep's clothing, cannot be relied upon when there is the greatest need.

Perryopolis, Penn. R. W. LIGHTBURN.

Letter No. 6.—I read with interest the letter of "General Superintendent," *Coal Age*, Nov. 28, p. 1004, regarding methods of preventing the formation of ice in mine shafts in winter. My experience leads me to think that the comments and calculations made in the reply to this inquiry may, perhaps, prove misleading.

Permit me, then, to give a brief description of the manner in which we have accomplished a double object, by preheating the air entering the downcast. Not only did this prevent the formation of ice in the shaft in winter, which had previously been a source of much trouble, but the method we applied increased the humidity of the mine air to almost 100 per cent.

About four years ago, owing to the mine being considered somewhat fiery, and the return from one split reaching a portion of our old works that was inaccessible and could not be examined, the State Mining Department requested that the circulation in the mine be reversed. The change was made late in the summer and at once set me to thinking what means could be adopted to prevent the freezing of the hoisting shaft, which was now made the downcast for the mine.

Being troubled with ice in this shaft in the winter would mean the loss of many days and parts of days as there was already but slight clearance for the cages. Almost the universal reply to my many inquiries was to the effect that nothing could be done and I must expect to lose one or more hours, of a morning, chopping out the ice in bad weather, and, now and then, it would probably mean the loss of a day, to say nothing of the delay and expense due to broken guides and cages.

My decision was soon made to try out the plan of preheating the air, in a way that I had turned over in my mind many times. In spite of adverse criticism, we proceeded with the plan and met with gratifying success. The first step was to build a small tile house, a photo of which is shown in Fig. 1. The general plan of the house and arrangements of the radiators or heating coils, in respect to the downcast compartment of the hoisting shaft, is shown in Fig. 2.



FIG. 1. TILE HOUSE FOR PREHEATING INTAKE AIR

In the same figure is also shown a small detail of the four sets of radiators, each of which consists of four rows of 1-in. pipes, which were staggered as shown in the figure. These pipes were 10 ft. in length and screwed into a base 7 ft. long. The four radiators were set in pairs, one radiator behind the other so that the entering air was forced to pass between eight staggered rows of pipes before it reached the downcast air compartment. The water condensed in the radiators was drained to a trap, which was so arranged that the hot water could be discharged in a spray down the shaft or run off outside to the feed-water heater.

To complete the arrangement, hinged doors were placed over the hoist compartments of the shaft, so

that when these doors were closed all of the air entering the shaft had to pass through the radiators. In cold weather, the doors were closed at 3:45 p. m. and not opened again until 7 a. m. In very severe weather, the doors were also closed during the noon hour. This heating plan is arranged to use either exhaust or live steam, at about 5 lb. pressure. Ordinarily, exhaust steam is available from 3:45 to 11 p. m., but, from 11 p. m. to 7 a. m., live steam is used.

Humidifying the Heated Air Current

By introducing steam or hot water sprayed into the shaft, the heated air current is enabled to take up and carry into the mine from 12 to 15 times more water vapor than would be possible if the air was not heated.

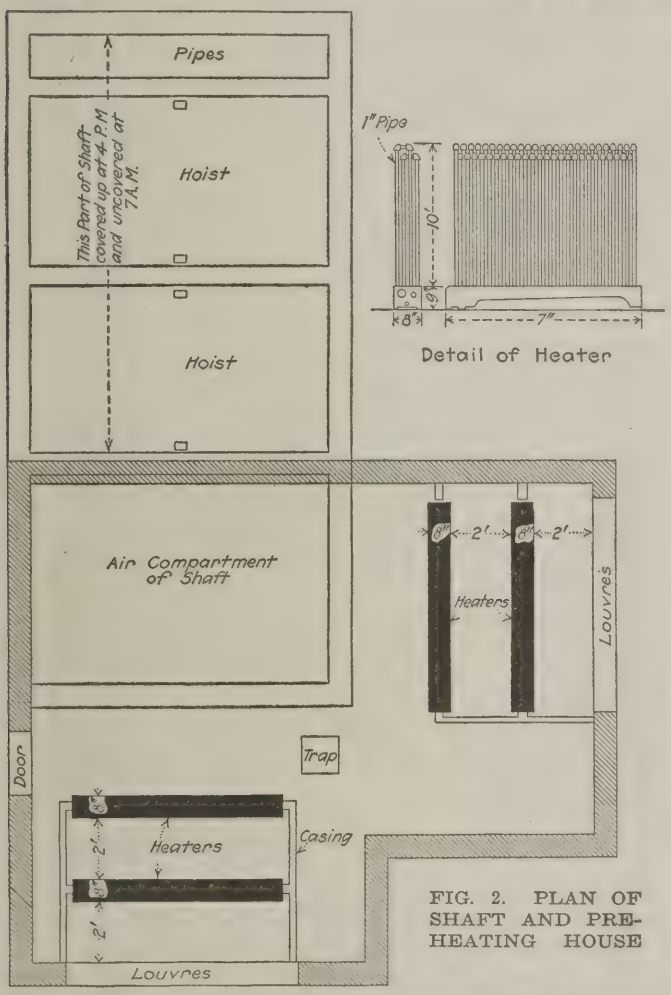


FIG. 2. PLAN OF SHAFT AND PREHEATING HOUSE

Calculating the weight of water vapor carried in a saturated air current of 100,000 cu.ft. per min., we find that, at a temperature of 20 deg. below zero (Fahr.), this current carries 0.385 gal. per min. into the mine. Again, at a temperature of 40 deg. above zero, the same air current fully saturated will carry 5.019 gal. per min. on its way into the mine. A heater and humidifier placed at the fan shaft of a mine would have exhaust steam 24 hr. a day if the fan was steam driven. Our heater is still in operation today, and will probably remain so for the next 20 years.

Before closing, allow me to suggest that the water running into the shaft is materially above the freezing point and must give up its heat units, until it reaches the freezing point and then its latent heat, before it will be changed into ice, which will materially assist in heating the mine air. Of course, wherever possible, exhaust steam should be used, as it is commonly a waste product and contains, roughly, 80 per cent. of the heat in live steam.

Mining Engineer.

Cleveland, Ohio.

[As to the suggestion of this correspondent regarding the heat given up by the water draining into a shaft, taking the temperature of ground water at, say 48 deg. F. and the latent heat of ice at 32 deg. F. as 144 B.t.u., the total heat in the water, above 32 deg. F., and given up, per pound of ice formed, is 144 + (48 — 32 = 160 B.t.u. Then, assuming 10 cars or, say 450 cu.ft. of ice formed in a shaft in 24 hr., which is a bad condition, the total heat given up by the water draining into the shaft and frozen is (160 × 450) ÷ (24 × 60) = 50 B.t.u. per min. It will be observed that this amount of heat is quite inconsiderable in comparison with the 56,976 B.t.u. required each minute, in the case described in the inquiry to which this correspondent has referred. (Nov. 28, p. 1004).

In discussing the practicability of the preheating of intake air for the prevention of ice trouble in shafts, it must be remembered that the severe conditions represented in the reply to this inquiry (p. 1004) do not continue ordinarily more than a day or so when the weather will usually moderate. The benefit derived from the preheating of intake air will doubtless then remove the accumulation of ice that is formed during the more severe periods. This will explain the practical benefit to be derived from a properly installed system, such as this correspondent has described.

Regarding the statement that exhaust steam contains 80 per cent. of the heat in live steam, it is worthy of note that, exhausting under a back pressure of, say 3 lb. gage, at sea level, a pound of steam contains 1150 B.t.u., while live steam at 100 lb. gage contains 1185 B.t.u. above 32° F. This shows that the exhaust steam contains 1150 × 100 ÷ 1185 = 97 per cent., instead of 80 per cent. of the heat in the live steam, under the conditions named.—Editor.]

Travel of Electric Current

Letter No. 7.—Referring to the question of whether an electric current travels in a conductor through its cross-section or over its surface, permit me to add a word or two from my own practical observation, which seems to support the idea that the current travels throughout every portion of the cross-section and not over the surface of a wire, only.

Like others, I have been told that an electric current is a fluid that travels over the surface of a conductor; but practical observation does not seem to support this theory, and I have come to believe that the entire cross-section of a conductor is as much alive as its surface.

One thing that has led me to this conclusion is the fact that steel rails carrying the return from a direct-current system are rendered brittle, in time, by the electricity passing through them. This brittleness of the metal is equally distributed throughout the cross-section of the rails. They are not brittle on the surface only. I have observed that rails never heat, except at joints that are connected by defective bonds, which would seem to tell the same story.

Again, the insulation of wires conducting electricity would appear to obstruct the flow of any current over the surface of the wire, particularly in the case of the wires of an incandescent lamp where they enter the bulb or globe, and where the insulation is so complete that there is practically no chance for the current to pass over the surface of the wire. To my mind, these practical facts seem to demonstrate that the entire cross-section of a conductor is alive. Indeed, I can see it in no other way.

Thomas, W. Va. W. H. NOONE.

Locating the Coal Beyond a Fault

Letter No. 4.—Having had some considerable experience with faults in coal seams, and finding these in different shapes, some upthrows and some downthrows, it may be that I can offer a little suggestion that will be helpful to the inquirer in *Coal Age*, Oct. 24, p. 797. Where we have met these faults, I have always been successful in tracing and finding the seams, although I have not undertaken to sink boreholes from the surface or in the seam, for that purpose.

Let me say that the advice given in the editorial note following this inquiry is quite correct in stating that this fault is "apparently a downthrown." The two boreholes sunk from the surface, if estimated correctly, should afford the means of ascertaining the amount of the dislocation. However, it should be remembered that if the original seam is rising on a 4 per cent. grade, allowance must be made for this, as the seam would have risen 16 ft. in going the 400 ft. to the first borehole, had the fault not occurred.

EFFECT PRODUCED IN FAULTED STRATA

The thickness of the coal beyond a fault will often be found to be quite variable, for a time. This fact will often prove misleading when one judges the continuation of the seam from its thickness. In the case cited, it is very probable that the 3 ft. 9 in. of coal found in the borehole corresponds to the 4 ft. of coal in the X seam, at the fault.

The method that I have pursued in tracing the coal beyond a fault is to study carefully and observe closely the slip of the strata, at the fault. It will generally be found that there is a small leader of coal, which, if followed, will prove a sure guide to the lost seam. Such has been my experience many times. In following this lead of coal, I have always driven as small a place as could be conveinently worked, and enlarged this after finding the coal. This small opening may have to be abandoned and another driven that will afford a better grade for hauling the coal, but that can only be determined after the seam has been located beyond the fault.

Before closing, let me suggest that if this fault proves, as expected, to be a downthrow, it may be found more economical to work the X seam, beyond the fault, through the original Y seam, as these two beds of coal will more nearly correspond in elevation, at the line of fault and can be connected by a short rock tunnel.

Worley, Ky. JOSEPH CAIN.

Letter No. 5.—As superintendent of a small mine, I have often been desirous of gaining outside suggestions, in regard to the many difficulties one meets in mining coal. I realize that this is the desire of the superintendent who inquires the best means of mining the coal cut out by a fault in his mine.

Allow me to make one simple suggestion, which is as follows: In my opinion, it would be well to start a borehole in the roof of the X seam about 10 or 20 ft. beyond the fault. Incline the borehole upward at an angle corresponding to the fault line. Do the same in the floor of the seam, sinking another hole downward in a sloping direction corresponding to the fault. Whether the seam is an upthrow or a downthrow, these boreholes should be able to find the coal, sooner or later.

Manorville, Penn. W. N. R. C.

Letter No. 6.—I have always been interested in studying the mechanical forces that have operated in producing a fault or dislocation of the strata. By a close study of the force that has caused the disturbance, in any particular case, and by applying a few theoretical principles, I have been able to correctly determine the nature of many different faults in practice.

In the case described in the inquiry in *Coal Age*, Oct. 24, p. 797, I was first tempted to agree with the suggestion that this is a "downthrow." However, taking into consideration the 4 per cent. grade of the seam, and the probable pitch or inclination of the fault or slip, I concluded this might prove to be an upthrow.

Since the first borehole is located in a sag in the surface, there is undoubtedly a downthrow between the face of the heading and that borehole. I fully agree with the idea expressed that the coal sunk in that hole belongs to the X seam, and believe that its thickness has been reduced by the pressure caused by the dislocation and movement of the strata.

There are three different ways in which strata may be faulted: (1) One part or section of strata may slip down on the other part or section. (2) Owing to extreme pressure, one part may be thrust up and over, or down and under, another portion of the strata. Again, (3) the strata may be folded, one section being completely overturned on another.

NEED TO CAREFULLY STUDY THE FORMATIONS

One could form a better judgment if he had a typographical map of the country and a correct profile or cross-section. This mine being a drift opening suggests a hilly country, which would enable a good study to be made of the formations, and that would be a great help in determining the character of the fault.

Where a fault line corresponds to the strike of the seam, besides the vertical there is a horizontal movement plainly evident; but when the fault line crosses the strike, it gives greater force to the horizontal movement. This will depend on the inclination of the strike and the pitch of the fault. These are always to me helpful considerations in determining the character of a fault.

My advice is that the two boreholes should have been carried deeper and the borings made with a diamond drill that would have enabled the study of the cores or sections of the strata taken from the holes. Should the two holes fail to give satisfaction, it would be well to prospect further on the fault line; but before doing so, it would be my plan to make a careful survey of the fault to determine its strike and inclination with re-

spect to the seam. By doing this, much needless expense may be avoided.

I recall an instance where thousands of dollars were expended in an attempt to determine a fault at Aguilar, Colo. The work done resulted only in tapping a number of gas and water feeders, without giving any idea of the nature of the fault.

In the present case, it would appear from the plan given in this inquiry that the strike line on the east of the main heading runs, approximately, with the strike of the seam and appears to have a rather steep pitch. On the west of the main heading the fault appears to traverse the strike of the seam at an acute angle and have a somewhat less pitch.

Judging from these facts, if correct, I would say the prospecting should be done on the main heading or at some point east of the same. The carrying out of these suggestions, however, should be done only after careful consideration by the officials on the ground. To give advice, in this case, is somewhat like a surgeon attempting to perform an operation without a strict diagnosing of the case. On no account, however, should the mine be abandoned unless it is known to be at the extreme edge of the coal measures. HENRY BOCK.

Carlinville, Ill.

Perplexities of Mine Foremen

Letter No. 6—Speaking of the perplexities of mine foremen, I am led to ask, Why! Does he have any? You would think not, from the miner's point of view. Even some mine superintendents seem to think that a mine foreman is the most ease-loving, care-free individual in existence.

I well remember my surprise when on my way to the pump and opening a door leading to a side heading I came suddenly on a gathering of almost every worker in the mine. They were holding a mass meeting and I was an intruder.

In response to my query if there was anything that I could do for them, I was informed that there was not; they just wanted to bring that d—— superintendent to time. A few of the men only were talking, as is usually the case, and I stopped and reasoned with them, and succeeded in inducing them to go to work.

Having but recently come to this mine, I was interested in acquainting myself with the prevailing habits of the men and soon found that their regular meeting place was where I had found them. It did not take me long to seek out the mine committee and inform them that they were violating the rules, which they well knew. They promised not to hold another meeting during working hours or in the mine.

At another time, I had been up the main road assisting in clearing away a wreck and, on coming down through a side entry, met a number of men coming out. I asked them quickly "What is the trouble?" They informed me that "Joe had ordered a pair of rails, yesterday, and they had not been put in yet, at 10 o'clock in the morning." With all my persuasion, I could not induce the men to go back.

The situation was about as follows: The motorman and his helper were obliged to shift their empty trip before they could pull out the loaded cars. This bunch of men had loaded their empties, which had been placed the night before. On the arrival of the first empty trip that morning, the needed rails not being in place, trouble arose and the men agreed to quit work until the rails were laid, which they did.

Delay in Repairing Cars Causes Trouble

Another instance illustrating a foreman's perplexities is the following: The brakes on the cars were getting worn, so that they would not hold a trip on the steepest grade. I had talked to the superintendent several times about getting the lumber needed to repair the cars. He never broke my heart by his answer, but always promised to order it at once.

One morning I was up the third left heading and, meeting one of the drivers who did not belong in that part of the mine, I asked him what he was doing over there. He replied that he was notifying the men of a meeting outside. "Why," I asked, "what is wrong now?" "Well," he said, "Dick has hurt his mule and the men refuse to work till the brakes are repaired."

I hastened outside, where I found most of the men who had already quit and others were coming. Going at once to the telephone, I called up the office and was informed that the superintendent was then on his way to the mine. I reported this to the men, stating that he would be there shortly.

Before the superintendent's arrival, I had quite a talk with the men, telling them of my conversations with our boss and how he had promised me that he would get the lumber needed to repair the cars. I ventured the suggestion that, "Possibly, it is hard for him to get the kind of lumber needed." The men replied, "This is the only d—— way we can get anything done here, so we won't work another stroke until the cars are repaired."

The Inefficiency of the Superintendent

After waiting a half-hour or more, the men became restless and wanted to go home. I urged them to wait a little longer and again called up the office, believing that if I could hold the men until the superintendent came he would be able to satisfy them and they would return to work. Again, I called the office only to be told that the superintendent was not in. The manager was there, however, and wanted to know if he could do anything for me.

I explained to him, as best I could, what the trouble was and gave him a full account of the promises that had been made to the men, adding that they had now quit and would not return to work, until the cars were repaired. The committee had come into the office in the meantime and heard what I said over the phone. They asked me, "Who were you talking to?" adding, "That is right, and every word of it is true."

The superintendent turned up about 3 o'clock that afternoon. When he was told that the men had all gone home, he became very indignant and swore he would get even with them. It is needless to say that the cars were repaired in a few days and the men then went back to work. It is true, I believe, that some mine foremen are easily annoyed, and it does not take much to perplex them. However, there are perplexities, at times, that would try the patience of a Job.

Osceola Mills, Penn. S. D. HAINLEY.

INQUIRIES OF GENERAL INTEREST

Drawing Pillars in Machine Mining

We are operating Sullivan shortwall machines, in a flat seam where the coal is from four and one-half to five feet thick, on the room-and-pillar system. The rooms are driven 27 ft. wide and 250 ft. long. The roof is composed of a strong sandstone and the burden over the present workings is about 200 ft. Since installing the machines, we have not attempted to draw any pillars but wish to do so shortly.

If some of the many practical readers of *Coal Age* would give us the benefit of their experience in drawing pillars with this type of machine, the information would be much appreciated. OPERATOR.

Drumheller, Alta., Canada.

Coal Age is pleased to present these practical inquiries to its readers, as they offer good food for discussion and always bring a ready response. Inquirers, however, so frequently fail to give some of the essential data without which it is impossible to give a wholly intelligent answer to the question asked.

In the proposition submitted above, it is most important to know the width of the room pillars, or the distance between room centers, from which the thickness of the pillars can be calculated. It is possible, of course, to assume a two-thirds extraction of the coal, in the first working, or take the width of pillars as, say 4 or 5 yd.; but this may not even approximate the actual condition existing in these workings.

We shall be glad to hear what our practical readers have to suggest, in respect to the use of the shortwall machines, in drawing back the pillars in this mine. The principal factor to be considered, aside from the width of the pillars is the effect of a hard sandstone roof. One must, also, assume a fair bottom and moderate hardness of the coal.

Gravity-Plane Haulage

We contemplate constructing a gravity plane at our mine, for the purpose of lowering the loaded mine cars from the mouth of the mine to the tipple. The length of the incline will be 5500 ft., from the knuckle to the foot of the plane, which will have a uniform grade of 20 per cent. The average weight of the mine cars is 1500 lb. and the capacity 2600 lb. of coal.

We would like to ask if this is a practical scheme and if it would be possible to handle 25-car trips with safety on such a plane. We shall appreciate seeing the question of gravity-plane haulage discussed by *Coal Age* readers who have such planes in operation.

Hooversville, Penn. SUPERINTENDENT.

The successful and safe operation of a gravity plane depends on many factors that enter the problem and must be carefully ascertained before attempting such an installation. Briefly described, the equipment consists of a substantial frame carrying two grooved head sheaves set tandem to each other and controlled by a strong brake.

The haulage rope must be strong enough to stop and hold the descending loaded trip, at any point on the incline. The brake, also, must be capable of exerting sufficient force to effect the same result. The plane should be a straight line, from top to bottom. The main portion should have a uniform grade; but this must be slightly increased at the top and decreased at the bottom, for short distances, to assist the starting and stopping of the trips.

In the operation of a gravity plane, the force producing motion is the gravity pull of the unbalanced load, which constantly increases as the loaded trip descends the incline and the rope is transferred from the upgrade to the downgrade side of the plane. The forces resisting motion are the gravity pull of the rope on the upgrade and the friction of the entire moving system.

There being an equal number of ascending empty and descending loaded cars, the calculation of a gravity system is based on two ratios of live to dead load. For example, the ratio r is the weight of coal (w_c) in a single car, to the weight of two cars ($2W$), one empty and one loaded; or $r = w_c/2W$, and the ratio r_1, the weight per foot of rope (w_r) multiplied by the length of plane (l), to the weight of two cars ($2W$); or $r_1 = w_r l/2W$.

An important factor in the determination is the resistance to the entire moving system, which is best estimated in pounds per ton, expressed as a decimal. Much will depend on whether the cars are equipped with plain or roller bearings and the friction of drum and rope bearings. This resistance, assuming 20 lb. per ton is $R = 0.01$.

The number (n) of cars that will operate successfully on gravity plane when the percentage (J) of grade is expressed decimally is calculated by the formula,

$$n = \frac{r_1(J + R)}{r(J - R) - R}$$

In the present case, assuming a $1\frac{1}{8}$-in. rope weighing 2 lb. per foot, we have

$$r = \frac{w_c}{2W} = \frac{2600}{2 \times 1500} = 0.867 \qquad r_1 = \frac{w_r l}{2W} = \frac{2 \times 5500}{2 \times 1500} = 3.667$$

Then, substituting the values in the formula for finding the number of cars hauled in a trip, gives

$$n = \frac{3.667(0.20 + 0.01)}{0.867(0.20 - 0.01) - 0.01} = \frac{2.31}{0.484} = 5+ \text{ cars}$$

Under these assumed conditions, it does not appear practicable or possible to handle 25-car trips on this incline, without the use of a "barney" to counterbalance the weight of the descending loaded trip, and whose weight will yet be sufficient to draw up the trip of the same number of empty cars. We shall be glad to receive the views of others and learn of their experience.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—Describe the various methods of propping and timbering slopes, gangways and chambers, in anthracite mines.

Ans.—In anthracite practice, the conditions of roof, floor and coal are quite variable, and these, alone, determine the method of timbering that should be adopted in any case. There is little difference in the timbering of a flat slope and that of a gangway, for the same conditions of roof and floor, except that timbers set in a slope should be inclined slightly up the pitch, similar to the undersetting of posts in inclined seams. On steep pitches where the track has a tendency to slip downhill, occasional long timbers should be used for track ties and hitched into the ribs on either side of the slope, so as to give the necessary support to the track and keep it from slipping.

Except where the seam is overlaid by an exceptionally sound roof, double timbers are set on all slopes and gangways. A double-timber set consists of a good cross-beam or collar supported on two legs, which are notched into the collar, the whole forming what is called a "timber-set." These timber-sets are placed at suitable distances apart, depending on the nature of the roof and floor. Where the roof is very frail, lagging of smaller timbers is used to span the space between the sets, thus giving additional support to the roof. Or, at times, the timber sets are stood close together, which is called "skin-to-skin" timbering.

Where the coal is exceptionally hard and overlaid with a fair roof, the crossbars or collars are sometimes hitched into the coal instead of being supported on legs. At other times, short legs are used and these are set in hitches cut in the coal. On steep inclinations, particularly where there is considerable side pressure, the framing of the timbers on gangways must be such as to conform to the conditions.

The timbering of rooms and chambers, in flat seams, must always be modified to suit the conditions of roof and floor. With a frail roof, or where slips occur in the roof, systematic timbering should be followed, the posts being set at specified distances apart, in rows, and staggered. When the seam is inclined, the posts must be "underset," or inclined slightly up the pitch, the amount depending on the inclination of the seam.

Ques.—In case of an accident in which a miner has received a wound severing an artery, what would you do to prevent hemorrhage before a physician arrives?

Ans.—If the wound is in the arm or leg, a rope or strong bandage should be wound about the member, at a point between the wound and the heart. The bandage is then tightened by inserting a stick beneath it and twisting the stick. A small stone or pad should be placed over the artery so that the tightening of the bandage will press the artery more tightly and stop the flow of blood from the wound. Where the flow is from several small arteries, or the wound is in a place that the flow cannot be stopped in this manner, it may be possible to coagulate the blood and reduce or stop the flow by applying sulphate of iron, either powdered or in a strong solution, by means of a sponge.

If there is bleeding from the lungs and the injured person coughs blood, he should be placed in a reclining position with head and shoulders slightly raised. Keep him cool and quiet and, if possible, give him ice to swallow. Restore his confidence by assuring him that there is no danger. If the bleeding comes from the stomach, the blood will look dark and clotted. The man should be made to swallow ice and given ice water to drink; also, an occasional teaspoonful of vinegar should be administered. Keep the stomach cool by applying a towel holding cracked ice to that part. Make no delay in sending for a physician.

Ques.—What proportion of carbureted hydrogen (CH_4) is mixed with the air when a cap begins to appear on the light of a safety lamp, and at what proportion does it explode?

Ans.—The detection of a flame cap in a safety lamp depends not only on the kind of lamp used and the oil burned, but on the experience and ability of the observer to see the cap. Using a common Davy lamp burning sperm or cottonseed oil, the average fireboss will detect the first appearance of a cap when 2 per cent. of gas is present in the air entering the lamp. This percentage corresponds to a proportion of gas to air of 1:50. Special types of safety lamps are often employed, capable of detecting 1 per cent. of gas or less.

The lower explosive limit of pure methane and air is reached when the proportion of gas to air is 1:13, which corresponds to 7.14 per cent.

Ques.—If 30,000 cu.ft. of air is passing with a water gage of 1.6 in., what quantity will pass when the water gage is 2.5 in.?

Ans.—For the same conditions in the mine, the quantity of air in circulation varies as the square root of the unit pressure or water gage. In other words, the quantity ratio is equal to the square root of the water-gage ratio. Hence, calling the required quantity x,

$$\frac{x}{30{,}000} = \sqrt{\frac{2.5}{1.6}} = \sqrt{1.5625} = 1.25$$

$$x = 30{,}000 \times 1.25 = 37{,}500 \text{ cu.ft. per min.}$$

Ques.—Name three essential elements to the efficient ventilation of a mine.

Ans.—The three elements essential to efficient ventilation are: A mine fan of sufficient capacity to produce the required air volume; a proper distribution of the air current in the mine; and, third, well-built stoppings, doors and overcasts that will prevent the leakage of air through them.

COAL AND COKE NEWS

Harrisburg, Penn.

For the first time the Pennsylvania State Workmen's Compensation Board has made a commutation of an award of compensation to an injured man so that he could be reëducated. An order recently issued by Chairman Mackey provides that $300 shall be paid by the Buck Ridge Coal Mining Co., of Shamokin, to Ben Tomashefski, of Renshaw, Northumberland County, one of its miners who lost his sight when cutting coal, it being supposed that his pick struck an unexploded charge of powder and that the explosion blinded him. Mr. Mackey's order says that the employer and insurance carrier have joined in the petition for commutation of a sufficient amount to provide that the man may go to an institution for the blind for some education in order to acquire a new occupation and that the plan for reëducation has been approved. The $300 will be taken off the weekly payments made during the course of the year to the miner, and the order requires the insurance carrier to see that the claimant is placed in a proper home.

United States fuel authorities and representatives of organizations interested in natural gas have been invited by the Public Service Commission to participate in the conference to be held in Pittsburgh on Jan. 8, on the conservation of the supply of natural gas in Pennsylvania. The commission has invited natural gas companies of the state, especially those parties to pending complaints to the meeting, which will be held in the City-County building at Pittsburgh, a special request having been made that they be represented either by counsel or engineering representatives. The conference is to deal with supply, rates not being scheduled for consideration. S. S. Wyer, chief of the natural gas conservation work of the Federal Fuel Administration, has been asked to speak on the supply in Pennsylvania, and conservation will be discussed by L. L. Graham of the Pennsylvania and United companies. They will be the only set speakers, but there will be a general discussion.

Uniontown, Penn.

Production in the Connellsville coal and coke region showed an increase for the week ended Dec. 14. The outputs of 636,826 tons of coal was an increase of 36,245 tons over that of the previous week and 113,105 tons over that of Nov. 23, when the output in this region reached the rock bottom figure of 523,721 tons. The output for the week ended Dec. 14 showed a gain both in coke manufacture and shipments of raw coal, principally byproduct. The coke output of 281,950 tons was a gain of 10,957 tons over that of the week ended Dec. 7, and coal shipments of 213,901 tons was an increase of 29,811 tons over that of the previous week.

Steady increase in output is held by fuel officials and operators as proof that influenza is now rapidly losing its grip. Although the coming of peace, with its resultant relaxation of individual effort, contributed to the low record of 523,721 tons, influenza is held to be the principal factor for the great drop in production which commenced early in October. During the week under review a total of 5701 cars was lost because of labor shortage, 3146 in the coke trade and 2555 in the coal trade.

Charleston, W. Va.

A number of causes operated to materially reduce production in the Fairmont region during the week ending Dec. 21. In the first place cars were extremely scarce, the average not even being 1000 a day, and on the 19th the supply was down to 798, only a number of which were placed at operations in time for early loading. There has been a steady decrease in the supply of cars for several weeks, and a number of direct and indirect causes have been responsible for such a condition of affairs—motive power and traffic barriers having contributed to present conditions. Trouble was also experienced in getting an adequate supply of electric power, at least at some of the mines. Market conditions, generally speaking, are satisfactory, though there is an absence of any brisk demand for Fairmont coal.

So great was the accumulation of unloaded cars from the New River District that coal sold through five different agencies was embargoed, the embargo becoming effective on Dec. 19. This had made it necessary for several large operations to shut down, or at least to curtail operations, limiting their product to what can be handled inland. Orders for New River coal are plentiful. Lack of shipping facilities is the only adverse factor with which the district has to contend.

With a gradual expansion of the markets into which Kanawha coal may be shipped, more of the output of the district is now being absorbed than was the case a short time ago, and consequently a heavier demand is observed, Kanawha coal at the same time regaining a part of its former markets in the West. Producers are sanguine that as soon as large consumers have had an opportunity to adjust themselves to new conditions there will be a much better market for coal. Kanawha district mines were not materially affected by embargoes on tidewater shipments over the Chesapeake & Ohio, since the bulk of the coal from the district flows westward.

Birmingham, Ala.

Steady improvement is being shown in the coal production for the Birmingham coal-mining district, according to Government statistics. There has been no cessation of demands for coal so far, and all Alabama operators seem as anxious as ever to get the largest possible production from their mines.

Meetings were held Sunday, Dec. 22, in all camps of the district, at which organizers of the United Mine Workers urged the men to give their best efforts toward obtaining increased production. Leaders of the organized mine employees have finally decided that the contract between the employees and operators will continue in force until the peace negotiations have been concluded. This will mean that there will be no disturbance of the relationship that exists between the two interests, for several weeks at least. In possible readjustments there is not the slightest doubt in any circles in the Birmingham district that any trouble will be experienced.

Coal producers on the Warrior River are elated over the Government appropriation for development of that stream in the near future. Old equipment purchased from private corporations has been put on a regular schedule, and is being taken advantage of to the fullest extent. The new equipment for the service, on which bids have been asked, will not be in full service until the middle of 1919. The freight rate between Cordova and Mobile on coal is 20c. per ton less by barge than by rail.

New York, N. Y.

The demands of the marine workers in the port of New York wil now be considered by the National War Labor Board, of which former President Taft and Basil M. Manly are the joint chairman. This was decided upon on Saturday last, when the matter was referred to that body by the New York Harbor Wage Adjustment Board. This action was taken by the latter body because the boat owners had notified the Wage Adjustment Board that they could not be bound by any decision that might be made on the matter of the eight-hour day dispute. The Railroad Administration had withdrawn from representation on the Wage Adjustment Board and so far has refused to appoint a successor to its representative. Owing to this vacancy the boat owners refuse to abide by any decision made on the matter of the eight-hour day.

In addition to the demand for an eight-hour day, the workers want an advance in wages.

Having finished the work designated to him, John P. Collins, who was the personal representative in New York City of J. J. Storrow, the Fuel Administrator for New England, will soon close his office at 1 Broadway and return to Boston. Mr. Collins has been here since May last, and has looked after the shipments of the so-called "Storrow" coal from this port; in addition, he has seen that retail dealers located on the New England waterfront have received a good supply of the domestic sizes.

One of Mr. Collins' first duties here was to organize the Long Island Sound Barge Operators' Association, which is composed of 17 transportation companies engaged in carrying coal from the 13 local loading piers up the Sound. Mr. Collins found that these concerns were keen competitors and that considerable delay was caused by the slowness by which tows were taken to New England or empty barges returned. With the new organization completed, these concerns, all of which maintained their individuality so far as business was concerned, handled each other's tows when their own was small in either direction, thereby saving considerable time. The combined fleets of the 17 concerns composing the membership of the association consisted of 43 tugs and 385 coal-carrying barges.

Under Mr. Collins' direction New England has received more industrial coal than was ever before shipped to that section. One of Mr. Collins' hardest tasks was to arrange for shipments of anthracite coal to waterfront towns along the coast of Maine. He was so successful in this that he made an average shipment of five barges monthly, as a result of which these towns have received their allotment of domestic sizes.

Victoria, B. C.

The coal output for November, 1918, shows a material decrease in British Columbia in comparison with the previous month, the difference being approximately 49,476 tons. This is explained by the fact that the Vancouver Island collieries, in almost every instance, failed to do as well owing to the time lost by their employees, many of whom were off for periods of varying length owing to the epidemic of influenza. The production is placed at about 168,006 tons, while that for October was 217,482. The total output for the year 1918 up to the end of November, therefore, is about 2,372,161 tons, or an increase over 1917 of 222,186 tons.

A short time ago the SS. "War Charger," after taking on coal in British Columbia for a voyage to the Orient, had to put back to port for the reason, according to statements given publicity, that she was unable to proceed on this fuel. On returning she loaded with Welsh coal. This reflection on the steaming quality of British Columbia coal is resented, it being maintained that it has been subjected to every test, practical and otherwise, with the best results and that it is so satisfactory that one of the Vancouver Island collieries was able to enter into a contract to supply the Pacific Fleet of the United States naval forces. If the "War Charger" was in trouble of the kind, which there is no disposition to deny, it is asserted that she must have been given an exceedingly poor quality of fuel and that the responsibility should be placed where it belongs and should be generally understood in the interests of the industry. The Board of Trade of Vancouver City has taken the matter up, its members pointing out that the absence of a full explanation of the "Charger's" return is likely to leave the impression in England and elsewhere that a boat cannot be coaled in British Columbia to the satisfaction of the naval authorities. Some declare that the matter is of sufficient importance to warrant the fullest possible investigation by a civic commission.

PENNSYLVANIA

Anthracite

Hazleton—Influenza has again broken out in this region. At Eckley the Lehigh Valley Coal Co. has been hampered by the sickness among its employees. At Weston and Oneida the same company has a number of men off daily, due to the "flu." The labor disaffection in the First District (Wilkes-Barre) has not reached this field, and the men apparently are pleased with the recent wage increase.

Jeddo—The G. B. Markle Co. has employed thirty Mexicans who were recently released by the Bethlehem Steel Co. The Mexicans will work in the company's mines as miners' laborers.

Upper Lehigh—Thirty men were recently laid off at the Upper Lehigh colliery. The new breaker, which is electrically operated, is much smaller than the old one and it can be run with fewer men.

Hazleton—The Worthington Pump and Machinery Co., maker of munitions, has laid off nearly all its men, and many of them have been idle for the past four weeks. These are men who formerly held mechanical positions at the mines, and their places are filled. Operators still report a serious shortage of miners and miners' laborers, but the former munitions workers seem to prefer idleness to taking that class of work.

Hazleton—Anthracite coal operators in the Lehigh region are opposed to the movement started by the National Polish League to enroll Polish miners and other industrial workers for the purpose of inducing them to return to their native land, on the ground that the plan would seriously interfere with maintaining a maximum tonnage.

Nesquehoning—December marked the sixtieth anniversary of the fire at Summit Hill, and also marked renewed efforts on the part of the Lehigh Coal and Navigation Co. to "kill two birds with one stone," by starting a new stripping to get more tonnage and to attempt stamping out of the fire at the same time. Over $1,000,000 has been spent to confine this mine fire. It is now hoped to save tens of thousands of tons of coal out of the fire before it shall be consumed. A large force of men have began work in a new sector with steam shovels. The plan is to strip or remove the top of the mountain that overlies the burning section and take away veins of coal that lie in the path of the fire. The area to be stripped is 400 yd. wide and a mile long. The average stripping depth is 40 feet.

Scranton—So as to insure responsibility for mine caves, the Hand estate and other Scranton interests controlling the Park Hill coal tract, have refused permission to five or six companies, including the Delaware, Lackawanna & Western R.R., Coal Department, which have negotiated for the lease, to mine the 5-ft. and 4-ft., the two top veins of coal, unless the operating company will assume all responsibility for damages occurring to the surface and buildings. It is said that this condition has proved the stumbling block so far in the different negotiations, but that three-fourths of the ownership, consisting of out-of-Scranton residents, are standing pat on the proposition.

Edwardsville—Barring unforeseen accidents, the new $2,000,000 steel breaker of the Delaware, Lackawanna & Western R.R. Coal Department, which was referred to in the news pages of *Coal Age*, Dec. 26, will be in operation by spring. The new breaker is designed to have a capacity of 8000 tons daily, which is double the capacity of the old wooden breaker it will displace. The coal will be prepared in nine sizes.

Bituminous

Pittsburgh—The tipple of the Pike County Coal Co., which was completely destroyed by fire a short time ago, has been rebuilt and is now in full operation. The contract for the reconstruction work was placed with Roberts & Schaefer Company.

Smithfield—The Russell Coal and Coke Co. has purchased five acres of land of the Henry Mathiot tract, near here.

Indiana—A company has been organized and has taken several leases on a large acreage of coal land between Savan and Locust, Indiana County. Several openings which have been operating as wagon mines will be improved and the coal will be brought to a central tipple to be erected on the Work farm. The shipments will be made over the Buffalo, Rochester & Pittsburgh Railway.

Black Lick—The Hetrick Coal Co. is constructing a tram road 2000 ft. long from its mine to the tipple of the Smith Coal Co. The mine was formerly operated as a wagon mine and has considerable development under way. It will add about 100 tons per day to the tipple tonnage of the Smith operation.

Homer City—Henry Reed has sold his mine, which is opened on the Sutter farm near Meco, to George Bulga, of this place.

Locust—The Locust Colliery Co. has completed several new miner's dwellings here. They are of the modern type and of excellent structure. Since the installation of electrical machinery in the mine a few weeks ago the production has been doubled.

WEST VIRGINIA

Williamson—Information from various parts of Mingo County, where there were many wagon mines opened during the war, is to the effect that every wagon mine in the county has been closed down. West of Williamson many of the larger mines have also suspended operations because of zone restrictions, and other mines are being operated on part time only.

Beckley—Early in January the improvements now under way at the plant of the Clyde-Pocahontas Coal Co., at Besoco, Raleigh County, will have been completed. The company is now installing a new generator and is completing the erection of a new substation.

Macdonald.— Supplementing previous mention of the extensive improvements being made by the New River Co. in its power facilities in connection with the operation of its mines at Sprague, such improvements are to cost in the neighborhood of $40,000. The new substation carries two 150-kw. sets and the building which houses the equipment is of brick, with concrete base and floors and a steel roof. It is about 35 x 45 ft. in size. The station has been in operation for about three weeks. A similar power plant is being built by the company at its Skelton operation, 14 of these substations already having been installed for the company.

Bluefield—In an explosion early on the morning of Saturday, Dec. 21, in the Havaco mine of the New River Pocahontas Consolidated Coal Co. at Havaco, near Welch, two men were killed and two members of a rescue party were overcome by afterdamp, when their gas masks leaked. The dead are: John Farmer, mine foreman; Samuel Jones, pumper; Fred Paulick, miner; Martin Harrock, miner. The Havaco is a shaft mine. Rescue parties were at work early, but were unable to penetrate to the point in the mine where the explosion occurred. So far the cause of the explosion has not been determined.

INDIANA

Vincennes—The first mine rescue station in Indiana will soon be in operation in Vincennes. William H. Forbes, who will be in charge, announces that he will have everything in readiness for an emergency within the next week. Until the completion of the new addition to the Vincennes Federal building the station will be maintained in the city hall. The equipment on hand includes ten Fluess type of self-contained breathing apparatus, each weighing 35 lb. Mr. Forbes expects the United States Bureau of Mines to provide at least ten apparatus of the Gibbs type, which are somewhat different from the Fluess, although both are made so that the man wearing them does not have to depend upon air from the exterior. Microphones and geophones, which are now in the possession of the United States Bureau of Mines will probably be shipped to Vincennes and used with the other devices for rescue work. These instruments can be used for the purpose of determining the location of men entombed in coal mines. In addition to the mine rescue work public classes in first-aid to the injured will be conducted in Vincennes and probably in Bicknell.

ILLINOIS

Carlinville—That Macoupin County, Illinois, is to be a greater coal-mining district than any oldtimer ever dreamed of is further demonstrated with the development of the field near Plainview. A. W. Crawford and his son, A. M. Crawford, have promoted many of the fields of the county and they are now interested in the Plainview developments. Drills have been ordered and prospecting will be begun at once. If coal is found in paying quantities the right will be paid for according to the terms of the options now held on many hundreds of acres of land in that vicinity.

Carlinville—A strike of ten days on the Illinois Traction System seriously interfered with the output of coal in this district. Many of the mines, especially smaller ones, depended entirely upon the interurban line for the transportation of supplies necessary for the operation of the mines. When the cars stopped running the mines were forced to close.

McLeansboro—Several test holes have been bored in Hamilton County which show a vein of 7 ft. 9 in. at a depth of somewhere near 700 feet. Options have been taken on land and work of organizing another coal company has been begun. The land in question is north of McLeansboro.

Carlinville—On Dec. 14 the Carlinville Mining Co. struck the coal seam in its new shaft. The seam is 7 ft. thick with a good roof, and the quality of the coal is said to be good. The mine was started about three months ago and the work has been pushed rapidly. The work of opening up the entry and placing the mine in full operation will proceed as rapidly as possible.

IOWA

Des Moines—The Blount Coal Co. is abandoning its American mine, west of the city, and at present is drawing pillars. The equipment will be moved to the company's new Interurban mine, which is to have a capacity of 400 tons per day.

Foreign News

London, England—London can get coal from Spitzbergen cheaper than it can be delivered from the collieries of Newcastle, and of a better quality. Enough coal is available there to pay the cost of the present war.

Victoria, B. C.—Diamond drilling of some coal property situated near the Sable River, Vancouver Island, is to be undertaken at an early date. A road now is being constructed up the river to permit the shipment of machinery to the prospect.

Nanaimo, B. C.—The Granby Consolidated Mining, Smelting and Power Co., Ltd., has awarded the Roberts & Schaefer Co. a contract for the erection of the coal washery to be located at the new mine near Cassidy's Siding. This company has completely equipped the tipple at this point, installation comprising Marcus picking table screens and loading booms.

Prince Rupert, B. C.—The coal problem has become so live an issue in this city that the City Council has appointed a special committee to investigate and report. It was charged recently that not only were the consumers of this community required to pay exorbitantly for their fuel, but that what they bought was much below the standard of first-class domestic coal. It seems that the Telkwa mine, situated on the Grand Trunk Pacific Railway, a short distance from Prince Rupert, has been unable to meet the demand chiefly because of difficulties encountered in obtaining transportation facilities. However, bunkers now have been built at a mine, a siding constructed, and arrangements effected which it is said will permit the shipment of a carload a day to the city.

Berlin—Under date of Dec. 23 the *Tageblatt* says it is informed that new strikes have broken out in the Silesian coal field, as a result of agitation carried on by agents of Dr. Liebknecht, radical socialist leader. [The Silesian coal field is in Poland.] The agents succeeded in inducing the miners to repudiate an agreement that recently had been entered into with the mine owners. The present Silesian output is half that of normal times. The Rhenish Westphalian coal fields also are partly paralyzed by a strike which has cut down the usual output one-third. The Socialist *Vorwaerts* declares that the entire industrial activity of Saxony will be crippled within two weeks unless more coal is assured.

Sydney, N. S.—Another development has come about in connection with the dispute concerning the operation of the submarine coal areas at Sydney mines. Some time ago the Nova Scotia Steel and Coal Co. sought from Fuel Controller Magrath an order granting it the right to operate on some of the Dominion Coal Co.'s areas. After hearing the case the Controller recommended that a 500-ft. strip of coal to the south part of the Princess mine should be taken from the Dominion Co. and given to the Nova Scotia, and that a 1000-ft. strip north of the Florence workings would also be taken. It is believed, however, that the Federal Government has not the power to take either of these areas but, if it desires to act, must expropriate and leave the question of damages and value to the Exchequer Court. It is now understood that the Dominion Coal Co. is prepared to take over the Florence slope from the Nova Scotia and guarantee its continuous working, or in case the Nova Scotia Company will not agree to this, the Dominion is ready to proceed to open its own slope and utilize the coal areas in that vicinity.

Personals

Tipton Stillwell, sales manager for the Boehmer Coal Co., St. Louis, Mo., resigned that position to go with the Bell & Zoller Coal Mining Co., of St. Louis.

George A. Ramsey has succeeded **R. T. Heller** as manager of the Columbus (Ohio) office of the Lake Erie Coal Co., the latter returning to the Cleveland office. Mr. Ramsey was formerly a resident of Columbus.

M. L. O'Neale has resigned as superintendent of the Connellsville Basin Coke Co., near Morgantown, W. Va., to accept the position of mine and mill superintendent of the New York Pyrites Co., at Gouverneur, N. Y.

Captain R. L. Douglass, who has been with the Fuel and Forage Division of the Ordnance Department, has resigned his commission and accepted the position of assistant general sales agent with the Consolidated Coal Co., of St. Louis.

Ben Percy, of Woodward, Jefferson County, Alabama, has resigned his position as general superintendent of coal mines of the Woodward Iron Co., of Woodward, Ala., effective Jan. 1, 1919. His successor has not yet been appointed.

E. G. Ridgway, for the past two years connected with the St. Louis office of the Peabody Coal Co., and previously in charge of the St. Louis office of George G. Pope & Co., has gone into business under the style of E. G. Ridgway, 1220 Syndicate Trust Building, St. Louis, Mo.

F. E. Bourget, who for the past thirteen months has been handling the distribution of bituminous coal throughout Ohio, Michigan, Indiana and West, for the United States Fuel Administration, has resigned to accept the position of special sales agent of the Interstate Coal and Dock Co., with offices at Cincinnati, Ohio.

Horace N. Trumbull, who has recently received his discharge from the Engineers Officers' Training School at Camp A. A. Humphreys, Va., has been appointed advertising manager of the Wellman-Seaver-Morgan Co., of Cleveland, Ohio. Before entering the service, Mr. Trumbull was advertising manager of the SKF Ball Bearing Co., of Hartford, Conn.

Capt. Edward Steidle, of the chemical warfare service, on his return from France will be restored to his old position, that of being in charge of Bureau of Mines Rescue Car No. 1. Captain Steidle went to France with one of the first gas and flame companies and saw much active service. He received a severe wound in the face, which destroyed the sight in one eye.

Joseph E. Thompson, of Benton, Ill., has been appointed director of the department of mines and minerals for the state to succeed Evan John, recently deceased. Mr. Thompson is well-known through the southern Illinois field. He was born in England and his first mining experience was obtained there. Since coming to this country he has had ample experience to qualify him for mine work. He has served in various important positions throughout the mining fields in Illinois.

H. W. Clarke, who until Dec. 15 was connected with the Advertising Service Department of the McGraw-Hill Co., at Chicago, has been appointed manager of advertising for the Chicago Pneumatic Tool Co., Chicago, Ill. Mr. Clarke has been identified with the engineering advertising field for several years. Prior to his connection with the McGraw-Hill publications he spent eight years with the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., part of the time as a member of the sales and publicity departments and later as Western publicity representative with headquarters at Chicago.

Obituary

Henry D. Thomson, aged 63 years, superintendent of the Fairhaven mine of the Pittsburgh Coal Co., died Dec. 24 at his home, at Carrick, Penn., of heart trouble. Mr. Braddock was born near Braddock and had lived on the South Side and in the Pittsburgh district. He had been with the Pittsburgh Coal Co. since its organization. For eight years he was superintendent of mines at Willock. A year ago he removed to Fairhaven.

Industrial News

Canton, Ohio—The capital of the Huff Run Coal Co. has been increased from $50,000 to $100,000.

Bellevue, Ky.—The Gorman Coal and Supply Co., capital $25,000, has been incorporated by E. A. Gorman, W. P. Neekamp and A. Z. Litz.

Russellton, Penn.—The Republic Collieries Co. has contracted with the Roberts & Schaefer Co. for a Marcus screen to be installed in its tipple at this place.

Cleveland, Ohio—The Cambrai Coal Co. has been chartered with a capital of $300,000 by E. S. Wertz, E. K. Geiselman, Joseph G. Breitenstein, D. E. Wertz and E. J. Wertz.

East Greenville, Ohio—The Dalton Coal Mining Co. has been chartered with a capital of $85,000 by George A. Enos, Fred S. McConnell, E. J. Underhill, R. M. Koob and Harry Abels.

Birmingham, Ala.—The Natural Bridge Coal Co. has been incorporated here, with a capital stock of $10,000. W. M. Holt is president and Palmer Daugette, secretary, Birmingham, Ala.

Cincinnati, Ohio—The Meadows Cannel Coal Co. has been chartered with a capital of $30,000 by Okey Meadows, Louis H. Stone, W. H. Schilderick, John R. Schindel and H. E. Christman.

Ashland, Ky.—The Lackey Coal Mining Co., recently organized with a capital of $100,000, has leased extensive coal properties along Beaver Creek and is arranging for early development.

Clarksburg, W. Va.—The Edgar Coal Co. has been incorporated by E. H. Bell, J. W. Agner, Harry W. Sheets, and others, all of Clarksburg, with a capital stock of $25,000, to operate a coal mine in Harrison County.

Huntington, W. Va.—Owing to the absence of many members of the West Virginia Coal Mining Institute, the winter meeting has been postponed. The next meeting of the Institute will be held in June, 1919.

Hartland, W. Va.—The Moran Coal Co., recently incorporated with a capital of $100,000, has perfected its organization. The company has acquired the plant of the Hartland Fuel Co., and is planning to increase the present capacity of two cars per day. Sam Moran is president.

Columbus, Ohio—W. K. Field, of Columbus, president of the Pittsburgh Coal Co., is also president of the Pittsburgh Coal Co. of Illinois, a new $2,000,000 corporation, chartered to carry on business in the State of Illinois. H. J. Elliott, of Chicago, will represent the company in that state.

Clarksburg, W. Va.—The Edgar Coal Co. has been organized for the purpose of mining coal in Harrison County, the new company having a capital of $25,000. Clarksburg people incorporated the company. Their names are E. H. Bell, Estelle Talbott, J. W. Agnew, Maud R. Agnew and Harry W. Sheets.

Charleston, W. Va.—The Charleston Domestic Coal Co., of which J. S. McVey, of Columbus, is president, has closed a deal whereby it has sold a working property of 900 acres on the Kanawha & Michigan west of Charleston to the Charleston Co-operative Coal Co. The plant has a capacity of about 600 tons daily.

Logan, W. Va.—The Peach Creek Coal Co., with an authorized capital of $99,000, plans the development of coal lands in Logan County, near Hughey, on an extensive scale. Those chiefly interested in the new company include N. E. and George C. Steele, M. E. Robinson, Mrs. Maude Steele and C. S. Minter, all of Hughey.

St. Louis, Mo.—The St. Louis Coal Co., one of the oldest jobbing and operating concerns in the city, was recently absorbed by the Lumaghi Coal Co. The St. Louis Coal Co. had three mines—the Slogo mine, at Marion, Ill., the Coulterville mine at Coulterville, Ill., and the Henrietta mine, recently dismantled, near Edwardsville, Ill.

Columbus, Ohio—Bids will be opened Jan. 6 by George A. Borden, president of the Columbus Board of Purchase, for 1400 tons of Hocking nut, pea and slack for the garbage and refuse disposal plants; 2000 tons of Hocking nut, pea and slack for the water-works department, and 3500 tons of Hocking nut, pea and slack for the municipal lighting plant.

Cleveland, Ohio—The Wellman-Seaver-Morgan Co., of Cleveland, Ohio, has opened a San Francisco office at 415-417 Rialto Building, in charge of Norman S. Ross. Business originating from California, Nevada west of the 115th meridian, lower California and the counties of Josephine, Jackson and Klamath, in Oregon, will receive the prompt attention of Mr. Ross.

Louisville, Ky.—A recent report from Whitesburg, Ky., was to the effect that the Woodburn Coal Co. has about completed its new mining town near Blackey, on the Rockhouse Creek branch railroad, and the new town of Woodburn. The company expects that the branch line will be ready to receive coal shortly after the first of the year, and will be ready to make shipments.

Birmingham, Ala.—The Frisco system on Dec. 21 announced an increase of five cents a ton on coal shipments from Alabama mines into Birmingham, effective Dec. 26. The rates with the increase added make the charge on these shipments 70c. from group 1, 80c. from group 2 and 85c. from group 3. A year ago the rates from these points were 30c. from group 1 and 40c. from groups 2 and 3, the last advance making the rate more than double from groups 1 and 2 and almost double from group 3.

Harrisburg, Penn.—Fewer accidents were recorded in the mines of Pennsylvania during the first eleven months of 1918 than in the corresponding period of 1917. Records compiled by the State Department of Mines show that in the anthracite region there were 419 fatal accidents inside the mines and 89 outside, in the period referred to, compared with 451 inside and 91 outside for 1917. In the bituminous region in 1918, there were 416 inside accidents and 45 outside, compared with 424 inside and 37 outside of the mines in 1917.

St. Marys Falls Canal, Mich.—During the season 1918 a total of 15,770,560 net tons of bituminous coal passed through the canals at Sault Ste. Marie, Michigan and Ontario, as compared with 15,736,654 net tons for the season of 1917, an increase of 33,906 net tons. The total of anthracite going through in 1918 was 2,211,050 net tons, as against 2,562,199 in 1917, a decrease of 351,149 net tons. The United States Canal was opened Apr. 20 and closed Dec. 14, 1918; season, 239 days. The Canadian Canal opened Apr. 23 and closed Dec. 17, 1918; season 239 days.

Philadelphia, Penn.—The famous Greenwich coal piers of the Pennsylvania Railroad are being demolished. These piers at the foot of Snyder Ave., at the time of their erection more than 25 years ago, were the finest in existence, having 80 loading chutes on the five piers. After the site has been cleared, which it is estimated will take a year, the city will erect municipal piers on the ground. The railroad company adready has in use a new series of piers just to the north of the old ones, the new piers being outfitted with modern car dumpers and capable of handling 25,000 tons of coal a day.

Columbus, Ohio—A complete reorganization of the Sunday Creek Coal Co., the New Jersey corporation, has been effected by the election of John H. Winder, president; P. A. Coen, vice president; J. P. Smith, secretary, and C. C. Cook, treasurer. J. S. Jones, the owner, was elected chairman of the board of trustees. The capitalization remains at $4,000,000, and the company will continue to operate under the New Jersey charter. The receivership, which continued for more than two years, was lifted recently upon orders of the court. Mr. Coen will continue as president of the Buckeye Coal and Railway Co., and the Ohio Land and Railway Co.

Bluefield, W. Va.—Chartered a short time ago with a capital of $300,000, the Big Munsey Coal Land Corporation has been launched as an important factor in the coal industry, officers having been elected a few days ago at a meeting held here, with M. H. Pedigo, of this city, as the company's first president. The vice president is A. F. Leckie and the secretary, A. E. Jennings. On the board of directors are William Leckie, M. H. Pedico, A. E. Jennings, A. F. Leckie, W. S. Morris, T. S. Crockett and J. T. Wooten. The Big Munsey company has acquired about 2000 acres of land on Pigeon Creek, in the Thacker field, much of which is covered with fine timber as well as being underlaid with six different seams of coal with a total aggregate thickness of 35 feet.

Seattle, Wash.—The Alaska Bureau of the Seattle Chamber of Commerce and Commercial Club recently received an urgent appeal for a supply of fuel from the Territorial Council of Defense, Juneau, Alaska. W. A. Clark, chairman of the latter body, stated that there was only enough coal in Juneau at that time to last four days and that none was to be found at Douglas City. As Juneau is in the Government Forest Reserve, no wood was available. Mr. Clark was told that the delay in dispatching fuel to the North was owing to the fact that the vessels of the Seattle-Alaska fleet could obtain none in the Northwest. Since then, however, the freighter "Latouche" loaded 800 tons at the Pacific Coast Coal Mining Co.'s bunkers, Seattle, and will discharge it at Wrangell and Juneau. It is feared that if shipments are not maintained more regularly there will be much suffering in the northern British Columbia and Alaska centers this winter.

MARKET DEPARTMENT

Weekly Review

Decrease in Production of Soft Coal Serves to Tighten Market—Purchasing Agents Now Out of the Market May Find It Hard to Get Coal Later—Anthracite Situation Exceedingly Favorable Due to Mild Weather.

THERE is an element of danger to consumers of bituminous coal in the present stagnant condition of the coal market. Production has declined steadily since the latter part of September, due partly to car shortage, to lack of labor and of late to a lack of demand. Instead of buying coal for their current needs and keeping their stock piles in reserve to meet possible emergencies, industrial consumers are staying out of the market and revert to their storage piles in the belief that prices must soon come down.

If production of coal had been maintained at its former high level, this attitude on the part of buyers would have demoralized the industry; for with an overstocked market prices undoubtedly would have fallen considerably below the Government maxima, and purchasers could have dictated as to quality and price. In fact bituminous operators only a short while ago, were decidedly pessimistic over the outlook. However, from the operator's point of view the situation now evidences signs of improvement. Modifications of zoning restrictions have enabled many mines to extend their shipping radius. Government prices have been adhered to rather generally, due to the fact that production has constantly been decreasing, and consumers who have depleted their accumulated reserves may find themselves unable to get all the coal they want just when they want it.

Labor in the bituminous regions is restless, transportation will slow up during stormy weather, and taking it all in all, the better part of wisdom would be for buyers to take advantage of the present favorable situation and keep the mines working. Government prices will not be abandoned before Feb. 1, and it may be that even if price control is relinquished the zone system of distribution will be adhered to. The need for transportation is as great as ever, and it has been definitely ascertained that the establishment of the zones has been responsible for the saving of thousands of car-miles.

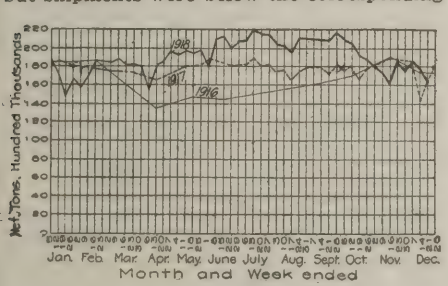
During the week ended Dec. 21 (the latest statistics available) the output of bituminous coal is estimated at 10,136,000 net tons. Production has fallen off in Ohio, Pennsylvania and West Virginia, though a slight improvement is discernible in the reports coming from Illinois and Indiana. For the coal year to date the total output of bituminous is 441,361,000 net tons, more than 38,000,000 net tons greater than the output of the same period in 1917.

Owing to the continuance of favorable weather on the Atlantic seaboard, the demand for anthracite coal has not been urgent. The distribution of the available tonnage has been accomplished with a great deal of efficiency, and at Christmas time not a single city in the United States reported a serious need for hard coal with the exception of Elizabeth, N. J. Emergency shipments were rushed to that point to relieve the situation. Dealers can dispose promptly of their stocks of the larger domestic sizes of anthracite, while buckwheat, rice and barley (the so-called steam sizes) are plentiful and do not move rapidly.

During the week ended Dec. 21 the output of anthracite coal is estimated at 1,839,000 net tons. The total production for the coal year to date is 72,541,000 net tons, a decrease of 1,400,000 net tons compared to the corresponding period of 1917.

WEEKLY COAL PRODUCTION

Bituminous—The decrease in the production of bituminous coal in the week ended Dec. 21, of nearly 500,000 tons, compared with the previous week, was largely in the Ohio, Pennsylvania and West Virginia districts. In Illinois, Indiana and the fields south and west, slight gains are reported, but shipments were below the corresponding



week of 1917. The estimated average daily output decreased from 1,831,000 tons in the week ended Dec. 14, to 1,689,000 tons in the week ended Dec. 21. Production in the week of Dec. 21, 1917, was greater by about 800,000 tons than that recorded in the corresponding week of 1918.

Anthracite—The production of anthracite in the week ended Dec. 21 is estimated at 1,839,000 net tons, a decrease compared with 1,924,000 tons the previous week, but a gain compared with the corresponding week of 1917. The total production from Apr. 1 to date is estimated at 72,541,000 net tons, about 1,400,000 tons less than in the corresponding period of 1917. The record for the calendar years 1918 and 1917, however, will not show as great a difference.

Rail receipts and tidewater dumping for New England were 258,000 net tons in the week of Dec. 21. compared with 326,500 tons the week of Dec. 14, and a weekly average of 542,700 tons for the coal year to date.

Total dumping at the North Atlantic harbors decreased slightly in the week of Dec. 21, from 695,506 net tons to 642,575 tons. New York and Philadelphia reported an increase of 40,000 tons, Baltimore and Hampton Roads recording decreases.

Beehive Coke—The production of beehive coke in the week ended Dec. 21 is estimated at 570,000 net tons, compared with 553,000 tons the previous week, and 657,000 tons in the coresponding week of 1917.

Byproduct Coke—Little change was reported in the production of byproduct coke, the output for the week ended Dec. 21—579,268 net tons—representing only a slight decrease below the previous week. Operators in New York State report continued difficulty in obtaining adequate supplies of coal. Operation below capacity is also reported from Massachusetts and Pennsylvania because of lack of demand for the coke. Lengthened coking time and the use of coal from stock piles that gives an improper mixture, causing the coke to stick in the ovens, are among the reasons ascribed for loss of maximum capacity.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running about the same as for the corresponding week of 1917. Road sales for both immediate and future delivery were less than for the same week of last year. Retailers report that holiday business reached a most gratifying total. Collections are good.

Dry Goods Economist—The higher market for raw cotton has its influence on cotton goods prices. The high of last week (29.44c.) having been superseded by a raw high of 32.60c. for spots, prices for gray cloths at the mills advanced ⅛ to 1c. per yard. Finished cotton goods, however, have not advanced. While the list prices issued by mills and by selling agents are unchanged, however, concessions which could be had in some cases last week are now denied. Jobbers declare that lower prices on cotton fabrics of all classes are out of the question, and expect the quotations now ruling to continue in effect for at least a month to come.

American Wool and Cotton Reporter—There is a large supply of wool in the world, in fact, a great oversupply, as compared with an undersupply of cotton. This is exactly the opposite condition to that which was expected when the war commenced, and it is likely to be a rather long time before anything like a satisfactory condition can develop in regard to raw material. For cotton there has been some improvement during the week under review. This improvement is based largely upon the more or less steady export sale of cotton, and upon improvement in so-called trade buying. Unquestionably, the industry in the United States is consuming less cotton than it has for a long time, and the consumption is still declining rather fast.

Bradstreet's—The larger aspects of things indicate conservatism, much feeling about for definite tendencies preparatory to swinging back to normal, further cancellations, inventorying, increased supplies of labor, downward revisions in prices of metals, divorcing of the government from commercial operations, and preparations for the marketing of supplies that

had been gathered for the purposes of war. The present post-holiday lull in wholesale and manufacturing quarters is more noticeable than a year ago, when war work kept things moving at a feverish pace, and marking time will probably be the rule until salesmen in numbers again take to the road or buyers arrive at the principal markets. Meantime, extensive plans are afoot for seeking trade abroad and here, and while elements of uncertainty hold more or less sway, pessimism is conspicuous by its absence.

The Iron Age—Sellers continue to call attention to high costs and low stocks and it certainly is true that the stocks of pig iron in furnace yards are very low, but there is an increasing tendency on the part of pig iron sellers to accept the new schedule which reduces prices $3 per ton on sales for delivery after Jan. 1. A few furnaces still insist that they will not reduce prices, but it is probable that at an early date the quoting at the lower level will prevail as to a very large percentage of the tonnage still to be sold for the first half of 1919. Statistics show, however, that many furnaces are sold up to July 1 as to 90 per cent. of their estimated production. In finished materials, there is very little buying at the new schedule. This causes no disappointment, for it was not expected, during the holiday season with so much uncertainty existing for various reasons as to the future, that buying would be active.

Atlantic Seaboard

BOSTON

Little inquiry. Railroads cease buying. All-rail movement continues light. No significant developments as to prices. Somewhat more optimism as to the future. Embargo against all-rail route via Shippensburg lifted. Hampton Roads dumpings light for New England. Uncertainty as to marine freights. Rumor that rehandling factors are seeking to "cover" contracts. Some inquiry for high volatiles. Narrow market over New York piers, and surplus of barges. Water-borne coal practically unsalable in open market. Few steamers now in coastwise trade. Anthracite movement improves both all-rail and by water. Railroad Administration standardizes rates on railroad-owned barges. Surplus of broken, egg and pea in most cities; stove and chestnut still scarce. Fuel Administration still holds on to distribution.

Bituminous—Salesmen who are canvassing the trade are able to develop little inquiry. The weight of opinion is all against buying fuel that will not be used for months, and there is too great anxiety on the part of steam-users to get clear of coal now on their dumps to warrant them in making purchases at this juncture. Uncertainty there is as to the future, but there are few who believe that even the fancy grades will command anything over the present Government level when the market opens in the spring. There have been quiet intimations lately that certain standard coals could be had for 15 and 20c. off, but these instances are hard to verify and without doubt reflect more the desire of the selling agent for business rather than any such desire on the part of the operator. Quotations of this kind are of course only for spot shipment.

Even the few railroads that were buying current all-rail to avoid picking up too much from storage have now ceased to place orders, and the market is bare indeed of new business. The railroads are particularly anxious at this time not to commit themselves for any definite price beyond the present, for the whole question of price on railroad supply coal is likely to be raised very shortly, even if the Fuel Administration refrains from withdrawing the fixed price. All concerned will make moves very cautiously the next few weeks.

On the part of several of the Pennsylvania shippers there are extra efforts just now to dispose of smithing coal, especially in box cars, but the outlet in this territory is much restricted, so much box-car coal having been placed through the Fuel Administration during July, August and September. Other than this there seems little consistent effort to place coal. A few of the power plants whose regular source of supply has been affected by influenza or shortage of labor for other reasons have made conservative purchases, but the tonnage has been small and the prices paid were closely in line with regulations.

All-rail movement continues very light, as indeed does all traffic on the New England roads. The average daily receipts for the past week at the five gateways were but 219 cars commercial bituminous, although railroad fuel showed something of an increase. The latter is accounted for by the beginning of deliveries on the part of some operators who failed to make them earlier on their contracts. It should also be remembered that there is still quite a volume of coal due the railroads on long-term contracts made well before coal took its upward swing nearly three years ago. All reports from the different regions show no dearth of car-supply; the low output is due almost entirely to illness and the disinclination of miners to work more than a few hours a day.

The small receipts from every quarter give the trade reason to feel more optimistic as to the future. While the weather is mild and stocks are not being depleted as a year ago, the fact remains they are getting less all the time and shipments are well below actual consumption. It is only a question when buying will begin; whether in April or earlier. A great deal depends upon the tide-water situation and the cost of coal by that route. If the prospect is for high prices in that connection then there will almost certainly be an active market for all the good grade coal that can possibly reach New England by rail. That much seems plain. And it is also a fact that curtailment has not been so drastic in the different lines of manufacture as was feared when the armistice was signed. All in all there is less pessimism in trade circles than two months ago, and there is not the apprehension over the possible withdrawal of the Government price.

A zone modification order made public in Washington on Dec. 24 permits shipments now via Shippensburg from operations on the Baltimore & Ohio and the Western Maryland railroads, thereby reopening the all-rail route to New England points. This is received with a good deal of relief by consumers who made contracts last year assuming the coal would continue to move all-rail and then were obliged later to accept delivery via the New York and Baltimore piers, with all the attendant charges.

At Hampton Roads there is still a large surplus of coal as compared with bottoms to load. Steamers and barges for New England grow smaller and smaller in number, and there are days when the clearances for this territory are practically nothing. Shipments on contract are extremely light, and are confined for the most part to large requirements where storage for more than a few weeks is not readily available. The shippers are looking for a revision in rates from Hampton Roads to Boston, but no intimation has yet been made as to what the new freights will be. Until some announcement of policy in this respect is made by the Shipping Board, it will be impossible to open the way for a new contract season.

Certain of the rehandling factors, however, have already approached their trade with propositions that in consideration of service the past year the customer is looked to for a season order this year, the price to be arranged later, but the contract to be considered "covered." This is what is expected to happen where connections have been strong for a term of years, but it is a little unusual to approach new trade in this way. Other than this there are no developments looking to season contracts.

There are signs of restricted inquiry for some of the fancy high volatile grades. It is natural that there should be dissatisfaction over the treatment accorded some of the consumers of these grades and that there should be attempts to close elsewhere the coming season. This is particularly true in cases where gas coal shippers have insisted that plants take their supply by water in the shippers' own transportation, and now there are some orders in the market for gas coal operators who are in position to send coal all-rail and will commit themselves to that route. Several of the shippers of high volatiles are discouraging in their predictions of light output. Some have gone so far as to say that the moment the Government price is taken off the better grades will soar at least $1 a ton.

The outlet for coals, even of fairly high grade, over the New York piers is narrow and inactive. Bunker demands are greater some weeks than others, but even for such purposes there is hardly a dependable market. Ports on Long Island Sound are taking little spot coal, and one result is a surplus of box barges. Water-borne coal in any port in New England is today practically unsalable, so far as the open spot market is concerned.

Anthracite—The movement of domestic sizes continues to improve all-rail but not to the extent anticipated. For the past week the average receipts were about 340 cars. The mild temperature of Christmas week had its effect upon the big city markets and for a day or two it looked as if coal would be rushed to New England by water in greater volume than at any time in a year. The barges were available and the coal was on hand, but the piers were so congested with the heavy accumulation of cars that undoubtedly a large tonnage was lost to New England. There were crews to load small boxes for New York retailers when the larger craft for this side of Cape Cod were left unattended. In spite of this, however, receipts have increased in several directions and it is now pretty well established that there is a surplus of broken, egg and pea in the hands of many dealers in the larger ports. Stove and chestnut are still scarce, but the companies are contriving to give each customer a share of the desirable sizes.

NEW YORK

Anthracite situation shows improvement. Domestic sizes continue to be short but demand falls off, most household consumers having received two-thirds of their winter supply. Smaller sizes plentiful and restrictions removed from buckwheat. Concessions on barley. Bituminous market unsteady. High grades scarce with fair and poor grades plentiful. Not much change expected during the next few weeks.

Anthracite—The situation shows a general improvement. There is a steadier movement of all domestic sizes, especially egg, stove and chestnut, which have been extremely short in this market for some time; and while the dealers could take care of heavier tonnages, there is plenty coming forward to meet current requirements. With conditions as they now are remaining for a few weeks longer, there are tradesmen who predict an overstocked market. Consumers, most of whom have already received two-thirds of their order placed last spring, are not willing to take the remaining third, and as a result retail dealers ended the year with deliveries slow and in some instances some of their help idle.

New York continues to live up to its reputation as a "weather market." Many consumers lay in only enough coal to tide them over a couple of weeks and then, when a sudden cold wave strikes the city or there is a heavy storm that interferes with traffic, they rush to their dealer with a rush order and expect it to be delivered at once. Present conditions are much the reverse of what they were a year ago, when the thermometer registered from 12 to 18 deg. lower than it registered the first of this week. At that time there was a serious coal shortage, and with the cold wave there was untold suffering, especially among the very poor.

Dumpings at the local docks for the seven-day period ended Dec. 27 amounted to 5691 cars, a decrease of 690 cars from the previous week. For the first 27 days of December there were 23,153 cars dumped, as compared with 19,724 cars for the corresponding period of November.

The situation with regards to the smaller sizes is unsteady. Supplies are steadily increasing and quotations below those made by the larger shippers and producers have been reported. Restrictions issued by the Anthracite Committee on May 27 against the shipment of No. 1 buckwheat and larger sizes to certain consumers have been removed to the extent that buckwheat can now be sold to any consumer who may wish to purchase it. This, it is believed, will go a long way toward keeping the stock of this coal down. The restrictions, however, continue in effect on shipments of pea and larger sizes.

Rice and barley are nearly a drug on the market. Stocks with some shippers are so large that concessions are being quoted, especially on barley.

The prospect of a settlement of the wage scale demands of drivers, engineers and yardmen employed by the retail dealers is not encouraging. Representatives of the State Labor Board, the War Labor Board and the State Fuel Administration have had conferences with the retail dealers and the representatives of the Union, but no satisfactory agreement has been entered into. If the demands of the men are granted it will involve a 50 per cent. wage increase, which would automatically increase the retail price of coal at least 50c. per ton, as the workmen, besides asking for a wage increase, also demand shorter hours of employment. The dealers consider that the advances asked for are unwarranted and beyond reason, some of them preferring to face a strike than to grant the increases. The men are also very determined, and say they will hold out for their demands.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$7.80	$8.55
Egg	7.70	8.45
Stove	7.95	8.70
Chestnut	8.05	8.80
Pea	6.55	7.30
Buck	5.10@6.05	5.90@6.25
Rice	4.65	5.10
Barley	4.15	4.30
Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—There is no activity in the local market. High grades of coal are in good demand, but they are scarce, while there is plenty of the cheaper grades with no call for them. Consumers continue to depend upon their present stocks rather than lay in additional coal of an inferior quality at high prices. Many consumers, too, believe that prices will be lower when the restrictions are removed.

The only salvation of the trade is better coal-consuming weather. But even with lower temperatures no big improvement is looked for until about the middle of the month. Production already curtailed because of influenza and a desire on the part of labor to observe the holiday season, some by devoting several days to hunting, is not likely to show any improvement until about the second week of the month. Even then consumers will not be any too anxious to increase their holdings but will continue to watch the situation closely in the hope of picking up good coals at lower prices.

Producers and shippers are uncertain as to what the outcome will be after Feb. 1, to which time announcement has been made in Washington maximum prices and zone regulations are to remain in force. As has been previously stated, and the same seems to hold good now, the opinion is about evenly divided that prices for the higher grades of coal may advance slightly in accordance with demand and that those for the cheaper grades will decrease in the same proportion.

The matter of contracts is again coming to the front. Conditions similar to those existing last spring are now prevalent. Producers see no advantage in signing up a portion of their output with the price situation as it now is. On the other hand, there are consumers who are willing to make a contract providing a clause is inserted allowing a change in price if there should be one. Producers and shippers contend that there is nothing to be gained by making a contract because of the fact that at least in many instances, if there should be a lower price in vogue, the consumer would find some way to break it unless his shipper would agree to the lower figure. Then it is always customary for producers and shippers to take care of their regular customers, no matter what conditions might be, and at the regular market quotations.

Some shippers have had difficulty in moving refused coal and concessions of 50c. below the Government figure have been heard of. Some of the pools containing coals suitable for bunker purposes are reported as filled. This, it is said, is particularly true of Pool No. 10, and some of the shippers interested are said to be willing to forego part of their extra allowance of $1.35 in order to move their coal.

Reports have been received here of concessions for certain grades of Pittsburgh gas coal. The gas coal supply here is not as large as it was a few weeks ago, and prices are steady.

There were dumped at the local docks during the week ended Dec. 27 5128 cars, as compared with 6413 cars the week previous, a decrease of 1285 cars. For the first 27 days of December the dumpings amounted to 22,091 cars, as against 22,502 cars for the same period of November.

Current quotations, based in Government prices at the mines, net ton f.o.b., tidewater at the lower ports, are as follows:

	Mine, Gross	F.o.b. N. Y., Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite trade still quiet. Weather very mild. Fuel officials urge buying. Credit question to the fore. Pea and egg becoming burdensome to shippers. Stove and nut supply improves. Steam sizes all dull. Buckwheat exemption cancelled. Bituminous short. Holidays cut production. Railroad confiscates best coal. Prices remain firm.

Anthracite—The fact that the local fuel administrator announces through the daily press that the public should not put off buying more coal because the weather is mild shows in a sense there is no active demand at present. Mr. Lewis states that the chances of obtaining a good supply now are probably better than they will be at any time later in the winter, and that consumers are making a mistake in waiting for severe weather before getting coal, when there is likely to be a rush and everybody will want coal at the same time.

After interviewing the largest retail concern in the city, we are more convinced than ever that the orders as originally placed by the householders were greatly inflated. This firm states that refusals to accept coal have recently become so numerous that they doubt if 10 per cent. of the unfilled orders now on hand would be received by the customers were they able to deliver the amount immediately.

Many dealers report their business in comfortable shape. They have no pressing demands that are neglected. A small number of consumers are soliciting credit, and this feature is being given some thought by the retailers. Of course, under the supervision of the Fuel Administration there is practically no competition in the coal trade, and dealers are still in position to demand cash with almost every delivery; the exception being such trade as has never abused its credit. However, the fact that the supply is becoming greater than the demand leads to the feeling that the restrictions of the Fuel Administration will be released almost over night. It is then that the customer will be permitted to go where he will to purchase coal; as a consequence, the dealers will have to once more offer inducements to keep their trade or to gather in new business. The producing companies are watching the situation closely and will make every effort to keep their accounts in good shape.

As to present supply, it would seem that retailers who are affiliated with the individuals are in good shape. It may be their production is above that of the basic year 1916-17, also it is possible that the anthracite committee is not making the same stringent demands as upon the big companies. It is becoming known that the larger operators, those who do not charge the differential of 75c. per ton, are receiving requests from quite a number of dealers to suspend shipments on egg and pea, and wonder is being expressed as to how the business of the smaller houses, especially on these two sizes, is being affected.

Limited production during the holidays and some colder weather will no doubt greatly alter the situation. Stove and chestnut are still in demand by practically all dealers. The largest operating company has made substantial gains where it was delinquent and few complaints are being made.

Another of the large companies has, however, made no progress whatever and is sadly neglecting this market. For some reason the fuel authorities are ordering heavy consignments of this coal in other directions, and it is leaving its customers here in desperate shape. Buyers who had been dealing with this concern exclusively are at their wits' ends and are free in expressing their determination to never again depend entirely on one shipper.

Strange as it may seem, a substantial tonnage of this company's business has been transferred by the fuel authorities to a middle house, and the coal will be shipped from an operation that has no direct selling force. The coal will therefore cost the dealers, and hence their customers, 95c. per ton more than they expected to pay. To say that the trade is objecting is putting it mildly. All the dealers affected will not accept the arrangement, while others say they are compelled to. The concern referred to is fully cognizant of the position in which it is being placed, but apparently will let nothing interfere with its policy of strictly following the rulings of the Anthracite Committee, regardless of any effect it may have on its future business relations with its trade.

The steam coal market is weak. The fact that Port Reading has been embargoed was quickly reflected here in a heaviness of all steam sizes, including buckwheat. Buckwheat has weakened considerably, with rice even worse, barley unsalable and culm absolutely off the market with no likelihood of its return. The buckwheat situation is reflected in a new order sent out by the fuel administration removing all restrictions on this size. It will be recalled that under date of Jan. 17, 1918, buckwheat had been declared a domestic size and no shipper could ship it to an industrial plant without a special exemption from the administration. Under the recent ruling shippers are now permitted to find a market anywhere for this size.

The prices per gross ton c.o.d. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.45
Egg	4.80	6.15	Rice	2.90	3.80
Stove	5.05	6.40	Boiler	2.70	3.70
Nut	5.15	6.50	Barley	2.40	3.30
Pea	3.75	5.00	Culm	1.25	2.15

Bituminous—There continues to be a tendency to a stiffening in the demand for soft coal, but only on account of shortened production. Most of the shortage has been occasioned by the holidays, which the men are inclined to lengthen out even longer than usual. Some operations report strikes due to purely minor differences, such as the cost of furnishing carbide for lamps, which illustrates the tendency of the men to slacken work.

The greatest stringency continues in the best coals, and this week the Pennsylvania Railroad has confiscated a greater quantity than ever of the low volatile coals. In the districts served by the Baltimore & Ohio the car supply has also been somewhat restricted, although in the Pennsylvania districts the average has been somewhat better.

As to price, the general impression now is that the full Government price will prevail until some time in February, for despite any other influences, even mild weather, it is thought the demand up to that time will be sufficient to warrant a continuation of price regulation.

BALTIMORE

Closing days of December see first snow flurries. Soft-coal situation easy, and hard-coal supplies now pour in for trade.

Bituminous—A wee touch of winter has come to Baltimore after a fall and early winter season of exceptional mildness, and the past week saw the first snow flurries. Easy movement of coal-laden cars and a large tonnage production led to heavy deliveries of soft coal to this section. Some few mining districts complained of lack of cars, but the majority of openings were liberally treated. The movement to this section is heavier than the more urgent demand warrants, and some little difficulty was experienced the past week (and is still being experienced) in getting rid of less desirable fuels.

The tendency, in the face of a steady improvement in the grade of coal coming in to this district, is to seek the better classes. There is now no talk of cutting the Government prices, however, and this is accepted as a healthy sign. Many in the trade predict that the specialized coals will sell above the Government maximum as soon as the restrictions of the Fuel Administration are removed.

Anthracite—At last the retail hard-coal trade is seeing a liberal supply released here. The December movement was so satisfactory that the thoughts of famine in the minds of every coal man just before the armistice was signed have vanished. Already some of the more important companies here are asking their customers how much they will take of the one-third undelivered on the books of the coal men. The mild winter may cause some orders to be cut down a bit; and besides, consumers have learned many lessons in economy in burning.

A few of the dealers are still considerably back of their two-thirds delivery, but the inflow of coal is now taking care of all urgent cases. A few dealers are storing a little coal. The month of December will probably have seen a total movement in excess of 75,000 tons of hard coal when the official figures are made up. For the coal year from Apr. 1 to Dec. 1 a total of 435,063 tons was received in Baltimore for domestic and public service corporation use. This leaves nearly 300,000 tons on the city's allotment, to be delivered from Dec. 1. The situation here at present, however, for the first time in months, can be classed as fairly easy.

PITTSBURGH

Holiday curtails production. Contract shipments absorb output. Demand for high-grade gas coal.

Last week coal production in the Pittsburgh district was again quite below normal, on account of the holiday, which was well celebrated. While the market absolutely lacks snap, there being scarcely any buying demand except for special coals, the output is well taken care of by contract shipments and standard grades of coal are held at absolutely full prices. There is considerable demand for high-grade gas coal, particularly from steel works, and it is asserted that if price control were removed gas coal would sell at a substantial premium above steam coal, whatever the steam coal level might be.

Most operators in the Pittsburgh district were in favor of the Fuel Administration retaining control of prices for some time, perhaps to the end of the coal year, and are correspondingly gratified at the recent announcement that the control will continue to Feb. 1, at least.

Industrial consumption of coal has diminished somewhat since the signing of the armistice, but not by a great deal, since the steel industry has been working at practically capacity except for a few closings during Christmas week. It is doubtful whether the steel mills will be working as full 30 days hence, as orders for steel are very light. Domestic consumption has of course been far below normal. Industrial consumers as well as retailers have been drawing upon stock piles and will have little by way of reserves if there is any real winter weather. Requirements of byproduct coke ovens are hardly being met in full. The Pittsburgh district is looking forward to much lighter demands for lake coal next season than was experienced in the past season, when West Virginia's deficit, on account of the special demands of the Navy, had to be made up. The market remains quotable at Government limits, but without any brokerages in addition to regular prices: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

BUFFALO

Big bituminous surplus. Consumers indifferent to the market. Ohio coal trying to get in. No prospect of further shortage. Prices would go down if not enforced. Anthracite in good supply.

Bituminous—The world seems to be full of coal, and it is hard to get consumers interested in it. The outlook is for a surplus exceeding any in recent years. The fact that there has not been coal enough since the middle of 1916 shows what is taking place everywhere. Bituminous output is larger than it was at any time since the war began, and it will be still larger unless many of the mines close down or run on restricted time.

In Canada coal is piled up, and it is almost impossible to sell any. The amount that has paid demurrage is not only great, but it seems to be increasing. Add to this that the railroad yards are blocked with so much coal that a general embargo is feared, and it is easy to see what has become of the market. Some shippers say that they might find buyers if coal was offered at 50c. off Government prices, and in some instances operators are cutting prices a little.

Jobbers are encouraged, though they are aware that their time has not wholly arrived. The change from scarcity to surplus has been made so quickly that it gave them little chance for business. So far all the jobbers get is a shifting of inquiries from consumer to operator. The consumer wants as little of them now as the operator did formerly.

The one point of firmness is that the Government does not propose to throw off the arbitrary price perhaps till February, when the old contract system promises to return. Quotations remain at $4.65 for thin vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump, $4.20 for same, slack or mine run; $5.65 for smithing and smokeless, $5.60 to $6.10 for cannel, all per ton f.o.b. Buffalo.

Anthracite—The supply continues to increase. A few days more at this rate and the complaint of shortage will cease. It is reported that everybody has at least some coal, and the people who are receiving a full supply are increasing fast. It seems to be the late increase of supply that has helped the situation, but the closing of the lakes was partly responsible. December is breaking the record for mildness. It is a certainty that not half the fuel has been used that was used during the same month last year.

As it appears now, the middle of February will see more coal offered than is asked for, and some say it will come a month sooner than that. After that the big price is all that will trouble anyone. There is sure to be a turn toward some other fuel if there is any to be found that is acceptable. It is said that quite a good many consumers, especially in Canada, have bought bituminous or cut wood for winter. Some country dealers are already flooded with anthracite that they can neither unload in time nor sell promptly, and a few orders are reported by the shippers to have been canceled.

Reports from the upper lakes are not reassuring, but at this rate the roads can help out more or less. The car supply is good as far as reported by the trade, the only difficulty being that the motive power is inadequate and that unused cars hinder the movement of trains. The fear of famine is past.

CLEVELAND

The turn of the year finds steam coal demand still dwindling, domestic consumers with supplies ample for the remainder of the winter on hand, production off fully 50 per cent., operators more and more tempted to shade Government prices. No. 8 coal at 30 to 60c. under the maximum is being liberally offered.

Bituminous—The only ray of hope in the entire bituminous market is the view of some operators that a fair amount of buying will be done in January by steam-coal users whose operations have not been greatly curtailed by the cessation of war work, and who have not been in the market recently because of a desire to work off war-priced stock piles. This buying will not be large, it is believed, but it will prove most sustaining and provide the only big outlet for No. 8 coal until the lake trade again shows some life, which will be about the middle of March.

Probably at no time this winter has the market been weaker and the outlook so cheerless. Although they did a winter business all summer, retail dealers are complaining bitterly of weather conditions. Supplies put in last summer have been so little eaten into because of the mild weather that little or no buying any more this winter is expected. Financially, some of the smaller dealers have been hard hit. Steam-coal users may be said not to be buying a ton just now. Inventory and holiday time partially account for this, but there is no disguising the fact business conditions have been steadily growing worse. The only ones now consistently holding up are the automobile and automobile parts industries.

Holiday time has cut heavily into production, but this is no cause for concern to operators. What is telling, however, is the constantly increasing proportion of maintenance, something which continues whether mines are worked full time or only half. Mine workers were encouraged to take off as much time as they wished Christmas and New Year, a very dissimilar condition from a year ago. Car supply in the No. 8 district has shown quite a drop, having been only 74.42 per cent. in the week of Dec. 14, compared with 82.16 in the week preceding. Lost production due to car shortage in the week of Dec. 17 was 101,700 tons to members of the Pittsburgh Vein Operators' Association of Ohio, compared with 71,350 tons in the week of Dec. 7.

Any amount of No. 6 coal can be picked up in this market at 30 to 60c. off the maximum. Operators, at least the larger ones, seem to be standing by Government prices on standard No. 8 coal, but the smaller ones are doing some shading. General market conditions, however, render shading a poor stimulant. Some large steam-coal users continue to "nibble" and undoubtedly would place good-sized tonnages were an attractive figure named. These tactics have not yet resulted in any business.

Ending of price fixing Feb. 1 may weaken the position of lake shippers who are figuring on holding out for the 1918 figure. So far as steam and domestic coal is concerned, little change will be felt, it is believed, so long as labor costs remain high. Breaking down of zone barriers will widen the market for No. 8 operators, while it will result in some Pocahontas coming in in competition.

Anthracite—The larger retail dealers continue to receive allotments of five to six cars a week, but domestic demand is distinctly off. Practically all that is coming into Cleveland now is being applied on long-deferred orders.

DETROIT

Slowing of activity in industrial lines, customary at the year end, and an oversupply of bituminous, tend to create a sluggish market in Detroit.

Bituminous—Neither steam nor domestic coal of the bituminous type shows much activity in the local market. Among several influences that are reflected in the market condition one is a diminished demand due to the easing off of industrial activity at the year end, which in the case of many concerns is made more pronounced by the cancellations of Government contracts for munitions and war supplies.

A condition which jobbers pronounce a more important factor in the falling away of business, is the over abundant supply of bituminous now in the reserve piles of steam plants and in the yards of retail dealers. This is the outcome of a sort of frenzied buying that took place a few weeks ago, under stimulus of the reiterated warnings that a serious shortage might be expected this winter.

These disturbing forecasts were circulated just about the time the fuel administration was calling on everyone to buy any coal that could be had, without regard to whether the stock was of a sort suitable to meet the consumer's requirements. Large shipments from Illinois and Indiana were coming into the market at that time, while the movement of West Virginia and Ohio coal was light, because of the priority rules applying to lake loading. The combination of circumstances resulted in numerous steam plants and retail dealers being overstocked with low grade coal, which in the case of some of the retailers is said to be in the form of mine run and other sizes that do not readily find a market with their customers.

Dropping temperatures this week seem to bring a brightening outlook for the retailers, as, providing the frosty weather is continued, there is likely to be a stronger demand from household consumers.

Anthracite—While efforts are being made, it is said, to obtain an increase in the city's allowance of anthracite, shipments continue in small volume. Domestic consumers dependent on base-burner heaters are being urged to put in at once the two additional tons they are allowed to receive to complete their winter supply. It is estimated there are approximately 55,000 of this class of consumers in Detroit. Any residue of anthracite remaining after they are supplied will be available to hot-air furnace users to the extent of one-half their fuel needs for the winter.

COLUMBUS

Colder weather has stimulated the retail trade to a small extent, although the full benefits have not yet developed. Steam trade is still quiet. Production is not large.

A cold wave that appeared just previous to Christmas has had the effect of stimulating the retail trade, which has been rather quiet for the past month or six weeks. Retailers have started deliveries on orders caused by the lower temperatures, and there is quite an increase in the volume of business. Retail stocks are good and the cold spell is not yet reflected on the operating and jobbing ends of the industry. Consumers are buying the fancy grades principally, as Pocahontas is now in the market. Frequent calls are also received for Ohio-mined coals. Retail prices have been shaded slightly under the influence of slow business, but many of the larger dealers are holding to the Government levels. Rural dealers are having a good trade, as farming communities did not stock as early and as liberally as urban sections.

The steam trade is quiet and probably will remain in that state for some time. Consumers are heavily stocked and are loath to buy under present conditions. Manufacturing plants are casting around to get on a peace basis, but the transition will take some time. Railroads are taking a fair tonnage, and that is the best feature of the steam trade. War plants are gradually cutting down, and their fuel requisitions are not so large as formerly. Most of the steam producers are playing a waiting game, being content to abide their time instead of trying to force trade by cutting quotations. It is realized that there is little demand and coal can not be sold to any extent by cutting prices. Some of the smaller producers, and especially those from West Virginia, are shading prices, but the effect is not felt in the trade generally.

Production is rather slow, due largely to lack of orders. Influenza is still having its effect on the output. But there is no special reason to increase the production and operators are generally loading when they have orders to fill. Cancellations, which were frequent several weeks ago, have now practically stopped and many cancelled orders are being replaced on the books. This indicates a better selling. In the Hocking Valley the output has been about 65 per cent. and in the Pomeroy Bend field about the same. In eastern Ohio the output has been slightly above 50 per cent.

CINCINNATI

Mild weather dominates the trade, demand being limited in all departments of the market. Prospects for colder weather are welcomed.

The coal trade is still under the influence of a remarkably mild season, coupled with the fact that most people, including both domestic consumers and industrial users of fuel, have enough coal to run them for a time. The most remarkably warm winter in several years has been experienced thus far, and several prospects for colder and more severe weather have passed by without making good. The consumption of fuel has accordingly been on a limited scale, so far as heating purposes are concerned, while the industrial situation also remains such as to make consumption very small, compared with a normal season.

The sudden let-up in manufacturing caused by the end of the war has not as yet given way to activity, and is not expected to do so until after the first of the year, if not a good deal later: in the meantime the business resulting from demands for immediate delivery is extremely small. Predictions of much colder weather in the near future must be realized before the coal trade will have anything much in the way of business, and the Christmas holiday, with its reduction in production, is therefore actually welcomed, instead of coming as a serious factor in limiting the available amount of fuel, as the case usually is, and was emphatically last year. Should severe weather come and last for a time, enough emergency demand is expected to stimulate business somewhat, although it is realized that really active business depends chiefly upon the industrial situation.

LOUISVILLE

Colder weather along with reduced production great aid to general market. Prices firmer, and market in generally better shape. Domestic coal showing some improvement, with almost all grades of steam draggy.

The first snow of the season struck Louisville on Christmas Day, and the retail business is showing some slight improvement as a result. However, cold weather is needed to clean up surplus stocks, and get the consumers back into the market. Consumers at the present time are so well protected that orders for the most part are for small quantities. Jobbers report a slightly better volume of inquiries, but not so much actual business. Reports of lower prices are leading to more inquiries than actual business, but the market is looking up.

With the producers the situation is somewhat easier as a result of the layoff for the Christmas holidays. Some mines are down entirely, while others are operating only 40 per cent., still others making no effort whatever to operate more than two or three days. Cars are plentiful and labor is in full supply. A number of producers are reported to be cutting prices slightly in order to secure business and are absorbing brokerage. Wagon mines and small mines without marketing facilities are reported to have cut prices as much as 50c. a ton and more, but are slowly being forced out of competition by lack of demand and the fact that tipple mines have an overproduction.

Rail coal shippers are somewhat worried over the prospects for a revival of river coal movement. Due to the fact that the pressure on West Virginia and Pittsburgh field operations has let up somewhat, it is reported that consumers in these districts are again looking up their river markets, and are planning to start shipping by water on high tides. Due to the fact that rail rates have been increased 25 per cent. by the Federal Director, and that water rates show only a small increase in operating expenses, of less than 10c. a ton when handled by big towboats, it is believed that river coal will be a big factor in the Ohio and Lower Mississippi river markets. There is a shortage of coal-carrying equipment on the Ohio which may hold back movement somewhat this season, but it is believed that with advantage in freight rates coal by river will come back strong.

General complaint is again heard concerning collections. Retailers have been having a little trouble in collecting, while the mine operators have been so anxious for business that some of them have again started shipping rather freely on open account. One large mine operator said he was voicing the opinion of a number of operators when he said "Collections are rotten."

Coke

CONNELLSVILLE

Coke control probably continues. Continued scarcity. Blast furnaces somewhat less active.

While at this writing there has been no formal announcement by the Fuel Administration as to how long it intends to continue control of coke prices, the trade in general is disposed to conclude that the Fuel Administration's policy will be the same with respect to coke as with respect to bituminous coal, so that the announcement that price control on coal will continue at least to Feb. 1 is to be taken as indicating that coke price control will also continue. If the coke operators have any feeling on this subject it is one of disappointment, as they were in hopes of some fancy prices ruling for a while if price control were taken off Dec. 31. The blast furnaces, on the other hand, are very much pleased, even those that have contracts, as they anticipated difficulty in securing contract deliveries if price control were taken off, asserting that coke operators have often yielded to the temptation to sell in the open market coke that was due on contract.

The blast furnaces are not running altogether as well as they were. While very few have actually blown out, quite a number are operating at slightly reduced rates. There is no new demand for pig iron and shipments are made up of such iron as buyers are willing to take on contract. Many buyers are seeking cancellation of contracts, but the furnaces assert that they expect all contracts to be carried out.

There is practically no furnace coke being offered in the open market, but there are fair offerings of foundry coke, and demand is lighter than it was. The market remains quotable at Government limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ⅜-in., $7.30; clean screenings, over ⅛-in., $5.50, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Dec. 21 at 288,505 tons, an increase of 4540 tons, and raw coal shipments at 206,400 tons, a decrease of 7500 tons.

Buffalo—The supply is improving, as coal is more plentiful. The situation, however, is not easy yet, and it is not likely to be immediately, due to the scarcity of help in the beehive districts. The output is increasing, though, and it will likely continue to increase. Furnaces are expected to be active, no matter if they have no war orders to fill. Hardware is so scarce here that it is difficult to buy nails or anything of the sort, and this shortage must be made up somehow. Fuel breeze coke is not finding a very ready market and the same will soon be the case with the sizes.

Middle Western

GENERAL REVIEW

No market of any kind. Industries well stocked with coal and only curtailment of production will help the coal industry to steady itself and prepare for the future.

We are practically at the beginning of the new year, and no relief, of any substantial nature, is in sight for the coal operator. The demand for coal on all sizes, either steam or domestic, is gone. The market, if it may be called such, has degenerated into purely a "weather proposition," and nothing short of a blizzard will help.

The writer recently made a trip which covered the manufacturing centers of Illinois, Indiana and Michigan. It was found that all the large steam plants had enough coal on hand to enable them to run from six to ten weeks. It is safe to say that all factories in the territory mentioned above acted on the advice of the Fuel Administration, and are in a position to run full time. It is true that there are isolated cases where there is little coal in storage, but it is also true that there are plants with enough storage coal on hand today to enable them to run steadily until the first of April.

The domestic situation, in a modified way, is about the same. Take the city of Grand Rapids, Michigan, for an example. It is estimated that there is approximately 65,000 tons of domestic coal consumed in Grand Rapids every winter. The local Fuel Administration say they have figures to show that the retail dealers have in their bins today approximately 50,000 tons of coal. The retailers say that they have little chance of selling this coal, as they stocked up their trade during the summer and fall months. From this it can be readily seen that the retailers of Grand Rapids will not purchase coal very heavily during the coming winter. A careful investigation further shows that what is true about the domestic coal situation in Grand Rapids is equally true of nearly all the towns in the Mid-West territory. It may be that some retail dealers are purchasing heavily at this time, but these cases are rare enough to be the exception that proves the rule. There is one oft repeated factor that will no doubt help matters, and that is the average householder has his bins filled with Illinois or Indiana coal, which burns much faster and with less resulting heat than the higher grades of eastern coal.

There is no doubt about the fact that what ails the coal industry today is overproduction. The factors which brought about this condition are too well known to go into at this time. It is pretty generally conceded by the operators that there is only one cure for the trouble at present hindering the industry, and that cure is a decrease in production either to be brought about by the operators themselves, or through action on the part of the Fuel Administration. At all events, it will be a beneficial thing if some strong influence is brought to bear in order to steady conditions in the industry until such time as the reconstruction program is well under way, when it will be possible for the industry to look into the future and prepare itself for further developments.

CHICAGO

News that eastern coal is to be kept out of local market pleased dealers. Anthracite situation puzzling. Many dealers have plenty of hard coal, while others have none. Little anthracite being delivered to consumers.

The news that the present zones were not to be abolished for some time came to the Illinois and Indiana operators, as well as the retail dealers of Chicago, a few days ago, and brought with it a decided feeling of relief.

The operators were pleased by the information, because they were assured that Chicago, one of the few remaining localities where coal is sold, would continue to be open to them. The dealers were pleased because they now have an opportunity to dispose of their surplus stock of Illinois and Indiana coal. If eastern coal had been allowed on the market, it is very probable that serious difficulties would be encountered in disposing of the Indiana and Illinois coals to the public. It is only fair to state, however, that it is a debatable question if eastern coal ever wins back its old position in Chicago. Many people and firms who heretofore would use only eastern coal, and who, through various conditions have been forced to burn Illinois and Indiana products, like these coals so well that the eastern fuels will probably never displace them.

The anthracite situation continues to be an affair of many angles—so many that few people understand it, even the local Fuel Administration. It appears that some dealers have plenty of it in their bins, while others have none. It doesn't make much difference, however, because those with it are bound by so many rules, restrictions, regulations and other things, dear to the heart of the local Fuel Administration, that there is no opportunity for them to move it from their bins.

MILWAUKEE

Colder weather and snow promise to liven up a dejected market. Anthracite and coke prices reduced by the fuel administration, owing to a shading of dock charges.

The coal market ruled unusually quiet all through the month of December, because of the mildness of the weather, but Christmas week brought snow and a blizzard, which, if it continues, will inject "pep" into the situation. The last run of anthracite cargoes has been unloaded, but there are still some cargoes of soft coal afloat. Receipts of anthracite by rail continue to a moderate extent.

Following closely after the raise of 90c. per ton on all grades of anthracite except

buckwheat, noted last week, came an edict from the same source making a reduction in the retail price of anthracite of 25c. per ton and cutting coke 50c. per ton. The drop in the price of anthracite was due to the fact that dock companies have been restricted to a charge of 50c. per ton for loading wagons and trucks. Formerly they were allowed 75c. Wagon dealers are accorded a margin of profit of $1.75, and wholesalers $2.25. The new ruling put the large and small dealer on the same footing in regard to retail prices. Anthracite delivered at the curb is now worth $12.52 for nut, $12.21 for egg, $12.43 for stove and $11.05 for pea. The maximum price that can be charged for carrying in coal is 50c. per ton. Coke is now $11.50 carried into bins, as against the former price of $12.

ST. LOUIS

A dragging market continues. Weather conditions bring better prospects. No domestic or steam demand to speak of. Car supply good, transportation getting slow. General situation seems to be slightly improved, with prospects fairly good.

The local market is still heavy and slow. The cold weather that started on the 24th helped a little, and business always is slow during the holidays. The light snow that followed on the 26th and 27th was the first of the season, and it was not of a nature that helped the situation at all.

Domestic demand is poor. As a matter of fact, there is scarcely any domestic coal moving except into the poorer sections of the city, the residents of which usually live from hand to mouth.

Steam business at the last part of the year is always slow, firms preferring not to spend any more money than they have to at the close of the year and usually depending upon their storage supply to get through the last week or ten days. That, of course, has held the movement up, but everything indicates a better tone to the market in the near future and operators and retailers are looking forward to some splendid business periods during January and February, and possibly into March. The railroads have not bought as heavily recently as they were expected to, and they will likely soon come in for a good tonnage.

In the Standard field the situation is still in bad shape. Some mines have been down entirely for as long as a week at a time, and others are running on one and two days a week. Screenings are exceptionally hard to move, and some companies have as many as 100 cars of screenings unbilled, being able to move lump in a pinch. However, other mines have a surplus of lump sizes on hand, and there does not seem to be any systematic method of equalizing the distribution of the different sizes from the field as a whole. If it were permissible, and the authority were delegated to some association or individual capable of keeping clean and free from entanglements, a pool of the Standard field would be the only method whereby any efficiency would enter into the distribution plan at all. Some operators sell all lump and no screenings, and others sell all screenings and no lump, as a result all the mines are idle and a lot of coal is given away below cost for the lack of a proper selling or distributing agency.

There is some dissatisfaction at different places in the Standard field among the men from lack of work, etc., but it is expected to gradually disappear with a better demand.

The railroad tonnage from the Standard field is fairly good, but not what the operators would like or what they expect. It is good enough, however, to keep several mines going on fairly decent working time.

In the Mt. Olive field conditions are much better than those in the Standard field. The demand for this coal, which is of higher grade, is better throughout the north and west, and a heavy tonnage seems to be going to Chicago. Working time is good, and the railroad tonnage from this section is also heavy, so that in a general way the Mt. Olive field presents a somewhat satisfactory situation.

In the Carterville field in Williamson and Franklin Counties, and also in the Duquoin field, the conditions have improved in the last few days. While there is a surplus of coal in these fields, orders seem to have come in for shipment to the north in better volume. In a general way the situation has improved. Cars are somewhat short in some places and transportation is not all that it could be, even in the few days prior to the recent snow; but taken as a whole, the situation in these fields is entirely satisfactory. There seems to be no trouble anywhere, and while some mines are not getting all the working time they want, a general feeling of satisfaction ushers in the New Year in these districts. The railroad tonnage from these fields is also heavy and has helped to maintain the market conditions.

In the St. Louis market Standard 2-in. lump is still selling anywhere from $1.50 to $1.80, with Standard egg and nut at about the same price. Mt. Olive is as low as $1.65, and 6-in. lump from $1.75 to $2.00, with screenings at from $1.20 to $1.50.

There has been no cut in the Mt. Olive prices to speak of, and only here and there has anything been done in the way of cutting Carterville prices; and that was usually on restricted equipment or on off-grade coal.

There is no change in the domestic prices in St. Louis and at the close of the year they are as follows:

Carterville lump	$5.75
Mt. Olive lump	5.25
Standard lump	5.00

The Government price per net ton f.o.b. mines, with the exceptions above noted is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.75	$2.55@2.75	$2.40@2.70
3x6-in. egg	2.55@2.75	2.55@2.75	2.40@2.70
2x3-in. nut	2.55@2.75	2.55@2.75	2.40@2.70
Washed:			
No. 1	3.05@3.20	3.05@3.20	.....
No. 2	3.05@3.20	3.05@3.20	.....
No. 3	3.05@3.20	3.05@3.20	.....
Mine Run	2.35@2.50	2.35@2.50	2.20@2.30
Screenings	2.17@2.32	2.17@1.32	1.50@1.60

Special preparation on Carterville is 10 cents extra. Williamson & Franklin Co. rate is $1.10. Other fields 95 cents.

General Statistics

Directors of the Pond Creek Coal Co. have declared a dividend for the quarter of 37½c. a share, payable Jan. 1 to stock of record Dec. 27. Since July 2, 1917, Pond Creek has been paying 50c. each quarter, so that the present declaration is equivalent to a cut from a $2 to $1.50 annual basis.

LOADINGS OF BUNKER COAL DURING OCTOBER, 1918

Bunker coal laden on vessels engaged in the foreign trade, according to the Bureau of Foreign and Domestic Commerce, is as follows for each of the customs districts specified:

Districts	Gross Tons
Maryland	31,713
New York	231,894
Philadelphia	21,661
Virginia	64,473
Total	349,741

BALTIMORE & OHIO

Following is a statement of coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of August, 1918, as compared with the corresponding month of the previous year:

	1918, Tons	1917, Tons
Coal	4,658,226	3,165,568
Coke	219,126	295,917
Total	4,877,352	3,461,485

Exports of Anthracite and Bituminous Coal and Coke, by Customs Districts and Countries, During October, 1918

(Compiled by Bureau of Foreign and Domestic Commerce)

From Customs District	To	Anthracite, Tons	Bituminous, Tons	Coke, Tons
Maine and New Hampshire	Canada	66	19	138
Vermont	Canada	1,570	12,391	326
Massachusetts	Canada	37	.....	.....
Massachusetts	Newfoundland	6	.....	.....
St. Lawrence	Canada	132,136	218,569	2,906
Rochester	Canada	82,427	90,049	338
Buffalo	Canada	224,399	289,894	52,928
New York	Canada	11,565	.....	.....
New York	Dutch West Indies	.....	1,030	.....
New York	San Domingo	.....	15	.....
New York	Bermuda	.....	.....	100
New York	Guatemala	.....	.....	2
New York	Danish West Indies	.....	.....	2
New York	Argentina	.....	.....	94
New York	Venezuela	.....	.....	5
Philadelphia	Cuba	1,957	.....	.....
Philadelphia	Danish West Indies	.....	426	.....
Philadelphia	Brazil	.....	409	.....
Maryland	Cuba	.....	5,103	.....
Maryland	Brazil	.....	2,615	.....
Maryland	Peru	.....	.....	1,584
Virginia	Bermuda	.....	538	.....
Virginia	Panama	.....	17,605	.....
Virginia	Mexico	.....	1,659	.....
Virginia	Other British West Indies	.....	3,960	.....
Virginia	Cuba	.....	79,489	69
Virginia	Danish West Indies	.....	1,985	.....
Virginia	Dutch West Indies	.....	2,138	.....
Virginia	French West Indies	.....	1,170	.....
Virginia	San Domingo	.....	1,340	.....
Virginia	Brazil	.....	35,437	.....
Virginia	Chile	.....	22,419	.....
Virginia	Uruguay	.....	10,121	.....
South Carolina	Cuba	.....	2,500	.....
South Carolina	Uruguay	.....	3,711	.....
Georgia	Cuba	.....	1,450	.....
Florida	Cuba	.....	1,099	.....
Mobile	Cuba	.....	300	.....
New Orleans	British Honduras	.....	1	2
New Orleans	Guatemala	.....	51	.....
New Orleans	Honduras	.....	240	.....
New Orleans	Nicaragua	.....	251	.....
New Orleans	Chile	.....	7,500	.....
New Orleans	Mexico	.....	.....	47
Sabine	Mexico	5	.....	.....
San Antonio	Mexico	197	592	5,819
El Paso	Mexico	210	4,714	3,729
Arizona	Mexico	.....	12,215	9,872
Southern California	Mexico	3	6	.....
San Francisco	Salvador	1	.....	5
Washington	Canada	.....	280	154
Washington	Chile	.....	6,483	.....
Alaska	Canada	.....	3	.....
Montana and Idaho	Canada	.....	42	.....
Dakota	Canada	.....	1,115	58
Duluth and Superior	Canada	.....	1,348	48
Michigan	Canada	1,351	105,593	19,248
Ohio	Canada	8	940,926	21,323
Total		456,029	1,888,801	118,796

COAL AGE

Volume 15 New York, January 9, 1919 Number 2

Is it Opportunity or Crisis?

BY FLOYD W. PARSONS

ONE-SIXTH the area of France has been devastated. The territory destroyed included the richest districts in the country. Approximately 350,000 French homes were utterly ruined. From 70 to 90 per cent. of France's steel, sugar and weaving industries no longer exist. The machinery has either been demolished or carried away. One-fifteenth of the population of the Republic is dead or missing.

France must be restored. So must other areas that have suffered the ravages of war. Rapidity of execution is the primary consideration in this matter of reconstruction. Almost everything is needed, and in large quantities. Where can the necessary supplies be obtained most readily?

The United States Army has on hand enough lumber to build 100,000 small houses. It has millions of dollars' worth of plumbing, heating, water-supply and sanitary fixtures. It has bakeries that will produce 2,000,000 loaves of bread daily. From the demolition of war plants America will be able to salvage astounding quantities of useful material and equipment.

What is more sensible than that the United States dispose of these supplies in the regions desolated by war. Setting aside all impulses of human sympathy, there are material reasons for such action. Practically all supplies have but a limited ability to resist rust and corrosion, and it is commonly agreed that to sell such materials now in our domestic market would seriously curtail the Nation's normal production at a moment when we are trying to find employment for 5,000,000 soldiers and munition workers.

We are building a great merchant marine. To fill these ships we must secure foreign markets. Such work is slow and expensive. Here we have a chance to satisfy our humanitarian ideals, establish a foreign trade and help overcome the danger of a domestic labor panic. It is not important that we be paid for these things immediately. The debts Europe already owes us cannot be settled unless America proceeds at once to make France, Belgium, Serbia and Russia self-supporting. The chief security for our loans is the recuperative power of the Allies. The food we send them only makes the debt larger. It is the acres of land and factories we restore for production that enhances our security and hastens repayment.

Let us say to France right now: "Here is the material for reconstruction, and if you say the word, we will also furnish you an unexcelled engineering organization to start the work while your people are getting on their feet once again." If we will do this, there will be no doubt in Europe as to our sincerity in the matter of international agreements that will forever end war.

America faced war unitedly. Let us not face peace irresolutely. Already in our midst we hear the prophets of woe. Theorists talk of bread lines and panics that will accompany the deflation of our industries. Our practical men who deal in facts know better. They are aware that industry can slow down if skilfully managed, without disturbing the relation of wages and cost of living.

The workman must now think of increasing his individual production, and the employer will not have to think of decreasing wages. Let us grow up to inflation by establishing new profits which labor can share. The world's needs were undersupplied before the war, and now with the coming of peace we are minus the labor of 15,000,000 workmen, killed or disabled. It will be a generation before the common wants of humanity can be supplied on a pre-war basis.

We must talk more of increasing production and less of liquidating wages. America occupies a new place in the world. The cure for domestic inflation is foreign trade. We have a splendid chance to begin our expansion right now.

This is a time of opportunity, not of crisis.

Changes in Beehive Coke Oven Construction Due to Mechanical Operation

By GEORGE W. HARRIS
Editorial Staff, *Coal Age*



FIG. 1. PULLING COKE AND FORKING IT BY HAND

THE Yankee is reputed to be one of the laziest of fellows. At least such a statement about his countrymen was said to have been made by the late George Westinghouse, at a dinner given in his honor in London, England, a number of years ago. The further comment was offered, by way of explanation, that if the Yankee was given a piece of work to perform involving hard manual labor, he lost little time in devising some mechanical device that would do the work for him.

Numerous instances are on record of devices that have supplanted almost entirely the human element in industrial operations. A striking case of this kind is at hand in connection with coke plants. For many years coke has been drawn from beehive coke ovens and forked onto cars by hand. It has been such a familiar sight that it requires no special comment (see Fig. 1). The physical effort of drawing coke from an oven with the ordinary coke puller is not excessive in itself, but the discomfort caused by the heat from the oven and the recently quenched coke adds greatly to the labor of this operation during hot weather. However, it takes considerable time to draw an oven by hand and the oven is losing valuable heat during the operation.

There is always an incentive to supplant hand labor by a mechanical device that will do the same work quicker and cheaper. The advantages of such an arrangement are most apparent during strikes or at times of labor scarcity. It is of added benefit to a plant to be able to accomplish with a few men and a machine what would ordinarily require several times the ordinary labor force to do by hand. Also, by drawing an oven by mechanical means coke costs are reduced and the output of the oven increased. Probably such considerations as these largely influenced and hastened the working out of a mechanical coke-drawing and loading machine.

The most extensively used machine of this type—the Covington, made by the Covington Machine Co., of Covington, Va.—is shown in Figs. 2 and 3 operating at a beehive coke plant of the H. C. Frick Coke Co. This machine consists of two principal parts, an extractor for drawing the coke out of the ovens and a conveyor for screening and loading it into cars. The steel ram used to extract the coke is carried in a swinging carriage so as to reach either side of the oven. These mechanical features of the Covington are the result of a gradual growth, the necessary changes being made in the ovens as modifications of the old beehive type became desirable.

The type of mechanical extractor used, and its action, brought about changes in oven door width, the oven brick liners, door jambs and coke yard details. The old oven door was too narrow to permit of operating the ram to best advantage, so it was widened

to a width of about 42 in. or more. The brick in the lower course of liners, which frequently received the impact of the ram of the coke extractor, were found to be rather light to withstand the hard usage they received and accordingly were made larger and heavier. Similarly, the door jambs were modified to better meet the new requirements imposed upon them. Substantial construction is required in the lowest jamb to resist the wearing action of the ram bar in its travel in and out of the oven.

The changes noted were the essential ones, and were brought about by failure of the oven parts under the more severe service of the mechanical extractor over that of the old hand coke puller. Such parts simply needed to be made heavier, of different shape or of other material. When the new method of coke extraction was thoroughly established other changes were made in old ovens, as repairs or renewals permitted their adoption with little additional expense. When new coke plants were contemplated further modifications were possible; these greatly reduced the cost of the plant and at the same time permitted the same or an increased efficiency in oven operation. Among such improvements is the abandonment of the wide, elevated coke yard with its retaining wall and the lowering of the oven itself in the same proportion.

The accompanying illustrations bring out these points. In Fig. 4 is shown a cross-section of a typical old-time beehive block, or double row, coke-oven plant with its elevated ovens and yards necessitating considerable dry wall for oven foundation and yard retaining walls. Contrast the old type with the machine-operated plant shown in cross-section in Fig. 2. One of the most apparent and striking changes is the lowering of the whole plant. Cut off some 7 to 8 ft. of the lower part of the oven foundations and yard in the plant shown in Fig. 4, and the new type as illustrated in Fig. 2 will be had.

New machine oven plants can be constructed flat on the ground—no high foundations for ovens are necessary, no yard retaining walls are required and little filling. The grades for the yard and machine tracks

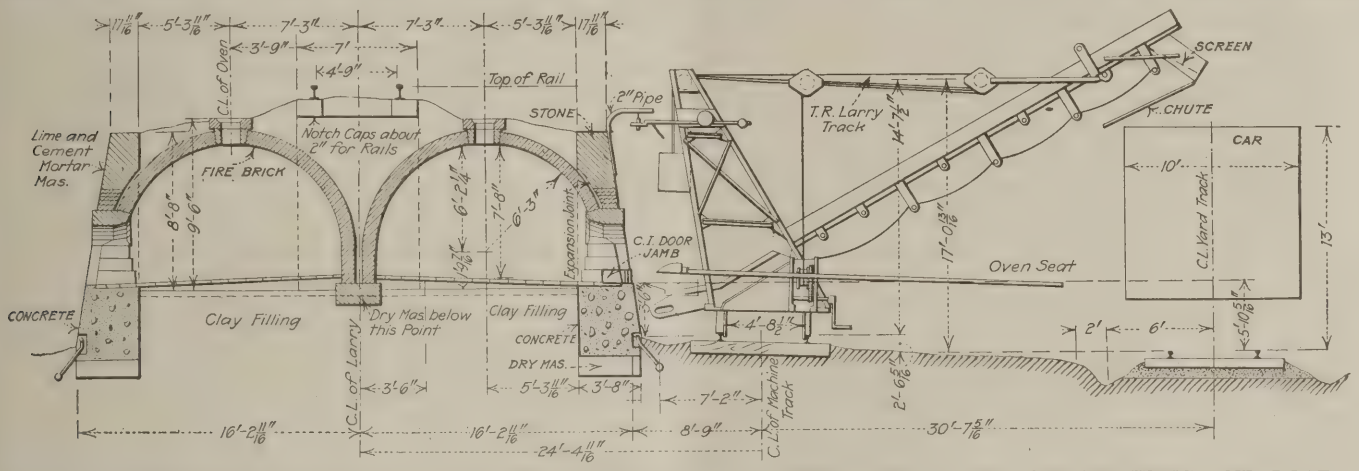


FIG. 2. CROSS-SECTION OF BLOCK COKE OVEN ADAPTED TO MACHINE OPERATION—COKE-DRAWING AND LOADING MACHINE SHOWN IN POSITION

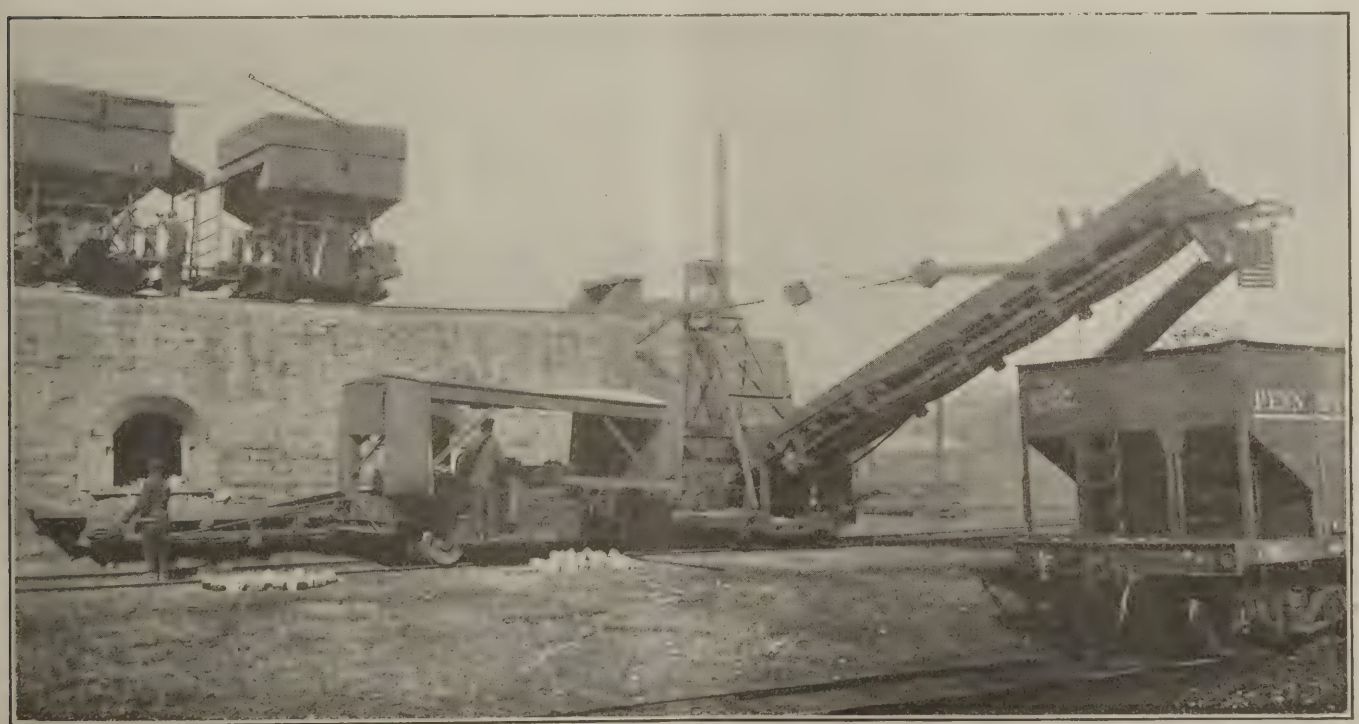


FIG. 3. COVINGTON COKE-DRAWING AND LOADING MACHINE OPERATING AT A PLANT OF THE FRICK COKE CO. IN WESTERN PENNSYLVANIA

are practically on the same level. Furthermore, the height of the bottom of the oven above the machine track has been reduced; the old height was 3 ft. 6 in., now it can be 2 ft. 7½ in. This lower oven represents quite a saving in cost of construction. Attention is also directed to the distance of the yard track from the coke oven; this is practically fixed by the length of the coke-loading apparatus and is a minimum distance. Some old coke yards are twice

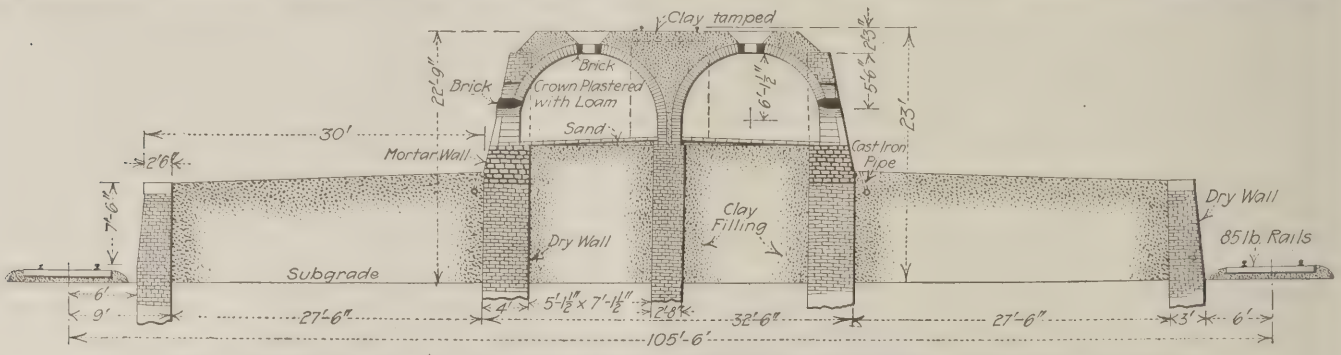


FIG. 4. CROSS-SECTION OF OLD-TYPE BLOCK BEEHIVE COKE OVENS, OPERATED BY HAND

the width of those shown in Figs. 2 and 3. In the machine-operated oven yard, storage room for coke is not a consideration; generally the coke is on cars for shipment before it has entirely lost its heat.

The largest beehive coke-oven operator in the country is the H. C. Frick Coke Co., of western Pennsylvania, a subsidiary of the United States Steel Corporation.

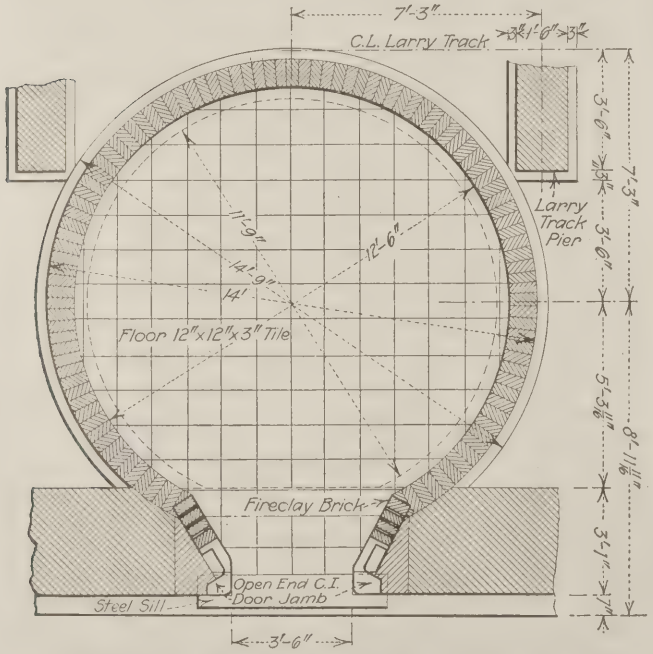


FIG. 5. PLAN OF COKE OVEN SHOWING FRICK JAMB DETAILS

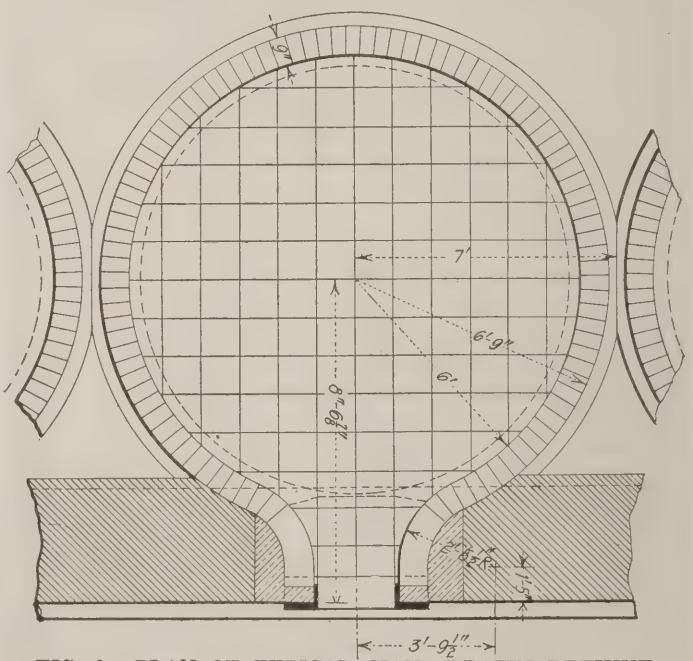


FIG. 6. PLAN OF TYPICAL, HAND-DRAWN BEEHIVE COKE OVEN

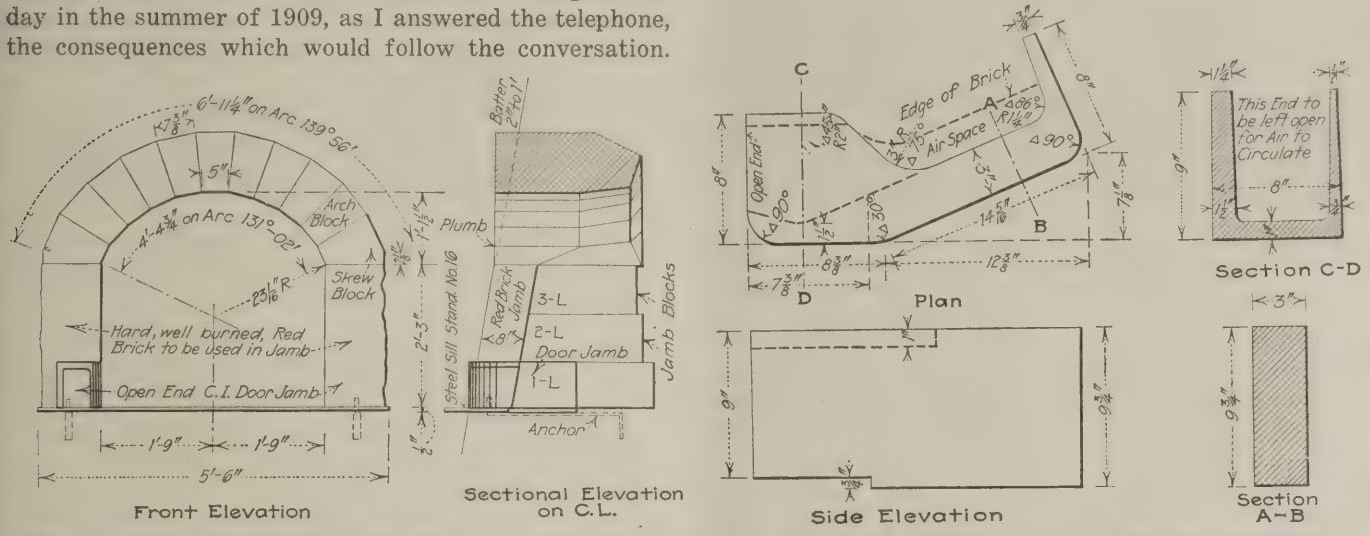
This company operates some 19,000 ovens and has installed over 80 Covington machines at its coke plants. Furthermore, the methods used by this concern are of more than ordinary interest to those operating beehive ovens, as the practice of the Frick people today represents the mature judgment of many years of experience in coke manufacture. In Figs. 5 to 10 inclusive are shown details of the present Frick method of construction for machine-drawn ovens. Where this company is rebuilding or repairing its old ovens (no new ovens of this type are being constructed by the Frick company) concrete is used in the front wall from a point 6 in. below the yard level to the oven seat. From the oven seat to the top of the wall mortar masonry is used, the mortar being composed of sand, lime and cement. The proportion of lime and cement varies somewhat in the different parts of the wall. On the portion of the wall over the door, where the greatest heat is encountered, about one-third cement and two-thirds lime are used; but in the rest of the wall about equal proportions of lime and cement are employed.

There has been no change in the Frick method of constructing the foundations or in the plan of tamping clay filling under the ovens. Neither has there been any change in the method of constructing the ring dry-wall under the ovens in either the bank or the block type. Dry-wall is used for the foundation to a point within 6 in. of the brick wall, the top 6 in. of this wall being constructed of mortar masonry.

Due to the abrasion of the coke and extractor bar on the lowest jamb, the Frick people are now replacing this jamb with an open-end cast-iron jamb, as indicated in Figs. 5, 7, and 9, and as shown in detail in Fig. 8. The cast-iron jamb has an open outer end in order that there may be a free passage of cool air back of the metal exposed to the greatest heat from the oven.

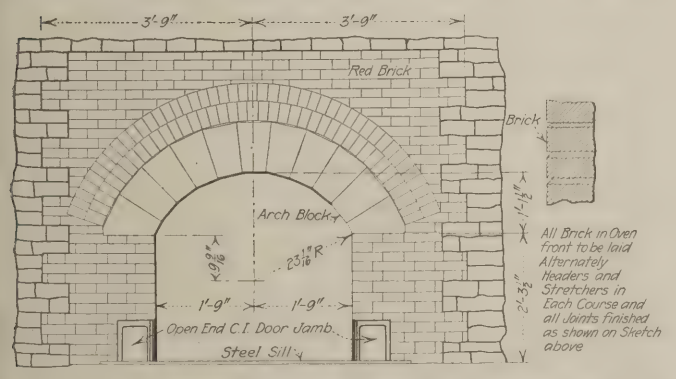
On account of excessive wear on the bottom courses of the ordinary lining brick, these are now being replaced with lining-blocks 9 in. high and 21 in. long; they are heavier than the usual liners and are not so subject to damage when accidentally struck by the scraper head of the machine.

In connection with the straight jambs on either side and directly back of the oven door there is an interesting bit of history, which is best told in the words of G. W. Greenwood, treasurer of the United Refractories Co., of Uniontown, Penn.: "Little did I imagine one day in the summer of 1909, as I answered the telephone, the consequences which would follow the conversation.



FIGS. 7 AND 8. ELEVATION AND SECTION OF STANDARD FRICK BEEHIVE DOORWAY FOR MACHINE-OPERATED OVEN AND STANDARD CAST-IRON DOOR JAMB

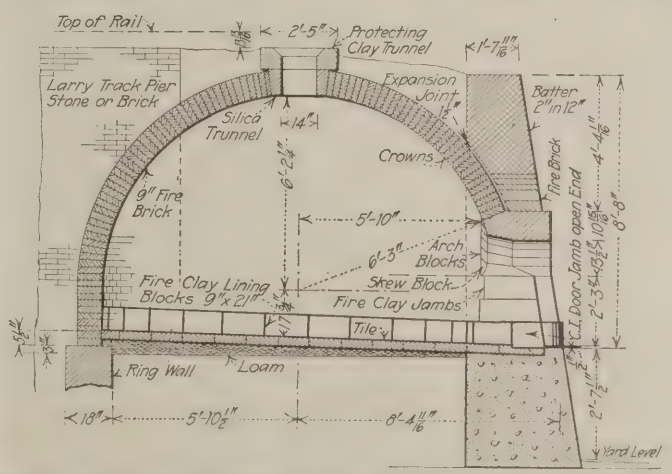
The call was from a wide-awake, progressive superintendent of a coke plant not far from Uniontown, who wished to discuss with someone the possibility of making brick and shapes which would simplify the drawing of coke by machines. Now, in the original type of beehive coke oven—a hemispherical dome with an opening at the top for the escape of fire and smoke—there is also a short entrance arched over, like the passageway into an Esquimo's snow-built home. The plan



at the floor of the oven is somewhat like the bottle-shaped opening shown in Fig. 6.

"It will readily be seen that the coke on each side of the door cannot be drawn so readily, as it has to be pulled around the corner formed by the reverse curve. So long as the drawing was done by hand, this difficulty apparently received little consideration. But with the introduction of machines, it was found impracticable to clean out the oven completely, the scraper of the coke-drawing machine not being like the gun which was warranted to shoot around the corner. So it was asked if the plan of the oven could be modified to allow direct access to all parts of it. At the same time there was the necessity of preserving the bottle-neck shape of the front opening on account of the arch which covers it. Accordingly, a representative of the United Refractories Co. and the superintendent who brought up the subject together worked out a compromise by which the opening at the floor of the oven is like that shown in Fig. 5, while at the base of the arch which covers the opening a horizontal section of the oven resembles Fig. 6.

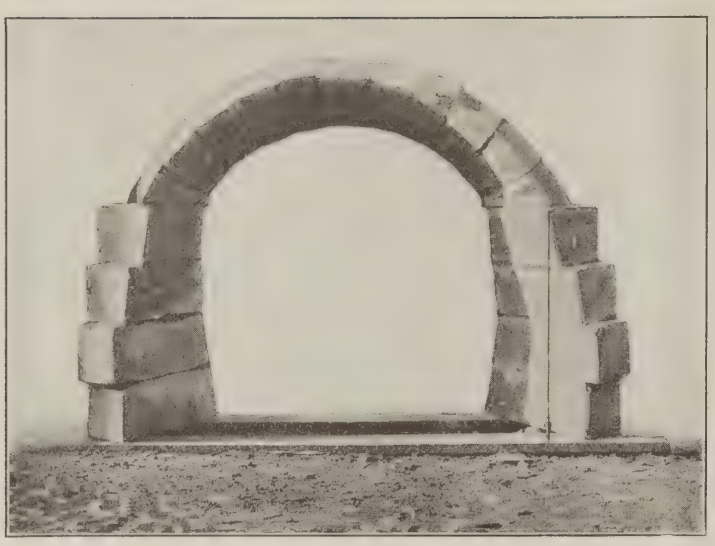
"The arch is supported on each side by jamb blocks, which up to 1909 or 1910 had always been made with a curved face. The plan worked out was to use one or more straight jambs for the lower course or courses

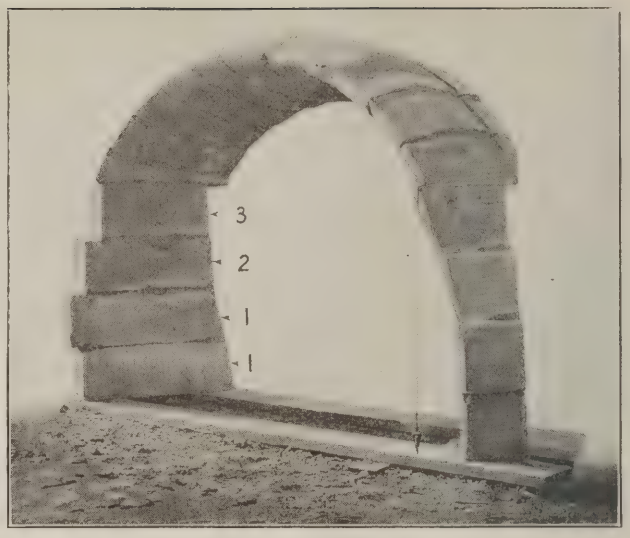


FIGS. 9 AND 10. DETAILS OF OVEN FRONT AND DOORWAY AND SECTION THROUGH STANDARD FRICK OVEN

on each side of the doorway; the next course of jambs being straight on the lower edge and the face developing so that the upper edge was slightly curved. Next the top course of jambs began with the flare of the course immediately below, at the top having a more decided flare, conforming to the base of the arch and making a firm support for it.

"The success of the plan was apparent from the start. The height to the base of the arch (springing line of the arch) is either 29 in. where three jambs





FIGS. 11 AND 12. SETS OF JAMBS AND ARCHES ERECTED IN THE OPEN TO FORM A DOORWAY
Fig. 11—View of doorway from a point in the oven and directly behind the arch. Fig. 12—View of doorway from a point in the rear and to the right, looking obliquely through the doorway

are used on each side or 38 in. in the case of four jambs. In the latter case two No. 1 jambs are first used on each side (being superimposed), each jamb being approximately 9 in. in height; the odd 2 in. in the total height being supplied by the skews. The arches are placed on the top pair of jambs so that they project about 9 in. in front of the top jambs. These details are shown in Figs. 7 and 9. The front overhang of the end of the arch brick is to permit the use of red brick on either side of the door, as shown in Fig. 7. The width of the oven door determines the position of the front ends of the jambs; they are swung as far apart as necessary in the back to fit in with the liners of the ring wall of the ovens. The divergence in each particular case is determined by the diameter of the oven and the length of the neck. This construction tends to eliminate the inaccessible pockets on either side of the oven.

"In Fig. 11 the arrangement of the jambs and arch bricks (erected in the open) is shown as viewed from the standpoint of a person in an oven looking out through the doorway from a position directly behind the arch. A plumb-bob is shown suspended from the base of the arch to the ground; from the position of the bob one can see how the top jamb overhangs like a precipice. Also, it can be seen in Fig. 12 that there is a beeline from the feet of the observer right through the lowest jamb on the right of the doorway. This view was taken from the rear, and to the right, looking obliquely through the doorway, so as to show the overhanging (side overhang) No. 2 and No. 3 jambs.

"Recently there has arisen the feeling that all the advantages in drawing coke should not be reserved for the machines. It is felt that where the drawing is done by hand, the men should also have a straight pull and not be obliged to draw coke around the corner. As a result the so-called straight jambs for machine ovens are being used also for hand-drawn ovens, the only difference being that they are set closer together on account of the narrower door. These jambs have been favorably received in the field, particularly by large operators in the western Pennsylvania region."

The business-like precision of mechanically operated coke plants catches the eye of a person visiting the works of progressive coke men. The yards of such plants at times may even suggest a temporary cessation of work, as the business of drawing and charging ovens is attended to with dispatch and such operations may be completed by noon, giving an air of idleness to the plants. It has been said, "It looks like Sunday at the ovens." The darky coke puller is fast disappearing too. He may still be a picturesque sight in the eyes of some, but not to the practical coke manufacturer of today. Officials of the Frick Coke Co. and the United Refractories Co. (leading sources of such information) furnished the data, photographs and prints for this article.

Reservation of Superior Coking Coal Is Considered by British Committee

In the report of the Carbonization Committee of Great Britain special note is made of certain seams of coal in the celebrated Durham field of England, which have been exported as steam coal; this coal is particularly adapted to the manufacture of coke, forming a fine, hard coke, low in ash and sulphur. The report states that these seams should be reserved exclusively for this purpose and on no account should the export of this particular quality of coal be permitted; the export of coals capable of producing a good quality of metallurgical coke must of necessity in time be a disadvantage to the expansion and economy of the iron and steel trade of Great Britain.

An increased foreign demand for the best coking coals is predicted by the Committee in the near future as some of the countries which produce relatively small quantities of iron and steel are making plans for increasing their output and coke ovens will be included in their schemes. Even if it is found upon investigation that there is a sufficiently large reserve of coking coals to meet the needs of the increasing home iron and steel industry, nevertheless every effort should be made to export any surplus available for such purposes, as metallurgical coke; it should be exported in that form in order to retain the valuable byproducts at home.

Some Tests with Flow Meters

By JOSEPH A. MAGUIRE
Schenectady, N. Y.

SYNOPSIS—*In order to increase plant efficiency actual facts must be known. The flow meter furnishes means for readily obtaining the actual consumption or output of a steam generating or consuming apparatus. The tests here described resulted in the elimination of wastes that were unsuspected.*

PRESENT world conditions, necessitating conservation of all resources, have brought to a deserved prominence many pieces of apparatus heretofore incorrectly looked upon as luxuries. Some years ago the flow meter was in this class, but of late power plants in all industries have been straining to their utmost in an endeavor to raise efficiencies and, consequently, the real value of this device has been gradually realized.

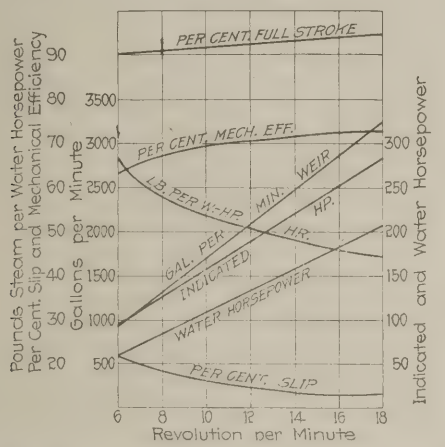


FIG. 1. CHARACTERISTIC CURVE OF DUPLEX COMPOUND CONDENSING PUMP

Steam end, 19 x 36 x 36 in.; water end, 21 x 36 in.; head, 248 ft.; suction, 10 ft.; steam pressure, 125-140 lb.; Scranton jet condenser vacuum, 22-24 in. Steam curve includes losses in 1460 ft. of 8 in. main and 68 ft. of 5 in. main

A considerable amount of prominence has been given to the use of the flow meter in boiler rooms of manufacturing industries, central stations, etc., but its application to mine power plants is practically an untouched subject. The present article is an account of operations in this field.

A short time ago a number of collieries operating 36 boiler and power plants were thoroughly investigated by their owners and engineers. These men had foreseen the coming coal shortage and were preparing to meet it not only through increased production but by conservation in their own plants. Flow meters were installed as a means of obtaining the required information.

The testing equipment, at the start, consisted of four Type F flow meters, the necessary mechanisms and an assortment of nozzle plugs and pipe reducers. Later eight more meters of the same kind were added.

After a preliminary survey of the entire layout it was evident that the pumping situation was the most serious and needed immediate attention. The first pumping plant investigated, located 250 ft. underground, consisted of four simple duplex direct-acting non-condensing pumps, each of 2000 gal. per minute rated capacity, and two duplex compound condensing pumps, each of 4000 gal. per minute capacity. The condensing pumps were equipped with low vacuum jet condensers. These six pumps were located in three adjoining pump-rooms, two of which were partially submerged during periods of high water.

Steam was supplied from a modern boiler plant on the surface, at a distance of 2500 ft. The steam main was a 10-in. pipe for a distance of 600 ft., then branching to two 8-in. mains to the pumps. Bypass connections at the pumps allowed any set of pumps to be operated from either 8-in. line, and connections at the foot of the borehole, where the 10-in. pipe branched, allowed either 8-in. pipe to be supplied from an old boiler plant.

It was decided that the required information could best be obtained by determining the characteristic curves of the various pumps separately and in combination. For this purpose three meters were installed on the steam lines to the pumps. A double end contracted weir was built on the surface to measure the discharge of the pumps, and engine indicators were used to determine the indicated horsepower, mean effective pressure, length of stroke, etc.

One of the three meters was connected on the surface to the 10-in. steam line. The other two were located inside the mines, on the 8-in. lines, 1600 ft. from the pumps. Each instrument had a calorimeter and recording pressure gage connected nearby. In order to meet accurately the wide range of flow necessary for the tests, one of the meters inside was connected to two nozzle plugs, one an 8-in. and the other an 8 x 5½-in. reducer.

In order to get the meters installed it was necessary to load them in mine cars, lower them down a slope to a gangway, haul them by mule to the airway where they were to be installed and finally carry them to the points chosen for their location. There the meters were unpacked, assembled and adjusted.

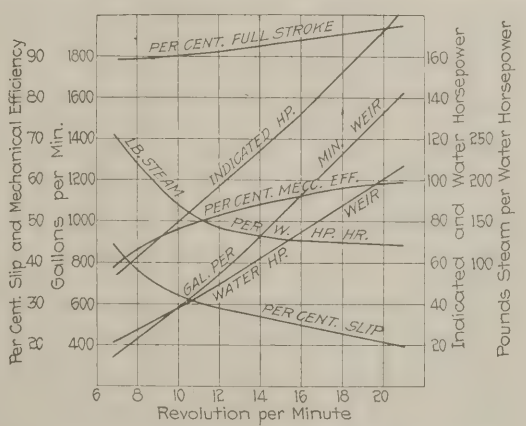


FIG. 2. CHARACTERISTIC CURVE OF DUPLEX NON-CONDENSING PUMP

Steam end, 24 x 36 in.; water end, 14 x 36 in.; head, 254 ft.; suction, 6 ft.; steam pressure, 125-134 lb.

The accompanying curves are some of those taken during this investigation. Fig. 1 was taken from tests

on a duplex compound condensing pump and Fig. 2 from a test on a duplex noncondensing pump. These tests, it should be borne in mind, were taken after the pumps had been installed several years. The steam consumption curves also include condensation losses in pipe, etc. The tests were made with the steam lines and pumps in the condition in which they were found and as ordinarily operated. They were in fairly good repair.

An analysis of the curves showed several important facts. The difference in steam consumption per water-horsepower between the compound condensing pumps and the simple noncondensing pumps was particularly noticeable. It was, of course, recognized that one type was more efficient than the other, but the large difference in economy was more easily seen by obtaining definite figures under similar operating conditions. This one item has been of much value in numerous other pumping installations, since it emphasized the facts in a way that no estimated figures have been able to do.

Another point demonstrated by the test was the lack of capacity of the pumps. The condensing pumps were rated at 4000 gal. per minute at 22 r.p.m., but they could not be safely operated above 3000 gal. per minute. Their best operating capacity from a standpoint of repairs and upkeep was at 1700 to 2000 gal. per minute, while their best efficiency was obtained at about 3500 to 4000 gal. per minute, a rating at which they could not be operated. This not only explained the difficulty experienced in caring for floods but also showed a wastage of about 3000 tons of coal per year due to the necessity of using the noncondensing pumps even in low-water periods.

As a result of these tests two 2500 gal. per minute electrically driven centrifugal pumps have been installed and have effected a fuel saving of about 4500 tons of coal per year. In addition, and of equal importance, is the fact that production is not now curtailed during periods of high water.

It might be interesting to note that the totals of the two inside flow meters checked within 2 per cent. of the meter on the outside 10-in. main.

After the foregoing tests had been completed a series of boiler and power-plant tests were carried out. The primary purpose of these trials was to determine power costs, boiler-plant efficiencies and, in the case of the generating plants, efficiency from coal pile to switchboard.

The size of the boiler plants varied from 1500 to 4000 hp. and the electric plants from 1400 to 3000 kv.-a. For these tests, platform scales were used for weighing the coal. Flow meters were installed on individual boilers and on the distributing steam mains. Other equipment included feed water flow meters, draft gages, recording pressure gages, flue gas thermometers, Orsat analyzer, electrical instruments, etc. The plant tests were of one week duration. Individual boiler tests of 25 hours were made, checking a flow meter against the feed water measured in calibrated tanks.

Types of Boilers That Underwent Tests

The types of boilers tested were horizontal return tubular B. & W., Stirling and Wickes. The furnaces were of the Dutch oven type, with sloping 18 per cent. air space dumping grates. Steam jet blowers furnished forced draft in the smaller plants and engine-driven fans in the larger ones. The fuel was a mixture of No. 1 buckwheat and birdseye anthracite containing 10 per cent. moisture and 15 per cent ash. The conditions, from a metering standpoint, were often difficult because of low velocity and pulsating flow. Nevertheless, the average error was seldom over 2 per cent. and in only one instance 10 per cent.

From the standpoint of the engineers and helpers making the test the conditions were equally trying. Boiler-room temperatures varied from 125 deg. F. down to 10 deg. Meters on steam mains, although filled with a strong alcohol solution, frequently froze. Those mounted on boilers did actually freeze occasionally, and at times draft gage and Orsat readings were only pos-

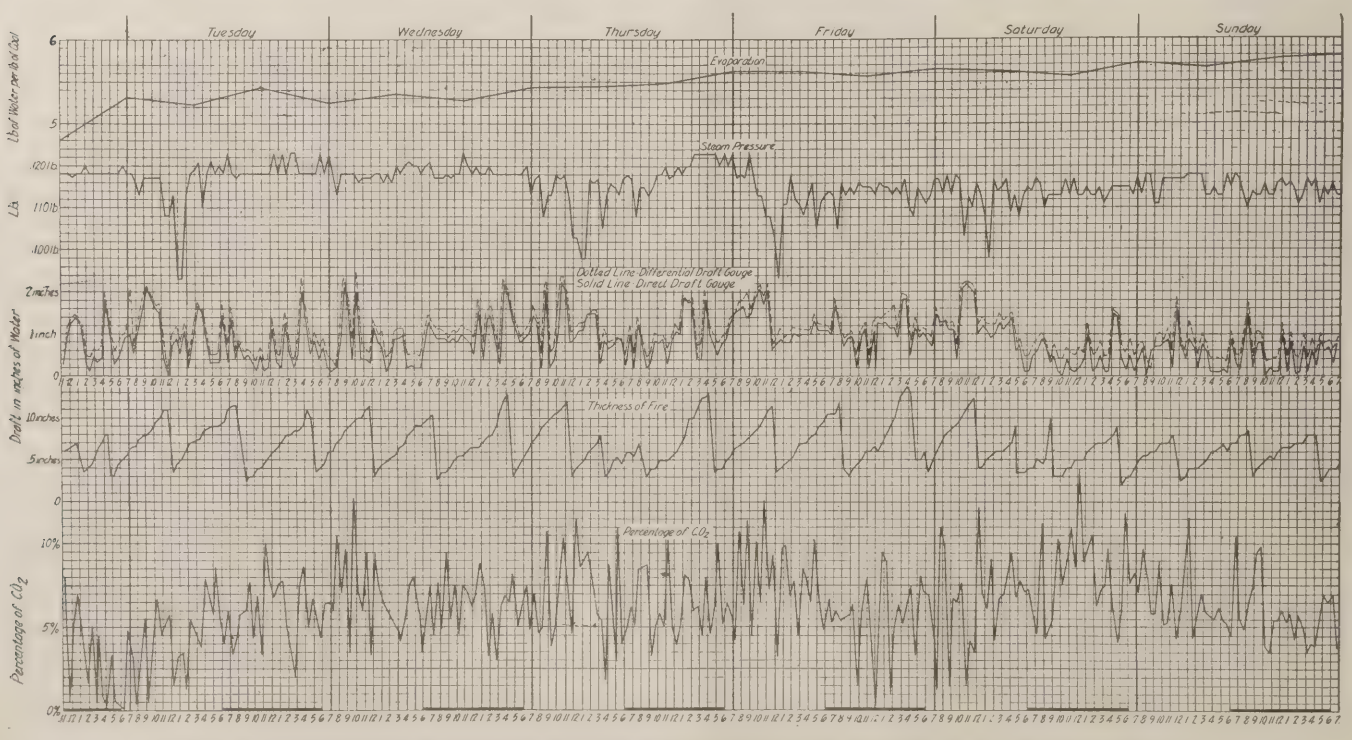


FIG. 3. EVAPORATION OF ONE BOILER FROM READINGS TAKEN IN A SIX-DAY TEST

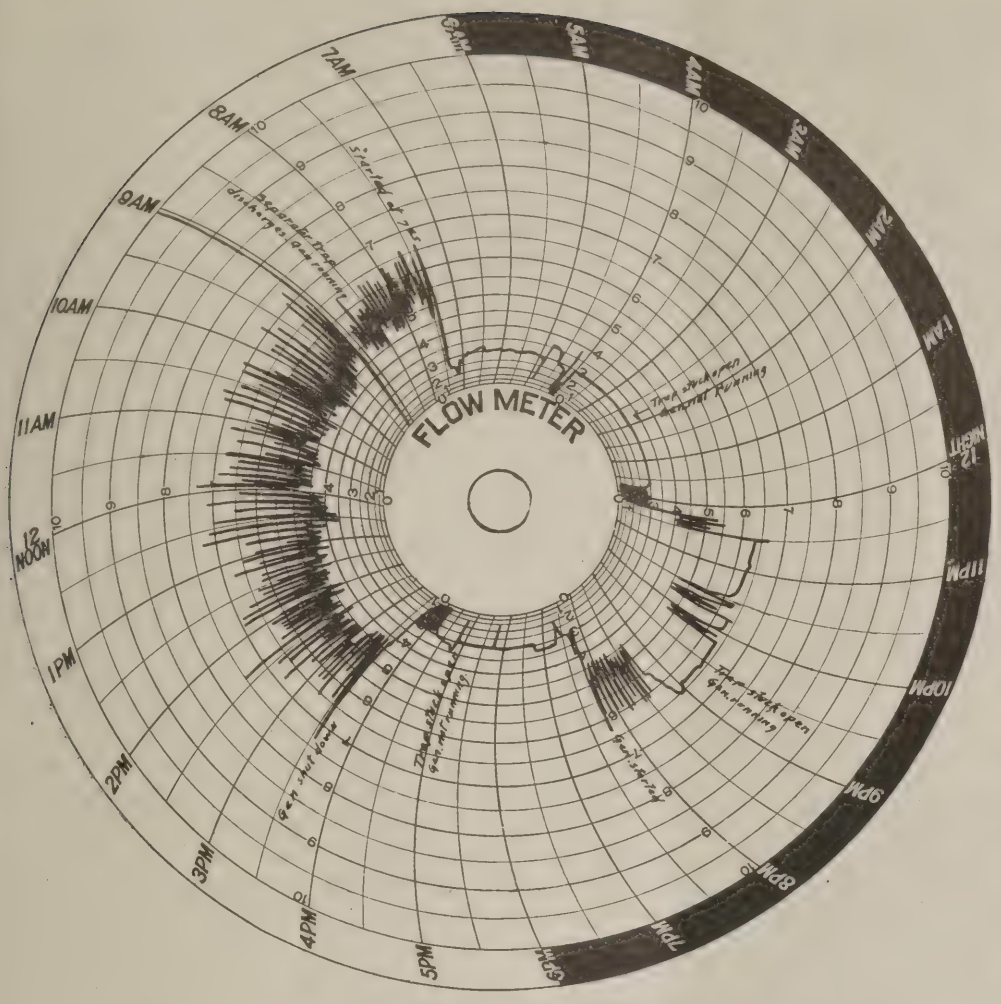


FIG. 4. A 24-HOUR FLOW METER CHART

sible by building fires on old grate bars directly under the instruments.

Power costs and distribution ratios were determined from the flow meters. The boiler units showed a general lack of capacity and a low efficiency; an average of 125 per cent. rating was the best the most modern plants could develop.

The curves shown in Fig. 3 indicate the evaporation of one boiler plotted from readings taken during a plant test of six days. The boiler was a 270-hp. Stirling. The test was made without instruction or otherwise interfering with the usual operation of the plant, the object being to obtain, as nearly as possible, the usual operating conditions.

In view of the extreme care taken to secure normal operating conditions, the rise in the evaporation curve from 4.8 lb. of water per pound of coal as fired to 5.8 at the end of the test is of interest. This curve gives an excellent illustration of the value of checking results. The increase in evaporation was due entirely to the firemen bettering their efforts as they realized they were being investigated.

Fig. 4 shows a flow meter chart taken in one of these tests. The meter was placed on the line supplying a 300-kw. compound noncondensing Corliss engine driving an alternator. The high momentary demand lines with the engine shut down and with it running should be noted. An investigation disclosed the fact that the trap on the boiler-room header was out of order. The water from the header had been going to the engine separator and was thence discharged by the trap, causing the lines on the chart referred to above. It showed also that the separator traps frequently stuck open, allowing a steam wastage of 100,000 lb. per 24 hours. Repairing the traps remedied this trouble.

In addition to disclosing a condition that might have wrecked the engines eventually, had the separator traps failed to open, it was figured that the stopping of steam waste would pay for all the meters in one month's operation. After the results of these tests had been fully tabulated and analyzed, certain recommendations were made to the owners, one of which was the replacement of 15,000 sq.ft. of grate surface by new grates of smaller air space and the addition of 10 mechanical stokers. The 2500-kv.-a. mixed pressure turbines will also be installed later.

The foregoing tests, and the benefits which will accrue from them in the way of increased efficiency and fuel saving, represent a phase of engineering work in which the flow meter finds its rightful place. In many power plants there are actions going on or equipment improperly functioning which will finally make themselves evident; but in many of the cases these discoveries are made only after considerable damage has been done. It is in such instances that these meters prove themselves a valuable aid.

Peat Plays Important Part in Relieving Coal Shortage in France

Coal substitutes are being used in France, owing to the fuel shortage. Among such substitutes peat offers large inducements for exploitation; it is found over large areas of France. Mixtures of peat with other fuels have proved satisfactory. In one instance a mixture of six tons of fresh peat, one ton of sawdust and one ton of coal dust and factory waste was tried. A binder of wet peat is added in the mixing machine and the resulting briquets are left to dry until they contain no more than 30 per cent. moisture.

These peat briquets are used in France for firing boilers. At one locality trials with varying proportions of peat and coal have been conducted on a large scale, the maximum amount of peat so used being 90 per cent., the proportion depending somewhat on the amount of moisture in the peat. Investigations are also being carried on at the present time looking to the feasibility of utilizing peat as fuel for gas producers, and for supplying gas for gas engines.

Coal Crushing Installation at an Illinois Mine

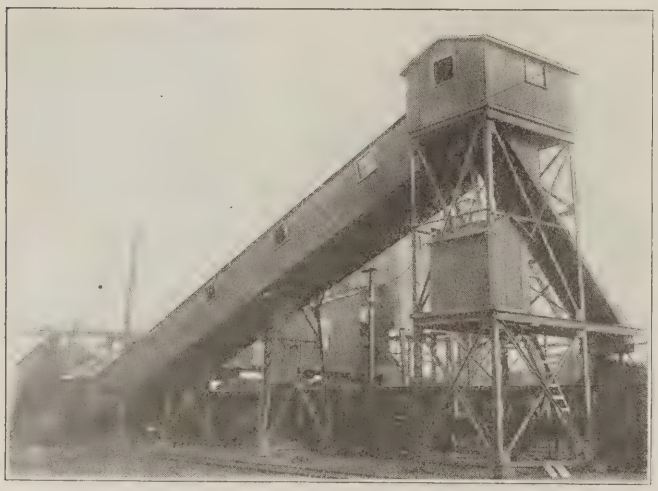
By W. G. Kimball
Staunton, Ill.

When it became necessary to increase the crushing capacity at No. 2 mine of the Mt. Olive and Staunton Coal Co., at Staunton, Ill., the experience gained from the first crusher installation was utilized. This showed the following points were desirable, if not absolutely necessary, for a successful coal-mine crushing plant:

1. That the change from normal loading to crushing, and back, be simple and quick; that only lump sizes of coal be fed to the crusher; that the flow of coal be regular; and that it be possible to instantly stop this flow.

2. That the crusher and coal-handling machinery should be able to handle, without damage to itself, props and ties and other foreign material such as lifting jacks and rail plates.

3. That the discharge pit and other places liable to collect quantities of coal should be capable of easy cleaning.



SURFACE PLANT OF MT. OLIVE AND STAUNTON COMPANY

4. That the machinery be as free as possible from liability to breakdowns and consist of standard parts capable of repair at the mine shop, or easily obtainable from any supply house stocks; and that the power supply be continuous.

The new crusher was accordingly located at the end of the shaker screen, being fed by an extension from the main screen, receiving its motion from it when the connecting-rods are in place. To make this connection requires from ½- to 2-min. stop of the main hoist. This is all the time that is necessary to change from normal loading to crushing or *vice versa*.

An American ring coal crusher was chosen as fulfilling the crushing requirements and indicating a low cost for maintaining the crushing surfaces. A 125-hp. General Electric motor was direct-connected by flexible coupling to the crusher, both being mounted on a structural iron subframe, built 10 ft. wide, in order to span the belt pit.

Despite the large ground space required by a belt conveyor and the high cost of the frame structure, the belt conveyor was chosen in preference to a bucket elevator, as the belt only required a pit 5 ft. deep against 13 ft. for the elevator. Furthermore, the belt could handle a mine prop without damage to itself. A 42-in. Stevenson-Adamson belt conveyor was accordingly installed on a heavy frame made by the American Bridge Company.

The railroad car-loading chute is arranged so that a bar screen may be installed, allowing separation of the crushed product into nut and slack. The nut will be carried by a second conveyor across the slack-loading track to a nut-loading track. This has not yet been found necessary, as the normal supply of nut coal obtained from the tipple is sufficient. This was not true when crushing mine-run coal.

A 100-kw. generator is arranged to run the crusher and elevator motors on a circuit entirely separate from the rest of the mine, thus reducing the chance of losing the power and filling the crusher pit and crusher with coal. With the former installation, this form of accident sometimes required four hours to clean up—the spaces being so small that all the coal had to be moved with the hands.

While the crushing apparatus is in operation a man stationed at the side of the feeder shaker watches for foreign matter in the coal. He has the shaker-engine control wire at hand and stops the shaker in case of trouble, or on signal from the yard.

As it was not feasible or considered necessary to construct a hopper to allow car changing, and as it is bad practice to stop the belt under load, only the shaker feed is stopped. This makes it necessary for the yard foreman to give the stop signal about half a minute before his car is filled out, and the start signal as much later as he judges the change will take. It is interesting to note the precision with which this is done, the coal stream from the chute dwindling away to nothing just as the car is filled and starting with full force as the new car rolls into place. No hoisting time is lost.

The coal sizing as obtained with the crusher set for 1¼ in. is identical with the 1¼-in. slack from the mine, it being difficult to find the line marking the change in a car partly filled under the tipple and finished out with crushed coal.

The equipment was designed to convert all the lump and nut coal that the mine could hoist (375 tons per hour) into slack. It has been tested up to 3000 tons per hour without reaching the limit of capacity. At this rate about 90 hp. was required for the crusher and 15 hp. for the elevator.

Use of Colliery Waste Heaps

The *Zeitschrift für angewandte Chemie*, in its Sept. 13, 1918, issue states that it is well known that carbon dioxide is an active agent in the nutrition of plants when applied under suitable conditions. Carbon is gradually converted into carbon dioxide when added to the soil in a finely divided state. The chemical change is brought about more effectively when lime is mixed with the carbon. A recent German patent suggests the use of a mixture of coal dust and lime as a substitute for some of the artificial manures now become scarce. Large quantities of one of these materials exist in the waste heaps in the neighborhood of the collieries.

Effect of Steam Blowers on Combustion

By W. D. OWENS
West Pittston, Penn.

THE use of steam in any form of jet blower diminishes the recoverable heat content of the coal consumed. For instance, it was stated in a recent issue of *Coal Age* that it required 11.61 lb. of air theoretically to convert 1 lb. of carbon into CO_2. It was also stated that about one-half more air must be added for practical purposes, and many plants are using twice as much. Therefore, practically at least, it requires 17.41 lb. of air to pass through the furnace for every pound of coal consumed.

It was also shown in the article referred to that 8.94 lb. of nitrogen is isolated upon the union of oxygen from the air and carbon, and this nitrogen is of no value whatsoever. Now, since 17.41 lb. of air is necessary, 11.61 lb. is directly concerned in the combustion, leaving 5.80 of unaltered atmospheric air going through the flues. Hence, we have as the product of ordinary furnace combustion 2.67 lb. of oxygen plus 1 lb. carbon plus 8.94 lb. nitrogen and 5.80 lb. of common air, making a total of 18.41 lb. The specific heat of carbon dioxide is 0.217, that of nitrogen 0.245 and that of common air 0.2375. The average of these in the proportion of their densities and percentages is 0.2368. Assuming that the fuel will produce about 13,000 B.t.u., the temperature in the furnace developed by the burning of 1 lb. of this coal will be:

$$\frac{13{,}000}{18.41 \times 0.2368} = 3000 \; deg. \; F.$$

If, now, we assume that a steam blower is installed which injects 4 per cent. of steam into the necessary quantity of air (and it must be remembered that the quantity of air cannot be lessened upon the addition of steam into it), and we will have $18.41 \times 0.04 = 0.7364 + 18.41 = 19.1464$ lb. of air and steam going through the flues. Now since the specific heat of steam is equal to 0.48 (and indeed it cools off so rapidly before entering the grate that its specific heat becomes nearly that of water itself), we have as follows:

$$\frac{13{,}000}{19.1464 \times 0.2559} = 2653 \; deg. \; F.$$

It was found in the first calculation that without the use of steam the temperature of the gases should be about 3000 deg. F. Therefore, a decrease of 347 deg. F. when steam is mixed with the draft, means a loss of about $\frac{437}{3000} = 11.5$ per cent. in the heating capacity or the evaporative power of the boiler.

Of course, the advocates of steam blowers may argue that the steam, when entering the ashpit, and mixing with the air, is the means of raising the temperature of the whole volume of air before it passes through the grate bars, and hence raising the temperature of the whole atmospheric volume going through the flues. This is true, and plenty of experiments have been conducted to find to what extent the temperature is raised when about 5 per cent. of steam is mixed with the draft. The results average about 65 deg. F. Therefore, there is no valid objection to deducting this from the result of the foregoing calculation. Thus $347 - 65 = 282$ deg. and $\frac{822}{3000} = 9.4$ per cent. of loss. In addition to the foregoing the steam taken from the boilers to operate a "steam blower" so as to produce the draft, lessens the practical operative horsepower of the boiler about 10 per cent. more. Thus, in the aforesaid calculation, it was found that 4 per cent. of steam furnished in a volume of air, one-half more than that theoretically necessary, amounted in weight to 0.7364 lb. of steam furnished for every pound of coal consumed. If we now take the average evaporative power of coal to be about 6½ lb. of water, we are losing when using steam for steam blowers about $\frac{0.7364}{6.5} = 11.3$ per cent. of the capacity of the boiler plant. Therefore, between the loss of power caused by the steam passing through the fireboxes and the quantity of steam taken away from the boilers through the steam blowers, we have $9 + 11 = 20$ per cent. of the power of the boiler plant that is consumed in its own operation.

The presentation of the facts in this form should seriously impress upon the minds of every foreman in charge of a boiler plant the great amount of power wasted and dividends lost, to the company, when steam is thus used carelessly. It should also convince him that no steam whatsoever should be mixed with the air draft of any boiler plant, unless the quality of the coal is such that this must be done in order to prevent serious trouble and expense from the effect of clinkers.

I have heard the remark upon several occasions, from men well educated, that the steam from steam blowers, passing through the fire grates into the furnace, is a source of considerable increase in the temperature of the gases in the combustion chamber. I am sure, however, that if they had given the subject any serious consideration they would think themselves rather ridiculous. The reason for this claim is, of course, that steam in passing through the fire is disintegrated into its original gases—oxygen and hydrogen—and that on the recombination of these gases to again form water, the temperature is raised to a point somewhat above 5000 deg. F., this being the temperature realized in the oxy-hydrogen blow pipe.

It is not necessary to say a single word upon the absurdity of such a possibility. How can disintegration and reunion take place through the medium of heat and be accompanied by an evolution of heat?

The only points that can be advanced in favor of using a steam blower are: (1) That the steam issuing from such a blower into an ashpit raises the temperature of the air before it enters the fire, and therefore the ultimate temperature of combustion is to that degree higher than it would have been without the steam. (2) The steam mingling with the air keeps the bottom layer of fuel resting upon the bars moist, and hence prevents clinkers from adhering to the grate, and walls (if the coal contains sufficient iron pyrites to cause such trouble). Furthermore in keeping the material loose, it also aids in preserving an air passage open through the bars.

Sociological Work Accomplished by the Consolidation Coal Company

THE slogan appearing in each issue of the *Mutual Monthly Magazine,* which is published by the Consolidation Coal Co., reads: "Our interests being identical, we work together for our common good—employer and employed." This announcement is an indication of the spirit with which this prominent miner and shipper of coal approaches problems connected with its employees. The Consolidation has over 10,000 names on its payroll, and has established what it calls an Employment Relationship Department. This department looks into the health, education, amusement, recreation and other matters connected with the mining population about the company's various plants. The stars on the service flag of the company number 1174, about 10 per cent. of the employees having joined the colors.

The work of the Employment Relationship Department is most interesting. Possibly the health of the employees and of their families is given the first consideration. A force of 44 doctors and 13 trained nurses attend directly to this matter in the different divisions of the company, and their skill is reflected by the good health conditions of the mining towns under their charge. Registered trained nurses who have had more or less training in town and country practice were secured, though they must have had at least one year's practical experience before entering the employment of the company. In selecting the nurses, personality as well as education, training and experience were taken into consideration. Their duties are numerous and varied, and their work most exacting and trying; diplomacy, tact, knowledge, experience and untiring effort, combined with a pleasing personality, are among the necessary qualities they must possess in order to insure success in their work.

The nurses work with the doctors under the general supervision of Director C. L. Green, of the Employment Relationship Department, but are subject to the orders of the division managers so far as their duties pertain to local matters of discipline and the policy of the company. The general scope of their work, general activities and so on, are outlined by Director Green, to whom weekly reports are submitted. These reports show considerable activity on the part of these nurses during the year 1917, as the following formidable list indicates:

Nursing visits	7499	Office cases	1485
Instructive visits	6770	School cases	56
Social visits	6498	School examinations (medical)	373
Miscellaneous visits	561	School talks	235
Home visits—school cases	237	Meetings attended	71
Field cases	1468	Dressings	1259

In addition to the duties connected directly with health work, these nurses engage in general community and playground work, kindergarten activities and domestic science instruction; they also conduct safety and first-aid classes among the children, and visit the schools, where they give health and first-aid talks and demonstrations. They visit the healthy as well as the sick, and are always prominent in local Red Cross and relief work. Furthermore, they have organized Junior Boy Scout companies and sewing circles. At the community houses they meet with the women of the mining towns and instruct them in knitting, sewing and cooking. They also teach hygiene and report on the sanitary conditions of the mining towns.



FIG. 2. SCHOOL BUILDING AT JENKINS, KY.

The importance of this work can hardly be overestimated, and these nurses would be sorely missed were they to be withdrawn from their sphere of usefulness. In some sections access to the various communities in which they work is facilitated by modern methods of travel, but in the Kentucky divisions in winter it may be quite another matter—quite different from the enjoyable horseback ride in "the good old summer time," as shown in Fig. 1.

An admirable system of nursing has been worked out by Mr. Green and one that is producing good results. A nurse is placed in charge of a district and is given general instructions only; she is held responsible for her work and given full latitude as to the methods to

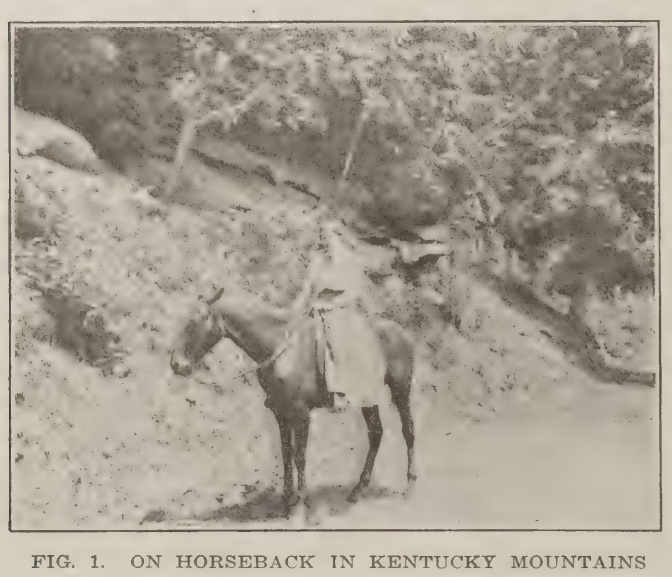


FIG. 1. ON HORSEBACK IN KENTUCKY MOUNTAINS



FIG. 3. INTERESTING GROUP OF YOUNGSTERS IN THE KINDERGARTEN CLASS—CHILDREN OF CONSOLIDATION EMPLOYEES

be used in accomplishing the results desired. The nurses feel this responsibility and respond to the confidence placed in them, seeming to be more inclined to offer suggestions as to improvements in methods of doing their work than they would be when acting under detailed orders and subject to much supervision. Mr. Green expressed himself enthusiastically about the present corps of nurses, commenting especially on the willingness they showed in assisting to combat the poliomyelitis epidemic at Monogah, W. Va., during the summer of 1917.

The hospitals of the company in the various divisions are said to have been operated with great success from a medical point of view. New hospital units were built during the year 1917[1] and others are under construction. Among those completed are a hospital in the Pennsylvania division at Gray and two in the Miller's Creek division (Kentucky), one of which is a small emergency hospital room. The men in the Maryland division, Pennsylvania division (in part) and West Virginia division are cared for in state hospitals.

[1]See *Coal Age*, page 543, March 23, 1918, for view of Consolidation hospital at Jenkins, Kentucky.

The activities of the Employment Relationship Department along educational lines are quite comprehensive and include the following: Coöperative work with public schools; kindergarten work done by the company; domestic science work done by the company; general educational work relating to hygiene, sanitation and so on. The company assists the public schools with money, school plots and in the building of schools, supplements teachers' salaries in order to secure a higher class of instructors, assigns visiting nurses to give safety and first-aid talks and demonstrations, awards prizes for the best-kept school grounds during vacation periods, and promotes other similar activities.

Among the fine up-to-date school buildings in the vicinity of the mines of the company is the school at Jenkins, Ky., shown in Fig. 2. Others of a similar character are being built, and all the schools are furnished with the most modern equipment obtainable. The kindergarten work carried on by the company's teachers begins with the ending of the regular school term and continues until the opening of the public schools in the fall. Excellent results have been obtained through this work, and great interest is always shown by the chil-



FIG. 4. PLAYGROUND AT A MINING TOWN OF THE CONSOLIDATION COAL COMPANY



FIG. 5. RECREATION BUILDING AT McROBERTS, KY.



FIG. 6. MINER'S HOME IN THE MARYLAND DIVISION

dren and by their parents. There is an excellent field for kindergarten enthusiasts at the mining villages, and nowhere should more marked results follow a successful teacher's efforts. Carried on at a time when the regular schools are not in session, its activities follow along lines advocated by many leading educators. One of these kindergarten classes is shown in Fig. 3.

Domestic science instruction is also furnished by the company's teachers during the vacation period, children as well as adults being given instruction in cooking, general housekeeping and sewing. These teachers sometimes occupy one of the miner's five-room houses when a community house is not available, in which event the upstairs rooms are used as living quarters and the first floor is thrown into one large room. In addition to the regular domestic science work, this room is also used by Red Cross, Little Mothers' League, Camp Fire Girls, Boy Scouts and similar organizations. In the domestic science work, plain cooking of the foods within the reach of the population at the mines is taught and the foods are cooked with the same fuel as that used at the homes. At the time the instruction in preparing foods was given it had to do with those materials which were regarded as non-essentials to the war; it included demonstrations in the use of corn, rye, barley and other grains used as substitutes for wheat flour.

In general educational work relating to hygiene, sanitation and so on, is included the work done by the visiting nurses at the homes of the employees, in the recreation buildings and in the community houses. This work is carried on throughout the year and consists of get-together meetings, lectures, talks, cooking demonstrations and sewing and knitting classes. All these activities seem to be beneficial and productive of good general results, as they create interest in the locality and tend to stabilize labor.

Recreation and relaxation of employees are provided by the Consolidation company in the shape of indoor amusements and theatricals, outdoor directed amusements and playground work and outdoor undirected amusements. An outdoor playground is shown in Fig. 4. The physical director is on hand for any of the indoor amusements or sports carried on in the various recreation buildings and which consist principally of billiards, bowling and basket ball. The recreation buildings are twelve in number, three being in use in



FIG. 7. A CONSOLIDATION PARK AT JENKINS, KY.; OFFICE AND RECREATION BUILDINGS ON LEFT

West Virginia and nine in Kentucky. In the latter state, at all but one location, these buildings are in duplicate—one for the white and another one for the colored element of the population.

Permanent recreation buildings are planned to replace the three structures in West Virginia, as these are temporary in character, and a fourth building is under consideration. Another building is also planned for the Pennsylvania division. Those mining towns near large centers of population are in a different class from those villages remote from large towns. Under the latter class come the mining towns of Kentucky; here four of the recreation buildings in the Elkhorn division of the company have auditoriums where high-class pic-



FIG. 8. JENKINS (KY.) BAND—ALL EMPLOYEES OF THE CONSOLIDATION COAL COMPANY

ture plays (the best that can be secured) and other theatricals are given.

In Fig. 4 is shown the manner in which the Consolidation company has beautified the grounds in the vicinity of the office building and the recreation hall (on the left) and the hospital (on the hillside to the right) at Jenkins, Ky. The recreation building for the white population at McRoberts, Ky., is illustrated in Fig. 5. For the same reason that auditorium facilities are necessary in Kentucky, the recreation buildings planned for the isolated sections in the West Virginia division will also have provision for the giving of both theatricals and moving picture shows.

A physical director guides those participating in outdoor amusements and playground work. Tennis courts and baseball diamonds have been provided by the company. The men about the mines appreciate the facilities for sport and congregate on the recreation grounds after work. During the summer of 1917, two male and two female physical directors were employed to good advantage. Baseball is the popular outdoor amusement of the men, the inter-division games and the games with outside industrial teams being played to large audiences of interested "fans." The teams are fully uniformed and equipped, this at their own expense. The Ida May (Mine No. 87) baseball team, which made such a fine record during the past season, is shown in Fig. 9. Mine No. 87 is the recent shaft development of the company, near Fairmont, W. Va. A band has been organized among the Consolidation employees at Jenkins, Ky., and their playing doubtless contributes to the pleasure of those living in that section, judging from the group shown in Fig. 8.

The Employment Relationship Department is particularly active as regards publicity matters. In December, 1917, the first number of the Consolidation Coal Co.'s *Mutual Monthly Magazine* was published by this department, and it was decided to issue this magazine regularly, between 10,000 and 11,000 copies being printed each month. The entire expense of publishing and distributing the magazine is borne by the company.

The Consolidation company, through the medium of its monthly magazine and printed circulars, endeavors to present timely information to the miners and their families. Each payday a different circular is handed to the men; these are made so attractive that the recipients almost invariably take them home. The information in the circulars is



FIG. 9. BASEBALL TEAM OF THE IDA MAY MINE, NEAR FAIRMONT, W. VA.

intended to interest in turn the miners and the various members of their families—the women and the children about the mines.

The monthly magazine touches on a variety of topics and endeavors to reach the men from every angle. Interesting sketches are published of prominent men connected with the company, or others deserving of special mention, or maybe a description of some interesting piece of work about the mines. Popular interest is maintained in this family paper by printing all interesting personal items about the employees and their families. The various activities encouraged and directed

by the Employment Relationship Department are all regularly commented upon and accompanied by numerous illustrations.

Every encouragement is given to the population about the mines to cultivate gardens—they greatly improve the appearance of the house lots and have a decidedly practical bearing as contributing most acceptable supplies for the housekeeper. Prizes were offered for vegetables only during the season just ended, and no men on the monthly payroll were eligible for garden prizes. Due to the urgent need for home production of food products, especial attention was given to vegetable gardening, the object being to have the largest possible crops raised on the ground available for cultivation.

Considerable enthusiasm was aroused by the company's garden policy. For example, in the West Virginia division of the Consolidation, three cash prizes were offered to each of ten groups of mines in addition to the division or regional prizes. Thus the group first, second and third prizes were $15, $10 and $5 respectively, the corresponding division prizes being $35, $25 and $15—a total of $370 and 33 prizes in this division alone. In judging the gardens for awarding the prizes, variety, arrangement of vegetables planted and condition in which the garden was kept counted 50 points; quantity of vegetables planted as compared with the ground available made up the remaining 50 points. In judging, surrounding circumstances such as condition of the soil and local obstacles met with in making a garden were considered, as well as the number in a family who could work in the garden. At the end of the season after the prizes had been awarded, further prominence was given the matter by publishing illustrations of the successful competitors and also views of their gardens. This was an additional incentive to excel, for few fail to appreciate publicity—a deserved compliment after a season of toil, in many cases at odd hours after the regular work of the day was over.



FIG. 10. GARDEN WHICH TOOK SECOND PRIZE IN THE WEST VIRGINIA DIVISION

In Fig. 10 is shown the garden which received the second prize in the West Virginia division for the year 1918; those who were responsible for the success of this garden are also shown. The illustration brings out nicely some of the benefits derived from a cultivation of the ground around the homes of the miners. A further instance of what can be done in the way of making the home surroundings attractive by planting shrubs, vines and flowers about the house—and then caring for them—is also shown in this illustration.

Among the activities encouraged by the Employment Relationship Department community work stands out prominently. There would seem to be few sections of the country in which the people should respond quicker to this influence than in the coal-mining regions. Those living in villages about the mines have some decided advantages over the scattered population in some rural districts, it is true, but frequently the landscape about coal operations is most unattractive. The miners and their families need influences which tend to take them away from thoughts of their work and their surroundings, and out of themselves—who does not for that matter, at times?

Can Holland Supply Itself with Coal?

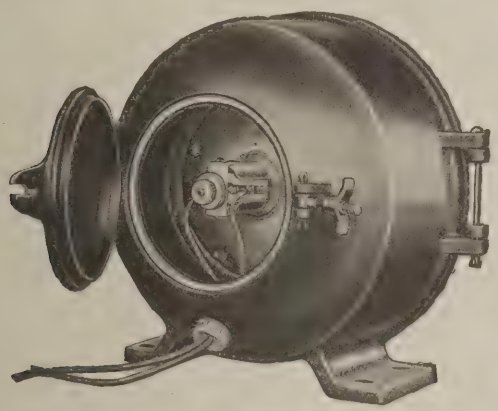
According to the *Allgemeene Handelsblad*, the whole production of coal in Holland has considerably increased since the beginning of the war. It now appears that Holland can, though with some difficulty, provide herself with fuel without having recourse to imported coal. Before the war, about 7 million tons a year were required for Dutch consumption. Of this quantity, the Limberg mines produced at the most a third. During the war production increased by 270 tons a month. The output of brown coal has largely increased. Peat equivalent in heating power to 350,000 tons of coal was produced this year. The use of this fuel is finding favor and consumption is increasing rapidly.

On Sept. 3 the *Zeitschrift für angewandte Chemie* republish the item quoted above. In its preceding issue, however, the *Zeitschrift* had made a statement which appears somewhat at variance with the one given in the *Handelsblad*. The statement referred to is as follows: "In accordance with a recent agreement with Germany, Holland is now receiving more coal from Rhineland-Westphalia. Since the beginning of the month two railway trains have been dispatched daily from that coal-producing district to Holland, laden with 1500 tons of coal. For the present four such trains are to run daily, laden with 3000 tons. Hence some 78,000 tons a month will reach Holland by railway, so that of the total 120,000 tons agreed upon, there will be left 42,000 tons for carriage by water."

New Mine Headlight for Haulage Locomotive Use

The Electric Service Supplies Co. will shortly place on the market the type MLC-96 Golden Glow incandescent headlights for mine use. These headlights are similar in all general features to the type ML-96, except that the case instead of being drawn steel, is made of cast iron, and provide high illumination under all conditions encountered in mining service, combined with low current consumption and maintenance cost, thus offering an efficient form of headlight for haulage locomotive use.

The headlights are equipped with yellowish green mirrored glass reflectors, which are first molded to the form of a true parabola and then accurately ground, after which they are polished and silvered. The light, in striking the mirrored surface, is reflected back through the glass, and in passing through this special glass the violet and blue rays are absorbed, leaving a beam of golden-yellow light, which penetrates fog, dust and smoke to a greater extent than is possible with a white light. Furthermore, the dazzling and blinding effect of a white light is avoided. These glass reflectors, in addition to being highly efficient, are also durable, permanent, cannot tarnish or scratch, are easily cleaned and do not require polishing. Taken from any angle, they make an exceedingly efficient headlight.



REAR VIEW OF MINE HEADLIGHT

Type MLC-96 headlights, being designed especially for mine use, have the reflector and socket flexibly suspended in the case, in order to prevent the vibration of the mine locomotive from breaking the lamp filament. The case is made of cast iron, with a rear door which permits of the adjustment of the socket so as to bring the lamp filament into the exact focal point of the reflector. The reflector, with the socket and all other mechanism and spring support, is mounted in a shell that is removable through the front door, making all parts accessible for inspection or repairs.

These headlights are suitable for 56-, 72- and 94-watt concentrated filament Mazda lamps having a light center length of $2\frac{1}{16}$ in., and satisfactory results cannot be secured from any other type or size of lamp. They may be connected in series with special resistances designed for the purpose, or in series with other incandescent lamps on the locomotive, provided these lamps are of exactly the same current consumption and of the proper voltage. The headlights complete weigh approximately 25 pounds.

Legal Department

TRESPASS UPON COAL LANDS—In Maryland, where a mining company negligently encroaches upon the coal deposits of adjoining land, the aggrieved owner is entitled to recover the value of the coal at the mouth of the mine, not being limited to the value of the coal in place. This rule has not been changed, as applied to merely negligent trespasses, by the Maryland statute which declares that one who furtively or in bad faith abstracts minerals for the land of another shall be liable for the value of such minerals, without deduction on account of the expense of mining. (Maryland Court of Appeals, Monahan vs. Mt. Savage George's Creek Coal Co., 104 Atlantic Reporter, 480.)

INDIANA WORKMEN'S COMPENSATION ACT—A mine employee was not debarred of right to an award under the Indiana Workmen's Compensation Act, for loss of the sight of an eye following an injury in the course of his employment, because he failed to give the employer written notice of the injury, where it appears that the employer had actual knowledge of the fact of the injury, and where the employer's company physician assured the injured man at first that the injury would not be serious. A coal-mining company has sufficient notice of an accident to a miner if the pitboss or foreman knows of the occurrence. (Indiana Appellate Court, Candalia Coal Co. vs. Holtz, 120 Northeastern Reporter, 386.)

LIABILITY FOR ROOF FALL ACCIDENT—Where a landslide at a mine left dirt and debris on tracks leading into the mine, an employee engaged in removing the same, preparatory to timbering, was entitled to assume that the coal company had made his place of work reasonably safe. But if a fall of rock and dirt from the roof at that place was so apt to occur that a miner of ordinary prudence would not have encountered the danger, the employee assumed the risk of injury from such a fall. (Kentucky Court of Appeals, Wallace vs. Hazard Coal Co., 205 Southwestern Reporter, 692.) The Virginia statute, requiring miners to prop and secure their working places, does not apply where danger at a particular place was not of such character as to call for use of props, as determined by the mine foreman or the miner making a report of unsafe condition. A miner was not negligent in working in a place which the foreman had assured him would be made safe, and which the slate men told him had been made so. Under the Virginia statutes negligence of a mine foreman, boss, or fireboss, and their assistants, in the discharge of statutory duties, is negligence of the operator. (Virginia Supreme Court of Appeals, Keen vs. Jewell Ridge Coal Corporation, 96 Southeastern Reporter, 767.)

SURFACE RIGHTS FOR MINING PURPOSES—Mere failure of a mine owner for a long time to exercise mining rights in the surface of land does not extinguish them. A grant of ways into, over, and under a tract of land, at such points and in such manner as may be necessary and proper for the mining and marketing of the coal under it, does not limit the grantee to a single way or opening. Under such a grant, ways and openings that are appropriate, useful and convenient in the mining of the coal are legally necessary and proper. Mere inconvenience to the owner of the surface, wrought by the exercise of mining rights, does not constitute a limitation upon them. The existence of a small garden cultivated by a tenant on the surface does not prevent the owner of mining rights from exercising them at that point. A clause in a deed granting mining rights, which absolves the grantee from liability for injury to springs in the surface or destruction thereof, as an incident of the removal of the coal, justifies such injury or destruction at such time as the mine owner may see fit to take out the coal, and injury to a spring constitutes no ground for restraining mining operations. (West Virginia Supreme Court of Appeals, County Coke Co. vs. Elkins Coal and Coke Co., 96 Southeastern Reporter, 973.)



New Order Definitely Fixes Price of Household Coke

An order providing that, in localities where anthracite is obtainable, the prices to dealers of byproduct coke for distribution by them in less than carload lots or for household purposes shall not exceed the established maximum prices of gas coke sold under the same conditions, was announced Dec. 29 by the United States Fuel Administration.

The order became effective Jan. 1 and applies to prices at point of production. It was stated that its effect would be to lower the maximum prices of byproduct coke, which already is selling at less than these prices in some localities.

Another order, also effective Jan. 1, established definitely that in localities where anthracite coal is obtainable the prices to dealers of gas coke for distribution in less than carload lots or for delivery direct to consumers for household purposes shall be the same as the lowest price for a 2000-lb. ton of stove anthracite at the mines plus the lowest freight rate to the point where the coke is produced.

This order followed receipt of information that in some places the standard 2000-lb. ton of coke was being compared for price-fixing purposes with the anthracite ton of 2240-lb. and that question had been raised as to what anthracite price should be taken for comparison. The order makes it clear that for comparative purposes the ton shall be 2000 lb. of coal and coke alike, and that the lowest anthracite price in the district taking the lowest freight rate to the point of coke production is meant.

Rear Admiral Reports on Use of Coal by American Navy

During the fiscal year ended June 30, 1918, the Navy required more than 4,000,000 tons of bituminous coal. Rear Admiral McGowan, in his report to Congress, discusses various phases of the use of coal by the Navy. In part, he says:

For the fiscal year 1917, the total Navy requirements were approximately 1,200,000 gross tons; while in 1918 the tonnage required was in excess of 4,000,000 tons. Of this tonnage, delivery was taken by the Navy of about 3,500,000 tons at principal tidewater ports, the balance being distributed among smaller stations and various interior points.

The Navy's anthracite coal requirements are as yet comparatively light, being in 1918 about 70,000 tons, principally at North Atlantic ports—approximately three times more than the quantity used during the previous year.

In the distribution of the Navy's fuel requirements, it was found necessary at the beginning of the fiscal year to meet the emergency conditions at the then early period of the war to place allotments with the leading suppliers throughout the country for an equitable share of the total production, in order that the unexpected demand could be divided as far as practicable among every leading interest concerned; in doing which care was exercised to have these allotments represent, as far as possible, a proper *pro rata* of the total production from the companies involved, based upon their percentage of output, proximity to the transportation required, convenience of facilities, etc.

In doing this, the question of price to be paid received special consideration which, in the case of coal, was taken care of by prices fixed in August, under Executive announcement, adopting as the unit base at leading districts of Navy coal production the following prices: Pennsylvania, Maryland and West Virginia (Pocahontas field)—$2 per net ton or $2.24 per gross ton; West Virginia (New River district)—$2.15 per net ton or $2.408 per gross ton. This basis has since been generally increased by different Executive modifying orders advancing the prices indicated, including wage increase of $0.45 per net ton and relative advances in central Pennsylvania, Maryland and New River district, West Virginia, to correspond with the increased cost of production in those districts, developed since the adoption of the initial fixed basis; the average price during the latter half of the fiscal year being approximately $3 per gross ton at mines producing Navy coal.

In the matter of coal, the fuel problem has been largely narrowed down to the production of "Navy Standard" furnished from mines accepted for this purpose after careful inspection and tried experience and of which the total output is limited—rendering it necessary that the utmost conservation be used in this high-class coal; to which end wherever possible other high-grade coal is being used by the Navy on work of lesser importance in order that this Department may at all times closely coöperate with the pressing requirements of other military arms of the service; and the entire commercial program as a whole, in which the vital question of our transport service and assistance to the allies has not been lost sight of.

In this direct connection, it is not inappropriate to refer to the benefits secured by all concerned in the more rapid and elastic coaling of vessels through the Tidewater Coal Exchange created during the year at the principal Atlantic ports, under the operation of which it is not essential in placing loading assignments to designate the specific pier at which vessels must load; and instead all three piers at Hampton Roads—Lamberts Point, Sewalls Point and Newport News—can be employed, depending on the supply of coal on hand and open berths available at the time of vessel's readiness. The equalization of coal credits in the exchange or pool, under the rules laid down, satisfactorily takes care of the distribution between coal suppliers and mines at interest, independent of questions as to indentity of coal.

In the handling of the daily current problem, the matter of increased storage for fuel, with more rapid handling of vessel bunkering and the transfer of coal cargoes, has been given special attention. Early in the fiscal year a fixed program of increasing all facilities for the handling of

fuel was inaugurated with a view to expanding the facilities then available which were sufficient to meet peace-time needs but entirely inadequate for the rapidly increasing requirements of the Navy.

To this end, a survey has been made of the principal ports where important work is now under way that will not only very greatly increase the total storage but also the daily handling of coal and oil. This particularly includes development on a large scale at New York Harbor, Hampton Roads, Philadelphia, Boston, Baltimore, Charleston, and in fact the survey and consequent work involves every port where cargo shipments in volume are anticipated.

As an illustration of the work done, the two storage plants constructed at Hampton Roads might be cited. One of these, covering approximately fifty acres, has been constructed by the Virginian Railway Co., while the second is being erected by the Chesapeake & Ohio Railway Co.; each having a total capacity of 300,000 tons of coal, with a storing and redelivering capacity at each plant of 300 tons per hour—the former plant being served by a large cantilever gantry crane with several reloading tracks and the latter by two large locomotive cranes of special design, equipped with booms, having an effective handling radius of 102 ft.; while the facilities of both plants as to trestles, convenience of ample track and water deliveries as well as opportunity for the additional free and full use of ships' gear, are unexcelled.

In addition, at principal Atlantic ports the most modern machinery has been provided to expedite the bunkering of ships, including the installation of special elevators both ashore and afloat, enabling the expeditious coaling of any ship under the various governing conditions.

The total plans include the latest mechanical devices and equipment for the rapid and satisfactory handling of coal in all forms and for all purposes, the securing of which, under the manufacturing embargoes more or less existing, has been a complex matter, as well as the question of necessary labor not only for the new construction work but for the manning of the coaling plants as completed.

On this latter point, it has been found necessary to develop a new form of organization which has active charge of the fueling activities at each port where established. An assistant aide for supply in charge of fueling has been appointed, who is directly responsible for the bunkering of all ships and handles all details in connection with the fueling of naval vessels—with results that have already demonstrated the efficiency of the organization; ships being refueled at a minimum of time and expense. The storage of coal alone will, when completed, represent capacity of approximately 1,500,000 tons.

During the year, steps have been taken toward increasing the supply of Navy standard steaming coal, in doing which—after thorough examination and necessary tests—it has been found possible to add a number of mines to the "Navy Acceptable List." A "Supplementary List" has also been established, embracing mines producing a high grade of coal suitable for bunkering purposes on certain types of vessels, thereby conserving the highest grade bunkering coal for purposes where it is absolutely necessary.

In connection with available coal supply, it is expected that further investigation of coal mines in the Matanuska District, Alaska, now actively under way, will show that source of supply to be of substantial service; and to that end provision was made in an Act recently approved authorizing a certain expenditure in the discretion of the Secretary of the Navy for mining and handling coal in that section.

With the development of those fields, it is expected that an adequate supply of coal for west coast and mid-Pacific stations will be provided, it being hoped that the coal will prove of such quality as to make unnecessary the shipment of bituminous coal from the Eastern fields.

Elimination of certain wasteful elements in competition is said to be one of the desires of President Wilson. He is said to favor the enlargement of the Federal Trade Commission to nine members.

New Cost Report Sheets Require Much Additional Data from Operators

Much additional detail is required in the new cost report of the Federal Trade Commission. Bituminous coal producers whose output exceeds 60,000 tons annually must make returns. Last year those producing less than 100,000 tons were permitted to make out a much less detailed report. In the new report, it is required that all details of cost must be divided between labor and supplies. Information is required under the following headings, each of which has numerous subdivisions: Mining, ventilation, drainage, yardage and deadwork, stripping, haulage, tipple operation, preparation (commercial coal), power, overhead, fixed charges to mining, other charges to cost, credits to cost, selling expenses, general expenses and administration, miscellaneous income, deduction from income, sales of coal produced, departmental transfers. The following accounts are to be used in the balance sheets:

Assets—(a) Current assets: (1) Cash in bank and on hand; (2) accounts receivable—current; (3) notes receivable—current; (4) inventories, less reserve for doubtful accounts. (b) Deferred assets: (1) Insurance paid in advance; (2) taxes paid in advance; (3) royalties paid in advance; (4) stripping done in advance. (c) Intercompany accounts: (1) Accounts receivable; (2) notes receivable; (3) loans. (d) Investments: (1) Stocks of other companies; (2) bonds of other companies; (3) mortgages; (4) real estate not used in coal production. (e) Fixed assets: (1) Coal lands and ore veins held in fee; (2) buildings, (3) machinery and equipment; (4) development charges; (5) office furniture and fixtures, less reserve for depletion and depreciation. (f) Good will, leaseholds, property rights, etc.

Liabilities—(a) Current liabilities: (1) Trade accounts payable; (2) trade notes payable; (3) wages accrued. (b) Accrued liabilities: (1) taxes; (2) interest; (3) unclaimed wages. (c) Intercompany: (1) Accounts payable; (2) notes payable; (3) loans. (d) Capital stock—preferred; (e) capital stock—common; (f) bonds; (g) mortgages; (h) loans and notes payable, bank or open accounts; (i) appropriated surplus; (j) surplus.

Eastern Coal To Move to Middle West

Eastern coal has been made available to dealers and consumers in Ohio, Indiana, Illinois and Michigan, provided the approval of the state fuel administrator can be secured. The coal will move on out-of-zone permits issued by the United States Fuel Administration. Many dealers and consumers in the Middle West have disposed of their stocks of low-grade coal, and it is believed that no injustice will be done in the great majority of cases by allowing the purchase of higher grade coals. It is believed, however, that the state fuel administrator will be zealous in protecting any centers where accumulations have not been disposed of. One city, for instance, acting in full accord with the state administrator, established a pool and brought in a very large supply of the only coal that was available at that time. It will be necessary in that city for the state administrator to afford this protection for some time to come.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

In the anthracite region the mine workers are still disposed to rebel because they did not get the second war bonus for their work in the month of October which apparently they believed they were going to get up to the day on which the award was announced by Dr. Garfield. The late date at which the award was made would have made a retroactive bonus unfair unless the Fuel Administrator could have contrived a retroactive price. That he could not do.

In Illinois, where work is now scant, the mine workers want Government ownership. They say the Government would keep them working steadily despite business conditions. We commend them to confer with the munition men who are being laid off. The Government has no work for them though the industry was created by the Government. The mine workers have noted how the whilom munitioner is coming back to the mines now he is not wanted, though he refused to come back when he was wanted. But he can perform a considerable service to the nation by informing the mine workers that the Government will not and indeed cannot guarantee steady work. It buys today and refuses to buy tomorrow as its necessities require, and when the Government owns the plant it is shut down just the same when the need for the material ceases.

Up in the anthracite region Federal agents are busy trying to find why men won't work. A local correspondent well says: "The Federal agents will doubtless have a pleasant stay and the miners will lose time as before. The only cure for loss of time is dismissal, a cure which is now out of fashion. In the Schuylkill field where no one is allowed to work a breast unless assisted by another man the tardy workers cause hardship when paired off with steady men. If a 'butty' cannot be found for a miner, he must return home or work at 'company work' at a considerable loss to himself." It is a pity that owing to an apparent difference in scale, the Gallagher law, the variant mining conditions and the remoteness of the fields, Illinois mining men will not try to find work in the anthracite region. If they did the overplus in the Middle Western fields would readily solve the problem for the hard-coal producer. That the Illinois labor is not thus available is the more regrettable because the incoming soldiers in the anthracite region are not proving willing to settle down to their old employment. Returned soldier boys are not taking their old positions at the mines. They are spending vacations of varied length and then departing for the city centers in search of work. Many men are seeking employment as "company men," but few contract miners can be secured.

In the Big Sandy region of eastern Kentucky, especially in Pike County, no little labor trouble has arisen. It is said that the operators of the region are discharging men for joining the United Mine Workers of America, the trouble seeming to center around Pikeville where Vice President Pettry of District No. 17 and a party of organizers of whom he was in charge have been arrested. According to President Keeney further attempts to organize the mines around Pikeville were abandoned pending a meeting of the International Board at Indianapolis on Jan. 6. At the present time 2250 mine workers in the Kentucky field have joined the organization.

So much for eastern Kentucky. The other end of the state has its troubles. In Hopkins County, still a non-union field, the operators have asked the mine workers to accept a reduction of 5 per cent. in their wages because work has been slack. It seems quite probable that the men will accede to the demand made on them, for in the week ending Dec. 21 the idleness from lack of orders reached 26.9 per cent. and from all causes 42.2 per cent.

Anthracite Mine Workers' Insurgency

The old year at its end saw insurgency at its height in the first district of the anthracite region. On Dec. 28 an insurgent meeting was held by 125 delegates which by resolution instructed a committee to bring John Lewis and William Green, international vice-president and secretary respectively, before a convention of mine workers to explain the provisions of the recent wage agreement. Both the officers of the union have sent word that they will appear. President Frank J. Hayes, the international president, will not be able to attend.

The consent of Lewis and Green is tantamount to a recognition of the insurgent convention which is to be called despite the protests of the tridistrict board which is in charge of the labor destinies of the anthracite region. For two years there has been a growing disposition to contest the judgment of the ruling powers. A rival organization has even been built up. Now at last insurgency within has become so strong that insurrection is recognized. The insurgent does not have to leave the union. He now continues a member and modifies the administration of the union even if he does not actually regulate it.

Bolshevism in Illinois Mines

Illinois miners are becoming increasingly restive under the slow work which has prevailed since the armistice was signed. This feeling took form as a demand on the Government that it assume the ownership of the mines, the resolution being passed at a crowded mass meeting held at the Lyric Theater, Belleville, Ill., Sunday, Dec. 29. The meeting was called to discuss the present lack of employment and to decide upon a remedy.

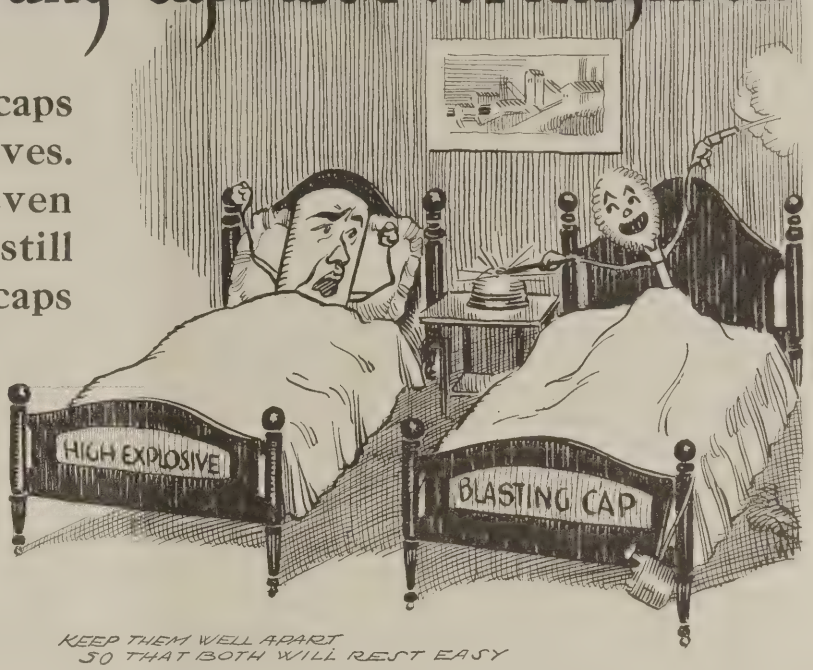
After addresses by Duncan McDonald, former secretary-treasurer of the Illinois United Mine Workers, now secretary-treasurer of the National Coöperative Association; Andrew Wilson, of the Alliance of Labor and Democracy; President Daniels, of the Belleville sub-district; and Vice-President Carbine, of the Illinois State Federation of Labor, the following resolutions were adopted:

"Whereas, private ownership of coal mines creates acute competition in the market, and as, under the private ownership, mines are operated only for profit without regard to the interest of the miners, and whereas past experiences have proved that private ownership of mines and the operation of the same at such times as the private owners see fit has made the employment of mine workers insecure and worked a hardship on them and their families, and whereas there are hundreds of miners in the Belleville sub-district out of employment, and hundreds working less than half time due to private ownership and private management of mines, therefore be it resolved that the miners of Belleville earnestly and urgently call upon the House of Representatives and the Senate to enact a law providing for Government ownership of all mines in the country, and the democratic management of the mines by the miners employed therein."

St. Clair County, in which this meeting took place, is one of the biggest coal-producing counties in Illinois. When the resolutions were introduced Philip Veal objected to their adoption and urged that another resolution be drafted in favor of placing the mines under the control of a Workingmen's Council. He moved that three cheers be given "by the soviets of Belleville who are in sympathy with the soviets of Europe," but the three cheers were not given. They were headed off by calls for the adoption of the Government ownership resolutions, and the meeting proceeded to pass those resolutions as written.

Explosives and Blasting Caps are Poor Neighbors

DO not store blasting caps with high explosives. If they are kept even three feet apart there is still danger, because blasting caps go off easily; and when they explode they cause the high explosives to go off also, if they are at all near each other. Therefore, blasting caps and high explosives should be kept at least 10 feet apart.



KEEP THEM WELL APART SO THAT BOTH WILL REST EASY

What difference in effort does it make to you, when putting them both away, if you put them a few feet apart or put them both together? But what an awful difference it would mean should something accidentally set off your blasting caps when they are near your powder.



HE SHOOK THE FIRE OUT OF HIS PIPE AND STUCK IT IN WITH THE EXPLOSIVES.

Last year at a neighboring mine a man was carrying his blasting caps and two sticks of powder in his inside coat pocket. Without thinking, he shook the fire out of his pipe and stuck it in with the caps and explosives. The caps exploded and fired the explosives, and his entire side was blown off.

Think about this accident and don't carry explosives and caps together when you go into the mines. If you carry the caps, let your buddy carry the powder; or, if you must carry both yourself, carry caps and explosives in entirely separate places.

—Safety letter from a large company to its men.

EDITORIALS

Do Less and Have More

WORKINGMEN in England want the 44-hour week. If they want more leisure, the idea is not bad. If they think that in the shorter time they might be able to do just as much work, they would be advancing a proposition having some slight element of feasibility, especially in some lines of work. But strange to relate, instead of presenting either of these reasons, the British workmen say they want to reduce production.

They wish to reduce production, be it noted, with every mother's son of them complaining that they do not have enough, not of one thing but of everything. Where the things they produce go to, nobody knows. They produce too much and yet they have too little. Some one must dump part of the production into the Thames and the Mersey.

We all want more than we are getting. Write that in your political economy. If we all work more, we will make more and we will all have more; unless some one dumps the product in the Hudson and the Mississippi.

If there are at any time too many miners, leave the mines and go to producing something that it takes coal to produce, and which is in demand. Then you will, in doing that work, furnish a demand for coal that will revive the coal industry. If every one produces less, they will have to get along with less; for what is made is what we have, and what we don't make we don't have. "Do less and have more" is a fallacy.

Only for short periods, when people wilfully refrain from purchasing, are there too many artisans. Immediately thereafter there comes a glut of business; for a large part of what we have done without must eventually be bought, and what was left unbought and undone must largely be bought and done in the years that follow.

Perhaps in time of light demand it might be well to do less. We usually do; we work fewer days in the week or shorter time. But when demand is brisk we still keep up the practice of short-time work and try to take almost as many holidays as we did in the slack season. The result is that we buy less than we need in the slack periods and cannot get what we want and can buy in busy periods. Production is always a little behind the needed level.

A country like Great Britain, with its female percentage increased and its male percentage decreased, is not in prime condition for a shorter day. A country with a lot of cripples is not ready for experiments in the efficiency of shorter working hours. A country that is converting its plants from war work to peace work will not be helped by laboring less industriously.

Every nation has, in certain parts of its career, decried and lamented over-production. Yet year by year the amount of almost everything produced has increased per capita. We want more. Let us work to get it. Goods are not produced by Act of Parliament, but by toil. Still, if goods were producible by the fiat of the Labor Party in the palace of Westminster, the workingmen would not want them because they say: "Away with commodities. They smother us. We are surfeited with them. Do less that we may escape them. The more goods there are the worse our condition is." All of which is nonsense, for the progress of the working classes goes hand in hand with increased production.

Under-consumption and Over-production

SHORT hours and more frequent holidays are a good corrective of over-production whenever over-production occurs. It is a universal practice at the mines. Both operators and miners concur in it. Men are not discharged when business is slow. The same number of men are employed, all are given an equal turn, but the mine is shut down when the coal needed has been loaded onto the cars.

Unfortunately the short working days, which become frequent during these periods of over-production or under-consumption, tend to become the recognized hours for working; and holidays kept one year are likely to be regarded as necessary in the year following. In fact the tendency is to put the shortened hours and shortened time generally into contracts and thus make a binding law out of a mere practice, the provision necessary to meet a temporary condition thus being made obligatory when the condition no longer obtains. The human machine is thus hampered and choked down so that, when business improves and opportunity for steady work presents itself, full days and full weeks of days will not be worked.

An automobile driving through the country is held up at railroad crossings and road crossings. When it reaches the crowded city its progress is stayed at almost every street intersection. How does the chauffeur of the car react to these annoyances? Does he demand a slower car because it is evident he cannot travel steadily at the full speed of his automobile? Not at all. He looks for one that will make the requisite speed between stops and that picks up speed readily. He wants a faster, more responsive machine and not a slower one.

The labor machine is not much different. It is frequently stopped on the road or caused to run slow. It needs all the more to be speeded up between such occasions, for the more delays the more necessity for speed

The workingman faced by occasional short-time operation should prepare himself to do his utmost when occasion comes. He needs to keep in mind that when slack times end, and times are booming, he should be ready by greater diligence to make up for the time lost. Instead we find a disposition to meet the shortage of opportunity to work by the enacting of crippling restrictions which prevent a large production from being attained when the consumption is large and production cannot possibly supply it without maximum endeavor.

Halts in our progress and signs causing us to slow up, we must expect. Hills there will be that we cannot

take "on high." Curves there will be that we cannot negotiate at full speed. Consequently let us provide a machine, which, run on the level, can bowl along at a lively gait. Rarely is there an economic situation at any time or in any industry such as would assure absolutely steady work. The anthracite industry is now almost the solitary exception, and surely no one would suggest a reduction in output in that industry.

Perhaps the Government may eventually with success provide everyone with work when work is scarce. The suggestion has been made that the Government add this duty to its many other functions. The idea seems good, but having spent a billion or so on roads or schools when times are bad and taxes hard to pay, it will seem good to do the same when times are good and men are scarce, because taxes will be easily collectible. Governments are like the men they represent. They tend to do under one set of circumstances what they learned to do under the necessities of entirely different conditions.

The human mind individually and collectively takes on a permanent set, and the cure for adversity is taken long after the need for it has gone. The drug does its curative work, but the man who has been cured by it becomes an "addict." It would be a bad plan for a man who took cocaine and knew that it sapped his strength to pledge himself to take it indefinitely. It is bad for a union when it knows that shorter hours will hamper production to take on itself to advocate shorter hours indefinitely regardless of the demand of the public for the product of its members.

When the number of hours the members of a union are allowed to work is reduced, then in times of prosperity it is necessary to hire more men. The operator is obliged to go far and wide to secure them. He loads up the industry with labor, and at the next slack time it seems necessary to the miner to reduce the working hours again. As a result hours get indefinitely short, the cost of coal rises, and the consumer, who in the large is only another workingman, suffers. The condition of the miner is not improved. His work is not rendered steadier by the restriction in hours, and never will be. Restrictions in the number of men introduced into the industry is the only real cure, and that violates every law of industrial propriety. Industrial freedom requires that we shall be allowed to work at any job for which we have an ability, provided there is work to do in that line.

We Want To Get Too Much Out of the War

WE DID NOT enter the war for gain. We did not seek an acre of ground nor did we look for any little thing like a trade concession. It cost us a large loss in money and a far greater loss in lives. Nothing mercenary sullied the help we gave the allies during the war struggle; nevertheless, we are seemingly seeking in peace to gain a little too much out of the war, for when we desire things which are incompatible, we cannot get them, try as we may.

Before the war we were a debtor nation. We are so no longer; the debtor nations are now in Europe. Before the war we had no merchant marine; we are getting a marine service which may eventually outstrip that of Great Britain. Before 1914 Europe went her way without much thought of America; our well-to-do people went to visit Europe, but Europe, quietly self-satisfied, rarely returned the visit. It is likely that Europeans from now on will regard a visit to the United States as we have regarded a visit to France or Great Britain, as part of a liberal education. These are great gains, but they have their disadvantages.

When the war commenced in Europe that continent partly balanced her bills for what she bought from us (1) by the interest on our debt to her, (2) by the work of her merchant marine for us, (3) by the money expended by visitors to the great European resorts, (4) by the savings of the immigrants in America, sent home by various agents or taken home by the returning immigrant.

With these many ways of paying its bills, Europe was able to accept much merchandise from us and pay for it without sending us goods in return, goods which, to be frank, we did not want and which we tried to keep out entirely by tariffs. The payment by the work of the merchant marine, after once our merchant marine died a natural death from competition and the Civil War, did not introduce any difficulties in our national life. It did not paralyze any of our industries, for we owned no overseas transportation service of any considerable magnitude. We irked under the conditions, first because we had memories of the wonderful merchant marine of earlier days, second because we thought the greatest of nations should have a large mercantile marine, and thirdly, because we believed, probably erroneously, that the European shipowner discriminated in favor of European goods.

But after all, most of us would rather buy transportation of Europe than iron and steel and other products such as are made in quantities in our own factories. And yet it is not material whether we would or would not rather buy transportation than steel; the fact remains that if we will not buy transportation we must buy something else. Bills must be paid. Europe owes us more than we ever owed her, and the interest charge is large and must be paid regularly. If she buys transportation of us instead of selling it, we must accept pay in merchandise; and if Europe repays our visits and spends money here, we shall have to settle for what Europe expends here by the buying of more goods.

There is a new order of things. We play now the rôle of the rich man for whom others labor. Most people like that part in the world's comedy. But nations have a queer way. They do not want others to work for them. The mark "Made in Germany" was gall and wormwood for the Britisher. He could not bear, even before the war, to think of a German splitting blocks of wood for him into match sticks or coating the tips with sulphur and phosphorus or fabricating matchboxes. Nor did he respond otherwise when he read "Made in Sweden." He resented it.

Almost as reasonably might the mine owner object if he saw a car of coal coming out of his mine marked "Mined by John Smith." Would he resent John Smith's mining a car of coal for him? If he did, how long would he be an operator? Is he to feed John Smith and his family? Is he to house him and clothe him without permitting him to mine him a car of coal, at least now and again? Is it not rather his arrogant way to want the said John Smith to mine two cars, so long as he, the operator, knows a way of disposing of the coal and has the money to pay for it?

DISCUSSION BY READERS

Accounting of Materials

Letter No. 3—The letter of A. T. Lament, dealing with the subject of accounting of materials in mining practice, *Coal Age*, Nov. 21, p. 956, proved very interesting to me, as I have tried for a long time to find a simple and yet foolproof system of keeping track of the labor and supplies of material sent into the mine. I have been particularly desirous of finding a method that would insure charges being placed to their proper accounts, and it is this feature of Mr. Lament's letter that is most helpful.

The strongest recommendation of any system is the fact that it has stood the test of actual use around a mine, and the statement of its author that the system he describes has been in practical use for several years makes it worthy of careful study. A half-baked system is worse than none at all. Recently, so many inferior systems have been advocated that it is a comfort to find a system that has stood the practical test.

In studying Mr. Lament's letter, however, I found, very much to my regret, that he did not enter into the cost of haulage in the mine, in detail. Mine haulage is a subject that is hazy, in the minds of most coal operators, in respect to itemizing the cost. They have found it exceedingly difficult to differentiate between these different items.

Items Frequently Charged to Wrong Accounts

I am glad to see that the subject of cost accounting in mine haulage is under discussion in *Coal Age* and hope it will evoke some interesting details regarding these costs. Frequently, car repairs are charged to some other account when they properly belong to haulage, and the same is true of locomotive repairs, track repairs, and similar items. At least, that is the way it appeals to me.

About the most difficult item to apportion, however, is the cost of power. This has been referred to in the excellent letter of J. Kenvin, Dec. 26, p. 1175. It is my belief that the cost of power consumed in gathering work should be separated from that required for haulage on the main roads, in order to make an intelligent showing that would assist in securing the greatest economy in these two branches of the work.

I have consulted some of the best authorities on the subject of mine haulage, without arriving at any satisfactory results. The general opinion is that conditions in mines vary so greatly, that it is impossible to devise a system that would be generally applicable for determining these costs.

Although I realize the complexity of this subject, it does not deter me from wishing to place the question squarely before the readers of *Coal Age*. I feel that some of our practical men, experienced in coal-mining practice, will be able to suggest ways out of these difficulties and simplify the seemingly complicated question of properly distributing mine-haulage costs. We may rightly expect that the average of these suggestions would put us all on the right track to secure greater economy in production. PROGRESSIVE.

———, W. Va.

Centrifugal Mine Pumps

Letter No. 1—Referring to the reply to the inquiry of "Superintendent," regarding the relative size of suction and discharge pipes and the corresponding openings in a centrifugal pump, which appeared in *Coal Age*, Dec. 5, p. 1049, permit me to say that my experience in installing centrifugal pumps for the pumping of gritty, acid mine water, in the Southern anthracite field and at other points, leads me to differ with the idea set forth that the column pipe into which a centrifugal pump discharges should have a larger diameter than that of the discharge portal or opening.

The use of a column pipe having a diameter larger than that called for by the opening flange in the pump casing may cause serious difficulty if there is an abrupt change from one size of pipe to another. Air would accumulate at this point and, slipping by the column of water, would allow the latter to fall and cause a shock to the impeller and possibly burst the column pipe or do other serious damage.

However, if the increase in size from the discharge opening in the pump casing to the larger size of the column pipe is obtained by introducing a section of pipe with a gradually increasing diameter, which would afford no opportunity for the lodgment of air, little difficulty will be experienced by the use of a larger pipe, either for the suction or for the column pipe than what is called for by the respective flanges.

It is my opinion, however, that no distinct advantage would be obtained by enlarging either the suction or the column pipe. The statement that a 9-in. discharge opening would call for a 16-in. column pipe does not agree with my experience or with manufacturer's ratings. The suction and discharge opening flanges are correct for the suction and column pipes, respectively.

Pumps Are Designed for a Given Head

Replying to the second question asked by the correspondent, regarding the effect of a greater or lesser head than that for which a centrifugal pump is designed, let me say that the effect is to decrease the efficiency of the pump, in either case. Operating a centrifugal pump under a *lesser* head than that for which it is designed increases both the discharge of the pump and the horsepower required for its operation. The contrary is the case when the pump is operated under a head *greater* than that for which it is designed. The discharge will then be decreased and a less horsepower will be consumed in driving the pump. But, in either case, the efficiency of the pump is decreased.

To illustrate this point, let me assume a five-stage centrifugal pump running at a speed of 1170 r.p.m. and discharging 1000 gal. per min., under a head of 550 ft. In this case, 200 hp. is delivered at the coupling to the motor and the pump is yielding an efficiency of 72 per cent. This pump has a 6-in. discharge and an 8-in. suction opening in the casing and is provided with a 6-in. column pipe and an 8-in. suction pipe. The maximum head at which a centrifugal pump will operate is dependent upon the peripheral velocity of its impeller.

The pump just mentioned, running at the same speed, will discharge 400 gal. per min. against a head of 665 ft., consuming 130 hp. at the coupling to the motor and yielding an efficiency of 52 per cent. Again, at the same speed, this pump will discharge 1400 gal. per min. against a head of 350 ft., consuming 210 hp. and yielding an efficiency of 55 per cent.

Operated against no head, the same pump will discharge 1540 gal. per min. and consume 230 hp. while so doing, showing no efficiency. Under a head 600 ft., the pump consuming 14 hp., the efficiency is zero and the quantity zero. It is apparent that this pump will operate successfully anywhere between the limits mentioned, but will give the greatest efficiency under the conditions for which it was designed.

Effect of Curving Impeller Blades Forward

The remarks just made refer to a centrifugal pump designed with the blades of the impeller curved backward from radial, in the direction of rotation. This is the least efficient way to design a pump, from a power-consumed point of view; but, everything considered, it is the most satisfactory operating unit. An impeller with blades radial or curved forward will cause a serious overload when operating against a head less than that for which the pump is designed.

Regarding the length of suction, as stated in the reply to this inquiry, a long suction is always a distinct disadvantage. A great length of suction might cause the failure of the pump, owing to the inertia of the mass of water in the suction pipe. It may happen that the pump will run away from the suction; or, in other words, pump the water from the casing quicker than the partial vacuum, owing to the drag in the suction pipe, can replenish the space vacated by the water pumped.

When starting a centrifugal pump having a long suction, a very perceptible period of time is required to accelerate the mass of water in the suction pipe and give it a velocity that will supply the pump or equal its discharge. In that case, a void space is formed between the water in the suction pipe and the water in the pump. The pump will then suck air, which reduces the vacuum, and the operation of starting must be repeated. For this reason, the discharge valve in the column pipe should always be closed when starting a centrifugal pump.

Wm H. Grady,
Pottsville, Penn. Consulting Engineer.

[The exception taken by this correspondent to the statement made in the reply to the inquiry to which reference has been made is not supported by the statements and practice of the leading manufacturers of centrifugal pumps. While it goes without saying that an expanding section of pipe is required to connect the discharge opening of a centrifugal pump with the larger size of the column pipe, it is an unquestioned fact in all pumping practice that there is a large saving in power when the velocity in the column pipe is moderately reduced, say to 6 or 8 ft. per sec.

On the other hand, the high velocity of discharge of water from the pump casing demanded by the high speed of the impeller of a centrifugal pump calls for a considerable reduction of this velocity after passing the discharge portal and before entering the column pipe leading to the surface. This reduction of velocity is, of course, to be made gradually by an expanding section of pipe, as explained.

The following are brief quotations from the publications of three of the leading manufacturers of centrifugal pumps:

It is advisable to make suction and discharge piping one or two sizes larger and connect same to the pump, by means of an increaser. There is a decided advantage in doing this, for it effects a saving in power at the mines or a gain in pressure and an increased suction lift if necessary.

Another manufacturer states as follows:

The suction and discharge pipes should be selected several sizes larger than the suction and discharge openings of the pump. The suction line should be carefully laid so as to avoid the possibility of the formation of air pockets in the same.

Still another manufacturer states the following:

As a rule, a velocity of 6 to 8 ft. per sec. should not be exceeded in piping, as a higher velocity is apt to result in excessive friction loss. It is also true that seldom, if ever, should the piping be installed of the same size as that of the outlet or inlet of the pump. Centrifugal pumps must necessarily have a high velocity through the casing, in order to obtain a high efficiency; and, thus, the size of the openings of a properly designed centrifugal pump is no gage whatever of the proper size of the piping to be attached to them. The only correct method of determining the pipe size is one which includes a careful analysis of the velocity of the water through the piping, length and character of the piping, number of fittings, bends, etc.

Our thanks are due this correspondent, however, for his remarks regarding the effect of a greater or lesser head than that for which a centrifugal pump is designed. As he has stated, there is always a loss of efficiency when a centrifugal pump is operated under a lesser or a greater head than that for which it is designed. In designing a pump to give a desired discharge, the greatest efficiency can only be secured when the discharge is proportionate to the square root of the head. In other words, in respect to securing the highest efficiency, this type of pump is subject to limitations regarding the ratio of the discharge to the square root of the discharge head.—Editor.]

Portable Coal Loaders

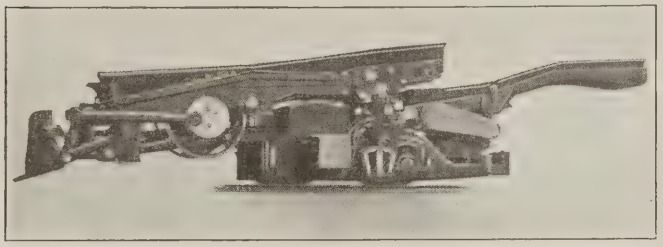
Letter No. 2—Speaking of portable coal loaders, to which recent references have been made in *Coal Age*, and referring particularly to the inquiry of "Operator," Nov. 21, p. 961, kindly permit me to draw attention to still another type of this class of machinery worthy of mention. I refer to the Halby shoveling machine, designed for underground shoveling and loading, Lake Shore Engine Works, Marquette, Mich.

Having seen this machine in operation at Braznell, Penn., and at North Fork, W. Va., and knowing that it is doing good work and giving satisfaction in each case, I thought that many of the readers of *Coal Age* would be glad to know a few facts regarding the value of this class of equipment in coal mining.

The Halby machine is built in three types, varying from 7 to 10 tons in weight. The machine is built to operate on any track gage and uses either compressed

air or electricity, as desired, although electrical operation of the machine is recommended. The electrical machine is ordinarily equipped with a 25-hp. motor. The trucks are mounted on Hyatt roller bearings and a worm drive is provided, by means of which the machine is self-propelled. All parts of the machine have been designed to withstand severe service.

In the accompanying figure is shown the machine known as the "T700" machine, which has an overall length of 23 ft. 4 in., an overall width of 4 ft. 8½ in. and an overall height of 4 ft. 6 in., being designed especially for operating in 5-ft. coal. Another model, the "T600," has an overall length of 23 ft. 2 in., a width of 5 ft. 2½ in. and an overall height of 5 ft. 10½ in. The widths given do not include the operator's



THE "HALBY" SHOVELING AND LOADING MACHINE

platform, which extends 10½ in. on the right or left side of the machine, as desired.

The power and truck sections, which are separate units in the T700 model, are combined in the T600 model. Also, the rear conveyor, in the former machine, is arranged to discharge its material, either into a car standing on the same track or on a track parallel with that on which the machine is operated. The T600 model can discharge its material only into a car standing on the same track, behind the machine.

There is no limit to the size of the coal handled by these machines, except the limitation imposed by the headroom in the mine where the machine is operated, since the material must pass over the top of the conveyor, under the roof. Lumps weighing 1500 lb. are readily lifted in the dipper or scoop of the machine, transferred to the rear conveyor and loaded into the car waiting to receive the material. These facts should be of interest to all coal operators. OBSERVER.

Pittsburgh, Penn.

Specific Gravity Determination of Coal

Letter No. 1—Kindly permit me to add a word to my previous article, which appeared in *Coal Age*, Dec. 12, p. 1078, on the determination of the specific gravity of coal by a rapid method that gave practical results. While the process then described is correct, I have since found that the following slight modification is of advantage when but a few samples of the coal are to be handled in the determination:

After the 100 c.c. of water has been added from the pipette and the flask has been shaken, more water is added, as previously described, at the bottom of the second column, page 1078. But, before the flask is filled to the mark, 5 c.c. of oil is added from a small pipette. This 5 c.c. of oil must be accurately measured and is, therefore, best added from a 5-c.c. "delivery pipette," or, if desired, a "capacity pipette" may be used. In that case, however, the same pipette should be used in calibrating the flask. After adding the oil, fill the flask to the mark with water, and calculate the results as described before. A. G. B.

Pottsville, Penn.

Letter No. 2—In the article by A. G. Blakeley, published in *Coal Age*, Dec. 12, p. 1078, attention is directed to the possibility of quickly estimating the approximate percentage of ash, in commercial samples of anthracite coal, by determining the specific gravity of an average sample.

Mr. Blakeley describes simple and excellent methods for such determinations, and gives interesting data covering 119 samples of coal, all of which were taken from one colliery. These data are quoted in illustration of the relation of ash to specific gravity, and from the figures given the specific gravity of "ash-free coal" can be calculated.

For example, using the figures given by Mr. Blakeley, in different combinations, we may calculate the specific gravity of ash-free coal as follows:

	Specific Gravity	Ash Per Cent.	Sp. Gr. "Ash-free" Coa (Calculated)
Chestnut	1.61	12.89	1.4748
Rice	1.75	26.24	
Buckwheat	1.67	18.27	1.4726
"Boiler fuel"	1.86	35.86	
Chestnut	1.61	12.89	1.4700
"Boiler fuel"	1.86	35.86	
Average			1.4725

The remarkably close agreement shown by these figures prove the determinations quoted by Mr. Blakeley were made with great care and accuracy. The same figures, if similarly used to calculate the specific gravity of the ash content, show that the average specific gravity of the ash is surprisingly high, being about 2.55 to 2.56. Possibly the presence of an unusually large quantity of pyrite in this particular coal may account for the apparently high gravity of the ash.

Diagrams of Anthracite and Bituminous Coal

An article in the February, 1918, Bulletin of the American Institute of Mining Engineers and a similar article published in the August, 1918, Journal of the Engineers' Club of Philadelphia, contains a diagram that I prepared to illustrate the relation of the specific gravity of bituminous coals to their percentages of ash and sulphur (pyrite). Had the data been available at that time, I should have prepared a similar diagram to show a like relation as existing between the specific gravity and ash of anthracite coals. Mr. Blakeley's paper furnishes the data from which such a diagram can readily be constructed.

It would be seen, at once, that these diagrams are remarkably similar. The bituminous-coal diagram shows an increase of 1.46 — 1.25 = say 21 points, in specific gravity, corresponding to an increase of 20 per cent. in ash content; or 21 ÷ 20 = 1.05, for each per cent. increase in ash.

Similarly, the figures from which an anthracite diagram can be drawn show, in one instance, an increase of 1.75 — 1.4725 = 27.75 points, in specific gravity, as corresponding to an increase of 26.24 per cent. of ash; or 27.75 ÷ 26.24 = 1.057, for each per cent.

In another instance, the anthracite figures show an increase of 1.86 — 1.4725 = say 38.75 points, in specific gravity, as corresponding to 35.86 per cent. increase in ash; or 38.75 ÷ 35.86 = 1.081, for each per cent. increase in ash content.

It will, of course, be understood that an anthracite diagram prepared from this data will not be applicable to coals of lighter specific gravity, such as those of the Scranton-Wilkes-Barre district in which the specific gravity of ash-free coal is probably about 1.38; but the *ratio of increase* in specific gravity, for each increment in the percentage of ash, remains approximately the same as that given above; namely, from about 1.057 to 1.081, for each increase of 1 per cent. in the ash. As a ready means for quickly and approximately calculating the ash from the specific gravity, or *vice versa*, Mr. Blakeley has used the factor 1, which is sufficiently accurate for ordinary purposes.

Data Must Correspond to the Quality of Coal

Objection may perhaps be made to this method of determining the specific gravity of ash-free coal, on the ground that the figures given by Mr. Blakeley represent the specific gravity of a mixture of coal and slate, rock, bony coal and other impurities existing in anthracite, as prepared for shipment, or for local use.

By the methods in use, it is impossible to remove all of the slate and rock from coal shipments. It would be contrary, moreover, with proper regard for the conservation of our fuel supplies, to remove all of the bony coal, because most of this grade has a relatively high thermal value. It is entirely possible, however, that the impurities constituting the ash of the coal may not be of the same specific gravity as that of the slate, which is mechanically mixed with the coal. When that is the case, of course, the specific gravity of the ash-free coal is not 1.4725, and other data must be used.

While it will certainly be understood that there can be no such thing in nature as "ash-free" coal, yet the specific gravity of such basic coal must be the imaginary starting point of diagrammatic curves, useful both for laboratory and commercial purposes. Data bearing on such assumed basic coal is therefore useful, important and valuable. Unfortunately there are few published data available for reference. Richard's treatise on Ore Dressing gives the specific gravity of anthracite (the ash not stated), as varying from 1.32 to 1.70, and other reference books are equally vague.

To determine accurately the specific gravity of so-called "ash-free" coal in each of the anthracite districts, it would seem necessary to have a series of determinations of the average *specific gravity and ash percentage* of: (1) High-grade (very low in ash) hand-picked samples; and (2) low-grade (high in ash) hand-picked samples. Such samples should include no slate or rock, or coal that could be classed as bony coal. From these two sets of determinations, it would then be possible to calculate the specific gravity of the impurities of the coal that constitute the ash and the specific gravity of a basic "ash-free" coal for the district or coal bed from which these samples were secured.

The publication, by Mr. Blakeley and other chemists engaged in anthracite coal work, of data of this nature would be a valuable contribution to our knowledge, in a field that seems to have been almost entirely neglected. This subject is of further interest in its relation to the question, often asked but never conclusively answered, "What is coal?" Is it a *mechanical mixture* of carbon, clay, silica, etc., containing condensed or entrained gaseous, hydrocarbon compounds; or are some or all of the hydrocarbon and other gaseous elements chemically combined with the carbon of the coal; or are some or all of the constituents of the ash chemically combined with the carbon or the hydrocarbon constituents?

In connection with the development of the coal-washing method invented by Thomas M. Chance, which effects the *complete* removal of slate and rock, by the flotation of the coal and bony coal, a series of determinations of the specific gravity of commercial grades of anthracite have been made. Many of these determinations were checked by using chloride-of-zinc solutions, the specific gravity of which was accurately fixed. Most of these determinations were made on coals coming from the southern and middle anthracite fields.

As the efficiency of the Chance method depends entirely upon differences in the specific gravities of coal and bony coal, on the one hand, and slate and rock, on the other, the difference in the specific gravities of the coals from the southern and the northern districts was carefully noted, in order to adjust the specific gravity of the fluid mass required to make a perfect separation. The results we have obtained are generally in substantial agreement with the much larger number of determinations given by Mr. Blakeley in his article; but, as already stated, these results cannot be applied to the lighter coals of the northern districts.

Philadelphia, Penn. H. M. Chance.

The following is the method of calculating the specific gravity of ash-free coal and of the ash, respectively, as explained by Mr. Chance, at our request:

	Specific Gravity	Ash Per cent.	Ash-free Coal, Per cent.
Chestnut	1.61	12.89	100 — 12.89 = 87.11
Rice	1.75	26.24	100 — 26.24 = 73.76

Calling the specific gravity of ash-free coal x, and that of the ash a, considering a unit weight of each of these grades of coal, we write

$$0.8711x + 0.1289a = 1.61 \quad (1)$$
$$0.7376x + 0.2624a = 1.75 \quad (2)$$

Combining these two equations to eliminate a, and finding the value of x, we have

$$x = 1.4748$$

Similar calculations for buckwheat and boiler fuel give $x = 1.4726$; and for chestnut and boiler fuel, $x = 1.4700$. The average of the values gives for the average specific gravity of ash-free coal, for this quality of anthracite, as $x = 1.4725$.

Again, solving equations (1) and (2), with respect to a gives for the average specific gravity of the ash, for this quality of anthracite, $a = 2.55$.

Reducing Ventilation at Firing Time

Letter No. 2—The question of reducing the circulation in a mine, at the time of firing, has again been brought to the attention of readers, by the letter of John Verner, *Coal Age*, Nov. 28, p. 1000, in which he urges once more the importance of the air factor in producing explosive conditions in mine workings.

It would seem in this, as in all other practices in coal mining, both operators and miners are prone to stick to the old methods with which they have been long acquainted. It will take some time to convince many mining men that their fans should be shut down, or at least slowed down, before shots are fired in the mine. Others, who have been forced to adopt this practice, will be just as hard to induce to go back to the old system.

In some mining districts, the practice of reducing the circulation of air in a mine when firing has been adopted and followed for a considerable time. Other districts have made no change in the quantity of air in circulation, while in still other districts the practice is to increase the circulation by speeding up the fan when the time for firing shots has arrived. It would seem, therefore, that mining men do not have a common understanding of what is the safest method to pursue.

There is a mine, in Indiana, that has had the practice of shutting off the circulation when firing and, in that mine, a number of accidents have occurred from blown-out shots. In other mines in the same field, the ventilation has been unchanged at firing time, and it is worthy of note that fewer accidents have happened in those mines than in the one just mentioned. This is not necessarily, of course, to be attributed to the practice of reducing the ventilation in the mine first named. The frequency of accidents in that mine may have been the result of improper practices in drilling and blasting the coal.

Bad Practices in Blasting Coal

At some mines in southern Illinois, it was no uncommon thing, a few years ago, for explosions to occur as often as once or twice a week. Some of these were very severe while others were not so bad. These explosions, however, were caused by the excessive use of powder in blasting, and locating the charge too far on the solid. It was nothing unusual there, at that time, for miners to drill their holes from 8 to 10 ft. in depth, which would invariably put the charge on the solid, where it would have no opportunity to perform its work, and the result would be a blown-out shot. One of these shots was reported as 12 ft. deep and measuring 6 ft. on the heel and 12 ft. on the point. But it was not fired, as it would undoubtedly have caused another explosion.

Mr. Verner's contention, I believe, is that the circulation in a mine should only be reduced where there is no danger from the accumulation of gas. It would seem advisable that the circulation should be reduced in a dusty mine, at firing time, in order to reduce the quantity of dust floating in the air. But, where a mine is generating gas in quantities that would produce a dangerous accumulation during the period of firing, unquestionably, the circulation should remain unchanged. Any interference with the ventilation, in such a mine, would be dangerous.

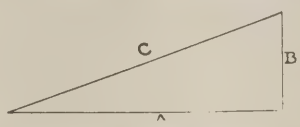
Although I have had no experience in gaseous mines, it is my belief that the question of reducing the ventilation at firing time is limited to mines not producing gas in dangerous quantity. As this question is an important one, I hope to see it discussed from different viewpoints, by men who have had experience both in gaseous and dusty mines and in mines generating no gas or dust.

Cleaton, Ky. Ostel Bullock.

Estimating Percentage of Grade

Letter No. 2—Referring to the letter of Joseph R. Thomas, *Coal Age*, Nov. 21, p. 959, permit me to say that the method he mentions of estimating the percentage of grade based on horizontal measurement is simple enough, but does not apply to cases where the percentage of grade is referred to pitch measurement.

Kindly permit me to give two methods that I have used in calculating the percentage of grade referred to pitch measurement. The first is as follows: In the triangle *ABC*, *A* is the horizontal distance corresponding to the pitch measurement *C*, and *B* is the rise of the incline for that distance. It is evident that, since this is a right triangle, the hypotenuse *C*, representing the pitch distance, is equal to the square root of the sum of the squares of the horizontal distance *A* and the rise or difference in elevation *B*, as expressed by the formula



THE INCLINED PLANE

$$C = \sqrt{A^2 + B^2} \qquad (1)$$

But the percentage of grade when based on pitch distance is equal to the difference of elevation between two stations divided by the distance measured on the pitch between those stations. Therefore, calling the percentage of grade x, this is expressed by the formula,

$$x = \frac{B}{\sqrt{A^2 + B^2}} \qquad (2)$$

Following is the second method: Referring, again, to the triangle *ABC*, since the percentage of grade referred to pitch distance is equal to the rise *B* divided by the pitch distance *C*, it is expressed by the sine of the pitch angle or the angle of inclination of the plane, which is the angle formed by the lines *A* and *C* in the figure. Therefore, knowing the difference in elevation between two stations and the horizontal distance between them, as given on the mine map, the first step is to find the pitch angle. The tangent of this angle is equal to the difference in elevation divided by the horizontal distance between the stations, measured on the map.

$$Tan\ a = \frac{B}{A} \qquad (3)$$

Reference is then made to a table of sines and tangents, in order to find the sine corresponding to this calculated tangent.

For sake of illustration, assume the horizontal distance between two stations, as taken from the mine map, is $A = 400$ ft., and the difference in elevation, 30 ft. Then, estimating the percentage of grade by the first method given, substituting these values in Equation 2, we have

$$x = \frac{30}{\sqrt{400^2 + 30^2}} = \frac{30}{401} = 0.074, \text{ or } 7.4 \textit{ per cent.}$$

Again, making the same calculation by the second method given, substituting the same values in Formula 3, we have

$$Tan\ a = \frac{30}{400} = 0.075$$

The angle corresponding to this tangent, as taken from the tables, is 4° 17′, and the corresponding sine of this angle is practically 0.074, which makes this grade 7.4 per cent., as before.

Let me suggest, here, that it is not necessary, as Mr. Thomas states, to calculate the pitch distance by dividing the distance on the map by the cosine of the angle of inclination. Although, in the case I have assumed, there is slight difference between the tangent and the sine of the pitch angle, this difference is greater as the angle of inclination is increased.

West Pittston, Penn. Richard Bowen.

INQUIRIES OF GENERAL INTEREST

Smoky Coals

Please say why soft or bituminous coal makes a much darker smoke when burning than anthracite.

Wilkes-Barre, Penn. STOKER.

Bituminous coal contains less fixed carbon and much more volatile matter, consisting largely of hydrocarbons and tarry substances that are not consumed in the furnace and escape with the gases produced by the combustion of the coal. It is these solid particles of unburned carbon that form the darker smoke of bituminous coal.

Safeguards in Trolley Haulage

Kindly explain the simplest and best method of protecting the trolley wire in mine haulage, so as to avoid accidents from men and animals coming in contact with the wire and receiving a shock that might prove fatal. We are using a 250-volt, direct-current circuit for haulage in our mine.

Also, explain how the trolley wire should be arranged so as to avoid its crossing room necks, where trolley locomotives are used on gathering hauls.

Bicknell, Ind. MOTORMAN.

Probably the simplest method that can be employed to safeguard a trolley wire, in mine entries, is to protect it at all points where men and animals must pass under the wire, by suspending light boards on each side of and parallel to the wire, at such points. The boards should be 1 x 6 in. and supported by strong hangers of strap iron secured to the roof by expansion bolts driven into holes drilled for that purpose.

The boards should extend an inch or two below the trolley wire and be spaced about six inches apart. When properly arranged they offer no obstruction to the passage of the trolley, but furnish ample protection against accidental contact with the wire owing to neglect or careless indifference to the danger. Sometimes the boards are made to swing, by hanging them on eyebolts, but that is not essential.

Trolley wires should be hung on substantial insulated supports, and follow one side of the track only. The wire should hang about 6 in. outside of the rail, on the side of the track opposite to that where clearance is provided for the necessary passage of men in the performance of their duties in the mine.

The use of old rubber hose, where this is available, has been suggested as being an excellent substitute for boards, for the protection of trolley wires at crossings where men and animals must pass. A sufficient length is first cut from the old hose and then split open and hung in place of the boards. The rubber being pliable and a good insulator is forced up against the trolley wire by anything striking it and insures perfect insulation from the current.

In electric haulage, nothing is of greater importance than that the installation be made by a competent mine electrician—that is to say, an electrician who has had experience in coal-mining practice and understands the conditions that surround the work in the mine. Only such an one is competent to decide what safeguards are necessary for the protection of the workers and to provide practical appliances.

In answer to the second question asked, let it be said that where trolley wires are hung on producing entries the wire should be carried on the opposite side of the entry from that on which the rooms are turned, except where it is impracticable to make such arrangement. Only in exceptional cases should a trolley wire be carried across the mouth of a room, and then it must be properly guarded.

Locomotives equipped with two trolley poles have been used in some mines, which make it possible to take power from either side of the entry. In that case, the trolley wire could be transferred from one side of the entry to the other with slight inconvenience. The use of such a 2-pole locomotive would obviate the necessity of carrying the trolley wire across the mouths of the rooms.

Coal Resources of Germany

Will *Coal Age*, or some of its readers, kindly inform us what are the coal resources of Germany? Have any large additional coal reserves been discovered recently; and if so, where are they located? At the present time, this question should be of particular interest to all interested in the future development of the coal trade throughout the world. LIGNITE.

———, Mont.

The question asked by this correspondent has, indeed, an interesting bearing on coal-trade development following the great war. Some of the most valuable of the coal deposits of Germany are located in the Alsace-Lorraine territory, which the Germans took from the French in 1870 and which now falls, again, into the possession of France, as a result of the recent allied victory.

Little information is available in regard to any recent discoveries of coal deposits in Germany. The latest publication bearing on the coal resources of Germany is that given in the report of the Executive Committee of the Twelfth International Congress, Vol. 3, entitled "The Coal Resources of the World." This report, which is wholly in German, can be found in the leading libraries. It was issued in 1913, the year previous to the outbreak of the war.

Probably some of the readers of *Coal Age* can furnish facts or offer information that will be of interest in reference to the coal deposits of the Central Empires, and their present and prospective development.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—In a mine giving off 2500 cu.ft. of marsh gas per minute, the volume of air entering the intake opening is 4,000,000 cu.ft. per hour. What is the percentage of gas in the return current? Would you consider this percentage of gas dangerous?

Ans.—The circulation, in this mine, is 4,000,000 ÷ 60 = 66,666 cu.ft. per minute. The total volume of air and gas passing in the return airway is, therefore, 66,666 + 2500 = 69,166 cu.ft. per minute, and the percentage of gas in this return current is (2500 ÷ 69,166)100 = 3.6 per cent.

This percentage of gas is far too dangerous under any mining conditions, and immediate steps should be taken to withdraw the men and improve the circulation in the mine.

Ques.—When air splits are necessary in mines, how would you determine their limit of usefulness?

Ans.—The practical limit to splitting air currents in mines is determined by the resulting velocity of the air passing the working faces. Under ordinary conditions, this velocity should not fall below 3 or 4 ft. a second. If the mine is generating gas, the velocity of the air current must be sufficient for the removal of the gas and prevent its accumulation in pockets in the roof or in other void places. The necessary velocity of air in mine workings depends much on the pitch or dip of the seam.

Ques.—What is the breaking strain of a good steel hoisting rope 1½ in. in diameter?

Ans.—The breaking strain of a 6-strand, 19-wire, steel hoisting rope is found by multiplying the square of the diameter in inches by a constant depending upon the quality of the steel. This constant for ordinary cast steel is 34; for crucible cast steel, 39; and for plow steel, 44. These constants represent the breaking strain of a 1-in. rope of each respective quality of steel. Therefore, the breaking strain of a 1½-in. crucible cast-steel rope, having 6 strands of 19 wires each, is

$$S = 39(1\tfrac{1}{2})^2 = 87\tfrac{3}{4} \text{ short tons.}$$

Ques.—Why is afterdamp a variable mixture?

Ans.—The composition of the afterdamp of an explosion of gas in a mine will vary with the percentage and the kind of gases in the firedamp mixture before the explosion. The character of the afterdamp will also depend on whether or not dust took part in the explosion and what amount of dust was present, and the quantity of air in circulation. These are the principal conditions affecting the completeness of the explosion and the character of the gases forming the afterdamp.

Ques.—A rectangular collar 10 in. deep supports 3000 lb.; what will it support if its depth is increased to 12 inches?

Ans.—Assuming this collar is uniformly loaded and supported at both ends, the load it will support varies as the square of the depth of the collar or beam, the width of the beam remaining unchanged. Calling the maximum safe load, for a depth of 12 in., x, we have $x : 3000$; $12^2 : 10^2$; and, $x = (3000 \times 144) \div 100 = 4320$ pounds.

Ques.—If the quantity of air in the downcast weighs 1800 lb., the depth of the shaft being 300 ft., and the difference of weight of air in the shaft is 250 lb., what will be the length of the motive column?

Ans.—In replying to this question, it must be assumed that the reference here is to two shafts of equal depth, sunk from a level surface. It is also assumed that the shafts are of the same size in cross-section, and that, while the weight of the volume of air in one shaft is 1800 lb., that of an equal volume of air in the other shaft is 250 lb. more or less than that amount. On this basis, it may be calculated that the weight of air in the first shaft is 1800 ÷ 300 = 6 lb. per foot of depth. Then, the difference in weight of air in the two shafts being 250 lb., the length of motive column, under the assumed conditions, is 250 ÷ 6 = 41⅔ feet.

In mine ventilation, the motive column producing a circulation of air is calculated by dividing the pressure producing the circulation, expressed in pounds per square foot, by the weight of a cubic foot of the air, which gives the corresponding motive column, expressed in feet.

Ques.—What would you consider was the cause of a flame traveling down a 100-ft. room and out on the entry, when a shot was fired at the face of said room, and what remedy would you apply to prevent danger?

Ans.—Such an occurrence points to the probable existence of an inflammable atmosphere in the room, caused by the presence of gas or dust or both. The gas- and dust-laden air, ignited by the flame of the shot, causes a local dust explosion at the face of the room, and the consequent projection of the flame from the mouth of the room onto the entry. The same result is also caused, at times, by the occurrence of a blown-cut or windy shot exploded at the face of a room. In the presence of gas or dust, such a shot will invariably produce a local explosion and a large volume of flame will be projected from the mouth of the room, unless the force of the explosion is exhausted before it reaches that point.

In order to prevent such occurrences, strict regulations must be made and enforced in regard to blasting the coal. All holes drilled must be properly mined or sidecut, and no holes permitted to be located or drilled to such a depth that the charge will be placed on the solid. Every hole should be inspected before it is charged, and the weight of the charge limited to a specified amount. The best plan to pursue is to employ shotfirers whose duty is to inspect, charge, and fire all holes that in their judgment are safe. Care must be taken that no shots are fired in the presence of gas, and all accumulations of dust at the face avoided.

COAL AND COKE NEWS

Harrisburg, Penn.

The fact that the Pennsylvania Railroad Co. is demanding and receiving from the mines on its lines east of Pittsburgh 1152 cars of coal a week, which is commandeered by the Pittsburgh fuel administration officials and turned over to it, is causing complaint from operators, byproduct concerns, mills and manufacturers. The coal commandeered by the railroad is of the metallurgical grade, used for coke, byproducts and manufacturing purposes generally. Little of this coal is of the steam variety, and the operators say that it should not be used for steam-making purposes by the railroad when it is so badly needed for metallurgical consumption.

The Fuel Administrator at Pittsburgh has stated that the operators are right in their complaint, and that the Pennsylvania R.R. has positively refused to accept coal for its engines from any source except the mines on its lines. This means that it will not accept coal from the Pennsylvania Lines West. The fuel administrator says in other words, "The Pennsylvania R.R. will not pay a freight rate of 65c. a ton. For this reason, I am furnishing the company 1152 cars of coal a week directly from mines along its road, much of it coming from the mines on the Pittsburgh, Virginia & Charleston division. It is the order of the Federal Fuel Administration, and all I can do is to obey. In my opinion it is neither right nor fair to the operators or the coke and byproduct concerns who badly need this grade of coal. But I am powerless."

Governor-elect William C. Sproul will be asked to incorporate in his inaugural message a recommendation for serious consideration by the Legislature of a proposition for state health insurance. This is among other sociological problems that will command attention of the state lawmakers this year. The success of the Workmen's Compensation Act and other humanitarian acts, it is declared, has convinced the larger interests that health insurance should be seriously considered.

In order to learn health conditions and the need for aid in the bituminous coal fields of this state, an investigation was made for the Health Insurance Commission in October, in Fayette, Washington, Westmoreland and Somerset counties. In the families of miners health conditions were found very poor. Prenatal care was virtually unknown; infant deaths were high, the rate in Fayette County being 160 per 1000 living births. Deaths from children's diseases were high. The commission found it interesting to note the contrast between the lack of care for the sick and the elaborate systems maintained by the coal companies to handle accident cases.

Charleston, W. Va.

Until Christmas week the car supply in the Fairmont region had been away below par, and just at a time when cars were needed. But during Christmas week, for some reason or other, the supply took a sudden spurt and empties began to accumulate, with a supply of over 2000 on hand the first day of the week. Despite the Christmas holidays and a general tendency to suspend operations, much coal was loaded, everything considered. Th was necessary owing to the fact that some of the larger companies had got behind with their orders, and also because of a steady demand from the Reading and other Eastern roads for railroad fuel. More miners are needed in the Fairmont field. Taken as a whole, the demand for Fairmont coal is rather brisk at this time—much more so than would naturally be expected.

Production in the Kanawha district has sagged considerably, yet not below, or at least not much above, the demand. An extremely quiet market is looked for until toward the end of January, and in the meantime operators are marking time. There was, however, during the week ending December 28, so far as reported, a total tonnage output of 42,065 tons.

"No market" crept into the last report of production in the Pocahontas and Tug River districts, and a loss of 3577 tons is shown from that cause alone out of a total tonnage loss of 97,992. It was also apparent that a car shortage was cutting down production, since a loss of 46,950 tons was sustained through that cause alone. The total output was only 360,567 which is the lowest figure for the year. Some of the mines in the Pocahontas field have cut down their operations to three days a week. It is stated that only a few days ago there were 5000 unreconsigned coal cars loaded between Bluefield and Cincinnati. The western boundary for the shipment of Pocahontas coal has been extended to include Cincinnati. Operators in the Pocahontas field are inclined to believe that the present lull will be of short duration.

Inability to secure ship facilities has caused a reduction of the output of the New River district. Embargoes have been in effect since Dec. 19 on tidewater coal, and the number has been considerably augmented since that time so that little or no coal is going to the seaboard. At the last of the year the market for New River coal is far below normal.

Deep dents were cut in the output of the Guyan region during the last week of December principally because of no market for the coal of the district, the loss from such a cause being 140,432 tons, or 54.68 per cent. of the total full time capacity of the district, the production loss, all told amounting to 72.44 per cent. of the total full time capacity or in tons 186,044, leaving a production of only 70,781 tons or 27.56 per cent. The "no market" loss reflects the generally unsatisfactory market conditions.

Birmingham, Ala.

A slight falling off in the coal output of the Alabama district is reported for the past week, due to holiday celebrations. The production for the last month of the year 1918 has not been satisfactory. For the week ending Dec. 7 the output was 381,065 tons; for the week ending Dec. 14, 387,430 tons, and for the week ending Dec. 21, 367,632 tons. There is still unsteadiness in labor, but the influenza epidemic is about over. There is hope that the return of men from the cantonments and army camps will alleviate the situation to a great extent. The pinnacle of production was reached the week ending Aug. 24, when 430,311 tons were mined.

Coal men of the district are optimistic regarding the operations of the next few months, and, in fact, the entire year. They state that the demand for all kinds of fuel will not be met for months to come. Coke production is still far under the demand. Producers and dealers in coke say that good prices obtain and that there is a ready market for every ton that can be supplied.

Seattle, Wash.

Considerable activity is manifested in the coal regions of Alaska, now that the Government railroad is completed to practically all the more important districts. The Alaskan Engineering Commission recently let contracts for the delivery of 6000 tons of Nenana coal from properties recently opened on the line of railroad, 29 and 44 miles south of Nenana. This marks the beginning of real development in Alaska's vast interior coal fields.

One hundred tons of coal are being produced daily at the Eska mine, in the Matanuska coal fields, by the Alaskan Engineering Commission, which is employing about 150 men at this place. The commission is also employing about 40 men in development work at Chickaloon. This is the property from which the coal, secured and tested by the United States Navy, was found to be the equal of Pocahontas coal for steaming purposes. The Chickaloon Coal Co. is actively pushing drilling and other exploration work on its lease area, adjacent to Chickaloon. The Bering Coal Co. has taken a lease in the Bering coal fields and has a large force engaged in extensive development work.

The Alaskan Anthracite R.R., under construction from Comptroller Bay to the coal property of the Alaskan Petroleum and Coal Co., was completed to tidewater on Bering River, Oct. 7, 1918. It is planned next season to extend this railroad seven miles from Okalee channel on Comptroller Bay, which will permit direct loading on to ocean carriers.

PENNSYLVANIA

Anthracite

Natalie—Madeira, Hill & Co. are improving this mining village by the addition of a number of miners' houses, built of cement blocks.

Lansford—The Lehigh Coal and Navigation Co. will soon begin the stripping of the overburden on a large track located between Summit Hill and Lansford.

Bethlehem—The official employees of C. M. Dodson & Co., Beaver Brook, Locust Mountain Coal Co., Shenandoah, and some former employees of Morea Colliery, together with the "soft coal" officials of Weston, Dodson & Co., were entertained by General Manager J. B. Connell in the firm's new office building, recently placed in service at this place. Addresses were made by the heads of departments and by two returned heroes of the war.

Hazleton—December was a rainy month. Many collieries were hampered by high water. At the No. 21 slope of the Lehigh & Wilkes-Barre Coal Co., the pumping plant failed and men and mules were hastily withdrawn to avoid an accident. The many "worked out" strippings on the Lehigh & Wilkes-Barre, Honey Brook division, make the handling of water a serious matter.

Rents of employees' homes on the O. B. Markle Co. property, which were reduced one-half during the war, were placed at the original figure beginning Jan. 1.

Bituminous

Pittsburgh—The Pittsburgh Coal Co. has contracted with the Roberts & Schaefer Co. for a Marcus screen to be installed in the Montour No. 10 tipple.

WEST VIRGINIA

Bell—The Carter Coal and Mining Co., having erected its own power station in connection with its plant at this place, will put the new plant in commission within the next few days.

Madison—The Spruce River Coal Co. contemplates within the near future a number of improvements at its plant near here and among other things has provided for the installation of a 2200-volt transmission line.

Omar—The Main Island Creek Coal Co. has recently completed its new store and Y. M. C. A. building at its Barnabas plant. The building was designed by Mr. Martin, who is manager of the company's operations at Amherstdale, W. Va. The cost of construction and equipment was approximately $75,000, and no pains nor means have been spared to make the building complete.

Welch—The bodies of Fred Paulick and Martin Verseskia, the two men who were killed in the Havaco mine explosion Saturday morning, Dec. 21, have been found and were brought to Welch to be prepared for burial. The theory has been advanced that a door leading into the mine passage had been left open, and gas accumulated, and when the electric motors went in they made sparks which set off the gas, causing the explosion. The damage done to the mine has not been estimated, but it is placed at a considerable figure.

Williamson—James Hatcher, one of the best known men of Pike County, Kentucky, began breaking ground on his mineral lands near Keyser, on the Big Sandy division of the Chesapeake & Ohio Ry., on Jan. 1, 1919. This property consists of 3200 acres of high grade splint and gas coals, and is underlaid by five workable seams of coal aggregating 25 ft. in thickness. Mr. Hatcher is contemplating making further railroad extensions, and about 1½ miles of grading is already completed. Eventually four miles will be opened on this property. Timber necessary for the construction of additional tipples and other mine buildings is being cut from this same property. A double tipple is planned for mines Nos. 2 and 3. All mines will be electrically equipped throughout. It is planned to construct 100 modern miners' homes, twelve of which are already completed, also a three-story store and office building

KENTUCKY

Bourbonville—Three large coal companies are making extensive development in the Harlan field. They are the United States Coal and Coke Co., the Wisconsin Steel Co., subsidiary of the International Harvester Co., and the Black Mountain Coal Co., which is said to be one of the Peabody interests. These three concerns are developing approximately 200,000 acres of fine coal lands in that field.

ALABAMA

Birmingham—Chief Mine Inspector C. H. Nesbitt has called a meeting of the board of examiners, to be held in his office in the Chamber of Commerce Building, Jan. 20 to 23 inclusive, for the examination of applicants for positions as mine foremen and firebosses. An unusually large class is expected, as this will be the first session of the board held since January, 1918, the meeting scheduled for July, 1918, having been passed to avoid any possible interference with coal production during the war.

INDIANA

Evansville—A report from Evansville, Ind., Dec. 29, stated that an attempt had been made to destroy the plant of the Crescent Coal Mining Co., near Evansville, by setting fire to the washhouse. John Patterson, night watchman, attempted to turn in an alarm and was assaulted by an unknown man, who escaped.

ILLINOIS

Belleville — The Beese Coal Co. has been incorporated by John Beese, Sr., John Beese, Jr., W. F. Hoehner, Charles Beese, W. G. Hoehner and C. A. Hoehner.

Springfield—Meetings of the Illinois State Mining Board will be held in January as follows: Jan. 9 and 10, at West Frankfort; 11, at Herrin; 13, at Belleville; 14, at Collinsville; 15, at Staunton; 16, at Springfield; 18, at Danville; 20, at Peoria; 21, at Canton.

O'Fallon.—Six hundred miners in the so-called Nigger Hollow Mine No. 2 of the St. Louis & O'Fallon Coal Co. were temporarily thrown out of work when fire was discovered in one of the entries of the mine. Men were put to work immediately to wall in the fire. It is expected that the flames will be smothered without difficulty.

Collinsville — The new labor temple, erected by the four miners' unions of Collinsville at a cost of $100,000, was dedicated on Sunday, Dec. 29. There was a parade and addresses by Thomas J. Reynolds, Illinois District Arbitrator of the United Mine Workers; Dan Thomas of O'Fallon, sub-district president; Frank Farrington, of Springfield, district president, and Frank J. Hayes, international president.

KANSAS

Scammon—The Carbon Coal Co. No. 2 is completing what is said to be the largest stripping mine in Kansas. The operation is south of Scammon and is located on a 320-acre tract of land. The present equipment consists of one No. 225 Bucyrus shovel and one Bucyrus loading machine. Present capacity is 600 tons per day. Equipment will be doubled shortly and the output increased to 1200 tons daily. W. A. Patterson is president; R. A. Gray, vice-president, and W. C. Shank, secretary and treasurer. General offices of the company are at Pittsburg, Kan.

Foreign News

Merritt, B. C.—At the Diamond Vale mine a tipple is being constructed in order to permit an early resumption of operations. The mine has been idle for some time.

Vancouver, B. C.—The International Coal and Coke Co., incorporated in the State of Washington, of which A. C. Flummerfelt, of Vancouver, is president, will reincorporate in Canada in order to save double taxation. It is capitalized at $3,000,000, and shareholders are being offered an even exchange of new for old shares, or 25c. in cash for shares of the par value of $1.

Nanaimo, B. C.—The Granby Consolidated Mining, Smelting and Power Co., Ltd., has recently put into operation its new Marcus tipple at Cassidy. This company will also erect a large coal washery, to be built in connection with the tipple, for the finer sizes. Contract for the tipple equipment was placed with Roberts & Schaefer Co., of Chicago, who also have been awarded contract for the new washery equipment.

Vancouver, B. C.—It is reported that the use of powdered fuel by the B. C. Sugar Refinery has proved satisfactory and that, as a result, the Powell River Pulp and Paper Co. and the Ocean Falls plant of the Pacific Mills, Ltd., are likely to adopt the same system. It is said that powdered fuel has been shown to be more economical than oil in this Province, and if the development suggested takes place there will be established an important additional market for the output of the coal mines of Vancouver Island, Merritt and Princeton.

Ottawa, Ont.—In order to enable the Nova Scotia Steel and Coal Co. to operate its submarine coal areas underlying Sydney harbor, which are only accessible through the intervening territory of the Dominion Coal Co., the Canadian Government has authorized them to enter upon and mine two portions of the Dominion company's leasehold, one about 4000 x 1000 ft. and the other about 8000 x 500 ft. The Nova Scotia Government is to receive the usual royalty of 12½c. per ton, and compensation is to be paid quarterly to the Dominion Coal Co., as the Government may determine. This action is taken under the powers conferred on the Government by the War Measures Act, on the recommendation of C. A. Magrath, as Director of Coal Mining Operations in Nova Scotia and New Brunswick. It is regarded as settling an important principle that operating mining companies cannot be deprived of access to their properties so long as payment is made for any trespass involved.

Personals

Lieut. J. R. Crowe, Jr., will shortly return to civil life and assume his former position as president of the J. R. Crowe Coal Mining Co., Kansas City, Mo.

Kerr W. Rittenhouse, who has been sales manager for the Central West Coal Co., Columbus, Ohio, for several years, has resigned to take a similar position with Consolidated Mining Co., also of Columbus.

Willis H. Brown, who has been out of the coal business for nearly a year because of illness, has opened an office on the 11th floor of No. 1 Broadway, New York City. He is well known to the trade, having been formerly connected with the Skeele Coal Co. and the Seiler-Rogers-Brown Co. He was a vice president of the latter concern.

Wiley L. Byers, general sales manager for the Producers' Coke Co., Uniontown, Penn., on Jan. 1, 1919, retired from active duty in that capacity after 6½ years of efficient service. During the war Mr. Byers has been assistant district representative and production manager of the Federal Fuel Administration, and was responsible in a very large measure for the wonderful record shown by the Connellsville coke region. Early in the spring Mr. Byers expects to enter business for himself, continuing in the coal and coke industry.

Obituary

Patrick Hogan, general superintendent of the Big Creek Coal Co., Canton, Ill., died recently. He was formerly a state mine examiner.

Louis Ray Kortkamp, of the Kortkamp Coal Co. died at his home at Hillsboro, Ill., after a short illness. He was the son of Louis Kortkamp, who was killed in the Kortkamp mine two years ago.

Robert L. Ralston, a prominent coal operator of southeastern Kentucky, dropped dead in a drug store in Middlesboro, Ky., on the evening of Jan. 1, while waiting for the city papers to come in on a late train. Mr. Ralston and several friends were discussing coal and other conditions, when he suddenly reeled and fell before he could be caught. He died before medical aid reached him, death being due to heart trouble. Mr. Ralston is survived by a wife and six children.

Coming Meetings

American Wood Preservers' Association will hold its annual meeting Jan. 28-29, 1919, at St. Louis, Mo. Secretary, F. J. Angier, Baltimore, Md.

American Institute of Mining Engineers will hold its 119th meeting Feb. 17-20, 1919, in the Engineering Societies' Building, New York City. Secretary, Bradley Stoughton, New York City.

American Society of Civil Engineers will hold its annual meeting Jan. 15-16, 1919, at the headquarters of the society, 33 West 39th Street, New York City. Secretary, C. W. Hunt, New York City.

Recent Coal and Coke Patents

Mining Machine. E. C. Morgan, Morgan Park, Ill., 1,276,249. Aug. 20, 1918. Filed Aug. 15, 1910. Serial No. 577,134.

Smoke Consuming Device for Fire Boxes. W. D. Boyce, New York, 1,276,166. Aug. 20, 1918. Filed Jan. 22, 1917. Serial No. 143,756.

Fuel Transmission Mechanism for Stokers. N. McGee, Altoona, Penn., 1,276,642. Aug. 20, 1918. Filed Dec. 29, 1913. Serial No. 809,349.

System of Mining Coal. E. O'Toole, Gary, W. Va., 1,276,952. Aug. 27, 1918. Filed Mar. 16, 1914. Serial No. 824,979.

Mining Drill. J. A. Kaye, Sault Ste. Marie, Ontario, Can., 1,277,220. Aug. 27, 1918. Filed June 15, 1918. Serial No. 240,152.

Ash Shifting Shovel. C. F. Wiley, Columbus, Ohio, 1,277,279. Aug. 27, 1918. Filed July 5, 1917. Serial No. 178,716.

Locomotive Ash Pan. T. P. Madden, St. Louis, Mo., 1,277,972. Sept. 3, 1918. Filed Dec. 8, 1917. Serial No. 206,224.

Calcining Coal at High Temperatures. W. Dyrssen, New York, N. Y., 1,277,707. Sept. 3, 1918. Filed May 27, 1918. Serial No. 236,866.

Locomotive Stoker. E. Pierce, W. Burlington, Iowa, 1,277,641. Sept. 3, 1918. Filed Aug. 14, 1914. Serial No. 856,630.

Ash Pan. A. T. Peterson, Mahtowa, Minn., 1,278,736. Sept. 10, 1918. Filed Mar. 20, 1918. Serial No. 223,618.

Coupling for Mining Cars. H. J. Williams, Nanticoke, Penn., 1,278,541. Sept. 10, 1918. Filed May 4, 1918. Serial No. 232,534.

Publications Received

Economic Operation of Steam Turbo-Electric Stations. By C. T. Hirshfield and C. L. Karr. Department of the Interior, Bureau of Mines. Technical Paper 204. Unillustrated, pp. 29, 6 x 9 inches.

Monthly Statement of Coal-Mine Fatalities in the United States, August, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, pp. 27, 6 x 9 inches.

Monthly Statement of Coal-Mine Fatalities in the United States, September, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, pp. 29, 6 x 9 inches.

Eighth Annual Report by the Director of the Bureau of Mines to the Secretary of the Interior. For the fiscal year ended June 30, 1918. Department of the Interior, Bureau of Mines. Unillustrated, pp. 124, 6 x 9 inches.

Production of Explosives in the United States During the Calendar Year 1917. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Technical paper 192. Unillustrated, pp. 21, 6 x 9 inches.

Methods for Routing Work in the Explosives Physical Laboratory of the Bureau of Mines. By S. P. Howell and J. E. Tiffany. Department of the Interior, Bureau of Mines. Technical Paper 186. Unillustrated; 63 p.; 6 x 9 inches.

Trade Catalogs

Copies of the catalogs, booklets and other literature listed below may be obtained free of charge by addressing the manufacturer.

Draeger 1917 Model Breathing Apparatus. Draeger Oxygen Apparatus Co., Pittsburgh, Penn. Two-color postcard folder illustrating and describing the new safety and comfort features of the latest model apparatus.

Coal Mine Car Bearings. Hyatt Roller Bearing Co., New York, N. Y. Bulletin 375. Pp. 12, 8¾ x 11 in., illustrated. Outlines the engineering advantages of the use of Hyatt roller bearings in coal mine cars.

Link-Belt Equipment for the Handling and Preparation of Coal at the Mine. Link-Belt Co., Philadelphia, Penn. Book No. 333. Pp. 88, 6 x 9 in., illustrated. Describes coal tipples, conveyors, washeries and other equipment used at the mines.

American Ring Coal Crusher. American Pulverizer Co., St. Louis, Mo. Pamphlet. Pp., four, 8½ x 11 in., illustrated. Describes a coal crusher that the manufacturer states uses less power and less labor than other like machines. The company guarantees the machine and takes all risks for wear and tear.

Lidgerwood Steam Mine Hoists. Lidgerwood Manufacturing Co., New York. Catalog. Pp. 32, 9½ x 12¾ in., illustrated. Presents the company's standard lines of steam mine hoists, and also a few types developed to meet special conditions. General specifications are given and tables of sizes, etc., for the different types illustrated.

C-H Mine Duty Self-Starters. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Publication 408. Pp. 2, 8½ x 11 in., illustrated. Leaflet describes two types of mine duty self-starters, and draws attention to the need of installing automatic motor starters of this type for controlling pump and fan motors. A C-H unit charging rack for miners' electric lamps is also illustrated.

Miscellaneous Applications of Electrical Heat by Means of Standardized Units. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Pamphlet. Pp. 4, 8 x 11 in., illustrated. Describes the C-H space heaters and makes special mention of the great variety of applications of these units. A blueprint accompanying the pamphlet gives all the dimensions of these standardized units.

V. V. Fittings. V. V. Fittings Co., Philadelphia, Penn. Catalog No. 21. Pp. 128, 8½ x 11 in., illustrated. A beautifully printed catalog listing the company's conduit fittings and safety switches. The pictorial index, occupying the first 13 pages in the book, affords the user of the catalog at once a visual and descriptive aid of the article he seeks information about, and should prove a valuable feature to prospective buyers of equipment.

Industrial News

Cleveland, Ohio—The Valley Coal Co. has increased its capital from $20,000 to $50,000.

Toledo, Ohio—The Rotal Elkhorn Coal Co. has increased its capital from $25,000 to $50,000.

Ohiopyle, Penn.—The Jim Run Coal Co. is preparing to erect some new bungalows at its mines near Ohiopyle.

Lexington, Ky.—The Barwick Coal Co., capital $35,000, has filed amended articles increasing its capital to $50,000.

Indianapolis, Ind.—The Panhandle Coal Co., of Indianapolis, has increased its capital stock from $200,000 to $400,000.

Niles, Ohio—The Niles Fuel and Supply Co. has been chartered with a capital of $10,000 by Charles H. Mason and others.

Chavier, Ky.—The Reckie Coal Co. has filed notice of an increase in its capital from $10,000 to $35,000, to provide for expansion.

Tyrone, Ky.—With a capital of $6000, the Tyrone Coal Co., has been incorporated by Albert Ledridge, A. J. Nowling and A. M. Nowling.

Pineville, Ky.—The Indian Creek Coal Co. has filed notice of an increase in its capitalization from $25,000 to $50,000 to provide for expansion.

Hazard, Ky.—The Midland Mining Co. has filed notice of an increase in its capital from $150,000 to $190,000, for proposed extensions and expansion.

Middlesboro, Ky.—The Block Coal Co., Middlesboro, Ky., capital $3000, has been incorporated by G. P. Sharp, James D. Yarborough and H. A. McCamy.

Newark, Ohio—The Eagle Mining Co. has been chartered with a capital of $10,000 by J. Howard Jones, Roderic Jones, Laura V. Secrist, George Hayden and Ray Patterson.

Canton, Ohio—The North Industry Coal Co. has been chartered with a capital of $50,000 by E. J. Condon, John Flueras, Constantin Westemean, Clude A. Volzer and Nick B. Alba.

Philadelphia, Penn.—The Atlantic Fuel Co., Fifty-second and Whitby Streets, has awarded a contract for the erection of a new one-story coal pocket at its works, about 30 x 125 feet.

Farmersburg, Ind.—The Barnhart Coal Co. has been incorporated with a capital of $25,000 to engage in coal mining. The directors are Frank Barnhart, Norman W. Freeman and Daniel C. Voreis.

Toledo, Ohio—The Nelsonville Coal Mining Co. has been chartered with a capital of $25,000 by William H. Albrecht, Jr., John R. Calder, George E. Seney, O. S. Brumback and John M. Ormond.

Regina, Ky.—The Winston-Elkhorn Coal Co., capital $200,000, D. R. Coleman, W. M. Coleman and others, plans large developments, operating four mines with shipping facilities over the Chesapeake & Ohio Railroad.

Columbus, Ohio—The Flint Coal Co. is the name of a new mining concern which has opened offices in the Columbus Savings and Trust Building with L. F. Bertrau in charge. The operation is on the Baltimore & Ohio, near McArthur, Ohio.

Philadelphia, Penn.—The Government, Navy Department, has awarded a contract to the Wark Yardley Co., 1737 Filbert St., Philadelphia, for the construction of a new coal- and ash-handling plant at the League Island Navy Yard, to cost $9435.

Philadelphia, Penn.—Walworth Manufacturing Co. has recently purchased the business of Hunter & Dickson Co., at 241-247 Arch St., and will operate it as one of its branches. The Walworth Manufacturing Co. manufactures valves and fittings for steam, water and gas work.

Huntington, W. Va.—The Vanbail Coal Co., 825 Fourth Avenue, recently incorporated with a capital of $50,000, has perfected its organization, and is planning for the early development of approximately 600 acres of coal properties. It is proposed to have a daily capacity of 500 tons.

Columbus, Ohio—The Hamilton Manufacturing Co. has installed one of its new stripping conveyors at the operation of the Vinton-Jackson Coal Co., in Vinton County, Ohio. This machine is the invention of William E. Hamilton of Columbus, and is reported to be doing good work.

Louisville, Ky.—The Seaboard Airline Railroad Co., which has been taking a considerable tonnage of eastern Kentucky coal, has cancelled all orders, being filled up with enough coal to last for several weeks. The Louisville & Nashville has also quit buying, and the Southern is almost filled up

Pittsburgh, Penn.—The Producers Fuel Co. has been organized to handle the output of coal operators as exclusive selling agents. Executive offices have been opened in the First National Bank Building. Officers of the company are J. K. Barber, president; W. S. Buyers, vice-president; R. C. Masten, treasurer.

Chattanooga, Tenn.—The Raccoon Coal Co. has filed articles of incorporation with a capital of $50,000 to develop coal properties in Wauhatchie Valley, near Kelly Ferry. It is proposed to install complete mining equipment, with a large new tipple. C. H. Huston, C. W. Howard and J. S. Fletcher head the company.

Preston, W. Va.—The Nethkin Coal Mining Co. has been incorporated with a capital of $100,000 to develop extensive coal properties near Newburg. W. R. Nethkin, Cumberland, T. R. Nethkin, Buckhannon, C. H. Lantz, Piedmont, W. Va., and H. C. Thompson, Philadelphia, Penn., are interested in the new organization.

Shenandoah, Penn.—The Wentz interests, operators of mines at Upper Lehigh Hazle Brook, Midvalley and Maryd, have acquired a mine at Raven Run. D. B. Wentz, president of the Wentz companies, applied for a charter for the new company, which will be called the Raven Run Coal Co. The plant will be located near Shenandoah, Penn.

Morgantown, W. Va.—The Davis Fuel Co. announces that it has changed its corporate name to Fiedler-Davis Fuel Co. in order to avoid confusion with other firms and corporations that bore names similar to the discarded name of the company. The change became effective Jan. 1. There has been no change in the personnel, capital or policy of the company.

New York, N. Y.—Charles S. Allen, secretary of The Wholesale Coal Trade Association of New York, reports that the Coal Exchange recently opened by the association is meeting expectations. About 25 transactions have been consummated through the Exchange, ranging from a few cars to 5000 tons. The members of the association are urged to avail themselves of the facilities offered.

Jeff, Ky.—The Acup Creek Coal Co., recently incorporated with a capital of $175,000, has been organized with Arthur L. Ware as president, John C. Eversole vice-president and Harry P. Jones, secretary-treasurer. The company is planning for the immediate installation of the necessary equipment for the development of about 2000 acres of coal properties, to have a capacity of about 1500 tons daily.

Buffalo, N. Y.—J. Fred Morlock reports that he has lately taken control of the mines of the Clarion & Allegheny, Pittsburgh & Allegheny and Cambria & Allegheny coal companies, in the Allegheny Valley and nearby districts. They have a total output of about 500 tons daily. The Cambria is a Lilly smithing variety. Mr. Morlock also has some other mines in that vicinity, which he took over some months ago.

Manchester, Ky.—The Columbia-Panama Coal Co. has recently acquired title to a total of 1300 acres of coal properties in the Manchester section and is understood to be planning for early development. It is said that the company is planning for extensive improvements and additions at its properties north of Manchester, including the erection of machine and repair shops and a new power plant for operation. H. H. Hardinge, Chicago, Ill., is president.

Buffalo, N. Y.—The Donner-Union Coke Corporation has filed plans for the erection of a number of new additions to its plant, to provide for increased capacity, aggregating in cost a total of about $300,000. Included in the structures are a new brick and steel product building, estimated to cost $100,000; service building, brick and steel, to cost $23,000; brick and steel machine shop, to cost $17,000; and reinforced-concrete coal bin to cost about $100,000, with auxiliary structures.

Bourbonville, Ky.—The Louisville & Nashvill R.R. is preparing to construct about 50 miles of new line in southeastern Kentucky to open up large coal fields. It is also announced that the same company will double-track that portion of the Cumberland Valley division between Corbin and Pineville in order to expedite the movement of coal trains. A section of the Harlan branch will also be double-tracked. That portion extends from Pineville to Paige, a distance of 18 miles. Large yards will also be built at Nolan and Baxter in the Harlan field. Construction work will start in the near future.

Dallas, Tex.—The coal output for Oklahoma during the month of November amounted to 368,225 tons, according to a statement recently issued by P. A. Norris, State Fuel Administrator for the State of Oklahoma. This is 16,273 tons in excess of the output during November, 1917. Mr. Norris also gave statistics showing that the coal production in the States of Arkansas, Missouri and Kansas showed a decrease for November this year as compared with November of last year, but that Texas showed an increase of 36,101 tons. It was shown that local industries and domestic consumers absorbed the increased production in Oklahoma, the railroads demanding less fuel than a year ago.

Clarksburg, W. Va.—Open-top cars are no longer available for team-track operators who are loading from wagon mines, according to instructions received Saturday, Dec. 28, from the office of C. W. Van Horn, superintendent of the Monongah division. Eastern shipments may be resumed at once. The circular letter announcing this change reads as follows: "Cancel previous instructions and effective at once and continuing until further notice discontinue entirely permitting open-top cars to be loaded at wagon mines or team tracks with coal. Also cancel instructions prohibiting coal loaded by wagon mines at team tracks to go forward to points east of Grafton. Permit such shipments to go forward either east or west unless specifically covered by other embargoes."

Jefferson City, Mo.—A bill for a workmen's compensation law, proposed by the Missouri State Federation of Labor, was introduced at the opening of the State Legislature on Jan. 8. It provides for the creation and management by the state of a fund to furnish insurance under the law at cost. The proposed law would be elective and not compulsory. If both employer and employees accept it, the employer will be liable irrespective of negligence for accidents arising in the course of employment. The schedule of benefits provides that in addition to all other compensation an injured employee shall receive all necessary medical aid for the first eight weeks, not exceeding $200, and in exceptional cases the commission may extend both of these limits. During temporary total disability the employee would receive two-thirds of his average wages until he is able to work again, but not longer than 400 weeks. During temporary partial disability he would receive two-thirds of his loss in wages until he is able to earn full wages again. For permanent total disability he would receive two-thirds of his average wage for the rest of his life. For permanent partial disability, after he is able to work again, the employee would receive two-thirds of his average wages for periods varying with the nature of the injury. If injury causes death, the employer must pay the reasonable burial expenses, not exceeding $200, and total dependents would receive two-thirds of the average wages for 300 weeks, to be immediately commuted and paid in a lump sum.

MARKET DEPARTMENT

Weekly Review

Market Conditions Still Stagnant, With No Hope of Improvement in Near Future—Output of Soft Coal Shows Tremendous Drop—Coal Industry Hopeful for Coming Year—Anthracite Situation Well in Hand.

MARKET conditions continue to be hopelessly dull. The lack of even the slightest buying sentiment proves only too conclusively that industrial plants are stocked with coal to an unprecedented extent. Many in the trade prophesy that it will be weeks before buyers evince any eagerness to contract for their future requirements.

The production of soft coal has dropped considerably, owing to the observance of the Christmas and New Year holidays. Figures compiled for the week ended Dec. 28, 1918, show that the output of bituminous coal during this period was the lowest in three years. Only 6,385,000 net tons were mined, which is 3,746,000 net tons behind the production of the week ended Dec. 21, 1918, and 3,352,000 net tons lower than the output during the Christmas week of 1917. The total production of bituminous coal for the period Apr. 1 to Dec. 28, 1918, is estimated at 447,748,000 net tons, an increase of 35,187,000 net tons over the output of the same period in 1917.

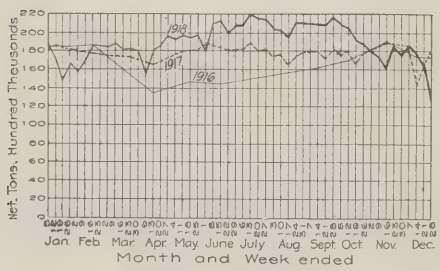
In spite of the falling off in production, shippers and dealers display no apprehension or uneasiness. Efforts at speeding up the miners during the war period resulted in an overstocked market the moment war industry ceased, and the net effect of the diminished output at this time will be to steady the market. Some little price cutting is reported, though the Government figures are being adhered to rather generally. The industry is looking forward to the entire elimination of Government control of coal, the consensus of opinion being that the regular channels of trade can now be depended on to take care of the country's needs.

No reports are at hand of a serious anthracite shortage anywhere, unlike the state of affairs at this time last year. In fact so favorable has the situation become that the Government has signified its intention of relinquishing control of anthracite distribution in the near future. All restrictions on the use of the steam sizes of hard coal have already been removed, and this will doubtless help the movement of the egg and pea sizes, which are fast becoming a drug on the market. Stove and chestnut are still scarce, but even the proportion of these two anthracite coals will grow larger soon, as Government requisitions are being cancelled.

The observance of the Christmas holidays caused hard coal production to fall off more than a half million tons during the week ended Dec. 28. The total output of anthracite for the period Apr. 1 to Dec. 28, 1918, is estimated at 73,830,000 net tons, or 1,606,000 net tons below the output of the similar period in 1918. This tonnage is rather gratifying when it is remembered that the hard coal regions have been severely handicapped by a shortage of labor throughout the year.

WEEKLY COAL PRODUCTION

The lowest weekly production reported in the last three years was brought about by the time lost on account of the Christmas holidays during the week ended Dec. 28. Estimates for this week place production at 6,385,000 net tons, 3,746,000 net tons or 37 per cent. behind production of the week ended Dec. 21, and 3,352,000 net tons or 34 per cent. behind production of Christmas week of last year. The average daily production for the current week (five days) is estimated at 1,277,000 net tons as



compared with 1,913,000 net tons for this coal year to date and 1,763,000 net tons for the same period of 1917.

Total production of bituminous coal for the period Apr. 1 to Dec. 28 is estimated at 447,748,000 net tons as against 412,561,000 net tons during the period Apr. 1 to Dec. 28, 1917, or an increase of 35,187,000 net tons.

The production of bituminous coal and lignite in the calendar year 1918 is estimated at 585,883,000 net tons, an increase compared with 1917 of 34,092,000 net tons or 6.2 per cent. Four states reported decreases, Georgia, Iowa, Missouri and Texas. The most important increases were in Pennsylvania, 11,264,000 tons; Ohio, 5,715,000 tons; Illinois, 5,064,000 tons; and West Virginia, 4,908,000 tons. The estimates indicate that West Virginia still retains second place as a coal producer, but the lead is so small that final returns may place Illinois in this place, assumed by West Virginia in 1908.

The loss of time brought about by the Christmas holidays caused anthracite production during the week of Dec. 28 to decrease more than a half million net tons, compared with the production of the week preceding, and was approximately 200,000 net tons lower than the production during the corresponding week of 1917. For the period Apr. 1 to Dec. 28, the production of anthracite is estimated at 73,830,000 net tons, which is 1,606,000 net tons or slightly over 2 per cent. below the production of a similar period of last year.

Carriers' reports for the week ended Dec. 28 show tremendous decrease in loading in all districts, not only compared with the week of Dec. 21, but also with the week of Dec. 28, 1917. In central Pennsylvania, the decrease in cars loaded amounted to approximately 12,000; in Ohio, 7800; in the district including northeast Kentucky and southern West Virginia, 12,100; in Tennessee and Kentucky, 6400; in the district including Illinois, Indiana and western Kentucky, 9500; and in the district including Iowa, Texas and the southwest states, 4000.

Bituminous coal shipments to New England during the week of Dec. 28 are estimated at 242,443 net tons as compared with the previous week's shipments, amounting to 258,247 net tons. An increase occurred during the week in rail receipts while tidewater shipments decreased from all harbors.

Tidewater shipments decreased approximately 10 per cent. during the week of Dec. 28 and are estimated at 583,072 net tons. A decrease of approximately 20 per cent. or 78,000 net tons, occurred in shipments from New York and Philadelphia with a slighter decrease in shipments from Baltimore. An increase of approximately 16,000 net tons or 8 per cent. occurred in shipments from Hampton Roads.

The production of beehive coke in the United States fell 130,000 net tons during the week of Dec. 28 compared with the week preceding, due generally to the loss of time on account of the Christmas holidays. The preliminary estimate places production during the week at 441,000 net tons as against 567,000 net tons during the Christmas week of 1917. The plants of operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania were operated during the week of Dec. 28 at 68.2 per cent. of their full time as compared with 73 per cent. during the week ended Dec. 21.

Byproduct coke production of the United States declined during the week of Dec. 28 approximately 16,000 net tons or 3 per cent., compared with the week preceding, and is estimated at 565,586 net tons. This production, however, exceeded that of the week of Dec. 28, 1917 by 136,722 net tons, or approximately 25 per cent. The limiting factor during the present week was lack of market in Pennsylvania. In addition, approximately one-quarter of the time of the Alabama ovens was lost on account of plant repairs. The plants of the country were operated during the week at 87.4 per cent. of their full time as compared with 89.4 per cent. during the week ended Dec. 21. The operators of the country were able to secure for the first time, during the week of Dec. 28, all the byproduct coal that was needed for their full time operation.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods was less than for the corresponding week a year ago. Road sales for both immediate and future delivery also were less. Many buyers were in the market on Monday and Tuesday seeking merchandise for January sales. Summarizing holiday business, retailers report that the total was excellent. Collections are normal.

Dry Goods Economist—Unusual interest is shown in various lines of dress cottons, because of lack of confidence on the part of buyers in the ability of mills to supply appreciable quantities of wool or worsted dress goods for some time to come. The raw-cotton situation is unsettled. Domestic mills are not buying, and exports are less than had been expected. In the gray-goods market, reductions of from ¾ to ¼c. per yard were made on some goods, while others advanced. The woolen goods situation is growing more acute.

American Wool and Cotton Reporter—That the wool market is more or less artificial is evident. Apparently every effort is being made to cancel the quantity of Australian wool which has been contracted for, but there is some question as to the ability of the Government to get out from under this contract, since it represents a good profit to the British Government, and it is understood that the British Government is not inclined to take back such a large amount of wool, when there is such a large oversupply on hand, and it may be hard to dispose of it. Cotton remains firm. There is a prospect that foreign countries will want cotton, which is a big factor in the strong situation. Another bullish factor is the fact that the present crop is the fourth short one in succession.

Bradstreet's—At the outset of the new year, following twelve months of record accomplishment, buying hesitates, skepticism as to the holding power of prices prevails, especially in the iron and steel industry, and inventorying still occupies attention; but, withal, advices as to potential demand for goods in general, at a price, of course, are rather liberally tinctured with optimism. In the larger lines stocks are light, shipments on old sales together with those going forward to eke out broken lines are quite large, but in a broad sense slack-water conditions prevail. Incidentally, the government continues to readju t contractual obligations, while assuring traders that unwanted supplies will not be thrown on the markets, and that foreign fields are likely to be sufficiently needy to absorb quantities of such commodities as the government holds.

The Iron Age—In every quarter the question of the readjustment of contracts to the lower prices adopted two weeks ago by leading sellers is uppermost. Pig iron producers set out to hold to the old prices, but in the past week the calls upon them for the revision of contracts have grown in numbers and in urgency. Some furnace companies seem inclined to yield, while others strenuously insist that contracts be carried out as written. The falling off of foundry operations is a factor to which more consideration is being given, however, and the adoption of the lower basis for pig iron has found more favor than was indicated a week ago. That some blast furnaces will not long operate with $3 taken from their market price is evident, and the readjustments in finished material will likewise impose some hard choices on high cost mills which must buy their raw materials in the market.

Atlantic Seaboard

BOSTON

Market extremely dull. Steamers being tied up. Somewhat increased movement all-rail. Railroads stop taking coal. Mild weather and curtailment in manufacturing have effect. No sign of new contracts. Changes in trade. Government price shaded, but only small tonnage offering. Hampton Roads dumpings light for New England. Difficult to arrange disposition. No indication of reduced prices on smokeless coals. Georges Creek comes forward only for smithing. Restricted market from New York piers. Anthracite continues to improve. New England fuel authorities loosen their hold. Broken, egg and pea in surplus everywhere. Steam restrictions off. Stove and chestnut still hard to get.

Bituminous—The New England situation continues practically without developments. The market is hopelessly dull and inquiry for any of the steam grades is practically nil. The accumulation is still so great throughout the territory that cancellations are general, and because it is next to impossible to replace these contracts the trade is suffering a very much reduced tonnage. Large plants which use up to 4000 or 5000 tons weekly are unwilling even to buy small lots at present prices. Buyers everywhere state their anxiety to get rid first of the inferior coal taken on during the rush in August and September. There have been so many cases of heating in storage that buyers are not to be blamed for their attitude.

An increasing number of steamers owned by the Emergency Fleet Corporation is being laid up in New England ports because of the lack of charters. All the rehandling factors have their trade so well filled up that there is only a very small outlet from week to week for such cargoes as arrive. In addition to that the Navy Department has more coal in storage here on private wharves than was ever known before, and this limits again the tonnage that can be absorbed by this market. The trade is much interested in what action the Shipping Board will take on coastwise freights. The present rate of $3.25 from Hampton Roads and $3.50 from Baltimore has been in effect since April, and it will not be many weeks before the trade will insist that the authorities make some statement of policy. As it is, the differential over all-rail rates is so great that all the coastwise shippers will be seriously hampered in any effort to place coal on contract. The Shipping Board, of course, has the matter in its own hands, and nothing but public opinion can force any reduction in rates unless the authorities turn back to their owners a sufficient number of steamers to affect the freight market. It is rumored that some of the largest ships withdrawn from the trade last year will be returned within a few weeks. Meanwhile, it is likely that the Railroad Administration will interest itself in this phase for the reason that so much railroad fuel is brought by water from Baltimore and from Hampton Roads.

An increase the past week in movement all-rail is largely due to railroad fuel coming forward on purchases made a month or so ago. Only in scattered instances is there any increase in the movement of commercial coal. Low output is still characteristic of most of the operations in central Pennsylvania, and for a month or two no heavier shipments are looked for. As for the railroads, all buying has ceased and probably will not be resumed until the present large reserves are worked down. All the New England roads have had very light traffic the past two months, and to such extent is this true that the Boston & Maine, for instance, is using 1000 tons less per day than a year ago. Contract shipments by water have been stopped and the steamers diverted on other business.

Mild weather and the curtailment in manufacturing of all kinds are having their combined effect. The textile centers especially show the result of this, and the day is simply postponed when there will be any active buying interest in coal for next season. There is every indication that when buying is resumed there will be more discrimination as to quality and shippers than we have known for at least three years. Practically all Government requisitions through the several district representatives are now off, even for railroads and public buildings, and this will undoubtedly mean a new effort on the part of the shippers affected to place their coal in the open market. There are no signs of new contracts, however, and as yet there is no intimation what next season's price will be on high-grade coal.

The Government price has been shaded the past fortnight by shippers of medium grades; $2.80@2.90 has been freely quoted for spot coal, but the tonnage has been small rather than large, and there are few traces of actual sales. The railroads would naturally be among the first to get these offers, and it is a commentary on the general situation that each time a price is heard it is 5c. or so less than the previous quotation. And this is at a time when most of the mines are on 30 to 40 per cent. output. So far the highest grades that are open to bunker pools have not been shaded.

Clearances from Hampton Roads for New England continue light. Disposition at this end is increasingly hard to arrange, and the agencies are making every effort to place their coal in other directions. Bunker business, of course, is most attractive, and all the shippers who can get such business have a wide margin on which to go and come, before there is any question of reducing the regular f.o.b. price for cargo coal. Bunkers will not take care of all the coal that will shortly be pressing for outlet, and either the export market will have to be enlarged or the mines will be forced to curtail. Nothing comprehensive in the way of business can be looked for from New England for months to come.

Notwithstanding the removal of zone restrictions all-rail, Georges Creek is not coming forward any more freely than before, when it was restricted to the water route. It becomes increasingly evident that this once popular grade will be available for this territory only for forge purposes. The past year or so the largest proportion has gone for naval and special Government use, and it is quite likely that this coal, which once had the call in New England, will practically disappear as one of the steam grades.

Anthracite—Shipments continue to improve both by rail and water, and there is now practically no anxiety in any direction over continuing supplies. The "independent" shippers are actively soliciting orders, and shipments that were impossible to get two or three months ago are now coming forward in considerable volume. Retailers are so much encouraged that they are cancelling orders previously on file with such shippers, and for the balance of supply are looking to sources which they regard as more dependable in off seasons.

Mr. Storrow has announced that all active regulation on his part is now practically at an end. All but a few members of his staff have been dismissed, and except for clearing up loose ends there will be little done in his office from now on. His own resignation has been tendered to take effect at the pleasure of Dr. Garfield. "Emergency" coal has been reduced to five cars daily, effective Jan. 5, and it is likely that another week will see this movement discontinued. Four cars daily are being distributed in Maine and one car in Rhode Island. It is rumored that all allotments will be withdrawn by Jan. 15, and distribution will once more be in the hands of the regular shippers. There are now only a few cases where communities are seriously behind in their quotas, and these arrears can be promptly made up when the shippers themselves are left free to make deliveries at those points.

Broken, egg, and pea are in ample supply in most cities and towns. Stove and chestnut are still scarce, but the proportion has gradually increased as Government requisitions have been cancelled. In cargoes from New York ports the usual assortment now is egg, stove, chestnut and pea in about equal proportions.

It is understood that all restrictions on the use of anthracite for steam purposes are now taken off. This should help the movement of egg and pea sizes, which are fast becoming a drug on the market.

NEW YORK

The anthracite market shows little activity. Dealers are well supplied and demand is slow. No serious trouble expected in providing for needs for balance of coal year. Orders for Independent coals cancelled. Anthracite steam coals plentiful, with prices easy. Good supply of bituminous on hand. Demand slow except for high grades. Trade marking time and buyers hesitate.

Anthracite—There has been little activity in the local market. Dealers are well supplied with coal and, because of the unseasonable temperatures until the early part of this week, consumption has been slow. The trade does not now look for any serious trouble in the way of supplies during the balance of the current coal year unless there should be transportation difficulties. Although production figures do not show any increase, but on the contrary the reverse, there is enough coal being shipped here to take care of the demands made on the dealers and to enable them to get ahead on certain sizes.

Producers and shippers of Independent coals are beginning to feel the effects of the continued mild winter, by the refusal of retail dealers to either accept deliveries of coal or to place orders for more. Dealers find it possible with the supplies they now have to secure sufficient tonnage through the larger producers and to save the 75c. per ton they must pay for Independent product. As a result it is probable that nothing short of a decided change in temperature can keep the market for individual coal from breaking. Consumers are so well supplied that they are now particular as to getting the size they prefer and are refusing to take any other.

There was a further decline in the dumpings at the local Tidewater docks during the week ended Jan. 3, a total of 5546 cars having been dumped as against 5691 cars the previous week. For December the reports show that 26,261 cars were dumped here, as compared with 21,891 cars in November, an increase of 4370 cars.

The quantity of the individual sizes of domestic coals the various shippers and dealers have on hand depends considerably on their trade. Egg is plentiful with most shippers, while stove and chestnut are tighter, but not scarce. This is caused by local conditions, certain sections of the Greater City using more of one size than another, the retail dealers being governed entirely by such conditions. Broken, pea and No. 1 buckwheat are long, more of the first named size being in dealers' yards than is usually the case in this market.

There has been little movement in the small coals. All sizes are accumulating rapidly and demand is small. Buckwheat is plentiful, some shippers being so well stocked that it is reported concessions are being made to move it. The same can be said regarding rice and barley. These coals have been purchased in larger quantities than has been the case under ordinary conditions, with the result that many retail dealers have large stocks on hand.

Bituminous—Lack of demand for the fair grades and a continued good demand for the higher grades of bituminous coal continues. This condition does not affect all producers and shippers, but is general.

The threatened strike among the marine workers, and which did result in several hundred workers stopping work for a few days, was one of the reasons why embargoes were placed on shipments at St. George and Port Reading late last week. There is an accumulation of coal at these two docks and movement has been slow.

Reports show an increase in the dumpings at the local docks for the week ending Jan. 3, 5451 cars having been handled as compared with 5128 cars the previous week. During last month 25,169 cars were dumped as compared with 24,582 cars the month of November. Receipts here are not expected to show any increase for the next couple of weeks. The mines have not recovered from the holiday season, and as the Greek churchdays are ahead, added to the scarcity of labor, the disinterestedness displayed by some workers, and the falling off in car supply on some roads, the prospects for increased shipments are not bright.

That New England is in good condition is borne out by the resignation of Fuel Administrator Storrow, announced on Saturday, Jan. 4. Mr. Storrow, according to reports, stated at the time that the situation both as regards hard and soft coal was now satisfactory and might be left to ordinary channels for the rest of the winter.

The removal of price restrictions and their effect on the market continue to be one of the chief topics of conversation among the trade. Shippers are not inclined to bind themselves to contracts and will not do so until they know the exact situation. Some of the trade look for the discontinuance of the zoning system this month, to be followed almost immediately if not at the same time, by the removal of the price regulations.

The pools containing coal suitable for bunkers are well stocked, but the demand is good while the keen competition among the small operators tends to keep the quotations where they were last week.

PHILADELPHIA

Anthracite growing more plentiful. Moderate weather still holds back demand. All companies making good shipments. Individuals likely the first to be affected when market breaks, which seems imminent. Egg and pea draggy. Dealers showing signs of independence. Retailers start advertising. Bituminous well taken. Short production. Export business starting.

Anthracite—It is known that some shippers and many retailers are actually wishing for severely cold weather. It is also developing that many hours of unnecessary work were devoted to figuring allotments and percentages of increases and reductions in tonnages as based on previous shipments to various dealers. This is convincingly proved by the fact that the largest shipping company feared to enter January orders for its numerous customers based on the tonnages due them. Knowing the condition of the market here, it deemed it advisable in order to avoid having refused coal on its hands to write all to whom coal is due, asking if it was their desire to have orders booked for their allotments. Naturally the rejections were few, for it will not be the big companies, with their prices 75c. or 95c. below the smaller houses, who will be the first to have their orders suspended.

The operators are showing signs of being pleased with their success in mining sufficient coal and in its distribution to all markets, notwithstanding the loss of about two million tons due to the epidemic. We have interviewed many buyers who are inclined to believe that the unusually mild weather to date has saved the situation and not the elaborate system of distribution, with its figures and percentages. It is also stated that tonnage lost through the idleness at the mines was in realty not necessary on account of the lack of severe weather.

Several of the largest shippers frankly admit the situation is causing them concern, while some of the smaller houses like to appear optimistic. To date we have been unable to find where they have been cutting into the differential, but anything is likely to happen, and we are watching for a genuine slump. A representative of one of the big companies reports that unless it soon grows cold and stays cold the whole system of distribution will go to smash and there will be a wild scramble for business. Surely the days of great activity in the Fuel Administration are numbered.

This week saw the demand for egg and pea continue to grow less. Aside from a few suburban dealers, the trade is well covered on egg, while pea is flat in all sections of the city. Some shippers report that most of their trade is even fairly comfortable on stove coal, but the demand for it is still good and very far in excess of that for egg and pea. For some reason little chestnut, as compared to the other family sizes, has been coming here and we know many dealers who are extremely short of it. No dealer can be found who will say his trade will take coal regardless of size. Unlike a year ago, when the householders were grateful for coal of any size, they now insist on the size to which they are accustomed and will accept no other.

With coal getting easier dealers are already showing some signs of independence. They seem to realize that they may soon be again able to buy their coal where they want and not only where they did during the 1916-17 coal year. They are recalling that all shippers have not refunded the state tax for the last six months of 1915. While coal was so tight no one pressed his claim, but it has not been forgotten and the question is soon to be forcibly brought to the attention of some shippers when the time is more propitious.

The representative dealers are concerned as to how their smaller competitors will hold prices after the retail trade loses the controlling interest of the fuel authorities. They dread the return of price cutting with the devious methods of that practice. Just now they are greatly displeased with a suburban dealer who for some months received coal only through brokers and whose prices were correspondingly high. This week he received quite a substantial tonnage from one of the big companies, his entire quota for several months. Immediately he inserted an advertisement announcing in big type "Reduction in Prices." Although he was no lower than many of his competitors his "ad." was misleading and his method condemned. In this connection it is noticeable that an increasing number of retailers who formerly used newspaper space are again advertising. There is no mention of prices, most of them referring to service, and some others to the fact that they have all sizes of coal in stock.

When consulting one of the largest houses as to the status of the steam trade we were informed that the least said about it for publication the better. Unquestionably it is dull, and even the dealers who supply the small trade are complaining. The only desirable size is buckwheat, and we believe all shippers are able to dispose of their entire tonnage of this size; but the other sizes are becoming a greater problem with each day.

Bituminous—There is a firm demand for all coal coming into the market. Shippers continue to report only a moderate car supply and a shortened production due to the holidays which is making itself felt with full force at this time. The railroads continue to pile up reserve stocks of motive power fuel, which still causes much difficulty to supply the commercial demand for high grade fuels. There is no tendency to price recession, as coal continues in good demand, and this is especially so since there is some indication of foreign export business starting in good volume very shortly. It is understood that several foreign cargoes are already contracted for.

BALTIMORE

New year begun with a number of problems yet to be solved but a plentiful supply of soft coal pouring in. Embargo necessary at times at Canton pier. Good run of hard coal with a decreasing demand. Nut only real scarcity.

Bituminous—The coal trade here is off on a new year with every feeling of confidence, although it is realized that many matters must be adjusted before a stable basis for trading is set. For the present there is a plentiful supply of coal pouring in. Indeed the rush was so great the past week that all the fuel was not absorbed promptly, and a brief embargo had to be placed against the Canton coal pier, where fuel from the Pennsylvania, Baltimore & Ohio and Western Maryland is concentrated under Government control for harbor delivery. Numerous industrial sidings also have been congested recently, and the railroads were busy urging more prompt unloadings.

Some industries, however, find that their coal supply is now running far ahead of their consumption under the reduced output incident to the close of the war. The fact that many industrial coal piles will last for weeks longer than was expected as a result of the coming of peace is also sharply reflected in orders for fuel.

Shipment of the less desirable coals is rapidly dwindling in the face of the release of better coals to the general market. Many representatives of coal mines are arriving here with offers of coal, but an encouraging feature is that none is talking of cutting the Government maximum.

As soon as the Government can release ship bottoms for the export trade and make some readjustment for the protection of freight rates in competition with British shipping handling Welsh coals, a giant coal export is expected. Baltimore in 1915 reached a total of more than 2,000,000 tons on export bituminous, anthracite and coke combined, and if this can be resumed or bettered here and elsewhere excess production in this country can be readily handled.

Anthracite—The first real winter weather has come to this section. Weeks of mild temperature vastly cut consumption here. The end of the war has brought to an end the "fancy" salaries of many war workers. All of this is having an effect on the situation here, and the expected new demands for coal have not developed. With coal prices so high many are "mothering" fires to save coal and are hoping for an early spring to enable them to pull through on the original two-thirds delivered, or just being delivered, by their coal men. Not a few are now refusing to receive the remaining one-third of their orders. There is enough business still undelivered on the books of the two-thirds of absolutely needed coal, however, to keep the coal men busy for a time. All incoming fuel, and it is now liberal in supply, is rapidly absorbed. Egg and pea coal at times is probably a little too liberal in supply, but stove is short in spots and nut hard to get. Buckwheat, which the public here never took kindly to as a domestic substitute for other sizes, even for mixing, is a drug on the market.

Lake Markets

PITTSBURGH

Production still below normal. Steam coal fairly steady with gas coal strong.

Coal production in the Pittsburgh district last week was well below normal and not much heavier than in Christmas week. There is now observable a tendency on the part of mine managements to allow their men to celebrate holidays as freely as they like, and in several cases mines have been closed entirely, partly as a contribution to the general market situation.

All observers agree that the Pittsburgh district is faring much better than other coal districts in connection with the general decrease in demand for coal and the tendency on the part of consumers to reduce their stocks. The weakness in steam coal is not pronounced, while gas coal is decidedly strong, rather than weak. Except for decidedly off grades, concessions on steam coal are usually confined to the allowance of brokerages of 10 or 15c. to dealers, who charge the consumer or retail dealer the full Government limit, but of course without the brokerage that the regulations permit the dealer to ask. In the case of gas coal brokerages are not usually allowed by the producer, and dealers have been able to effect sales without much difficulty at Government price plus brokerage.

There is an insistent demand for gas coal, and mine-run usually has to be taken, as the ⅜-in. being produced is absorbed by contracts, as is the slack resulting. The mine-run being sold in spot lots is chiefly from wagon mines. Some of the wagon mines producing steam coal have closed, but the gas coal wagon mines are still operating. As a rule they now secure only the Government limit, without the extra allowed for trucking. Government limits remain at $2.10 for slack, $2.35 for mine-run and $2.60 for screened, per net ton at mine, Pittsburgh district, and the market may be quoted at Government limits to consumers for steam coal and at the Government limits up to the limit plus brokerage in the case of gas coal.

BUFFALO

Bituminous very quiet. No prospect of early improvement. Jobbers still wait for a stir. Plenty of anthracite. Light consumption.

Bituminous—The demand is still slack. Consumers no longer fear a shortage and are using up their surplus. Most of them have a heavy supply. They see in the big production a prospect of lower prices, but are not generally willing to buy on the offer of reduction. As a rule the sellers are not cutting the price, but it looks as if they would do so before long. New mines are sending representatives to this market, and they do not expect to do business on full prices.

Jobbers complain about as freely as they did when the operators had no coal to turn over to them. Now it is the consumer who has no use for them. Still they are much more hopeful than they were. When

the surplus in consumers' hands begins to disappear they will get business again. The railroads are buying pretty generally, but they refuse to pay any profit to the jobbers. This leaves the jobbers pretty nearly out, but this condition is not likely to last, for the consumers must have more coal soon.

Anthracite—The supply increases at such a rate that all uneasiness has disappeared. The prospect is that there will be plenty of hard coal in a few days, so that a retailer can go to a city trestle anywhere and get what he wants. This is a state of things that has not occurred in two or three years, and is quite different from what was feared even a month ago. The shortage has been overcome for the most part by an increase of supply. It is true that the consumption has been extremely light all the season so far, but there has also been a great shortage of natural gas, which has in part offset the extra amount of coal. It is not now believed that any amount of cold weather will be able to cause a further shortage this winter.

And now comes up the question of anthracite surplus. Already the independent shippers are finding it hard to sell their output, especially if it is not known to be of the very best quality. Few consumers will order it unless they need it urgently or are acquainted with the quality. It is predicted, even by the jobbers who handle independent anthracite, that it will go at a discount before long, mainly because the regular prices are so high.

CLEVELAND

Signs that some steam coal will be bought in January are becoming brighter. The movement is not expected to be large, but undoubtedly will prove quite sustaining in the present weak market. Holiday celebrations have cut heavily into production, a thing which is not now causing operators here any concern.

Bituminous—One large user of steam coal in the greater Cleveland district has directed the interest with which it has been doing its coal business to resume shipments, at the full Government price, on Jan. 10. Other industrial consumers are also showing activity, and many operators look forward to a brisk—in a comparative sense, of course—market by the latter part of the month. Stock piles have been well depleted by those interests that have not been taking any coal since the middle of November or thereabouts, and it is expected they will be forced into the market shortly.

For this reason, mainly, operators declare they are holding firm to the Government price schedule. Actuating this stand to a degree is the belief of some operators that quite a few steam-coal users quit buying soon after the armistice was signed to try to weaken the market. While some standard No. 8 coal may be bought here and there slightly under maximum prices, it doubtless is the case that an overwhelming percentage of standard coal has not been shaded. Stripping coal has been pretty well swept out of the market by the oversupply of standard No. 8 coal, and continued offers at 50 to 70c. off have not proved successful stimulents.

Cold weather has finally set in, and domestic demand has responded to this change. Retailers' business, however, still is only a fraction of normal, and a revival in earnest is no longer expected. Receipts both for industrial and commercial use have fallen in proportion, for holiday celebrations at the mines were severely felt. In most cases they were of two days' duration, but with the market as it now is, operators did not object.

Anthracite — Receipts are increasing somewhat, dealers formerly satisfied with five to six cars a week now being able to get eight and ten. Demand has improved slightly because of the coming of winter weather, but not much more than present receipts could be disposed of because of the large domestic stocks of bituminous.

DETROIT

Various conditions, prominent among which is an over-supply of stock on hand, contribute in creating an inactive market for bituminous coal in Detroit.

Bituminous—Business of jobbers and wholesalers in the Detroit market is pronounced far less satisfactory than is usual at this season of the year. Their efforts to interest buyers of steam coal and retail dealers in the product of West Virginia and Ohio mines, which has again become available, is disclosing that quite a number of the buyers believe they are already holding more coal than they should.

Other causes tending to diminish the volume of buying in the local market in the closing week of the year include the general reduction of industrial activity that comes with the period for taking an annual inventory. To this may be added the cutting down of operations following the cancellations of numerous Government contracts for supplies for war purposes; the holding back of settlements on such contracts and the difficulties some manufacturers are meeting in trying to get materials they need to replace their plants on a peace basis of operation.

The stocks that some of the retailers and steam plants seem to find burdensome are said to include quite an amount of the coal from Indiana and Illinois, which was sent into the local market in large amount during the late summer and was bought because of the uncertainty that then seemed to obscure the outlook as regards ability of the buyers to get more desirable stock. The comparatively warm weather through November and December prevented the materializing of the expected retail demand.

Anthracite—Though not very much anthracite is coming into Detroit, the weather so far has been favorable to light consumption and dealers have not been subjected to any considerable degree of urgent demand from domestic consumers. The pressure for anthracite is also being relieved to a noticeable extent by a more plentiful supply of coke and by the fact that household consumers are now permitted to use coke to the full limit of their fuel requirements, although, in the case of anthracite, they are still required to provide a supply of bituminous equal to one-half of their fuel needs. The fuel administration has announced that the maximum price for coke delivery anywhere in Michigan will be $10.75 a ton.

COLUMBUS

Coal trade in Ohio still rather quiet, but there are signs of revival of interest. Domestic trade is stimulated by colder weather. The steam business is dull, as consumers generally are overstocked. Prices are fairly well maintained.

Because of the fact that most steam users are heavily overstocked with fuel, there is little steam trade in Ohio territory. Consumers are loath to buy under present conditions, and they are following the policy of using up their reserve stocks. Railroads are not using as large a tonnage as formerly, and in addition there is a movement on the part of the purchasing department to hold off in the hopes of beating down the price. Consequently, current business in steam grades is not large. Quite a few of the users who cancelled orders several weeks ago are asking that they be reinstated, showing a better feeling in steam circles. But on the whole the steam trade is quiet and not a great deal is expected for some time. Michigan is fairly well stocked up, and the same is true of the manufacturing localities in northern Ohio.

The domestic trade is slightly more active, due to lower temperatures which have prevailed. Retailers have been fairly busy in the past few days making deliveries, but the activity in domestic grades is not long enough to have it reflected to any great extent on the operating end. Retail stocks are fairly large, and consequently dealers are inclined to use up reserves. There is a fairly good demand for Pocahontas and other fancy grades. Prices in the retail trade are generally well maintained, but there is some shading on the part of certain dealers. This is not sufficient to demoralize the market, however. Retailers look for a better demand when the expected cold wave arrives. The season so far has been unusually open.

CINCINNATI

Colder weather has stimulated consumption somewhat, but supply is much in excess of the demand and consumers' stocks seem ample for the rest of the season.

Business among the coal trade in this section remains almost wholly under the influence of the heavy stocks of fuel which were stored by both industrial and domestic consumers in preparation for the current season, coupled with the comparatively small consumption, especially of steam fuel.

The quiet of the reconstruction period is prevailing with the manufacturers, many of whom have greatly curtailed production as a result of the cancellation of war orders, while others have closed down completely, for the purpose of changing their plants back from a war to a peace basis. The net result is that industrial activity, aside from the normal year-end and holiday quiet, is less than at any time in the past two or three years. Moreover, the remarkably mild weather so far experienced, broken as it was at Christmas by a light snow, and by colder weather just now, has made the consumption of fuel for heating purposes much less than normal, and stocks laid in for the winter have been reduced very little.

Present indications are that unless the remainder of January and the following winter months bring a sustained period of cold weather, consumers in all classes will carry over considerable stocks of fuel. However, indications are also favorable to cold weather, at least during the current month, to help consume the stocks on hand and thus prepare the way for a good spring season. The resumption of industrial activity in many lines is also looked for, with a corresponding increase in the use of fuel for steam purposes.

LOUISVILLE

Drop in temperature improves demand from small steam plants. Domestic demand quiet. Industrial demand fair only. Market slightly firmer.

Since Jan. 1 cold weather has about doubled the consumption of small steam plants in office buildings, central stations, etc., and has made things slightly more active for the retailer. However, domestic demand is not increasing materially, as consumers were well stocked and for the early fall and winter used coal considerably under expected requirements. The general steam demand is dull, due to the fact that industrial consumers are not especially busy. Coal is generally plentiful, and yards and bins are well stocked. Some river coal is now coming in and much larger shipments are expected within a few days.

Things at the mines show little improvement. Most of the mines are getting back into the running again after being down for the holidays, but some are not turning a wheel until a larger volume of business is booked. In several sections the mines have considerable coal in box cars and are trying to find a market for it. However, there is little unsold coal in transit.

Except for the small production of the past few weeks and the holiday shutdown, it is believed that the market would have broken sharply. However, reduced production has strengthened the market all around. Retailers are holding prices firmly. There is some coal being offered at mines at prices slightly under Government maximum quotations. However, this is mainly in connection with small mines and wagon mines, although a few producers are absorbing brokerage.

There has been a better demand for railroad coal during the past month than for some time past. Several of the Eastern and Southern roads have been buying freely. However, several of these are now loaded up, and by Jan. 15 it is claimed that the railroads will be fully stocked and this market cut off.

Excellent boating stages in the Ohio River are expected to result in considerable coal coming South. One local concern received ten barges a few days ago, which is the best shipment of river coal received in many months. More river coal would be moving except for the fact that river coal companies are still heavily stocked on rail coal. However, with a high river stage, free of ice, indications are that big operators will carry coal South on the rise, and await a market for it.

BIRMINGHAM

Domestic coal unusually scarce and demand heavy. Inquiries for steam coal good, but not specially insistent. Production took a big slump around the holidays.

Inquiries for domestic coal are especially strong at this time, both locally and from points throughout this zone, reports indicating a shortage at most all the chief consuming centers. Local dealers have little coal on hand and are unable to secure tonnage requisite to their requirements.

While steam-coal users were unable to stock much coal to carry them over the holidays in view of the restricted production which has been the order for the last month or six weeks, inquiries are not as strong as might have been expected. However, ample business is being booked to absorb fully the tonnage now being produced. Shortage of stocks is more manifest with the railroads than any other class of consumers, receipts and consumption running on a close parity with some of the lines.

Coke

CONNELLSVILLE

Coke scarcity increased. Operators show some indifference in matter of production. Furnaces indisposed to pay advances in event of Government control being relinquished. Market lower for screenings.

Coke has become extremely scarce, blast furnaces having felt for the past ten days the effect of the sharp decrease in Connellsville coke production and in shipments of byproduct coal that occurred during Christmas week. Several blast furnaces have been forced to bank, while many others are operating at reduced rates in hope of avoiding banking. Last week's production was not much heavier than that in Christmas week.

Many coke operators seem disposed to allow or even encourage their men to celebrate holidays whether on the calendar or not, and the Greek church holidays occur this week on account of the difference in the calendar. Evidently it is felt that reduced output of coke will prove an advantage to coke producers in the long run.

There are no prospects of an early removal of Government price restrictions, and while predictions have been made that if the control were removed when coke is as scarce as at present the market price would advance sharply, second thought indicates that the blast furnaces would hardly bid against each other for coke as they have sometimes done in the past, but would rather be disposed to bank.

Last week the blast furnaces generally reduced their pig iron prices $3 a ton, tardily following the program of price readjustment that had been mapped out by the American Iron and Steel Institute Committee for presentation to the War Industries Board Dec. 11. While the board did not receive the recommendations, they were given publicity and have had some standing. Having reduced their product $3 a ton the blast furnaces would hardly be disposed to pay any fancy prices for coke in the open market. The market is quotable at Government limits on furnace and foundry: Furnace, $6; foundry, 72-hour selected, $7, per net ton at oven. Crushed, over ¾-in., is nominally held at the Government limit of $7.30, but there is little being done. Clean screenings from old dumps, over ½-in., on which the Government limit is $5.50, no longer bring that price, and $5.25 is not easily obtained, as dealers who stocked up in anticipation of good demand for this material for domestic use have found their stocks move very slowly.

Buffalo—The situation grows easier, especially as the coal supply is no longer short. Besides, the output of pig iron has succeeded the demand of late, and the furnaces are not crowded. A Buffalo furnace owner is reported to have said within the past week that he had shut down one furnace and would follow with more if the iron sales did not pick up, for he was not going to stock up on this outlook. He was sure that prices would be easier soon. All this reduces the consumption of coke, so that the demand is quite moderate. Off grades are not selling well, but best quality is fairly active. Fuel coke is quiet, on account of the slackness of the coal trade.

Middle Western

GENERAL REVIEW

Brief storm followed by cold spell did not help coal situation as much as was expected. Tonnage decreasing. Coal carrying equipments not in demand at mines. Operators believe export of coal would help.

The Middle West recently received its first touch of winter. The storm that swept over the territory lasted two days, and was serious enough to hamper traffic to a small extent. This was followed by cold weather, which was of short duration, the temperature having climbed upward steadily for the last few days. The weather man predicts a storm on its way from the Rocky Mountains in the Northwest, which will affect our territory, including the Ohio Valley. Last week's blizzard proved one thing to the satisfaction of the coal man, and that is the present situation is beyond any substantial help from ordinarily favorable weather conditions. There was scarcely any noticeable difference in the market after the storm. Of course, it cannot be denied that the prolonged cold weather will have a beneficial effect on the market, but this effect will not be as great as previously hoped for by the coal operator.

A sharp decrease in tonnage continues, both for Illinois and Indiana, and in our opinion no improvement is to be looked for until perhaps the middle of February, or later. The coal-consuming public are seizing on the present weak market to dispose of their stored coal, and developments have shown that much more coal has been held in reserve than heretofore suspected, with the result that the public will not come into the market in any great force until some six to ten weeks hence.

The operators are facing the present condition with an admirable spirit. They have seen that very little, if anything, is to be gained by price cutting, and they have made up their minds to let their mines remain idle, rather than operate on a basis below the present Government price, and consequently at a loss.

It is a very unusual thing, at this time of the year, to note long strings of empty coal-carrying equipment in the various railroad yards, but the fact of the matter is that the yards in Chicago are practically cluttered up with strings of empty coal cars, which have not been sent down to the operating fields because there is no demand for them.

One of the problems that the Illinois and Indiana operators are engaged in solving at this time is the question of whether or not all coals will continue to be sold on the basis of Government price. It is generally known that there are a great many qualities of coal coming from both of the states mentioned, and an operator cannot expect the public to pay the same price for an inferior product that they would pay for the best coal that the state has to offer. The operators will have to adjust this question themselves, and, of course, the poorer grade products will have to be marked down from the Government price. In our opinion, this matter is a question for the coal operators' associations in the different producing districts of Illinois and Indiana, and is a question that should be handled and settled at as early a date as possible, in order that the market may the more readily adjust itself to new conditions.

The Western operators are looking at the situation in the Eastern coal fields with a great deal of interest, as they feel that if any immediate relief is to come, it will be through the East. The feeling is that there is a great demand for coal in Europe and South America. In fact, the press contains numerous mentions of the fact that coal is selling on those two continents at from $60 to $120 per ton. The coal operators feel that if the proper authorities took the matter in hand, and exported coal to these countries, that the situation in the United States would be relieved to some extent. Of course, this would take time, but the sooner it is undertaken and got under way the better. The general opinion in the West is that if any relief is to be looked for, it will have to come from our exporting activities.

If a substantial tonnage was exported it would keep Eastern coal out of Indiana and Michigan, and thus allow the Western coal to resume the place it had in Indiana and Michigan before the signing of the armistice.

CHICAGO

Domestic consumers seem to be stocked with coal. Large operation works only two days a week. Railroad buying a little more active.

There is practically no demand for domestic coal in the city. The recent storm, if it did nothing else, brought to light the fact that the average householder has a good supply of coal in his cellar, and is not a bit nervous about the prospects of a serious spell of cold weather. A look into the average dealer's yard showed no signs of extra activity; in fact, business was carried on just as sluggishly during and after the storm as it was before.

Some of the higher grade products of Franklin County suffered on account of this lack of market in Chicago. In fact, we understand that one of the biggest mines in the field, with a production of over 4000 tons per day, has only run two days in the last two weeks. This fact will give a general idea of the situation in Chicago.

There is some buying of steam coal, but not enough to make itself felt in any degree. The railroads are coming into the market a little more generally than they have heretofore, but are not making any purchases, merely giving instructions to renew shipments on orders previously placed.

MILWAUKEE

Order reducing the price of byproduct coke is rescinded. Mild weather slows up consumption and makes the outward movement slow. Solicitation renewed.

The reduction in the price of byproduct coke to $11.50, announced by the Fuel Administration last week, did not stand long, and this class of fuel is now retailing at $12.25, except pea size, which is listed at $10.25. There is no extra charge for delivery into bins, however. The reversal of the order reducing coke was brought about by the producers, who brought influence and argument to bear upon the administration.

A continuation of mild weather has a depressing effect upon the trade, and it is reasonably certain that a sudden withdrawal of price regulation would precipitate a slump in soft coal, as holders of eastern bituminous are meeting with increasing competition from western producers. Last year at this time there were no agents on the road, and orders were accepted subject to regulation as to delivery and price. Now dock companies are soliciting business.

It is an assured fact that there will be no coal famine. The last run of hard coal by lake helped out wonderfully, and under present weather conditions and with supplies coming daily by rail, there will be enough hard coal for those who are unable to burn bituminous. The rule allowing two-thirds of last year's supply to consumers with magazine heaters or hot-air furnaces, and one-third to those with steam or hot-water plants, is being adhered to.

There is no trouble in securing cars for rail shipments this year, and absence of deep snow makes rail hauling steady and more reliable.

ST. LOUIS

A slow and heavy market with a better tone at the end of the week and indications for better conditions. Steam demand is easy but domestic demand shows improvement. Surplus of all grades and sizes of coal. Transportation fairly good.

Expressions on the local situation are optimistic. The present winter has been the mildest since 1877. Up to the first of January there was not what might be called one cold day in the season. On the first of the year the weather got cold and at the end of the week it was below zero.

There has been a good supply of coal in storage, but this has affected the market only to a small extent. Here and there, however, are little indications of what is to be expected if seasonable weather continues. The steam demand everywhere still continues light. There is a little buying, but the storage piles are receiving the most attention. Some of these piles have been on fire and they are being gradually cleaned out, the consumer purchasing just enough coal on the open market to mix with the storage coal to help the general situation. The domestic demand with the first of the year picked up, and retailers everywhere are optimistic as regards the future. The demand, however, has not been sufficient to create any great change in the wholesale prices. Standard coal is still heavy, and many mines are idle on account of their failure to move the screenings. The railroad buying has been light but it is expected that the new year will bring in considerable railroad business. This will help the screening situation.

The country demand for Standard is easy. Cars are plentiful and there are no labor troubles nor anything out of the ordinary other than lack of business to keep the mines going. The domestic demand for Standard is not good, the call being for the higher grades.

The Mt. Olive situation continues to be the most satisfactory. There are plenty of cars, mines are working on rather good time, and although there is some coal unbilled, it is not in sufficient quantities to cause any worry. These prices are holding up to practically the Government maximum, whereas the Standard 2-in. lump is down to as low as $1.50 to $1.75, screenings as low as $1.30 to $1.50, mine-run $1.65 to $1.70, and 6-in. lump from $1.75 to $2. The domestic demand is fairly good for the Mt. Olive grade, although steam in St. Louis proper does not call for much of this coal. The steam demand is farther north, and in the country.

Conditions in the Carterville field show considerable improvement. Cars are not as plentiful as they might be, but there is an oversupply of them for some mines that are idle on account of no business. This affects the Williamson County field more than it does Franklin County.

There is plentiful supply of this coal coming in right now, but nothing to indicate that it will continue to come in if extreme weather grips the northern territory for any length of time. Then this coal would be diverted north. There is, however, a fairly good supply of this coal in storage by the retailers, and such steam users as have been able to get it are fairly well supplied. This coal practically holds to the Government maximum, although screenings are in some quarters long and in other sections are short.

For the first time in many months some anthracite buckwheat was offered on the St. Louis market but found no takers. There is a little Arkansas anthracite and smokeless coal coming in, but not in any great quantities. In a general way the market shows some improvement, and the coming week will probably develop better prices on Standard coals, with also a possibility of higher prices for retail, which are now below the figure fixed by the St. Louis Fuel Committee.

COAL AGE

Volume 15 New York, January 16, 1919 Number 3

Coal-Mining Results in the United States in 1918 and the Present Outlook

The Production of Coal in 1918 was the Greatest in History

The total output was	689,652,110 short tons
An increase of	38,526,110 short tons
Or nearly 6 per cent. over 1917.	
Anthracite production was	99,514,334 short tons
Or 179,334 tons more than in 1917.	
Bituminous production was	590,137,776 short tons
Or 38,346,776 tons more than in 1917.	
Coke output was	56,670,000 short tons
Or 1,603,000 tons more than in 1917.	

Byproduct coke increased nearly 4,000,000 tons while beehive coke decreased upward of 3,000,000 tons.

THE year that has just passed proved conclusively that in time of crisis, the ability of American mines to produce fuel is greater than the ability of our industries to consume it. If the war had continued through the year, the production of coal would undoubtedly have been in excess of 700,000,000 tons. Following the signing of the armistice in November the coal output decreased materially, the production in December reaching the lowest total of the year.

The country may look with satisfaction upon the record that was made in the emergency that existed. The stocks of coal in November were nearly three times as great as those that were in yards one year ago. Since bituminous coal is a product that cannot be satisfactorily stored for long periods, the natural outcome of the situation in recent weeks has been for the mines in most districts to curtail production. Only in this way can the large stocks of coal on hand in industrial yards be used up and normal conditions in the coal trade be resumed.

A backward look at the history of coal mining shows that only three times did it require an interval of two years for production to come back and exceed the last peak that was established. It is likely that the coal output in 1919 will be less than it was last year, for during the early months of this year the Nation will be going through a serious time of reconstruction. More than 10,000,000 tons of coal have already been released by the cancellation of war work in powder, airplane and small arms plants. The navy consumption will be 4,000,000 tons less this year. The railroads have effected plans that should save upward of 8,000,000 tons during 1919. Conservation measures that were forced on industries by the needs of the war will bear fruit during the coming months and bring about other material savings.

On the other hand, there is very little cessation of work in most of our great steel plants, and many businesses that were restricted during the last year are again resuming operations in a most hopeful fashion. One of the promising spots in the situation is the probability of greatly increased exports. For the first time in a generation America possesses a merchant marine. France is on the verge of a coal famine. The mines of both Belgium and France cannot be counted upon to relieve the situation, due to the fact that for the present there is absolutely no place for miners to live in the regions devastated by Germany. In most localities where mines existed there is not a single house to shelter anyone within ten or twenty miles of these collieries. Italy is also begging for American coal. These important foreign markets are ready for the American producer if only the Nation will immediately effect a program that will provide sufficient ships and establish reasonable rates. America should send 30,000,000 or 40,000,000 tons of coal to foreign markets in 1919 instead of the measly shipments of 10,000,000 or 15,000,000 tons heretofore exported.

Due to the war, Europe is minus the labor of 20,000,000 men killed or disabled. America today is not only the richest nation on earth but the greatest storehouse for raw materials that exists anywhere. Labor and capital understand each other better here than in any other country. This will result in a degree of coöperation that should introduce an era of unexampled prosperity. Fuel is the product necessary to turn the wheels. Before the last snow has fallen this winter, industries will be humming and America will have started on its career of greater internationalism in all its industries. The few weeks of hesitation furnish the coal operators with a much needed opportunity to rejuvenate and reëquip their plants. In 1919 competition will again be in force, and the best designed and best equipped collieries will enjoy the greatest success.

Activities in Different Coal-Producing States During 1918

THE year just passed has been a strenuous one. It was the first year in the history of the industry when Government control was exercised throughout the entire twelve months. As a general rule, however, operators who regarded Federal regulation with fear and trembling approach the return to normal, that is competitive, conditions with the same foreboding. Throughout the entire land a shortage of labor has been experienced. Enlistments and draftings into the army and navy have had their effect in reducing the operating forces of the mines. While no region was exempt, miners from the eastern and western fields were powerfully attracted by the high wages and steady work offered by the munition plants and shipyards. The coal digger, proverbially nomadic in his habits, promptly "pulled up stakes" and sought employment in more promising fields whenever his earnings from fuel production became lower than he thought they should be. Strenuous efforts were exerted by many of the coal companies in an effort to keep their working forces somewhere near normal and adequate. Car shortage, which has been the great handicap to maximum production in past years, was less felt in 1918 than was anticipated. Because of embargoes and priorities, however, shortages of mining supplies developed in some places. As a rule these were not in the main serious, and they exerted only a minor depressing effect upon production. As to the future, much is uncertain and few in the coal industry are willing to hazard a prediction. It is but natural that the problems of the immediate future, those that affect the destinies of the nation and in fact the entire race, should also possess a powerful influence over the third industry of the land. Most leaders of those engaged in coal production are agreed, however, that the immediate future is bright. There appears to be no reason why both output and consumption can not—within reasonable limits—be maintained. The following reports, written especially for *Coal Age*, in most cases by the chief mine inspectors of the various states, set forth in detail the results of the past year's effort. It is regrettable that the fiscal years of some states do not coincide with the calendar year. This is confusing, and a change to the calendar year would be beneficial to all concerned.

Alabama

By C. H. Nesbitt
Chief Mine Inspector, Birmingham, Ala.

THE coal production of Alabama for the year 1918, from present estimates, will total 19,000,000 tons. This is a decrease of 1,500,000 short tons as compared with 1917, notwithstanding that many new mines were opened and all operations ran with fair regularity throughout the entire year. To a certain extent the decrease is attributable to the influenza epidemic that prevailed the greater part of the last three months of the year; also to the fact that the mining industry of Alabama, like all other industries throughout the country, has been handicapped by a lack of labor. The state has been drawn upon heavily for men for military needs.



C. H. Nesbitt

The mining business in this state has been exceptionally good, and all grades and qualities of coal have not been equal to the demands for coking, steam and domestic purposes. Many improvements have been made during the year at different plants, notwithstanding the increased cost of material and the labor shortage. The fatalities recorded thus far have been those of a regular nature, and equal the record of 1917.

Proposed Government control of the transportation facilities on the Warrior River holds a bright prospect for the mining business in that section of the field. This will furnish a long desired outlet for Alabama coal as it is anticipated that shipment by river will enable a cheaper rate to Gulf ports.

The prospects for a good trade for 1919 are promising. This, however, depends upon industrial activities in other lines.

Alaska

By Sumner E. Smith
Alaska Engineering Commission, Eska, Alaska

PROBABLY about 75,000 tons of coal were mined in Alaska during the calendar year 1918. Of this amount the Alaskan Engineering Commission, operating leasing units Nos. 7 and 12 in the Matanuska Field, produced about 60,000 tons. Henry Baxter, manager of the Matanuska Coal Co., produced about 3000 tons early in the spring.

The Chickaloon Coal Co., of which Walter A. Gompertz is manager, ran several thousand feet of tunnels and has now started operations with diamond drills on its lease covering units Nos. 10 and 11 in the Matanuska Field. The Little Susitna Coal Co., operating near the main line of the Government R.R., not far from the Little Susitna River, produced about 2000 tons of coal; and the Cache Creek Dredging Co., operating a dredge on Cache Creek, mined about 5000 tons, which was used to generate electric power for the dredge.

Maitland & McNally, of Anchorage, Alaska, are operating what is known as the Wharf Mine at Bluff Point on Cook Inlet, producing coal for the cannery trade. They probably sold some 5000 tons during the year.

It is reported that the Alaska Coal and Petroleum Co., of Katalla, has mined about 1000 tons from its property on Canyon Creek in the Bering River Field. Operations have also been started by a company promoted by Falcon Joslyn and George Hazlett on a lease coving a portion of what was the old "English Company" ground at Katalla.

Several thousand tons of coal were mined in the Nenana Field for use in construction work on the Government

R.R. Most of this was produced from free-use 10-acre leases by small operators. The balance of the total tonnage was made up entirely from the production from free-use 10-acre permits scattered throughout the territory from Chicken Creek on the Upper Yukon to Candle on the Seward Peninsula. All of the foregoing figures of production are in short tons.

Arkansas

By Claude Speegle
State Mine Inspector, Fort Smith, Ark.

TO GIVE a review covering all the developments of the coal-mining industry of this state during 1918 is impossible. The coal region of Arkansas covers about 2000 square miles and comprises the six counties of Sebastian, Scott, Franklin, Johnson, Logan and Pope. The production of coal in each of these six counties is of commercial importance, but the counties producing the largest amount of coal are Sebastian, Johnson and Franklin. Sebastian County alone produces more than one-half the output of the entire state.

The approximate amount of capital invested in the coal-mining industry is $2,896,600. The production for the fiscal year ending June 30, 1918, was 2,373,687 short tons. The market value of this coal was approximately $7,777,080.

To produce this amount of coal 4425 miners and company men and 394 mules were worked in the mines. The miners used 99,028 kegs of black powder, at a cost to them of $198,056. The mines hoisted coal during 15,725 mine days.

Fatal and Nonfatal Accidents

Fourteen fatal and 150 nonfatal accidents occurred during this period. There were 169,549.14 tons of coal produced for each life lost and 15,824.87 tons for each nonfatal accident.

There were 378 office men and mine officials employed, making a grand total of 4803 persons actively engaged in and depending upon the mining industry. The total number of coal mines in the state is 155.

Washington and Crawford counties produce a small amount of coal, but owing to the thinness of the bed this fuel is only mined for local use. Ouachita County has a bed of lignite coal 15 miles in length and 7 miles wide, with coal 5 to 6 ft. in thickness. However, this field has never been developed, and its coal is only mined for local consumption. A great number of small mines and five large ones have been opened up in this state within the last year.

The amount of coal produced in Arkansas for the last six months of 1918 was approximately 1,257,434 short tons. This is as nearly correct as can be given at this time. The exact figures are available for five months, but the output for the month of December had to be estimated.

Colorado

By A. R. Tibbits
State Mine Inspector's Office, Denver, Colo.

DURING the year 1918 the coal industry of Colorado was confronted with many changes, but no effort was made tending toward stabilizing conditions. Early in the year there were insistent demands for increased production. Coal consumers both in this and the surrounding states were alarmed by reports of an impending coal famine, and there were strong indications that such a condition might be forthcoming.

In 1917 Colorado produced 12,515,305 tons, and in the beginning of 1918 the demand was such that it appeared we should face a shortage of approximately a million and a half tons. In order to avoid this danger every effort was made to speed up production. However, the industry was hampered by the issue of rules and regulations by the Federal Fuel Administration, often conflicting in their terms. The labor situation became serious, many of our best miners enlisted, others were drafted, and it should be remembered that Colorado for many months had been decidedly short of genuinely competent miners. Therefore, the operators were left to face the increasing demand with vastly reduced competent help.



James Dalrymple
State Mine Inspector, Colorado

The car situation on the other hand showed some improvement over previous periods. During March, April, May and June quite a number of mines at which small beds are being worked were compelled to close down because of the inability to operate at anything approaching a reasonable profit at the selling prices established by the Federal Fuel Administration. Later on, this matter was taken up with the authorities and partially adjusted, but this adjustment took considerable time, which resulted in a serious reduction in the tonnage of the properties involved.

Colorado consumes nearly all of her output, in 1917 only 2,634,458 tons were shipped out of the state, but when the system of zoning was put into effect by the Federal authorities, there was created a greater market outside of the state for Colorado to supply. A great drive for increased production was made, and all the mines worked full time. Early in the summer all the individual consumers who could pay for a winter's supply of fuel, and had the storage room, filled their bins. Also the yards of the local dealers and railroads were stacked up to the limit with coal, to meet demands for some time to come. In fact there is more coal stored in Colorado and by the jobbers in the adjoining states than in any previous year.

On Nov. 1 the production amounted to 10,812,548 tons, an increase of 516,379 tons compared with the same period of 1917, and about one-third of the expected increase. However, instead of a coal famine, there came a slump, which the sudden cessation of the war with the consequent cancelling of war orders and closing down of munition plants made more acute, with no prospect of an early revival of the business. The mines have slowed down, in some localities working only half-time, and many of the small operations have closed down altogether for lack of orders for their product. The drop in the production brought the increase of 516,379 tons of the first ten months down to 197,932 tons increase by the end of December.

With wages and the cost of production high, the retail selling prices were correspondingly high; but the wholesale prices per ton at the mines were slightly lower than in 1917.

The western slope, where a good grade of domestic coal is mined, was seriously affected by the closing down of the Colorado Midland R.R., leaving a number of small towns without direct railroad connections. This situation affected a number of mines in Garfield, Gunnison and Mesa counties.

In 1917 Routt County produced 1,057,685 tons and in 1918, as seen in the table, the production shows a decrease solely due to poor railroad facilities. In the winter and spring the heavy snowfalls almost completely blocked transportation, but an efficient railroad service could have overcome this to some extent. There is a steady demand for the coal of this district in Kansas and Nebraska because of its high thermal content and its fine storing qualities, also because it is not subject to spontaneous combustion. It can be shipped any distance and stored for a long time without impairing its value. In November 1000 cars of this coal was ordered, but could not be delivered, because of a lack of cars and the existence of snow blockades.

The only drawback to the free development of the mines in this district is the lack of an efficient railway system. However, the Denver & Salt Lake R.R. officials are making strenuous efforts to improve the system, and have built adequate snow sheds, installed new equipment and relaid the tracks where necessary. It is now the hope of all concerned that in the future transportation of cars will improve.

In the northern field where the lignite or sub-bituminous coal is mined, the question of slack is a serious one. This variety of coal makes about 49 per cent. of slack. The cost of production is as high as in the other coal-producing localities, but the product sells at a lower rate. This slack, in competition with the slack of other coals, is not in demand both on account of its slightly lower heating qualities and the fact that it will not stand storing. Unless quickly sold and used, it has to be dumped and represents money lost.

Many solutions to this problem have been considered. The making of briquets is not practicable because no cheap binder is available. The great sugar plants that operate in this field and can use this low grade fuel to advantage solved the problem to some extent by storing this slack in concrete pits covered with water, removing it as needed. One hundred and ten

PRODUCTION OF COLORADO BY COUNTIES FOR 1918, ALSO INCREASE OR DECREASE COMPARED WITH 1917

County	Total Production, 1918	Increase	Decrease
Boulder	1,306,099	28,834	.....
Delta	90,657	.....	12,591
El Paso	281,978	.....	92,642
Fremont	899,137	27,608	.....
Garfield	73,171	.....	31,437
Gunnison	647,295	.....	5,938
Huerfano	2,665,259	289,697	.....
Jackson	77,405	.....	8,884
Jefferson	120,668	.....	10,473
La Plata	137,420	.....	1,103
Las Animas	4,515,684	67,958	.....
Mesa	218,887	9,721	.....
Moffat	600	350	.....
Montezuma	797	.....	803
Montrose	422	.....	1,262
Ouray	614	.....	515
Pitkin	29,109	6,145	.....
Rio Blanco	4,604	.....	53
Routt	1,004,451	.....	53,234
Weld	638,978	.....	13,446
Total	12,713,237	340,313	232,381
Increase 1918 over 1917			197,932
Average number of men employed in and about the mines			14,200
Number of days worked per mine			196
Number of mines in operation			230

thousand tons of lignite were thus stored in the past year. This method of storing the lignite slack in the summer season eliminates any shortage of coal that may be caused by the increased demand for cars to move farm products in the fall and winter and makes a steady market for a product that is difficult to dispose of.

Most of the coal mined in Las Animas County is made into coke and is consumed at various plants in Colorado. As a domestic fuel none can be rated higher than that of Huerfano and Fremont counties, which is in great demand because of its splendid heating qualities and cleanliness.

There were no labor troubles other than a scarcity of experienced miners to add to the difficulty of the coal situation. In the northern field there was a moderate demand for the soft coal, resulting in the mines working only half time and cutting down the wages of the men. This prompted many of them to leave the state to seek better paid employment.

There were substantial improvements made at many of the mines in spite of the fact that the cost was extraordinarily high. The welfare of the employees received attention, and in many of the coal camps the living conditions were considerably improved. The rate of fatalities was about 4.7 per thousand men employed. While this is a high death rate, yet considering the preponderance of inexperienced and foreign-born men working at the mines it shows that safeguards to protect life were enforced to an appreciable extent.

It is difficult to say what the effect will be on the industry when the various restrictions placed upon it by the war are lifted. With an overstocked market, selling prices are bound to drop. However, in common with other coal producing states, Colorado will solve the new problems and work out matters satisfactorily.

Idaho

By Robert N. Bell

Boise, Idaho

THE Horseshoe Creek coal field of Teton County, Idaho, is the only portion in the whole State of Idaho that has so far developed a commercial coal mine. It embraces a portion of the famous coal-bearing formations of Wyoming, which extend for a short distance over the border into Idaho. The Horseshoe coal field is situated on the eastern slope of the Big Hole Mountains, 12 miles due west of Driggs, in Teton County, southeastern Idaho. Driggs is an agricultural center and the county seat of Teton County, with a population of 1000 and



Robert N. Bell

the end of Teton Valley branch of the Oregon Short Line Ry. The elevation is 6000 ft. above sea level. The Big Hole Mountains comprise an L-shaped spur of the Tetons, one of the major ranges of the Rocky Mountain system. The "Grand Tetons," as they are called, have some of the steepest and most spectacular, as well as the highest peaks, in the United States. They are plainly visible from the coal property, towering to an elevation of nearly 14,000 feet.

These coal deposits have been operated since their discovery in a desultory fashion by the original claim owners and were locally known as the Brown Bear, Boise, Horseshoe and Packsaddle claims. They were held by local people without means to push the development to a point where a large tonnage could be produced. This, in connection with the long wagon haul of ten miles to the nearest important settlement, kept the output limited strictly to local demands of the nearby agricultural communities.

In December, 1917, these properties were taken over and placed under one head, by R. S. Talbot, of Spokane, Wash., who successfully developed the large magnesite deposits of eastern Washington. The area of the coal property involved in the transaction is upward of 1200 acres. It is roughly oblong in shape lying northwest and southeast along the strike of the coal seams. The workable seams so far proved are nine in number and range from 30 in. to 12 ft. in thickness. The measures are interspersed with shales and sandstones of Cretaceous age. The average dip is 60 deg. to the southwest, and the principal seams upon which development work has been done produced a remarkably clean low-ash coal, which parts readily from the top and bottom rock.

A typical analysis of several of these seams is as follows: Moisture, 3.60 per cent.; volatile, 41.50 per cent.; fixed carbon, 52.60 per cent.; ash, 2.30 per cent.; sulphur, 0.40 per cent.

The present development work is being confined to the Brown Bear seam, and it was on this 5-ft. seam that the most noteworthy development work was carried on by the former owners. The old development work consists of a 400-ft. rock tunnel cutting the seam at a vertical depth of 80 ft. From this intersection, 2000 ft. of entry has been driven and from this opening mining has produced about 50,000 tons of coal; this was removed prior to the taking over of the property by the Talbot interests in December, 1917.

As soon as the new management took control of a slope 500 ft. long with a parallel air course was sunk, and at that depth about 800 ft. of entries have been driven in the seam; the coal exposed on this entry and air course above with a 30-ft. chain pillar is to be worked by 100-ft. rooms with 100-ft. pillars between.

A modern headframe has been built and a hoist and skip installed, together with all neccessary surface improvements. At present the skip delivers 20 tons of coal per hour to the tipple, and as the underground development progresses this capacity will be rapidly increased. The coal brought to the surface is run over bars which grade it into lump, egg, nut and slack, all except the slack being delivered to a 350-ton bin. At the present time this coal is being disposed of to the ranch-

ers and others who come to the mine with wagons and haul the product away. About 7000 tons of coal was produced in 1918, all from development operations.

A main development tunnel, 9 x 7 ft. in the clear and to be 6000 ft. long when completed has now advanced several hundred feet; it is designed to intersect the whole series of coal seams at an average vertical depth of 500 ft. The portal of this tunnel is slightly lower than the present entry on the 5-ft. seam. When this seam is reached, entries will be driven and connection made with the present workings. This main tunnel is about one mile north of the present slope on Horseshoe Creek, and at this point a lower camp has been established which will be the terminal of the railway spur now under construction. When the improvements are completed the upper camp will be abandoned.

A modern tipple, capable of handling 1000 tons per day, will be built at the lower camp. A powerhouse (almost completed) contains a boiler, Atlas-Corliss engine, an alternating-current dynamo of 125-kw. capacity and a Laidlaw-Dunn-Gordon compressor; the latter for supplying air to the drills in the tunnel. There is also a ventilating fan.

A railway spur ten miles in length is under construction from the main line of the Teton Valley branch and will terminate at the tipple site. The grading on this spur has been completed to the mouth of Horseshoe Canyon, a distance of 17 miles, and track laid to this point. Bad weather has interrupted railroad construction along the canyon which, however, is not a serious problem; and it is confidently expected that the branch will be completed to the lower camp by early spring. Pending its completion, coal is being hauled on sleds from the 500-ft. slope operations to the temporary railway terminal over a good easy grade recently completed. It is expected that the daily output of the mine will soon be from 200 to 300 tons. After the cross-cut tunnel is in operation it is expected to increase this output to 600 tons per day.

There are 40 men employed of whom 15 are engaged in underground work. The underground force is to be increased as rapidly as conditions will warrant in order to get out the tonnage intended. During the past summer and autumn 30 new buildings have been constructed, which include family cabins, quarters for single men, boarding houses, store buildings and so on. A saw mill was installed to supply lumber for these buildings and most of the new buildings at the upper camp are so constructed as to be readily moved when the camp is abandoned.

The various coal seams have been tested out and the property thoroughly surveyed and proved by surface work in addition to its 500-ft. slope development. From the data obtained as a result of this work and the uniformity of the seams, for a distance of two miles along their strike, it is conservatively estimated that the coal available above the level of the long cross-cut tunnel now being driven will be in excess of 130,000,000 tons.

The future of this field is decidedly promising, chiefly on account of the geological location and the quality of the coal. Though close to the Wyoming border, high mountain ranges intervene and shut off communication and competition with this part of Idaho. It is one of the most extensively developed areas of the state, embracing as it does within 50 miles of the mine three large sugar factories using approximately 50,000 tons of coal per year and three other factories of similar capacity now in process of construction. The comparatively short railway haul from this field to the extensive Snake River valley settlements will afford a splendid local market for the output of this field; it is far shorter than from the nearest Utah or Wyoming coal mining operations, which are the only likely sources of competition. Coal famines, in this rich agricultural territory from now on, should be a thing of the past and a good market is assured for the output of these deposits, for a long time to come.

Illinois

By Martin Bolt

Assistant Director, Department of Mines and Minerals, Springfield, Ill.

DURING the year 1918 the coal mines of Illinois will probably produce a larger tonnage than ever has been produced in any year of coal mining in this state. There are a number of reasons why the production will be greater than last year, and I will give these reasons.



Martin Bolt

In the year 1917 there were in operation in Illinois 810 mines employing 80,893 men, who produced for the fiscal year ending June 30, 1917, 78,983,527 short tons of coal by working 179 days as an average.

The mines are divided into two classes, shipping and local. The shipping mines, working 215 days and employing 78,056 men, produced 77,412,054 tons. The local mines, working 154 days and employing 2837 men, produced 1,571,473 tons of coal.

On the other hand, in the year 1918 there were in operation 967 mines, employing 91,372 men, and these men produced for the fiscal year ending June 30, 1918, 89,979,469 tons. There was an increase in the number of mines in operation of 157, of which 47 were in the shipping class and 111 in the local class. The increase in the number of mines in operation does not necessarily mean that there are that many new mines; a great many are old mines reopened, and very probably when the present conditions no longer prevail they will be closed down.

The new mines that have been opened are of the large up-to-date kind, equipped with all the latest improved mining appliances. They will in nearly every instance be large producers of coal.

In addition to the increase in the number of mines in operation, the number of men employed has also increased to a large extent, notwithstanding the fact that a great many mine workers are in the service of the country overseas and have done their part toward winning the war.

The figures given below are for shipping mines only, and are nearly correct for the first ten months of the year 1918, with estimates for November and December.

The number of short tons produced was 89,325,962, and there were 88,200 employees, who worked an average of 245 days. These figures, together with the tonnage produced by the local mines, will bring the total above 90,000,000 tons; had the production of July been maintained for the entire year, the production, in round numbers, would have been above 112,000,000 tons.

In addition to the increased production the conditions of the mines of the state have been improved to a marked degree; the coal companies are taking a keen interest in matters of safety, which will surely bring a reduction in the number of mine accidents, because the mines will be made more safe.

The coal industry of Illinois did its bit during the time of the war, and it can be depended upon to do the very same thing in times of peace.

Indiana

By John Ogilvie

State Mine Inspector, Indianapolis, Ind.

COAL output in the state of Indiana during the fiscal year ending Sept. 30, 1918, broke all records for this state. There was some time lost on account of the shortage of railroad cars, which was the principal cause of throwing some mines idle more than they otherwise would have been. There were some days lost during the year on account of strikes, but these

were few. Owing to the large demand for coal in this country, the miners of Indiana stood loyally behind the Government, laid aside their petty grievances and kept at work while their differences were being adjusted. Some time was lost on account of incendiary fires occurring at several mines. All the surface plants at two mines were completely destroyed, and this threw these mines idle for about sixty days.

The production of coal for the fiscal year was 28,795,682 tons, including block and bituminous coal. This was divided as follows: Block coal, 551,184 tons; bituminous coal, 28,244,498 tons. The wages paid by the various coal companies was $39,776,916.19, making an average wage earned per employee of $1424.06 per year.

The total number of mines employing more than ten men in this state is 245, of which 51 are new operations sunk during the fiscal year. This is a large increase of new mines for this state, and everything points to a bigger production of coal in the future.

The American Coal Co. at Bicknell has the largest producing mine in this state, having produced 5900 tons in one day. This company has sunk another new mine, which is being equipped to hoist over 6000 tons per day.

More Days Worked This Year

The average number of days that the coal mines were in operation during the year was 254. This is an increase of thirty days over last year. There was a considerable shortage of men during the year, owing to a large number of the best miners joining the army.

The stripping plants and small mines, those employing less than ten men, do not come under the jurisdiction of the mining department, but the following is a summary of the production of these operations for the fiscal year.

Steam shovel mining has become an important factor in the coal-producing industry in this state. These operators maintain an organization known as the Coal Producers' Association, which has twenty-one members who produced approximately two million tons during the fiscal year ending Sept. 30, 1918. The stripping system is used where the overburden can be removed economically by steam shovels or drag lines. From 15 to 40 ft. of overburden is removed. Bucyrus shovels with 8-cu.yd. dippers and 90-ft. booms are used where stripping is heavy. Nos. 3, 4, 5 and 7 beds of bituminous coal and Brazil block coal are excavated by this method. Stripping plants are operated in ten counties in the state.

There are about 300 small mines in the state, and it is estimated that the production of these for the year was 2,500,000 tons. Most of this coal is consumed within the state. Taking the production from mines coming under the jurisdiction of the state mine inspector, stripping plants and small mines, the state had a total production for the year of 33,295,682 tons.

The general condition of the coal market will, in my opinion, continue to hold good for some time to come. The war being at an end will allow other industries to get back to their regular work of producing commodities for which there is a great shortage, owing to many factories being employed in the manufacture of war supplies.

There were 114 fatalities in and around the mines during the year. The number of tons produced per fatality was 292,067. These fatalities were from the following causes: Falls of coal, 3; falls of slate, 49; mine cars, 15; mine motors, 3; explosions of powder, 8; gas and gas explosions, 14; exploding shots, 3; mine cages, 3; falls into shaft, 3; other falls, 2; electricity, 6; railroad cars, 4; miscellaneous, 1.

The mining laws in this state are inadequate, and it is to be hoped that the coming Legislature will place on the statute books some laws that will state specifically the safeguards to be used to protect the workmen.

The movement for prevention of accidents and knowing how to protect oneself from the dangers met with in coal mines is finding favor with the miners and operators in this state. The Federal Bureau of Mines is installing a rescue car to be located at Terre Haute; also a mine rescue station at Vincennes, to be equipped with oxygen apparatus for fighting mine fires and explosions. This station will have a large motor truck, which can reach the scene of any disaster in that district in a very short time. Many first-aid and rescue teams will be organized in the mining districts, through the use of these two stations.

The Knox County coal companies have in operation a mine rescue station at Bicknell, which has two separate teams of men, who can be reached in a short time should they be required. This team has done good work all over the state in the past year in fighting mine fires, and it also helped at the mine explosion at Clay, Ky., where 62 men were killed by an explosion of gas.

The Industrial Board is using its best endeavors in assisting the Mining Department to carry out to a complete development the safety movement.

Iowa

By L. E. Stamm
Secretary, Iowa Mine Inspectors

COAL-MINING conditions in Iowa were good throughout almost all of the year 1918, better, in fact, taken as a whole, than for a number of years past. As a usual thing the Iowa mines work fairly well during the fall and winter months of the year. With the coming of spring the small local mines of the state shut down, to again reopen some time in August. The larger mines, and especially those having railroad connections, and supplying railroad coal, work through the summer, but not with as lively a business as in the winter, when commercial coal is shipped in addition to the railroad trade.

In 1918 the mining business was good during the months of January, February and a part of March; then there began to be a slump that may be traced to two conditions confronting the trade just at that time. The first was the warm weather prevailing in March, which caused a falling off in the commercial coal trade, and the second was that many of the contracts for coal for railroad use expired in March and the roads refused to enter into contracts paying the Government price for coal at the mouth of the mines.

The operators of the state refused to sell for less than the Government price. The result was that no contracts were made for some time, and many of the mines of the state were idle a part of March, all of April, and some of them until well along in May. Mines in other states were working, and this caused a large number of miners from this state to leave for other mining fields. It is estimated that between 1200 and 1500 miners left the southern Iowa fields for this reason.

Prices Higher Than Before

Iowa used to be one of the favored states, getting her coal at a low price by reason of having so many mines within her borders. During the war all this has been changed, until present coal prices are the highest in the history of the state. Beginning with the prices fixed at mine mouth by the Government in August, 1917, the price of coal has been advanced on several occasions. An advance was given to the miners and other mine workers by the Washington agreement, which became effective in this state on Nov. 1, 1917. The Government allowed this advance to be added onto the cost of coal at mine mouth, and later the fuel committee fixed the price of coal placed in the bins here in Des Moines at $5.65. A general freight rate advance became effective in June, 1918, but no advance in coal was made here until September following, when the fuel committee fixed the price for Des Moines, put in the consumer's cellar, at $6.15 per ton. This is almost double the price paid for the same kind and grade of coal three years ago.

The year 1917 was a banner year in the production of coal in this state. Previous to that time the highest production of the state had been but little over seven million tons of coal per year. In 1917 this was increased almost two million tons, the actual figures for 1917 being 9,049,806 tons produced, while 15,464 men were given employment in and around the mines of the state for that year. This increase in tonnage was made with but few more men employed than in former years, and was possible because the mines were able to keep going the most of the summer months.

Had the mines of the state been able to keep busy during the months of

March and April, 1918, I am sure that the production of coal during the past year would have compared favorably with the amount produced in the banner year 1917. Taking everything into consideration, however, I am inclined to think that the 1918 production will be slightly less than that of 1917. I believe the returns will show about the same number of men employed in the mines. The actual figures as to production, men, etc., will not be available until about Feb. 1, as statistical blanks are sent out from this office Jan. 1 and the operators are given 30 days under the law in which to file their reports.

Labor conditions were exceptionally good in and around the mines of the state in 1918, and but few suspensions of mine work were caused by strikes or disagreements. These were chiefly on account of differences as to the meaning and terms of the agreement between the miners and operators, as affecting some particular work done in the mine, or some action taken either by the miners or operators.

Hard to Predict Future of Coal Industry in State

As to the outlook for coal production in this state for 1919, so many things have entered into the production and distribution of Iowa coal the past few years that it would be hard to make a sensible prediction for the coming year. Of one thing we are assured, and that is that the mines of the state are in good condition for future production. Since the war is over and the Government has ceased to control the output and distribution of coal as in war times, fuel from other states may now come into this commonwealth, and this may have the effect of lessening the production of Iowa coal.

Of another thing we are assured by the operators themselves, and that is that since the Government has exercised control in a measure over the mines of the state, the operators have a much better system of cost accounting and know better now the cost of coal production. This will be of value to them in the future. The year 1918 has seen a number of new operations in the state, and all these new mines are being well equipped for future production. We can therefore hope much for the coal business in Iowa for the year 1919.

Michigan

By M. D. King
Chief Assistant, Department of Labor, Lansing, Mich.

THE output of coal from the mines of Michigan during the twelve months ending Nov. 30, 1918, amounted to 1,501,053 tons. This included 154,303 tons of pick-mined coal and 1,346,750 tons of machine-mined coal. The details of operation are shown in the accompanying table. (See top of the next column for table.)

SUMMARY OF MICHIGAN COAL MINING STATISTICS FOR 1918

Number of mines in operation during the year	21
Average number of men employed	2,137
Average number of hours worked per day	7.8
Average number of days worked per month	22.4
Average daily earnings of each employee	$5.45
Aggregate amount of wages paid	$3,113,028.83
Total number of kegs of powder used	16,403
Aggregate tonnage of pick-mined coal	154,303
Aggregate tonnage of machine-mined coal	1,346,750
Total number tons of coal mined	1,501,053
Aggregate cost of output	$5,022,151.96
Average cost of coal per ton	$3.35

Missouri

By George Hill
Chief Mine Inspector, Bevier, Mo.

THE year 1918 breaks all records in Missouri's history in the production of coal. The total output reached approximately 6,000,000 tons, which shows a gain of 500,000 tons over 1917. This tonnage was produced in 32 counties, Macon, Lafayette, Barton, Adair and Ray counties being the chief producers.

Missouri is unfortunate, in comparison with some adjoining states, as our largest coal beds do not exceed over 5 ft. in thickness, and sometimes our largest annual tonnage comes from the Lexington seam, which averages from 20 to 22 in. in thickness. The mines have worked full time and practically every mine is in operation.

The production was curtailed in some respects in many counties on account of the shortage of labor, as many of the miners have joined the colors. The operators and miners have worked in harmony this year, as there has been no labor disputes and both sides seemed to agree that it was their patriotic duty to produce coal.

The outlook for 1919 appears good, as numerous new mines will be in operation. With the return of the miners Missouri should produce more coal in 1919 than in any previous year of the coal-mining industry of the state.

Montana*

COAL production in the State of Montana for the year ended June 30, 1918, was the largest in the history of the state, in spite of some adverse influences which were experienced in the shape of a scarcity of labor and a shortage of cars. The increase was due to industrial activity, the demand being far in excess of the supply at all times.

During the year in question many new mines, mostly wagon operations, were opened, while some old ones temporarily abandoned were reopened and at present are producing coal.

The only labor trouble of any importance occurred at the mine of the Republican Coal Co. at Klein, in Musselshell County. At this mine the men were on strike for a period of about ten weeks. This reduced their output for the year by about 100,000 tons. With the exception of this strike, the year in question was free from labor troubles and as a general rule the relationship existing between the employer and the employee was pleasant, each striving to adhere to the conditions and obligations that all had assumed.

No great disaster, such as a mine explosion, occurred at any of the mines of the state. This avoidance of disaster has been due to the constant vigilance and care of the foremen, whose duties require them to oversee the welfare of the miners under their charge. There have been fatalities—too many of them—but just as long as coal mines are operated, injuries and fatalities will occur. All that can be done is to safeguard the workmen as far as it is humanly possible to do so. This has been done, and the Department of Mines is receiving the active coöperation of the management of the various mines throughout the state. Many operators not only coöperate, but also take the initiative, devising means for reducing injuries and fatalities. This is particularly true of some of the larger companies that are sparing no expense to bring about conditions of safety in their mines that are decidedly worthy of emulation.

Twenty-one fatal accidents occurred in the coal mines during the year from July 1, 1917, to June 30, 1918.

*Abstract from Annual Report of ex-State Mine Inspector John Sanderson.

SUMMARY OF COAL-MINE OPERATIONS OF MONTANA

Number of mines reporting to the Mines Department	88
Machine operators employed	228
Loaders	1,032
Miners	1,496
Inside daymen	1,151
Outside daymen	839
Total number of men employed in and about the mines	4,746
Total tonnage produced	4,515,414
Total number of lives lost	21
Tons produced per life lost	215,020
Number of men employed per fatal accident	226
Number killed per thousand men employed	4½
Number of kegs of powder used	101,913
Tons of coal mined by machine	1,961,743
Tons of coal mined by hand	2,553,671
Per cent. of coal mined by machine	43%
Per cent. of coal mined by hand	57%
Total value of mine output	$9,525,386

New Mexico

By W. W. Risdon
State Mine Inspector, Albuquerque, N. M.

A YEAR of unusual activity in coal mining was witnessed in New Mexico in 1918. No strikes or labor disturbances have occurred during the year. The demand for coal has been unlimited. The railroads have given the mines excellent service. There has been but little loss of time on account of a shortage of cars. The scale of wages paid to the mine workers has been the highest ever known. Yet notwithstanding these favorable conditions, the state has fallen behind the production for the year 1917. The decrease totaled fully a half million tons less than the mines are capable of producing.

The output for the year 1918 amounted to 4,037,726 short tons. Of this 47,050 tons were anthracite; 3,229,387 tons bituminous; 761,289 tons semi-bituminous. The value of the coal mined amounted to $9,876,361. In operating the mines 40,506 tons were used; 1,126,935 tons were shipped to the coke ovens, and 2,870,265 tons were sold. The coke ovens made 607,241 tons of coke, valued at $2,448,494.57.

The number of men and boys employed at the mines were: Miners, 3070; day men underground, 837; boys underground, 45; 876 day men and 45 boys were employed on top; 315 men were employed at the coke ovens. There were 1,209,401 tons of coal cut by machines and 2,828,325 tons pick-mined.

Making an analysis and comparison of the reports of the large companies for the years 1917 and 1918, and reducing them to a like basis, we find the average loss per man per day for the year 1918 is 0.83 ton. This—including only the three largest companies—amounts to over 300,000 tons. The companies have been short of men and have been compelled to hire everybody who came looking for work. The high scale of wages paid at the mines, together with the fact that coal miners were placed in a deferred class by the draft board, caused many men to seek work in the coal mines.



W. W. Risdon

Many of these men not only had no experience in the mines but were indolent as well. There were enough of these shiftless and inexperienced men, together with a few Austrians, who worked only enough to make expenses, to cut down the production and cause the loss hereinbefore mentioned. Daily records kept of the men who report for work in the mines show that for nine months there were from 25 to 35 per cent. of the men laying off every day.

In addition to large reinvestments of earnings into permanent equipment, thus making for efficiency, the large companies are devoting much time, attention and money to bettering the social and living conditions of their employees. During the year several hundred thousands of dollars have been spent in the mining towns in renovating, repairing and repainting the dwellings; in removing old shacks and replacing them with comfortable houses; inclosing the yard of each dwelling with a fence; in building coal-houses and providing garbage cans and making a general clean up of the camps.

The living conditions of the average mine worker in these towns is equal—if not superior—to the living conditions of the workingman in the large towns of the state, and far ahead of anything New Mexico has to offer in its country districts. No additional revenue will be derived by the companies for the improvements mentioned. Comfortable homes will lessen the desire to move about and will work for a more friendly feeling toward the employer. When men are contented they have a higher efficiency than when they are dissatisfied. The respect and confidence of its employees is the biggest dividend paying asset a company can have.

North Dakota

By W. H. Robinson
State Engineer, Bismarck, N. D.

THE estimated coal production of North Dakota for the calendar year 1918 is about 1,000,000 tons. This estimate is based on the assumption that the same increase over that of the previous year will be shown in 1918 as was attained in 1917. The forecast for the coming year is difficult and uncertain. It is considered doubtful if the production for 1919 will exceed that of 1918 to any great extent. This belief arises from the scarcity of labor and the high wages demanded by what miners are available. Much, will however, will depend upon how rapidly and in what numbers men are released from the army.

South Dakota

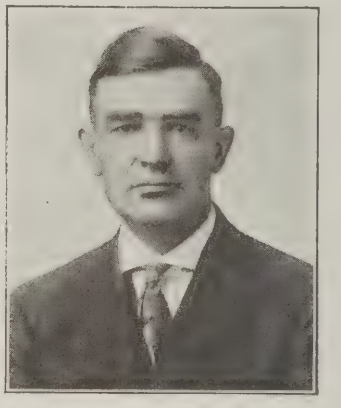
By Otto Ellerman
State Mine Inspector, Lead, So. Dak.

AS A coal-mining state South Dakota has, as yet, gained but little prominence, and for the year just ended the annual production was 10,100 short tons. The entire output was used in the immediate vicinity of the mines as a domestic fuel, no railroad shipments being recorded. The annual output shows a decrease over the previous year, the decline being due to a shortage of labor. With wages ranging from $4 to $6 per day, the operators experienced difficulty in obtaining satisfactory help and in some instances were forced to suspend work. With the return to normal times this barrier to the development of this natural resource will be removed and steady increases may be anticipated.

The mines, with the exception of those in Dewey County, are situated so far from railroad transportation as to make shipments to other localities impractical. This condition limits the output to an amount that can be used locally. Until railroads enter the area, no great progress will be made in coal mining. The coal is a lignite that disintegrates readily upon exposure to the air and would not withstand being transported any considerable distance. This, however, can be overcome by briquetting; tests have shown that this can be done with success and at a profit.

The field is a large one, and the estimate by the U. S. Geological Survey places the amount of minable coal in Harding and Perkins counties alone at over one billion tons. In addition to these counties, coal is found in commercial quantities in Meade and Dewey counties. Near Isabel and Firesteel, in Dewey County, the coal beds have an average thickness of 6 ft. and have been opened by entries several hundred feet in length.

To determine the extent of these deposits drilling has been done, and the figures obtained indicate over one million tons as available. The Lindt mine at Firesteel and the Robbins mine at Isabel have near railroad connections, the road being only two miles distant. In past years coal was hauled to the railroad and shipped, but during 1918 the scarcity of labor prevented this. The coal is clean and sells at the mine for $4 per ton.



Otto Ellerman

At the November election in this state, Amendment F to the State Constitution carried by a large majority. This authorizes the state to engage in the coal-mining business and for that purpose to acquire by purchase or appropriation all necessary lands, structures, easements, tracks, rights-of-way, equipment, cars, motive power, implements and materials. The amendment further provides that the state may pledge its credit to secure funds for this purpose. No expenditure of money, however, shall be made except upon a vote of two-thirds of the members of each branch of the Legislature.

To investigate the coal possibilities within the state, a commission was appointed and its report will be made to the next Legislature, which meets during the early part of 1919. The action of the Legislature in voting funds for the development and commercializing of the coal deposits will depend largely on the report of the commission.

The deposits are of sufficient size to warrant operations on a large scale, and with railroad connections and a briquetting plant, there is no good reason why South Dakota cannot be supplied with an economical fuel from its own fields. There were no accidents attributable to the coal-mining industry during the past year.

Ohio

By Jerome Watson

Chief Deputy and Safety Commissioner of Mines, Columbus, Ohio

THE coal industry in Ohio during the year that has just closed reached a magnitude never before attained. Ohio produced 41,677,986 tons of coal during the year 1917, and reports collected from the various coal-producing districts indicate that there will probably be an increase of 20 per cent. in production for the year 1918, bringing the tonnage to a figure something near 50,000,000 tons.

Lake shipments alone amounted to 29,388,242 tons from April until navigation closed Dec. 4. This represents cargoes amounting to 28,153,317 tons and 1,234,925 tons for fuel, shipped from the docks of Toledo, Sandusky, Huron, Lorain, Cleveland, Fairpoint, Ashtabula, Conneaut and Erie, and transported to these docks over the Baltimore & Ohio, Hocking Valley, Toledo & Ohio Central, Pennsylvania, Wabash & Lake Erie, New York Central and Delaware & Lackawanna railroads.

Unusual Demand for Fuel

The demand for fuel was unusual, and every effort was put forth to meet it. Of material aid in this respect was the fact that there was no such shortage of cars as was experienced during 1917. In the early part of 1918 such a shortage made itself felt pretty generally over the state. This was most acute in the Hocking Valley, and was the cause of the mines of that district averaging only about three days a week for the first three months. However, the evolving of the "zone system" greatly facilitated the supplying of cars, and during the summer and fall most of the districts had a car supply of from 80 to 100 per cent., while practically all districts reached a supply of 100 per cent. during the last two months, when the signing of the armistice closed many of the mines.

Another factor to consider when viewing the fact that the tonnage will probably not reach a figure so high as anticipated, is the shortage of labor due to many of the miners being of military service age. While many old mines that had been abandoned for years were reopened, and hundreds of small mines were opened up during this period of unusual activity in the coal business, it is estimated that there were no more men employed in 1918 than in 1917, if as many. In 1917 the mines averaged 51,286 employees. In spite of this the deputy mine inspectors of this state reported over 1600 mines operating during the last year.

The past year's record is indisputable evidence of the patriotism of the Ohio miners, for during the critical period through which we have just come, when the slogan was always "Produce More Coal," there were no labor troubles. True, the fixing of prices by the United States Fuel Administration left less cause for disagreement, but the customary petty disputes were noticeably absent.

The stripping operations of this state are coming to take an important place in the coal production. Figures for 1918 will show a marked increase over 1917, when more than 1¼ million tons were produced in this manner.

Ohio mines were singularly fortunate in having experienced no serious explosions or mine fires through the pressure of producing a high tonnage. While any accident causing a single death or injury is regrettable, the total number of such accidents reported for the year 1918 was in no way exceptional in proportion to the output, the total number of fatalities being 147. Of these, 91, or 62 per cent. of the entire number, were caused by falls of roof. Thirty of the total number of accidents occurred in Belmont County. There was quite an increase in the number of deaths due to this cause as compared with 1917, when 62, or 55 per cent. of the total number, were due to falls of roof—the total number of fatalities for 1917 being 112.

There was a decrease of four in the number of deaths due to mine cars, the total number being 17. There were eleven deaths from miscellaneous causes, an equal number having occurred from such causes in 1917. Six were the result of falls of coal, an increase of two; five were attributable to motors, an increase of three; six to explosives, an increase of one. The remainder of the fatalities occurred as follows: Three from railroad cars, two from gas, two from electricity, two from shots blowing through rib, one from a mining machine and one from a premature explosion.

Increase Shown in Output

All of the larger coal-producing counties showed increases in the number of fatalities. Belmont County reported the greatest number—43, as compared with 31 in 1917; Jefferson County showed 22, an increase of 4; Guernsey County which reported 15 fatalities in 1917, had an equal number in 1918; Athens County, 14, this being an increase of 2; Perry County, 14, an increase of 8, and Tuscarawas County, 10, an increase of 2.

Undoubtedly the closing of the year witnessed the final abandonment of a great number of the small mines, but if the present car situation continues, with the miners returning from military service, there is no apparent reason for a falling-off in the coal mining activity for the coming year.

Oklahoma

By Edward Boyle

State Coal Mine Inspector, Cumberland, Wyo.

THIS country's participation in the great conflict in Europe enabled the mines of Oklahoma during the year ending June 30, 1918, to work almost continuously. Assured of prosperity, operators made many substantial improvements on their properties. The miners also showed great loyalty toward the Government by overlooking many petty differences, and as a result the numerous shutdowns caused by local troubles, which prevailed before the war, were almost entirely done away with. The production of coal was thus greatly increased.

But a peculiar condition exists in Oklahoma, one that does not exist in the old coal-mining states and one that has retarded the mining industry to a great extent. The coal area being largely on Indian lands was segregated by the Government and has been leased to the operators of the state through the Secretary of the Interior on a royalty basis. Several years ago the Secretary of the Interior decided that it was unwise to make any more leases, and as a result there are thousands of acres of coal in the State of Oklahoma as yet undeveloped. Congress, however, eventually provided for the sale of coal and asphalt Indian lands, and many tracts have been sold recently while the rest is subject to sale at any time.



Edward Boyle

This is going to bring about the rapid development of the coal fields of Oklahoma, and will be the means of this state forging to the front and coming to be one of the foremost among the states of the Union in the production of fuel. There is a vast area of the state underlaid with a good grade of bituminous coal.

The mines of this state, generally speaking, generate large quantities of gas and a dust of a highly combustible nature. This requires strict legal regulation and supervision by the Mining Department in order to safeguard the lives of the miners. I think that under the conditions of the past year and the greater carelessness arising from the rush of business, accidents both fatal and nonfatal are naturally to be ex-

pected Under these conditions the public and the Mining Department should feel fortunate that under the existing circumstances, the state was able to mine 4,489,064 tons of coal with a total of fatal accidents numbering only 33. Concerning these fatalities, the reports show that seven men were killed by falling rock, five by runaway trips, one fell down a slope, six were killed by dust explosions and five were burned by gas. The other fatalities were caused by accidents of a minor nature, such as windy shots, etc.

The chief inspector does not desire to take unto himself all the credit for this enviable record. The coal operators are entitled to share in it because of the way they have coöperated with the department in this work; the district inspectors also were largely instrumental for the successful way the industry has been conducted during the year.

The tonnage produced in the year ending June 30, 1918, and the different grades of coal made are as follows:

Lump	633,688
Nut	180,035
Pea and slack	468,841
Run of mine	3,206,500
Total	4,489,064

The gains in the different grades of coal over the year ending June 30, 1917, are as follows:

Lump	84,911
Nut	48,319
Pea and slack	14,702
Run of mine	479,435
Total	627,367

Pennsylvania

By Frank Hall
Deputy Chief, Department of Mines, Harrisburg, Penn.

ACCORDING to most careful estimates, the production of coal in Pennsylvania in 1918 will reach about 272,373,714 net tons, of which 99,514,334 net tons were anthracite and 172,859,380 net tons bituminous. The coke production will probably be 24,000,000 net tons. The number of employees in the anthracite region was 147,868 and in the bituminous region 172,600.

The number of fatalities during the year was 1009, of which 541 occurred in the anthracite mines and 468 in the bituminous mines. In 1917 the production was 271,519,710 tons and the number of fatal accidents 1075. The record of the past year both as to production and accidents is one to be proud of, and this is particularly true regarding the fatalities. The usual dangers that meet the mine workers from day to day were increased by the number of unskilled men employed and by the frantic haste to produce coal, with the consequent carelessness on the part of the miners.

The Federal regulation of mining operations and of practically all the other branches of the coal industry has not, although a most radical innovation, proved an unmixed evil. Indeed the violent protests at first heard when the Government made known its intention to control and supervise the trade to a certain extent have been superseded in some quarters by expressions of positive approval. Perhaps the experience of the past two or three years may demonstrate the wisdom of closer relations between the Government and the business interests.

One of the results of the war, so it is predicted, will be a closer union between labor and capital. There seems to be a trend toward mutualism, but just what the outcome ultimately will be no one can tell. War is a leveler of all distinctions, at least temporarily, and it is probable that employers and employees having reached, amid the hardships of war, a juster and fairer view of their relations to one another,



Seward E. Button
Chief, Pennsylvania Department of Mines

may in the future work together with less of the antagonism that in the past has militated against competency, efficiency and social harmony. The great fact should be more generally apprehended that their interests are identical.

Profits from investment for the employer and compensation for service for the employee are still fundamentally necessary in the coal trade, as in other fields of endeavor. Beyond this, however, there should be consideration for the needs of the community. A fair profit to the operator, a fair wage to the employee, a fair price to the consumer (all of which is possible), and the coal mining industry would be conducted to a much greater degree than ever before in conformity with the Golden Rule—the rule that must sooner or later be the guiding principle in all business transactions.

The year just past has been one of particular stress in all branches of business, and the coal industry has been no exception. The war made an imperative demand for a maximum production of fuel, but at the same time depleted to a great extent the number of mine employees. However, notwithstanding the almost insurmountable difficulties encountered, the operators and employees both bent their energies to the fulfilment of the great task laid out for them, and the result attained in the way of production stands as a testimony to their loyal, patriotic, untiring efforts.

In addition to the shortage of labor the uncertainty of car supply was a potent factor in keeping down production. The epidemic of influenza also interfered greatly with output. But these difficulties will be helpful in causing greater activity at the mines in the future.

It is gratifying to know that the general readjustment from war to peace conditions is being made with much less friction and disturbance than was expected. In fact, few operations have closed down and few of the working forces have been reduced. Working overtime, an abnormal phase that has characterized the industry during the year, has been eliminated, and operations may now be expected to proceed with the usual celerity.

The cancellation of war contracts lessened to some degree the need of coal for many of the industries directly concerned in war work, but the delayed work of many manufacturing

PRODUCTION OF ANTHRACITE COAL IN PENNSYLVANIA IN 1918, FATAL ACCIDENTS AND COAL CONSUMED AT MINES

District	Production, Gross Tons	Employees	Fatal Accidents	Coal Consumed at Mines Net Tons
1	3,307,766	5,963	16	263,150
2	3,149,169	6,171	15	305,476
3	3,371,694	5,616	18	373,110
4	2,281,578	5,173	20	235,202
5	3,586,370	6,222	30	198,098
6	3,655,069	5,945	19	288,708
7	2,783,122	5,629	17	157,941
8	4,763,319	8,280	24	472,000
9	3,026,478	5,308	29	337,996
10	2,951,304	5,614	27	258,583
11	3,987,060	6,027	14	351,106
12	3,736,225	7,615	20	300,000
13	4,233,082	6,741	34	383,404
14	4,297,738	7,032	37	342,431
15	4,649,249	6,125	22	484,878
16	3,178,866	4,383	22	310,144
17	4,690,427	5,928	24	361,840
18	4,002,996	5,681	16	415,350
19	2,603,500	4,798	16	418,500
20	3,415,531	5,770	16	459,339
21	4,351,914	6,744	24	475,000
22	4,668,606	6,582	24	646,823
23	2,825,052	5,297	25	407,769
24	2,885,969	4,924	15	314,749
25	2,450,000	4,300	17	500,000
Totals	88,852,084	147,868	541	9,061,591

PRODUCTION OF BITUMINOUS COAL AND COKE IN PENNSYLVANIA IN 1918, FATAL ACCIDENTS AND COAL CONSUMED AT MINES

District	Production, Net Tons	Employees	Coke Production, Net Tons	Fatal Accidents	Coal Consumed at Mines, Net Tons
1	5,876,816	6,500	586,336	16	72,000
2	6,155,882	5,776	1,914,580	14	145,266
3	3,920,000	5,390	.....	11	145,000
4	4,360,139	5,121	131,715	12	151,426
5	6,850,000	6,750	3,285,000	20	150,000
6	5,252,559	4,572	1,115,352	14	87,310
7	5,350,000	4,890	.....	21	100,240
8	4,899,000	6,120	.....	6	54,000
9	6,650,000	6,710	2,663,500	12	180,000
10	4,073,456	4,934	10,000	8	93,000
11	7,682,015	6,710	2,676,819	11	185,445
12	5,500,000	5,100	455,299	20	200,000
13	3,750,000	3,250	.....	8	40,000
14	4,500,000	4,300	.....	16	100,000
15	5,512,500	6,889	26,000	10	86,000
16	9,200,000	8,300	4,600,000	34	200,000
17	5,338,948	5,666	.....	15	9,611
18	5,250,000	7,525	150,000	18	220,000
19	6,750,000	5,460	26,500	20	200,000
20	4,830,000	5,425	.....	16	100,000
21	7,030,683	6,590	198,750	23	278,440
22	4,472,421	3,540	92,705	9	133,342
23	7,400,000	6,900	2,500,000	18	170,000
24	5,908,464	5,960	.....	13	80,406
25	5,517,500	5,396	.....	15	90,500
26	5,473,300	4,880	.....	25	65,680
27	5,850,000	5,000	2,245,000	13	72,000
28	5,694,697	5,500	22,000	9	240,000
29	6,911,000	5,796	.....	23	120,000
30	6,900,000	7,650	395,000	18	140,000
Total	172,859,380	172,600	23,094,556	468	3,909,666

concerns that was put aside to make way for manufacture for the Government will create for a considerable time, perhaps for several years, a heavy demand for coal.

There is, however, a difference of opinion as to the immediate future of the trade. Some of the state inspectors and some of the operators look for a continuance of the present heavy output, while others are of the opinion that our home industries, no matter how active they may be, cannot absorb the tonnage that has been consumed under war conditions. It remains a fact, however, that the many industries that were practically eliminated during the past two or three years, in so far as nonwar materials were concerned, will resume their usual line of manufacture with a greater energy and force than ever before. This will certainly mean a demand for fuel.

Unquestionably the labor situation is one of great concern. There may be a shortage of labor owing to the fact that the miners now in the service of the army and navy will probably not be released for months to come. And if the foreign countries should find it desirable to keep their citizens at home, and therefore stop migration to this country, the greatest source of labor will have been eliminated. In some parts of the mining region many of the men are anxious to return to their native lands to see the destruction that has been wrought by the contending armies, and to get a first hand acquaintance with the new conditions thay are led to expect will exist. Many of these men may never return to this country. It may be that the number of immigrants for some time to come may not exceed the number in 1917 and 1918. In the former year this was 295,403, and in the latter, 110,618. These figures present a marked contrast to those of five years earlier, when the number was 1,218,480.

Another element of uncertainty is the wage question. At present the miners are receiving high wages. Any reduction in their compensation before the necessities of life have been reduced might cause serious dissatisfaction and bring about an unsettled condition of labor that would be decidedly detrimental to coal production.

Texas

By Bruce Gentry
State Inspector of Mines, Rockdale, Texas

THE production of coal in Texas during the year 1918 differs little from the records of previous years, being about 1,500,000 tons of bituminous and 1,300,000 tons of lignite coal. The number of bituminous mines in operation was 18, and of lignite 38. One new bituminous mine was opened and two were abandoned; ten new lignite mines were opened and five abandoned.

Progress of development of the bituminous fields is very slow, and the present outlook is that few new mines will be developed in the near future. One of the largest producing companies operating in the northern part of the state has developed a large oil field adjacent to its coal lands. Naturally the production of oil is more lucrative than that of coal, and this condition does not tend to boost the coal industry in this section.

The lignite industry is progressing rapidly and the outlook is that many new mines will be developed during the coming year. One of two strip-pit mines are being contemplated, these to be located near Rockdale in Milam County. There is here considerable territory where the overburden is shallow.

Some of the larger power companies are making investigations and studies of different points along the lignite formation with a view toward locating a large central plant for distributing power over transmission lines to different parts of the state.

The fuel shortage which has made it impossible to secure bituminous and anthracite coal in some parts of the state has led to the use of lignite as a domestic fuel, and the results have been satisfactory, as people have found that the lignite is a good fuel for domestic use. This introduction to the use of lignite is doubtless a good thing for the people, as the principal fuel deposits of Texas are of these coals and it will be necessary to look more each year to lignite as a fuel for all purposes.

The operators and miners have coöperated with the Government in increasing production and in delivering cleaner coal as requested for war needs.

Texas has been practically free from strikes during 1918. There has, however, been considerable labor shortage in both the bituminous and lignite fields. Some mines have suffered from car shortage.

The mines of the state have continued their good record for a small number of fatal or serious accidents. Better methods of mining are being adopted at some of the mines, but at many there is room for improvement. The outlook is that all mines will be active during the coming year.

Utah

By A. C. Watts
Salt Lake City, Utah

UNLIKE 1917, the year 1918 has had few unusual or exciting incidents which influenced the coal industry in Utah. With the beginning of 1918, the excitement attending the entrance of this country into the world war had given place to a grim and steadfast purpose to do everything possible to help win the conflict, and our miners had settled down to work in earnest.

The mild fall and early part of the winter of 1917 had permitted a steady flow of coal and coke to the markets, and when on Jan. 8, 1918, winter began in earnest with heavy snowfalls, the domestic consumer, heedful of repeated warnings, had a goodly supply of coal on hand, and the retailer had coal in his yard. But, having ever before him the tales of severe shortage and suffering in the East, which was bound in an arctic grip, our local fuel administrator gave orders for heatless nights which resulted in many good people going to bed early with their socks on and the relinquishment by many of their cheerful grate fires. The attention of office men was also called to the wasteful habit of having windows open in the office to lower the temperature instead of shutting off the steam. Unfortunately, that was the only way the poor clerk had to get fresh air.

As a reward for our sacrifices, coal came from the mines in an uninterrupted stream, and in three weeks the fuel administrator rescinded his heat-

less night order and coal dealers beban to solicit business. By the middle of February the mines were running only two-thirds time. With the return of spring, the fuel administrator began urging the consumer to start storing for the coming winter, without at first meeting with much response. To the coal operator, it was important that the market be maintained so that the mines could be kept working full time, for in the spring quite a large proportion of the miners become restless and with high wages all over the country they were not content to remain idle part time and have their earnings reduced.

Mindful, however, of the past and apprehensive of the future, the domestic consumer and many industries began early in the summer to store coal, all except certain railroads. More care and intelligence has been exercised in storing large quantities of coal because of dearly bought experience in the past. When fall set in, and this year winter started early in November, almost everyone who could had from 50 to 100 per cent. of his season's coal stored in the bins, and dealers had a good supply on hand. Such universal storing was done that in October the mines commenced to have idle days and there were many cars of unbilled coal on hand.

Now that the war has ceased and the tremendous demands of war industries for fuel have been curtailed and even stopped, there seems no reason why there should not be an ample supply of coal for all normal demands in the intermountain region. Up to January, 1918, there had not been a time for 16 consecutive months when the established operators were caught up with their orders. The situation at the end of this year is much different, and the operators are now looking for new business.

No Disasters During the Year

Fortunately there were no disasters in the mines of the state during the past year. In one important mine the coal in an old part of the workings took fire by spontaneous combustion, and although strenuous efforts were made to load it out, it finally became necessary to seal off that portion of the mine. The area affected was near a district in which in times past the coal had been burned out, and there was considerable residual heat remaining in the strata. Earlier operators of the property had not left sufficient pillars in their advancing work and had not pulled these pillars in a systematic way. The result was a considerable sloughing of the pillars remaining, which caused the broken coal to pile up around their bases to a depth of several feet. With temperatures of upward of 150 deg. F., spontaneous combustion occurred.

The method of allotting railroad cars during 1918 has been the same as followed during the previous year—it is called the idle hour method and was described in the columns of *Coal Age* last January. The car supply throughout the year has been exceptionally good—much better than in 1917.

For the fiscal year ending Nov. 30, the production of coal for the state was 5,175,813 tons, as against 4,036,069 tons for the fiscal year ending Nov. 30, 1917, or an increase of 28 per cent. Apparently the increase is due to approximately a 20 per cent. growth in production of the older mines and 8 per cent. due to new mines and small operations. No new properties of any consequence were opened during the year.

Exact figures for the first ten months of the calendar year and approximate and estimated figures for November and December show that the total production for the calendar year 1918 amounts to about 5,302,070 tons. This includes 756,460 tons made into coke.

Hard to Keep Forces Intact

It has meant strenuous effort on the part of the operators to maintain an adequate force of men in the mines. In the main coal producing districts of the state, those of Carbon County, the coal miners constitute the greater part of the population. The War Department gave no deferred classification on the grounds of industry, and, as stated before, patriotism ran high in the camps. Because of the young men being drafted or enlisting, specialized work such as driving, machine running, mechanical and electrical work suffered. Construction work was extremely difficult to prosecute efficiently, as many skilled mechanics had left for the cantonments, shipyards and other direct war work. From one company employing about 2200 men, 182 entered the service of the United States.

However, a study of the average number of men working for this company shows that it managed to maintain a larger force than in 1917. This was largely due to efforts made to secure men, but the high wages paid, good living and working conditions and prospects for steady work undoubtedly exerted a great influence. The same conditions should hold true for the whole district.

The turnover for this same company was about 100 per cent. as against 107 per cent. during the previous year. A large turnover of course affects the efficiency of an organization besides being directly the source of great expense.

The curves of average production per miner and per man employed in and around the mines shows a decrease from last year, and its steadily declining curve for this year. This is undoubtedly due to the large turnover for both years, but it may also arise from the increased wages the men earned.

The prospects for 1919 are not very clear. The mines of the state can easily supply all demands and with steady work overproduction instead of a shortage is to be feared. New properties opened in Wyoming and Idaho will increase competition which, if pushed to the limits reached in past years, will mean hard sledding to the weaker organizations.

Virginia

THE estimated production of coal in the State of Virginia for the calendar year 1918 was 10,100,000 tons. The total number of mines in operation—drift, slope and shaft—was about 313. The total number of fatal accidents occurring in the mines during the fiscal year ending Aug. 31, 1918, was 41. These arose from the following causes: Falls of roof, coal slate, rock, etc., 23; falls of top coal, 2; mine cars and locomotives, 8; suffocation from gas, 1; explosives, 3; electricity (shock and burns), 2; other causes, 2. The total number of all accidents, fatal and otherwise, entailing the loss of two weeks' time or less was 887. Permanent disabilities numbered 7, while the number of men hurt but losing less than two weeks' time amounted to 546.

Washington

By James Bagley
State Mine Inspector, Seattle, Wash.

DURING the first ten months of the year 1918 the coal mines of the State of Washington produced 3,488,008 short tons. This, with the estimated tonnage for November and December, will make the output for the state about 4,200,000 net tons for the calendar year 1918. This is the largest output this state has yet had and is an increase of about 200,000 tons over 1917.

The largest production was recorded in the month of August, when there was 137,343 days of labor performed, an average of 5430 men working 25.3 days and producing 379,965 tons for the month.

It is estimated that 95,000 tons of coke was produced at the mines in 1918, or about the same amount as in the previous year. This does not include the coke produced at the plant of the Seattle Lighting Co., located at Seattle, Wash. Fifty-seven mines and openings of all kinds operated during the year, with an average of about 5800 men employed, this being an increase of 500 employees over the previous year. They worked an average of 270 days.

While the production during the past year was the largest the state has had, it could have been increased if the market demanded it. A shortage of labor reduced the output at some of the mines during the summer, due to the large number of men drafted into the army and to many of the mine employees securing employment at the shipyards on Puget Sound. In the closing months of the year no labor shortage was reported.

The mines of the state are operated under agreement with the United Mine Workers of America. No serious labor trouble occurred during the year, the operators and their employees both working together for larger production.

The number of fatal accidents was large because of an explosion at the Burnett mine on Aug. 28 in which twelve persons were killed. The mine was worked with approved safety lamps and the explosion was thought to have occurred when one of the firebosses ignited a shot when gas was present. Thirty-three fatal accidents occurred to Dec. 21. These were due to the following causes: Falls of roof, 12; mine cars and locomotives, 3; gas explosions, 1; coal dust explosions, including gas and dust combined, 12; electricity, 1; suffocation in chutes, 1; falling down chute, 1; surface, 2.

Many improvements have been made in and around the mines during the past year tending toward the safety and comfort of the employees. All mines that generate explosive gas, in any quantity, have been placed on approved safety lamps. Mine rescue equipment has been placed at all mines where over twenty men are employed. Wash and changehouses, for the accommodation of the employees, have been built at all mines where a majority of the men have petitioned for them. New cottages and up-to-date hotels have been built at several of the mines for the accommodation of the employees, and on the whole the living conditions improved over former years.

COMPARATIVE TONNAGES, BY COUNTIES, FOR 1917 AND 1918—LAST TWO MONTHS ESTIMATED

County	1917	1918
King	1,314,366	1,347,300
Kittitas	1,741,237	1,776,500
Lewis	130,578	179,600
Pierce	606,449	618,500
Skagit	1,000	6,400
Thurston	204,688	267,500
Whatcom	4,841	4,200
Totals for state	4,002,759	4,200,000

C. J. Smith has opened a new mine at Ravensdale on the Northern Pacific Ry. A new preparation plant is under construction. Two beds that underlie those formerly worked at Ravensdale have been opened, and prospecting is being done on other measures that may be opened later. A new mine is under development at Bellingham known as the Bellingham Coal Mines, under the management of John C. Eden and Michael Earles. The seam of coal on which this mine is opened is classed as a good grade of subbituminous and was worked in the early history of the state, and coal shipped therefrom was sold in the San Francisco market. The old mine was abandoned about 35 years ago. Part of the output of this mine will be used at the plant of the Superior Portland Cement Co., at Concrete, of which Mr. Eden is president.

Contracts have been let and work started in sinking a shaft 300 ft. to a newly discovered 12-ft. bed of coal on the property of the Wenatchee Orchard Land Co. in Moses Coulee, near Wenatchee, Wash. The coal is classed as sub-bituminous and is thought to be about the same in quality as that mined in Lewis and Thurston counties. If development proves this field to be as extensive as it now promises, it will mean cheaper fuel for that part of central Washington, as coal is now shipped from King and Pierce counties to supply that market.

The problem that confronts the Washington coal operators in competing for business with surrounding districts and fuel oil is to find a market for the smaller grades of coal produced at the mines. In some of the districts, especially King and Pierce counties, where the coal is mined on the heavy pitches, the proportion of slack and pea, in some cases, runs as high as 50 per cent of the output, causing the market to be supplied with a surplus of these grades of coal.

The Pacific Coal Co., the largest producer of commercial coal in the state, some years ago installed a briquet plant near its mines which produces a briquet from this coal that is widely used on the commercial market. During the past few years it has carried on experiments to develop the use of powdered coal. During the last year it has spent considerable money in creating a market for the powdered coal, and during the last year some of the largest office buildings in the city of Seattle have changed from fuel oil to powdered coal, claiming it was cheaper than fuel oil at the present price and eliminating, to some extent, the smoke nuisance attendant upon coal and oil as ordinarily used.

No shortage of coal has existed during the past year in this state. During the last two months of the year there was a falling off in the demand for domestic fuel, due to the mild weather and the fact that the domestic consumer had stored his fuel during the summer and fall months as advised by the state fuel administrator.

West Virginia

SPECIAL CORRESPONDENCE

THE only figures obtainable on coal production for 1918 in West Virginia are those covering the fiscal year ending June 30, 1918. These reveal a material increase over the preceding fiscal year, and it is probable that were figures available for the calendar year of 1918 still further increases would be shown unless the sudden softening of the coal market following the signing of the armistice terms caused a slump in operations sufficient to offset gains made throughout the rest of the year.

The total production of coal in West Virginia during the period between July 1, 1917, and July 1, 1918, was 80,674,913 gross tons, which reduced to net tons gave the state a total production of 90,355,903 tons. This was an increase over the previous fiscal year of 868,261 gross tons, or 972,447 net tons. This large tonnage was produced by 71,075 inside employees and 18,272 outside employees, but only 710 more inside employees and 2542 outside men were used in the latter year to bring about the increase given.

There were 667 companies with 1203 mines in operation during the fiscal year ending June 30, 1917. This number was increased to 793 companies with 1359 mines during the year ending June 30, 1918—an increase of 126 companies and 156 mines. Despite the fact that a less number of men were engaged in the manufacture of coke during the 1918 fiscal year than was the case during the previous year—the figures being 2518 as against 2570—yet there was an increase in the coke manufactured, the figures being 3,122,722 tons as against 2,533,314 tons or an increase of 589,408 tons.

During the year the County of Summers began to produce coal for the first time. The county producing the largest tonnage during the fiscal year ending June 30, 1918, was McDowell, with a total production of 17,806,400 gross tons. Logan ranked next with 9,230,078 and Fayette next with 8,828,080 gross tons. The county producing the smallest amount of coal was Summers, with only 5338 tons.

It is estimated by the State Department of Mines that there were between 250 and 300 wagon mines in existence at the end of the fiscal year, many of which have ceased to operate since the signing of the armistice.

The mining industry labored under many handicaps at the beginning of the 1918 calendar year. Chief among these were inadequate transportation facilities and a totally inadequate car supply. With the advent of spring, however, the car supply improved, but floods interrupted operations. When the old system of car distribution was abolished and the mines were given an adequate car supply, production shot upward although affected by the drafting of men for the army, reaching a peak the latter part of July. The mines also gave promise of eclipsing their previous performance in October, when the influenza epidemic spread throughout the state, seriously affecting production. About the time the industry was beginning to recover from the influenza epidemic, hostilities ceased, and following a slum in the market, production dropped materially, reaching its lowest point during Christmas week.

While the coal trade is unusually quiet insofar as West Virginia is concerned, nevertheless coal men of this state look forward with optimism to the year 1919

On a rough guess it is estimated that the production for the calendar year of 1918 will exceed production for the fiscal year by 10 per cent., or that the total amount of coal mined in West Virginia up until Jan. 1 was about 100,000,000 tons. At least this is the opinion of the Department of Mines.

Northern West Virginia

By H. A. Williamson
Fairmont, W. Va.

COAL affairs in northern West Virginia are so involved one within another that it is an almost hopeless task to attempt to line them up. Government interest and control, or partial control, if not the most important feature of the year just past, is at least the one attracting most attention at the moment.

Some operators may not be quite satisfied with the coal prices fixed by the Government, yet it is evident that these prices have not in any way curtailed production. Just what will happen when this control is removed is, at this time, an important question; numerous opinions have been advanced, but in reality it looks much as if the operators, as a whole, are considerably more nervous about the removal of the price restriction than they were over its original application.

Pooling Meets with Approval

In a general way the same thing is true of the Tidewater Coal Exchange. Numerous operators were extremely pessimistic as to the pooling arrangement, but now a number of them are wondering what is going to happen when the system is abandoned.

In one direction at least the fixed price and pooling have helped the consumer. The snowbird, or wagon-loading, mines have not been so active this year. It cannot be denied that on the average the price of snowbird coal has been high, as that was the incentive for such operations; likewise it is undisputable that they require a longer time for loading cars than do tipple mines, hence if these cars are given to mines of the latter type they go out anywhere from 5 to 15 hours sooner than if the snowbird loaded them.

After all that has been written and said, the following seems a mere rehash, yet it is impossible to discuss events of this region for the year without bringing up again a condition which may now be justly stated to have become "chronic." In spite of statements at various times from the Federal management the car shortage here has been severe. It is possible that the average percentage of cars furnished has been somewhat higher than last year, but actually the long continued shortage has affected the situation in other ways than through a simple lack of cars. During the year 1917 and well into 1918 many of the larger companies carried extra equipment and continued work on various projects to increase tonnage. With the continued car shortage this equipment and work were gradually curtailed until at this time it is probable that there could not be a large increase in tonnage turned out other than what could be got by working six days a week with present equipment and labor. The longer this car shortage continues the more serious this condition will become, as there is, of course, a decided tendency for equipment and labor to shrink to a point where all factors balance. There is, for example, no incentive for the operator to repair the damaged mine cars on his car shop siding so long as he has more than enough in operation to take care of his output.

Due exclusively to shortage of railroad cars the labor actually available in the region had, up to the first of October, lost on an average two days' work from each week throughout the entire year. If we accept the figures as shown weekly by the U. S. Geological Survey, we find that almost without exception the car shortage has been more severe in northern West Virginia than in any other coal region. The Survey, in addition to showing time lost on account of car shortage, also shows percentage of time lost on account of what is termed "Labor Shortage," "Strikes," "Mine Disability," "All Other Causes" and "No Cause Given." The mere fact that other regions had more cars and were therefore able to work more days per week, would lead to the conclusion that the shortages due to these other headings listed by the Survey would be greater in northern West Virginia than in other regions; yet directly the opposite is the case. In many instances the percentage of shortage for the region due to these other causes is as low or lower than any other district, and almost without exception such percentages are far below the average for all regions. All this would certainly tend to show that both miners and operators must have made concentrated and well directed efforts to get out coal, and that had cars been available there would have been an increase in tonnage of at least 30 per cent. over what was mined for the year.

New Developments Under Way

Tonnage figures for northern West Virginia have always been difficult to obtain in any reasonable time. It appears now that the coal tonnage will be slightly less for 1918 than the production of 1917, while the coke production will be about the same or slightly more. About 20 new mines were opened, including a number on the Monongahela R.R., and one or two having arrangements for loading river coal. Work has been steadily continued on the new mines of the Consolidation Coal Co. at Wyatt, W. Va. There are three of these mines, at present loading coal over temporary tipples, with a steel tipple under construction to take care of the entire output, which is to be 4000 tons per day. It will be a relatively short time until this steel tipple is in operation. Construction work is being carried on at several other operations of smaller capacity, but owing to the car situation already outlined these new mines have had little or no effect on the total tonnage produced.

Based on normal production it can be said that there is a labor shortage; based on the car supply, however, it can be replied that the labor shortage has had no appreciable effect on tonnage.

The Lake trade, which has always been one of the mainstays of this region, suffered probably more than any other one branch of the business; 1917 saw this trade badly crippled, due to lack of cars and other items, but the shipments in 1918 will not be over 65 per cent. of those of 1917 and possibly not that much. This is due not only to lack of cars but also to Government instructions and orders applying fuel elsewhere under the zoning system. This is probably the only bad effect the zoning system has had on this region

Many Sales of Land Recorded

Numerous transfers of coal properties have been recorded during the year, and there has, as always, been ready purchasers for anything offered. Owners, however, have great faith in their holdings and transfers of large areas are rare—during the present year 200 acres being the largest one noted. There are purchasers for Sewickley coal and some small amounts of the Redstone Seam, while at points where they are available one or two beds below the Pittsburgh Seam are opened. The Redstone Seam is about 60 ft. above the Pittsburgh Seam, and the Sewickley about 60 ft. above the Redstone, while below the Pittsburgh about 635 and 705 ft. respectively the Upper and Lower Freeport occur. All these beds have received some attention and show at points conditions more or less favorable for operation, but from various causes such as poor quality, disturbances due to removal of Pittsburgh Seam, variations in thickness and limited area of workable coal there is a strong tendency on the part of experienced operators not to attempt their operation. The normal price of Pittsburgh Seam lands, with full mining rights, seems to be in the neighborhood of $500 per acre at this time.

A particularly gratifying feature of the past year has been the steady growth of safety work. It might appear that this phase of mining was somewhat overworked, yet when it is considered that nearly all mines worked shorthanded and with many inexperienced men, an increase in accidents should have been expected. This was, however, not the case, and unless something happens in the last few days of December, when the accident list for the year is compiled, it will be found well under the record for 1917. The compensation paid for accidents is a fair index of their extent and nature, and this figure will be in the neighborhood of 40 per cent. under that of last year.

For the future, miners and operators appear to feel that while it is quite possible, and more or less to be expected, that the removal of price restrictions and pooling arrangements will upset affairs for a time, the car

situation is bound to be bettered eventually and the available labor will increase with the letting up on Government contract work and other war activities—while sooner or later immigration, which has always been a large source of supply for coal-mine labor, will resume.

What will probably prove a most important event as affects the future, although it may not appear so at this time, is the entrance of the labor union into a field hitherto almost entirely nonunion. Labor had previously resisted attempts at unionizing and the operators had not been in favor of it. In a general way it appears to have been the opinion of all concerned that it was desirable, if not absolutely necessary, as a "war measure," and was carried out on this basis. The relationship between miner and operator has been most excellent in this region, and it is confidently expected that this will continue.

Many Byproducts Plants Building

Operations looking to future business appear on every hand. The Monongahela Valley Traction Co. is working steadily on a new electric power plant located at Rivesville, W. Va., which, with the plants and substations already operated by that company, will supply ample electric power to the various industries of the Monongahela Basin all the way from Morgantown to Clarksburg. The Domestic Coke Corporation, of Cleveland, is working steadily on the 60-oven byproduct plant located at Fairmont; these ovens are being erected under contract by the Koppers corporation. The Lymn byproducts producers of the Monongahela Valley Traction Co., also at Fairmont, are just about to start operation. If these producers are the success that is confidently expected, additional units will be started immediately. One or more of the large glass companies, so numerous throughout this region, are arranging for the erection of gas producers. All these operations call for the use of coal; not only this, they also will supply cheap fuel and power. This will attract allied industries whose normal growth will supply the final link of an endless chain demanding additional fuel and power, consequently more coal.

It would appear then that the future of this region now looks like one of rapid growth in many lines of industry calling for cheap fuel and power and, consequently, presents a bright prospect for the local coal trade. All of this makes for betterment of the region's interstate coal trade, which, of course comprises the bulk of the business.

It is the opinion of most operators that while the arrival of peace will, sooner or later, bring about a certain reaction or slacking up of industries, the extent of which it is impossible to predict, coal is nevertheless so essential that the coal industry will feel the minimum effect of such a reaction. Further, the enormous amount of reconstruction work necessary in various parts of Europe, the destruction of many coal mines in France and Belgium, and the complete or partial disorganization of the mining industry of Russia, Austria, Germany, Belgium, France and even Great Britain to some extent, will tend to stimulate American coal exports. The numerous vessels built and building under the American flag will furnish ocean transportation heretofore largely lacking. Altogether there will be a large market for coal in which this region will participate. And if the future prospects are not as brilliant as might be, they appear at least anything but gloomy or discouraging.

Southern West Virginia

By Josiah Keely
Kayford, W. Va.

Tables I and II give a monthly and yearly summary of car supply and loadings for the years 1917 and 1918 in the southern West Virginia fields served by the Chesapeake & Ohio Ry.



Josiah Keely
General Manager, Cabin Creek Consolidated Coal Co.

For the one interested in the study of statistics these tables will afford a history and a comparison.

In November, 1917, the car supply took a sudden and what as yet seems an unaccountable drop. The New River field, however, was favored to the extent of four supplies above other fields in December, ending that year eight suplies ahead.

With the beginning of 1918 the coal industry was well launched into the controversy with the railroads, the Government and the public as to what was causing the coal shortage. It did not seem to occur to publicity agents at first that the fact that the records showed the Chesapeake & Ohio was supplying only about half the cars required had anything to do with the shortage. The war industries started the previous spring had began clamoring loudly for coal, and there was considerable suffering in domestic markets. So uninformed was the general public that one railroad organ, which must have known better, had the temerity to publish an article laying the blame on coal operators, insinuating ulterior motives for curtailments and making an open accusation of unpatriotism.

In the meantime the operators of southern West Virginia began a daily record of the car supply. This was published, at first in obscure columns on back pages, but finally getting to front page space. The public was interested. As absurd as it may appear, it seems that it took an article by Jere H. Wheelwright, of the Fairmont field, written in simple language for the public, to make it understand that a mine was a dead proposition without railroad cars at the tipple.

Then there started in a system of railroading on paper. Allotments were cut down so that the railroad reports began showing increasing supplies of cars to the mines, apparently on the principle that if one loaf is not enough cut it in two and make two loaves of it. However, this was a good move, as all mines were more or less over-allotted, and some on what appeared to many an unfair basis.

By this time, early in 1918, the transportation failure had risen to be a national problem, recognized and discussed by the public; but before remedies could be applied, unheard-of wages were being offered in war work, especially at the Nitro plant below Charleston; furthermore, the selective draft had begun to operate. So by the time cars began to come in reality instead of on paper, many miners had become tired of two and three days per week and had left for the steadier industries.

About the latter part of June a new effect of war methods began to be acute. In order to get coal cars and keep them moving to and from the mines, all other freight was sidetracked and embargoed. It was not

TABLE I. COAL LOADING IN SOUTHERN WEST VIRGINIA FOR YEAR OF 1917

Month	New River		Kanawha		Coal River		Guyan Valley	
	Car Supply	Loaded	Car Supply	Loaded	Car Supply	Loaded	Car Supply	Loaded
January	4.45	209,830	5.47	276,765	5.62	77,155	4.79	341,560
February	8.76	436,010	8.13	391,500	7.68	112,880	7.78	558,910
March	10.13	503,780	9.19	451,530	9.95	147,295	9.53	681,580
April	8.97	426,260	9.45	429,990	9.59	114,395	9.94	669,320
May	13.85	519,170	12.97	508,180	14.00	146,155	12.60	692,590
June	12.31	497,270	12.55	462,240	13.38	134,095	13.60	742,090
July	15.47	518,670	15.47	510,905	13.82	129,820	15.01	760,940
August	14.91	572,025	15.15	495,835	15.35	163,270	14.77	752,780
September	17.65	594,020	15.90	530,730	15.93	140,640	15.89	741,450
October	18.07	615,640	16.52	566,845	14.88	171,100	16.13	805,120
November	12.02	543,190	12.03	471,070	12.92	181,100	12.40	699,450
December	13.24	547,180	8.10	263,870	8.21	126,910	8.51	500,990
Grand total	149.83	5,983,045	140.93	5,359,460	141.33	1,644,815	141.01	7,946,780
Grand total Chesapeake & Ohio Railay								20,934,100 tons

TABLE II. COAL LOADING IN SOUTHERN WEST VIRGINIA FOR YEAR OF 1918

Month	—New River— Car Supply	Loaded	— Kanawha — Car Supply	Loaded	— Coal River — Car Supply	Loaded	—Guyan Valley— Car Supply	Loaded
January	11.26	515,850	9.22	290,780	8.94	97,530	8.60	390,270
February	12.91	561,750	13.29	413,440	12.60	135,270	13.37	702,940
March	12.57	517,810	14.43	416,190	14.26	139,780	13.65	790,350
April	12.74	503,760	13.55	421,500	14.16	195,160	14.09	889,880
May	18.94	611,270	19.00	564,920	17.85	209,810	16.11	987,980
June	21.96	584,010	17.00	529,420	16.95	193,520	16.11	964,620
July	26.10	642,170	25.15	652,850	25.55	234,560	24.82	1,070,250
August	26.21	623,160	19.39	567,690	20.66	217,880	20.69	986,750
September	22.85	534,160	22.13	572,080	22.23	221,630	22.20	985,920
October	23.16	532,500	21.58	538,940	22.02	207,060	19.34	840,600
November	24.97	453,490	24.45	508,960	25.00	196,310	24.67	783,050
December	20.96	330,740	19.66	413,960	20.86	161,810	20.48	559,840
Total	234.63	6,410,670	218.85	5,890,730	221.08	2,210,320	214.13	9,952,450
Grand total Chesapeake & Ohio Ry								24,464,170 tons

unusual to experience curtailments of output on account of non-delivery of supplies, mine timber, feed, rails and repair parts. Labor was not sufficiently paid by the railroads to compete with other industries, so the branch lines over which the coal must be moved to the main lines were neglected. More money was spent cleaning up wrecks than would have made the needed repairs. It was not unusual to see a section foreman working alone or with only one man. Still, the cars did continue to come, and for the closing months of 1918 few operators on the Chesapeake & Ohio can say they did not have all they wanted.

A review of the year would not be complete without mention of the power failure beginning in the early part of the year and still causing occasional losses. The New River and Kanawha fields are supplied largely from the Virginia Power Co., at the mouth of Cabin Creek. This plant, instead of keeping a reserve unit, loaded everything up to the limit with increasing business, so that when one of its units went down New River and Kanawha had to alternate in power consumption. The Fuel Administration directed that these districts take a weekly turn working nights and early mornings. The miners stood it loyally for several weeks, then came strikes to force power service.

However, on the whole, labor loaded from one to two tons per day per man more than in 1917. This was due partly to the few loaders having a better chance to work, partly to the operation of the West Virginia thirty-six-hour-per-week law, and, I believe, largely to patriotism as nourished by speakers, placards and proclamations.

The increased value of coal made it possible for many companies that had not previously spent money on welfare work to extensively repair houses, build Y. M. C. A.'s and amusement halls, and to install playground equipment. Anyone passing through the field will be struck with the many evidences of prosperity as shown by the more attractive appearance of the camps.

On account of steady work the last half of the year, accidents per tons mined have been reduced as compared with 1917, when "big days" were attempted to make up for periods of car shortage.

Again turning to figures, the car allotment for this region has been cut just about half, it being 97,940 tons per day now, as against 189,260 tons in 1917. Also, the number of operations has nearly doubled. Probably few individual mines have put out more coal than in 1917, but with all the new operations the region shows an increase of nearly 20 per cent. over 1917, Guyan Valley showing as much increase as all the older fields put together.

Wyoming District No. 1

By George Blacker
State Mine Inspector, Cumberland, Wyo.

COAL production of District No. 1, of Wyoming, for the year ending Sept. 30, 1918, was the largest in its history. The mines have been working full time, with a scarcity of men. The demand for coal has never been greater than it has been during the past year. Each mine was taxed to its utmost, with each striving to meet the demand in order to bring the war to a victorious conclusion. Relations between the operators and miners have been pleasant, and only one object has been in view, that of winning the war.

Thousands of dollars worth of Liberty Bonds were purchased by the different



George Blacker

locals throughout the district. Every wage earner, man or woman, understood that he or she was expected to purchase at least one $50 bond. Permission was given the operators by the miners to collect 50 cents per man per month as long as the war lasted, this amount to be given to the Red Cross. I am indeed pleased to be able to report that our operators and miners during our national crisis have proved themselves patriots of the truest type.

The tonnage for 1918 was 6,244,731 short tons, as compared with 6,047,748 short tons in 1917, showing an increase of 196,983 tons. The number of fatal accidents for 1918 was 30 as compared with 36 in 1917, a decrease of six. Many new mines were opened during the year, but their development has been slow because of the great scarcity of men.

SUMMARY OF PRODUCTION, ACCIDENTS, ETC., OF WYOMING NO. 1 DISTRICT FOR FISCAL YEAR 1918

Number of counties producing coal	4
Number of shipping mines	45
Number of coal miners	1,628
Number of loaders	737
Total number of employees	5,165
Number tons of coal undercut by machines	2,195,254
Number tons pick mined or blasted off the solid	4,049,477
Total net tons of coal produced	6,244,731
Average days of active operation all mines	277
Number of fatal accidents	30
Number of nonfatal accidents	190
Number of employees to each fatal accident	208,158
Tons of coal produced to each fatal accident	172
Ratio of fatal accidents per 1,000 employees	5.7

Wyoming District No. 2

By R. V. Hotchkiss
State Mine Inspector, Sheridan, Wyo.

DURING the fiscal year ending Sept. 30, 1918, the production of District No. 2, Wyoming, was greater than ever before. The total tonnage produced was 3,172,538.25 short tons. The average number of eight-hour days worked was approximately 250.

CHIEF MINES OF WYOMING DISTRICT NO. 2—THEIR OUTPUTS DURING FISCAL YEAR 1918

	Tons
Sheridan Coal Mines, Nos. 7 and 8	326,932
Acme Coal Co.	421,492.1
Amalgamated Coal Corporation	116,312
Carney Coal Co.	413,953
Wyoming Coal Co.	430,099.9
Kooi Coal Co.	273,591
Cambria Fuel Co.	361,088.5
Owl Creek Coal Co.	309,384
Big Horn Collieries Co.	264,735
Poposia Coal Co.	254,950.65

Seven fatal accidents occurred, four arising from mine cars, two from falling coal and one attributable to explosives. One other fatality was listed, but was not charged to coal mining.

This made one man killed for every 453,219.75 tons produced, or 2.737 men killed for each 1000 employed. There were 48,068.76 tons produced for each nonfatal accident. Of these about 45 per cent. arose from falling coal or rock, about 25 per cent. from cars and 25.8 per cent. men were injured for each 1000 employed. The tonnage produced was disposed of as follows: To railroads, 1,265,068.05 tons; to commercial users, 1,752,855.46 tons. The slack shipped amounted to 219,786.2 tons.

As a whole, the miners have been well satisfied during the past year, laying aside their personal grievances

in order to back up the United States during the war overseas. The total number of men employed amounted to 2558. These men used 39,437 kegs of black powder, 13,108 lb. of giant powder and 73,008 lb. of permissible explosives. The working forces of the mines were distributed as follows: Miners, 1441; daymen, inside, 647; daymen, outside, 470.

The Sheridan No. 8 mine is the only new one now producing coal. It has been producing for ten months of the last fiscal year. It reaches a 47 ft. 6 in. bed of clean coal that is characteristic of the coal measures of northern Wyoming.

All the necessary improvements for bigger tonnage were maintained by all companies.

Seven certificates of competency were granted during the year, all of which were foreman's papers.

Alberta

By J. T. Stirling
Chief Inspector of Mines

THE estimated production of coal in the Province of Alberta for the year 1918 is approximately 3,250,000 short tons, and as the production for the year 1917 was 4,863,414 tons, this means that there will be an increase during 1918 over 1917 of approximately 1,300,000 tons. Exact figures are only available for the ten months ended Oct. 31, 1918. The total output during that period was 5,165,581 tons, as compared with 3,738,679 tons during the same period of the year 1917.

ALBERTA COAL PRODUCTION FOR TEN YEARS

Year	Output in Short Tons
1909	2,174,329
1910	3,030'757
1911	1,694,564
1912	3,446,349
1913	4,306,346
1914	3,821,739
1915	3,434,891
1916	4,648,604
1917	4,863,414
1918 (estimated)	6,250,000

The market for Alberta coal has been extended to such an extent that 433,331 tons were shipped into the Province of Manitoba during the first ten months of the year 1918, as compared with 188,647 tons during the same period of 1917. This additional market to a great extent was obtained owing to the fact that the shipments of coal from the United States to Canada were considerably decreased during 1918, and also because an extensive publicity campaign was started by the provincial government of Alberta warning consumers to put in a supply of fuel at the earliest opportunity; as a result a much larger proportion of the fuel required was stocked throughout the western provinces during the summer months.

Sixty-four new mines were opened during 1918 and 58 abandoned; the number at present in operation being 289 as compared with 283 at the end of 1917. Twenty-one fatal accidents occurred during the year as compared with 24 during the year 1917, and 119 nonfatal during 1918 as compared with 101 during 1917.

There are nine mine-rescue stations in operation in the province, three of these being installed in railway cars; 106 men have obtained certificates of efficiency in mine-rescue work. A large number of the bituminous coal mines in Alberta are now using electric lamps of the Edison type. There has also been a considerable increase in the number of coal-cutting machines in use.

Notwithstanding the increased production which has taken place during the past twelve months, the operation of the mines is being limited at the present time to about 60 per cent. of their capacity owing to lack of market. A large number of the mines—particularly in northern Alberta—have, during the last three months of the year, only been in operation on an average of about two days per week. It is estimated that if there had been sufficient market to keep the mines operating fairly steadily during the year 1918, that approximately 10,000,000 tons of coal could have been produced without increasing the number of men employed.



J. T. Stirling

DISPOSITION OF COAL PRODUCED IN ALBERTA DURING THE TEN MONTHS ENDING OCT. 31, 1918

	Short Tons
Sold for consumption in Alberta	2,884,259
Sold for consumption in British Columbia	85,147
Sold for consumption in Saskatchewan	1,147,590
Sold for consumption in Manitoba	433,331
Sold for consumption in Ontario	555
Sold for consumption in United States	113,151
Used in making coke	49,350
Used in making briquets	51,286
Used under colliery boilers	273,831
Put to waste	127,081
Total output (for ten months)	5,165,581

British Columbia

By George Wilkinson
Chief Inspector of Mines, Victoria, B. C.

DURING the year 1918 there was mined in the Province of British Columbia 2,881,915 short tons of coal, an increase of 195,354 short tons in comparison with 1917. Of this amount 1,866,571 tons was mined by the collieries of Vancouver Island, 195,191 tons by the collieries of the Nicola Princeton district, 819,785 tons by the collieries of the Crows Nest Pass district and 367 tons by the new mine at Telkwa in the northern district. The following are the comparative tonnages (in long tons) of the various companies and districts for 1918 and 1917:

COAST DISTRICT—VANCOUVER ISLAND

	1918	1917
Canadian Collieries (D), Ltd.	789,614	797,348
Canadian Western Fuel Co., Ltd.	731,922	658,427
Pacific Coast Coal Mines, Ltd.	82,629	150,538
British Columbia Coal Mining Co.	14,716	61,586
Nanoose Collieries	30,436	27,822
Granby Consolidated Mining Smelting and Power Co.	17,265	.....
Totals	1,666,582	1,695,721

The production of Vancouver Island collieries for 1918 was thus 1,666,582 long tons (1,866,571 short tons), a decrease of 29,139 tons (32,635 short tons) from the output of 1917.

COAST DISTRICT—SUBDISTRICT OF NICOLA PRINCETON

	1918	1917
Middlesboro Collieries, Ltd.	100,000	83,458
Merrit Collieries, Ltd.	.....	13,357
Pacific Coast Colliery	.....	206
Fleming Coal Co. (successors to Inland Coal and Coke Co.)	31,000	7,296
Coalmont Collieries, Ltd.	4,500	.....
Princeton Coal and Land Co.	38,778	46,926
Totals	174,278	151,243

The production of this district thus shows an increase of 23,035 long tons over the output of 1917.

CROWS NEST PASS DISTRICT

	1918	1917
Crows Nest Pass Coal Co.	605,979	456,686
Corbin Coal & Coke Co.	125,972	101,065
Totals	731,951	551,751

NORTHERN BRITISH COLUMBIA

Telkwa Collieries	328	.....

These two districts thus show an increase of 180,200 long tons, or 201,824 short tons, over the output of 1917.

Of the total amount of coal mined approximately 280,746 long tons or 314,435 short tons were converted into coke. The total coke production for British Columbia was approximately 190,696 long tons. Of this amount the Crows Nest Pass Collieries made 166,003 tons. The Canadian Collieries (D), Ltd., made 39,776 tons at its ovens at Union Bay, Comox colliery.

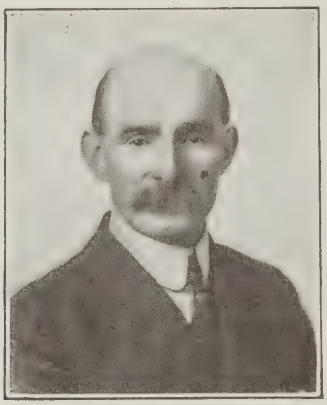
Strikes, mine fires and the ravages of the influenza epidemic have been responsible for a considerable loss in output during the year 1918. To these causes must also be added a serious shortage of labor during the year.

The monthly tonnages produced were fairly steady for the first seven months. The maximum tonnage for any individual month of the year was reached in August, when 249,237 long tons were mined.

On Sept. 4 a strike was called in the Crows Nest Pass district, a demand (based on alleged dangerous conditions) being made from the miners for the single-shift system. After the strike had lasted a month the mines were ordered opened by Commissioner Armstrong on the single-shift system pending an investigation into mining conditions by a royal commission to be appointed by the Minister of Mines who will report on conditions and determine if the demands made by the men for a single shift is warranted.

The commission is to be composed of one person recommended by the company, one by the men, and a chairman appointed by the Government. The commission has not yet started to investigate owing to the failure of the men to appoint a representative.

The strike in the Crows Nest Pass district was responsible for the loss of approximately 60,000 long tons, while the adoption of the single shift, and the ravages of the influenza epidemic,



GEORGE WILKINSON

have been responsible for the loss of approximately 75,000 more in the same district.

On Vancouver Island the East Wellington mine of the British Columbia Coal Mining Co. was closed down the first eight months of the year on account of a fire in the workings. This resulted in a loss of output of approximately 50,000 long tons. The influenza epidemic in this district has been responsible for a further loss of 50,000 tons.

NEW MINES OPENED DURING THE YEAR

The Granby Consolidated Mining, Smelting and Power Co. has opened and equipped a large mine at Cassidy's, Vancouver Island, where it has acquired a large area. The bed being mined is the famous "Douglas seam."

The mine is opened by three slopes driven in from the outcrop, one slope being used as a haulageway, one for a traveling road for the men and one for ventilation. The workings are being laid out along the most modern lines. The surface equipment is of the best, and nothing but the most up-to-date machinery is being installed.

About 100 acres of land has been cleared and some 75 houses built for the accommodation of the officials and employees. A water system has been installed and the houses are electrically lighted and fitted with all modern conveniences.

At Anyox the company has almost completed a battery of byproduct coke ovens, where it is the intention to make coke for use of the smelter at that point.

During the year the Canadian Western Fuel Co. started sinking operations on two shafts which will be known as the Wakesiah mine. Coal was reached in August at a depth of about 300 ft., the bed being the famous Wellington. The hoisting shaft is rectangular, 9 x 16 ft., and the air shaft is 10 x 8 ft. in cross-section. The surface equipment will be designed along modern lines.

The Harewood mine, which had been long closed, and was reopened by the same company last year, is producing approximately 1000 tons daily.

The new No. 5 mine opened by the Canadian Collieries (D), Ltd., at South Wellington is now producing about 300 tons per day. A good substantial tipple and surface equipment has been installed and this operation is capable of handling large tonnages.

In the Nicola Princeton district the Fleming Coal Co. has acquired the interests of the Inland Coal and Coke Co. and has reopened the mines, which have been closed for some time. The Coalmont colliery has also been reopened, and production started. A new mine has been opened in northern British Columbia at Telkwa and has been shipping a small amount of coal to Prince Rupert.

Improvements have been carried out at the various collieries during the year in an attempt to further safeguard operations. Safety inspectors have been appointed by some of the companies.

The Burrell gas detector has been adopted at all the collieries for testing for percentages of gas lower than can be detected by the ordinary safety lamp. In addition to the test made with this detector, mine air samples are taken monthly from the splits and returns of the various mines. These are sent to Ottawa for analysis, and records are tabulated and checked with the results obtained by the gas detector.

Some 4000 Edison electric lamps are now in use in the various mines of the Province. Training in mine-rescue work has been vigorously carried out by the various mining companies and by the Government of British Columbia.

The new Gibbs apparatus is finding much favor in British Columbia. The provincial government has installed six sets in its mine-rescue station at Fernie, which was the first consignment of apparatus of this type to Canada. Several of the mining companies are installing this apparatus, there being some twenty sets now on the way for installation.

A highly successful meet was held by the Vancouver Island Mine-Rescue Association at Cumberland on Sept. 2, and six mine-rescue teams competed for prizes. First-aid events were also held, and seven teams competed in the various events.

The annual meet of 1919 will be held in Nanaimo, and preparations are being made to make it a successful event. The Hon. William Sloan, Minister of Mines, was present at the meet held at Cumberland and presented the prizes to the winning teams. Mr. Sloan takes a keen interest in mine-rescue work, as well as all other things pertaining to the welfare of the workers.

Saskatchewan

BY E. PIERCE
Mine Inspector, Roche Percee, Saskatchewan, Can.

THE record output of coal for the Province of Saskatchewan, Canada, for the year 1917, was 336,726 tons, produced by 264 miners and 131 laborers from the 51 mines in op-



E. PIERCE

eration. It is noteworthy that there were no fatal accidents and only two nonfatal for the year. In the year 1916 the tonnage was 267,234, from 49 mines employing 236 miners and 131 laborers. There were no fatal accidents but an increase of two nonfatal over the record of 1917—four men were injured in or about the coal mines of the state in 1916.

The amount of coal produced in the province for the ten months ended Oct. 31, 1918, was 209,799 tons, and while figures are not available for the remaining two months, it is predicted that the record output of the preceding year will not be reached during 1918.

The mechanical equipment underground was increased slightly in 1917, when six electrical coal-cutting machines were in operation in the province, whereas four mining machines were used here during each of the previous two years. Of the four principal mines of Saskatchewan, two have electrical equipment. The Western Dominion Collieries, Ltd., produced 113,287 tons of coal in 1917 and is equipped with four electric coal-cutting machines and two electric motors underground; at the tipple of this company there is a mechanical box-car loader.

Coal—Now and Next Year

By C. E. LESHER
Statistician, United States Geological Survey

THE production of more than 585,800,000 tons of bituminous coal and lignite and 99,500,000 net tons of anthracite in the United States in 1918—a grand total of nearly 685,300,000 tons—has set a new high mark for the industry and the country; there is little likelihood of again reaching this record in the year now beginning, or even in 1920. Coal is produced in the United States to meet the requirements of industry and the domestic and public needs of the people of this country and Canada—not more than 1 per cent. of the output leaves the shores of North America. The needs of industry currently supplied, the mines have no choice but to stop, for, excepting by the larger anthracite companies, coal is not stored by the producer. Unless for production against a real or imaginary future inability to obtain fuel, the consumer does not invest in abnormally large storage piles of coal.



C. E. LESHER

The production of all kinds of bituminous coal in 1918 was ample for all needs. Despite the inroads of the influenza epidemic among mine workers and railroad employees, it would easily have been possible in November and December to have produced and transported 100,000,000 instead of 86,000,000 tons, and the year's total would have reached the coveted 600,000,000 mark. But the country did not need the coal. Even before Nov. 11, when word came that no more guns and shells and new plants for making these engines of destruction were needed, it was evident that the Fuel Administration's estimate of 623,000,000 tons from April to April would not be required; that, having seen that the coal mines and the railroads could get the coal into their stock piles, consumers were fast losing their anxiety.

In the six months from May 1 to Oct. 30, 1918, 319,000,000 net tons of bituminous coal were produced, six months in which the lowest monthly output was only slightly less than 51,000,000 tons and the highest more than 55,700,000 tons. At this rate 600,000,000 was easy and 624,000,000 not out of reason. The results, by months, for 1917 and 1918 are given in the following table; from January, 1915, to December, 1918, results are shown graphically in the diagram (Fig. 1).

Totals for the country as a whole do not begin to tell the story. Coal mines are not evenly distributed over the country, nor are consumers. Coal from each field has even in normal times fairly definite market territory outside of which it does not move, and under the zone system these areas are rigidly prescribed. A survey of the figures given in the table above throw light on the situation this winter.

PRODUCTION OF BITUMINOUS COAL AND LIGNITE IN THE UNITED STATES IN 1917, WITH ESTIMATES FOR 1918, BY MONTHS, IN NET TONS

	1917	1918
January	47,967,354	42,607,000
February	41,352,711	44,385,000
March	47,868,652	48,631,000
April	41,854,320	46,591,000
May	47,086,452	50,927,000
June	46,824,646	51,758,000
July	46,291,572	55,587,000
August	47,372,226	55,732,000
September	45,107,956	51,757,000
October	48,337,726	52,885,000
November	47,689,801	44,393,000
December	44,037,147	40,630,000
Totals	551,790,563	585,883,000

Demand for coal did not take an upward turn, following the depression of 1914, until late in 1915, and

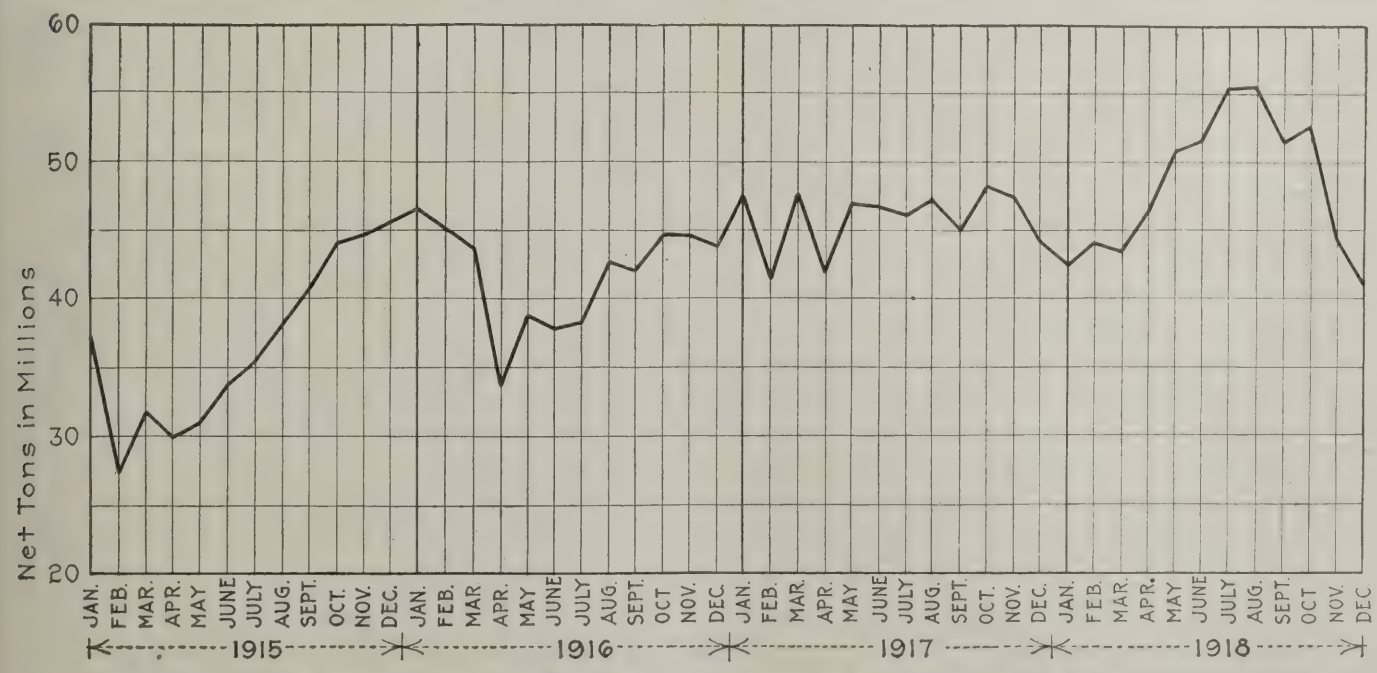


FIG. 1. PRODUCTION OF BITUMINOUS COAL AND LIGNITE IN THE UNITED STATES BY MONTHS, 1915-1918

then was sustained through 1916 only in the easternmost sections of the country. During the summer of 1916, while the mines in the Pittsburgh district were running full time, those in Illinois were suffering from their usual warm weather idleness because, by operating one, two or three days a week, all the coal anyone wanted in the latter state was supplied.

From October, 1916, to October, 1918, there were few dull moments in the coal business anywhere in the United States. Demand for coal to run the factories in the East that had sold munitions to Europe became, in the winter of 1916-17, more than the normal facilities could send forward, and Ohio and even Illinois coal was shipped to New England.

The mines that were to supply this intensified manufacturing activity along the North-Atlantic seaboard in 1917; Illinois, Indiana and western Kentucky, shipping in all directions, from Canada to the gulf and Nebraska to the Hudson, increased nearly 29,000,000 tons, or 31 per cent. There was nothing phenomenal in the record increase of these fields; a steady market permitted the operation of the mines in summer as well as in winter, something new for Illinois.

West of the Mississippi the fields from North Dakota to Texas gained 4,388,000 tons, or 16 per cent.; the Rocky Mountain fields 4,023,000 tons, or 14 per cent., and Washington 971,000 tons, or 32 per cent. In the south, Tennessee, because of strikes in the summer of 1917, made no progress; but Alabama gained 1,982,000 tons, or 11 per cent.

Compare these figures with the estimates for 1918. The most important group, that including Pennsylvania

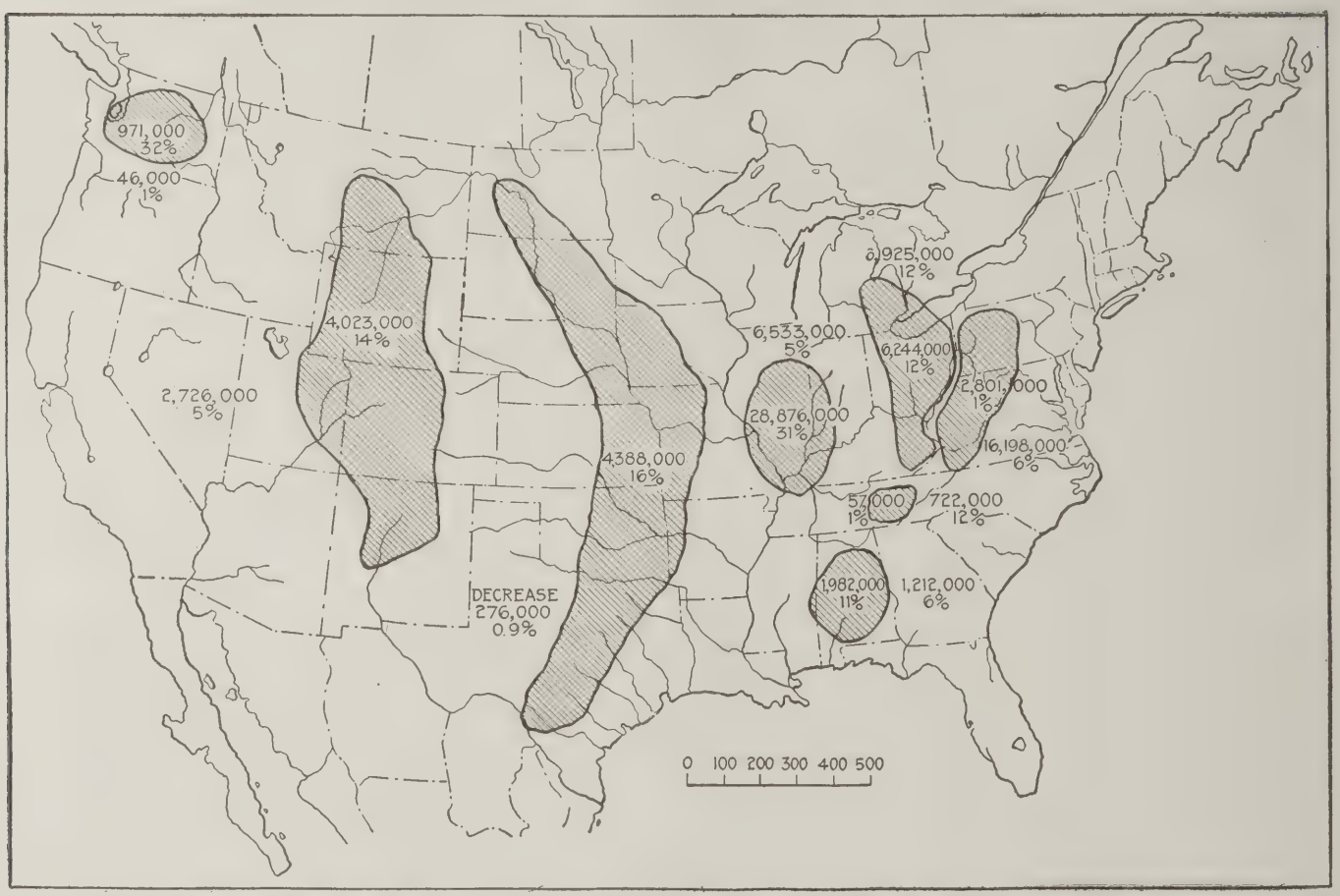


FIG. 2. MAP SHOWING GEOGRAPHIC DISTRIBUTION OF THE INCREASES IN THE PRODUCTION OF BITUMINOUS COAL IN 1917 AND 1918

The figures inside the lines give the increases in net tons and in percentages for the producing fields within the outlined areas for 1917 compared with 1916. The figures outside are 1918 compared with 1917

and as far west as the northeastern section of Ohio are in the four states of Pennsylvania, West Virginia, Maryland and Virginia, states from which, in 1916, came more than 54 per cent. of the bituminous output of the country and 60 per cent. of the total, including anthracite. And in 1917, with the greatest need for coal ever faced in this country (up to that time), a demand that fell heaviest in this section, this group of states—tributary to the North-Atlantic seaboard—produced but 1 per cent. more than in 1916; the group gained but 2,800,000 tons, while the other coal fields added more than 46,000,000 tons to their records.

Ohio and eastern Kentucky, with markets mainly west and north, gained 6,244,000 tons, or 12 per cent., and West Virginia—important because from here comes the major portion of our high-grade coal as well as the total supply for the North-Atlantic and New England States—gained 16,200,000 tons, or 6 per cent. In the country as a whole production of bituminous coal increased 34,000,000 tons, or 6.2 per cent. Eastern Kentucky, Ohio and Michigan gained 6,925,000 tons, or 11.6 per cent., about the same as the increase of 1917 over 1916. Tennessee increased 12 per cent. and Alabama 6 per cent. Illinois, Indiana and western Kentucky gained but 6,533,000 tons, or 5 per cent., against nearly 29,000,000 tons, or 31 per cent., in 1917. In the middle west the group comprising North Dakota, Iowa, the southwestern states and Texas had a slight decrease—

PRODUCTION OF BITUMINOUS COAL AND LIGNITE BY GROUPS OF STATES, 1915-1918

	Production, Net Tons		Increase 1916 Over 1915		Production 1917,	Increase 1917 Over 1916		Estimated	Estimated Increase 1918 Over 1917	
	1915	1916	Net Tons	Per Cent.	Net Tons	Net Tons	Per Cent.	Production, 1918	Net Tons	Per Cent.
Pennsylvania, Maryland, West Virginia and Virginia	247,442,000	270,922,000	23,480,000	9.5	273,723,000	2,801,000	1.0	289,921,000	16,198,000	5.9
Eastern Kentucky, Ohio and Michigan	37,371,000	53,480,000	16,109,000	43.1	59,693,000	6,213,000	11.6	66,618,000	6,925,000	11.6
Tennessee	5,730,000	6,137,000	407,000	7.1	6,194,000	57,000	0.9	6,916,000	722,000	11.7
Alabama	14,928,000	18,086,000	3,158,000	21.2	20,068,000	1,982,000	11.0	21,280,000	1,212,000	6.0
Illinois, Indiana, and Western Kentucky	83,418,000	94,110,000	10,692,000	12.8	122,976,000	28,866,000	30.7	129,509,000	6,533,000	5.3
North Dakota, South Dakota, Iowa, Missouri, Kansas, Oklahoma, Arkansas, Texas	26,224,000	27,119,000	895,000	3.4	31,507,000	4,388,000	16.2	31,231,000	276,000*	0.9*
Colorado, Montana, Wyoming, Utah and New Mexico	24,896,000	29,388,000	4,492,000	18.0	33,411,000	4,023,000	13.7	36,137,000	2,726,000	8.2
Washington	2,429,000	3,039,000	610,000	25.1	4,010,000	971,000	32.0	4,056,000	46,000	1.1
Total†	442,438,000	502,281,000	59,843,000	13.5	551,582,000	49,301,000	9.8	585,668,000	34,086,000	6.2

* Decrease.
† Does not include production in California, Alaska, Oregon, Georgia, Idaho and Nevada.

276,000 tons, or 1 per cent., compared with a gain of 4,388,000 tons, or 16 per cent., the year previous. The Rocky Mountain states increased 2,726,000 tons, or 8 per cent., nearly equal to the gain of 1917 over 1916. Washington, with a gain of 32 per cent. in 1917, increased but 1 per cent. in 1918. The distribution of the increases in 1917 and in 1918 are clearly shown in the map (Fig. 2).

Measure these production figures against the estimated requirements as shown on the map in Fig. 3. In 1917 there were delivered to industrial and domestic consumers and public utilities in the states north of the Virginia-North Carolina state line and east of the Ohio-Pennsylvania state line, 100,940,000 net tons of bituminous coal. To meet the growing demand of war industries the Fuel Administration estimated that requirements of this section in the coal year ending March, 1919, would be greater by 16,680,000 tons, or 16 per cent., than the consumption in 1917. Similarly for Ohio, Indiana, Illinois, Kentucky and Michigan, with a consumption of 115,354,000 tons of bituminous coal in 1917, the increase was estimated at 15,542,000 tons, or 13 per cent.

The southern states, Tennessee, the Carolinas, Florida, Georgia, Alabama and Mississippi, were estimated to require 7,065,000 tons, or 38 per cent. more than the 18,441,000 tons consumed in 1917. The dock states, Wisconsin, Minnesota, and also the Dakotas, were expected to require but 1,689,000 tons, or 9 per cent. above their figure of 18,279,000 tons in 1917. States west of the Mississippi and south of the dock states consumed 48,210,000 tons in 1917, and requirements in the coal year 1918-19 were estimated to be greater by 11,000,000 tons, or 23 per cent. In addition,

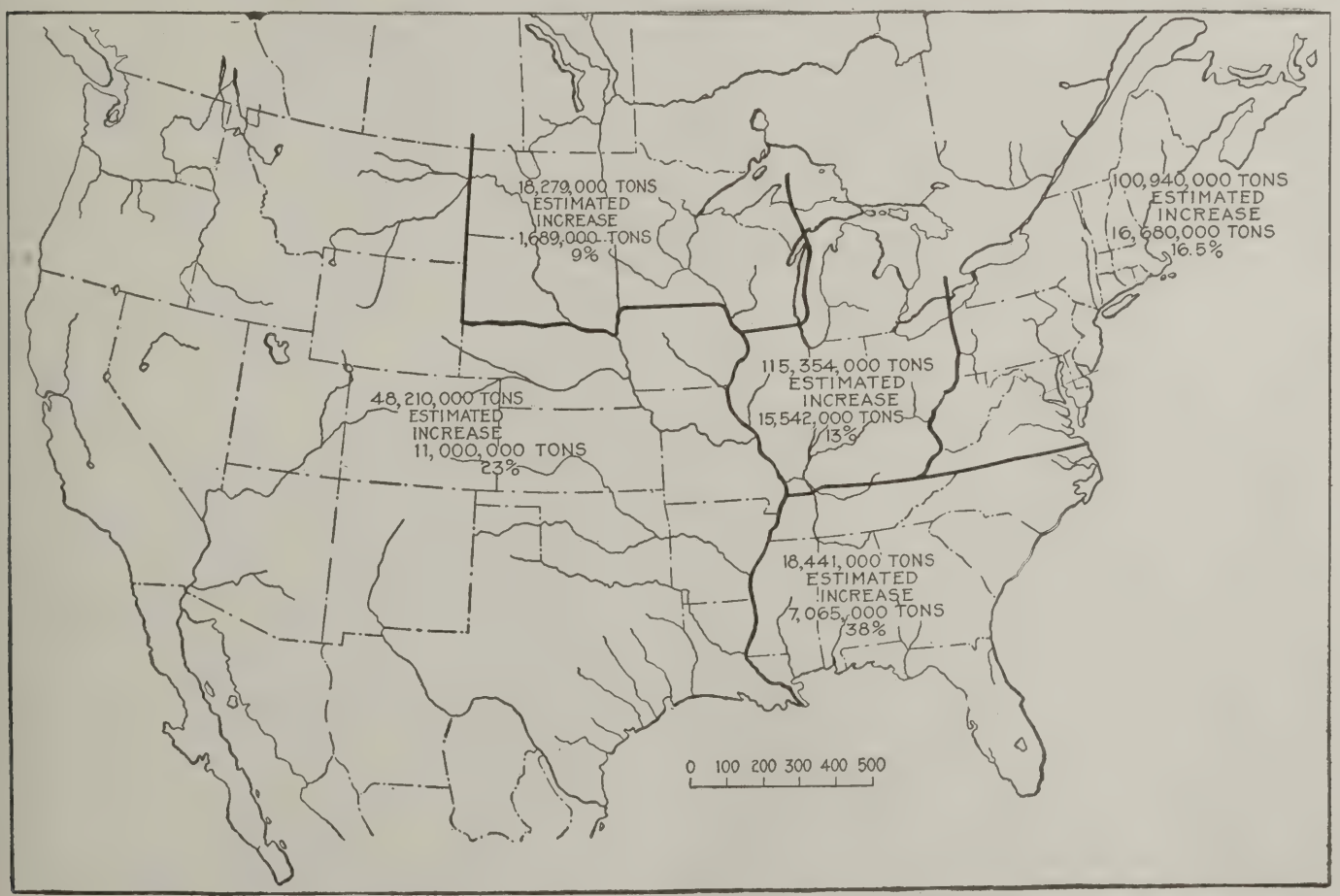


FIG. 3. CONSUMPTION OF BITUMINOUS COAL IN 1917 AND INCREASES IN THE REQUIREMENTS ESTIMATED AT BEGINNING OF COAL YEAR 1918-1919

The Fuel Administration estimated the needs for all industrial and manufacturing establishments, domestic consumers, public utilities and byproduct coke plants. Steam railroad fuel, colliery consumption and manufacture of beehive coke are not included.

the railroads had asked for an increase of 11,000,000 tons, or 7 per cent., from 155,000,000 to 166,000,000 tons, and the navy and Shipping Board asked for several million tons additional. About the only items that were not expected to increase were exports to Canada and abroad, and coal for beehive coke.

The coal fields of Pennslyvania, Maryland, West Virginia and Virginia, from which comes the supply of bituminous coal for the northeast section of the United States, also furnish the greater part of the tidewater supply for steamship bunkers, for the navy and for foreign export. They also ship high-grade coal, both low and high volatile, west by rail and by the lakes.

Lake cargo shipments from these states in 1918 were 16,506,000 tons, a decrease of 2,000,000 tons, compared with 18,453,000 tons in 1917. Deliveries at tidewater in 1918 were 37,489,000 tons against 31,181,000 tons in 1917, a gain of 6,300,000 tons, of which, however, 1,400,000 represented increased shipments to New England by water. All-rail shipments west beyond Ohio increased 2,700,000 tons, and all-rail and Lake Ontario deliveries to Canada, 1,300,000 tons. The net result was that, of the 16,200,000 tons increased production in these states, approximately 10,000,000 tons was available for consumption by all consumers, including the railroads, in the state of Virginia and north and east of the Pennsylvania-Ohio state line.

This increase of around 10,000,000 tons was accumulated after Apr. 1 to meet an expected increase in demand of less than 17,000,000 tons in the twelve months beginning with April. In other words, the northeast section of the United States, the sore spot on the map all through 1917 and early in 1918, has been taken care of this year.

The coal fields supplying the section around the lower lakes had increases in production in 1918 that have nearly equalled the expected gain in requirements. New high records in the movement of lake coal and rail shipments from Illinois to the northwest fully met the increased demands in that section.

In the south the anticipated need for an additional 7,000,000 tons did not materialize. Data have not yet been compiled to show to what extent the gains in production in Alabama—1,212,000 tons—and in Tennessee —722,000 tons—were augmented by increased shipments from Illinois, western and southeastern Kentucky and Virginia; but it is evident that less than half of the 7,000,000 tons additional was delivered in this section.

In the large central and western area shown on the map (Fig. 3), from which eastern coal was largely eliminated by the zones, the increase in production was less than 2,700,000 tons, sufficient, however, to meet actual demand.

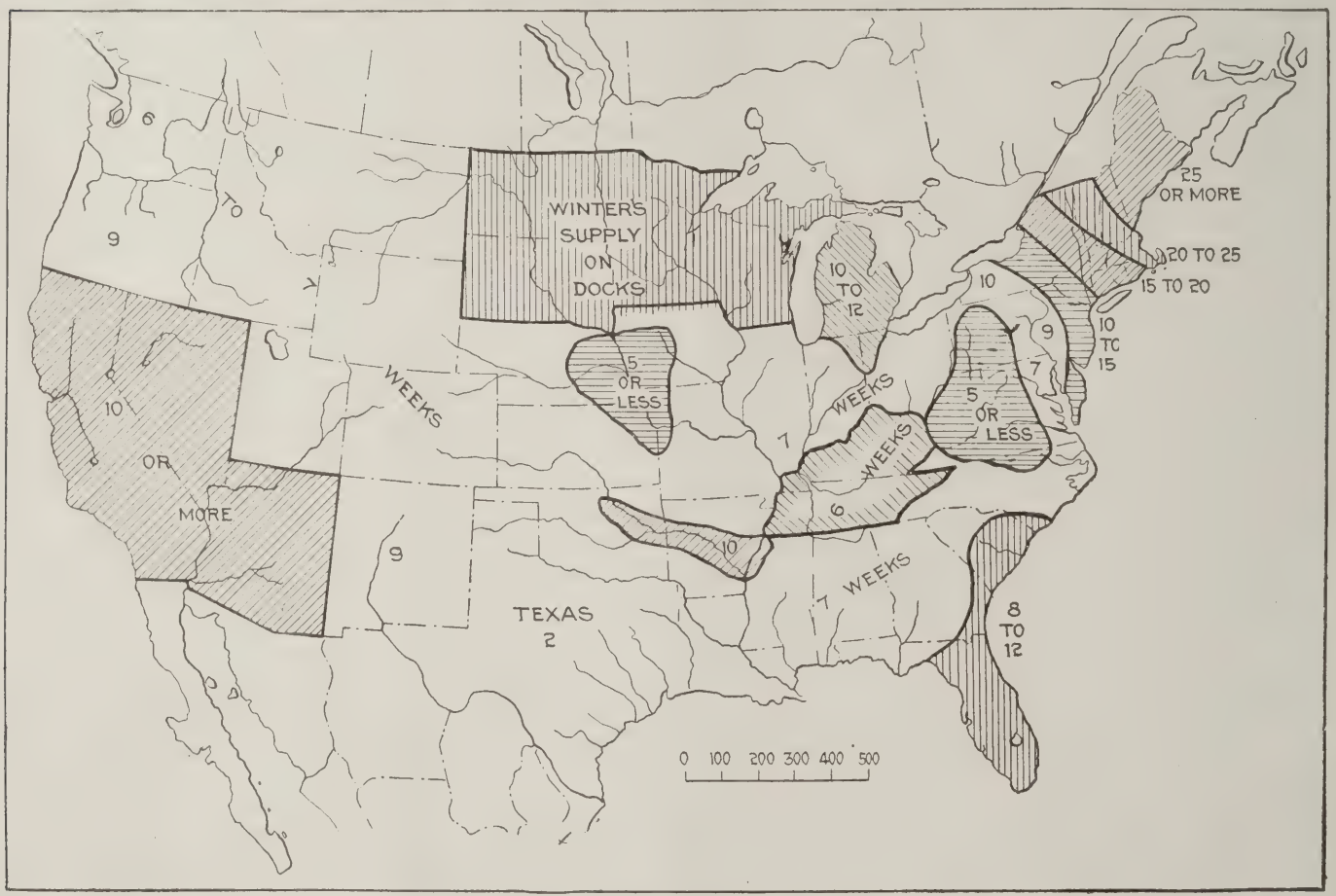


FIG. 1. NUMBER OF WEEKS' STOCKS OF SOFT COAL IN THE HANDS OF INDUSTRIES OTHER THAN STEEL MILLS AND COKE PLANTS ON NOV. 2, 1918

The situation on Nov. 2, 1918, with regard to stocks of bituminous coal in the hands of manufacturing and industrial establishments other than steel mills, and by-product coke plants, is shown on the map, Fig. 4. The most striking feature of the data thus shown is the generally high level of stocks of bituminous coal on hand immediately prior to the signing of the armistice, and the distribution of these stocks. Whereas in October, 1917, stocks were from two to three weeks in Pennsylvania, Maryland, Virginia and West Virginia, on

Nov. 2, 1918, the range was from three weeks in western Maryland, Virginia and West Virginia, five weeks in western Pennsylvania, to seven weeks in eastern Maryland, nine weeks in eastern Pennsylvania and ten weeks in western New York state. Eastward, stocks were greater. Delaware had 13 weeks, New Jersey 12 weeks, southeastern New York State 12 weeks and northeastern New York 16 weeks. In the New England states stocks ranged from 19 weeks in Connecticut to 27 weeks in New Hampshire.

The lower peninsula of Michigan averaged 12 weeks' supply; western Ohio, nine weeks. The industrial section along the Arkansas River in Oklahoma and Arkansas had 10 weeks' supply; southern Florida, 12 weeks. The dock states had their supply assured and in the docks or in the storage piles of the plants. In the Missouri Valley section in Nebraska, Iowa and Kansas only were stocks below the general level of from six to seven weeks. The further from the sources of supply the larger the stocks—a normal and proper condition. Comparative data indicate that stocks of bituminous coal last November were from two to three times those of a year before, even on the basis of augmented rates of consumption.

What of 1919? Will the consumption of coal in the United States be as great in 1919 as in 1918? What, if any, effect will the impending release of centralized control and regulation of distribution, price and labor have on the ability of the coal mines to satisfy whatever the demand that may exist?

The consumption of coal in the United States will not be as great in 1919 as in 1918. The railroads, the largest single users of bituminous coal, will save coal if by no other means can their enormous fuel bill be reduced. A program for the conservation of engine fuel, begun by the Railroad Administration under Eugene McAuliffe, is now said to be conserving coal at the rate of 10,000,000 tons a year. Freedom to select the best and most suitable coals, a privilege largely denied during 1918, will reduce the quantity consumed.

Increased Demand from Industries

Manufacturing industry stopped overtime work in November; overtime operations that required coal. Not only was production of coal at a low ebb in December, but consumption declined and was in some districts below that in the hot months of last summer. However rapidly it may be accomplished, time is required for the transition from a war to a peace basis. The small-arms manufacturing plants are long on help and short on work. The airplane factories have largely ceased operation. The manufacture of smokeless powder is one item, the end of which releases around 4,000,000 tons of coal to other consumers.

The iron and steel industry has shown no indication of lessened requirements for coal, next year, and this is the most hopeful sign that has appeared. This industry, which reached its maximum speed under the conditions obtaining in 1918, consumes in round numbers one-third of the coal used by industrials and public utilities. A study of the reports of fuel consumption by 142 of the larger steel plants shows an increase of 18 per cent. in the average weekly consumption of steam and gas coal (exclusive of that used in making coke) in 1917 over 1916, and an increase of but 3 per cent. in 1918 over 1917. These plants had 54 per cent. more coal on hand Oct. 1, 1918, than on the same date in 1917.

By the summer of 1918 the United States had about reached the upper limit in ability to consume coal, and had the war progressed the ability to consume would have been reached long before the limit of ability to produce.

Conservation has affected and will continue to affect the consumption of coal, but even this praiseworthy doctrine has its backfires. Conservation of transportation exercised through the zones was responsible for making a contractor in Iowa use local coal, two tons of which was required to excavate the same quantity of earth for which but one ton of Illinois coal had previously been required. Many consumers not making ship plate, shells or high explosives found it necessary in 1918 to burn low-grade coal or none. They can now get high-grade coal and will need fewer tons.

Coal saved in 1918 through fear of shortage, and saved because not obtainable, will be coal burned in 1919. The consumer has been reached, however, with the message of true conservation—economy in use. More than ever will the vender of coal be preaching efficiency in use as a selling argument for his particular product. Waste and extravagance will not disappear over night, but the seed of the conservation idea has been intensively sown and the harvest will be greater in 1919 than in 1918.

Foreign Markets Prove Attractive

Eyes are being turned to foreign markets overseas. Exports offshore were 1,500,000 tons less in 1918 than in 1917, and 3,800,000 tons less than in 1916. An increase that will be measured in the millions of tons may be expected here, but to offset it will be a decrease of perhaps as much as 3,000,000 tons in coal for the navy. Bunker requirements will continue to increase with the growth of the merchant marine, but the total is not a significant item and affects but few producing fields.

Viewed in more detail, it appears that the New England and lake coal markets will be easily satisfied in 1919, excepting always the highest grades of coal for which the demand has not been fulfilled for several years. With the certain removal of all restriction in distribution and the adjustment of freight differentials disturbed by the flat 25 per cent. advance of June, 1918, the flow of coal will again turn westward, and West Virginia, Kentucky and Tennessee will compete with Illinois and Indiana, and Illinois and Indiana with Iowa, Missouri and Kansas. To what extent eastern coal will regain its western market is a question as yet unanswered. The time through which consumers were denied the high-grade fuel probably has not been sufficient to permit a proper appreciation of the advantage in use and cost of the local product. Anthracite and by-product coke will again enter largely in the market for domestic use. West of the Appalachians the maximum of production for several years was reached in 1918. The fields from Pennsylvania to Alabama can hardly as a whole expect to exceed the 1918 record in 1919, if in 1920, but the districts in that area from which come the highest-grade coals of the country will have every opportunity to prosper.

Viewed from a distance the progress of the coal industry has been continuously upward, but at close range

it is seen to have had many fluctuations. In the past 38 years, or since 1880, there have been seven "peaks" in the curve of bituminous production—in 1884, 1887, 1893, 1903, 1907, 1910 and 1913, with the expectation of the writer that 1918 represents the eighth peak. In the case of four of the seven depressions following these peaks, but one year was required for the "comeback"; but following 1884, 1907 and 1913, two years elapsed before new high records were established. The records for the past 18 years show but one instance where production was down for three years in succession. The record of 315,000,000 tons in 1873 was followed by three years of depression, and it was not until 1877 that production exceeded the output in 1873.

Activities of the Wholesale Coal Trade Association of New York

By CHARLES S. ALLEN
Secretary of the Wholesale Coal Trade Association of New York, Inc.

THERE is a feeling among the members of the Wholesale Coal Trade Association that there is a useful function to be performed by the organization, if for no other purpose than to cultivate a closer and more cordial relationship among those engaged in the wholesale coal trade. The Coal Exchange, one branch of activity of the association, while in effect but a few weeks, has resulted in bringing together the members in a number of trades, ranging in volume from a few cars to as many as 5000 tons in one transaction. These transactions, without exception, have been consummated between members who were not accustomed to dealing with each other, and the establishing of the Coal Excange has confirmed the judgment of the Board of Directors that it would act as a medium for broadening the field for all members making use of it.

It is the feeling of the members that every effort should be put forth to continue and extend the work of producing clean coal to take every possible precaution to maintain and improve the standard of Pennsylvania, West Virginia and Maryland coals, and it is felt that this work cannot be more effectively done than by a consistent program having this in mind and urged at all times by the wholesale coal dealers. A consistent policy of this sort can but prove beneficial not alone to the wholesaler, who will thus avoid complaints from his customers as to the quality of the coal, but will result in avoidance of the payment of high freight charges on refuse material and generally work a betterment of conditions for the operator by creating a firmer demand for his output, not to mention the economy of railroad facilities in times of car scarcity by avoiding the hauling of refuse matter. This consideration is of especial moment when taken with the effort which is to be made for a more scientific classification of coals in the pools of the Tidewater Coal Exchange.

Many of our members, in common with the trade generally, have suffered loss by reason of the changes made in assessing freight charges on coal moving through the pools in the early days of the Tidewater Coal Exchange, as well as those caused by the change in the rate.

The Association feels that this is a matter which should have vigorous handling looking to placing the work of adjustment where it belongs, certainly not upon the coalmen, and steps looking to this end are now in contemplation and will soon be put into effect.

Since the ruling of the Fuel Administration fixing the export and bunker margin of $1.35, members of the Association have had hundreds of thousands of tons handled through the agency of the United States Shipping Board, on a large part of which this margin has accrued; but as yet there has been no division of this fund among those interested. The Association purposes actively following up this matter with a view to effecting a distribution of the fund to those entitled to share in it.

The advantages to be gained by the extension of the system of trade acceptances in the coal trade generally are so great that the association will urge this matter strongly on its membership with the hope and expectation that it will be generally adopted.

With the beginning of the new year the gathering of information from members as to the standing of concerns with whom they do business will be taken up, and this information will be available to all members.

Occasion having presented itself for the taking up with the Barge Owners' Association of the matter of delays in the movement of barges by those who perform such service, other than the railroads, assurances have been given the representative of the association that the fullest and heartiest coöperation will be given to correct any such difficulties; and it is expected that when our members have troubles of this nature in the future they will be promptly remedied when handled through the secretary's office.

The coal trade has been so accustomed to sit silently by and permit to go unanswered the most vicious assaults upon its good name for business integrity, that it has now become the fashion among the muck-raking newspaper tribe to print anything that comes to hand, regardless of its relation to the truth. This has so long been the case that the public, in the absence of denials, has come to believe these libels. The officers and directors of the association feel that the time has come to make public refutation of these stories as they appear, and the endeavor will be to correctly inform the public on all such matters as they are brought up from time to time.

The ways in which this association can be of service to its members are almost limitless, and there is a most ardent determination with the membership, through the Board of Directors, to avail of those avenues of activity in the coming year.

Work of the Bureau of Mines During 1918

By VAN H. MANNING
Bureau of Mines, Washington, D. C.

A FEW illustrations of the work accomplished by the Bureau of Mines during the past year in connection with coal mining and fuel investigations are given in this article by Mr. Manning. The Bureau's most important duty was to add its small share toward aiding the country in winning the war. That these investigations were helpful and achieved their purpose have been evidenced by the numerous demands made upon the bureau and the comments of those who were in touch with its various work.

DURING the last fiscal year the Bureau of Mines devoted almost its entire efforts toward winning the war. An organization built up primarily for the greater safety of more than a million miners in the United States found upon the declaration of hostilities that it was thoroughly equipped by reason of its years of investigations to be of immediate assistance to both the army and the navy. Its experience with poisonous and explosive gases, such as are found in mines, suggested that its men might be helpful in developing the poisonous gases used in warfare. Its methods in first aid and resuscitation from the effects of mine gases were such that they could be applied in the medical corps of the army and were of great educational advantage to the fighting men as a whole. The sudden and tremendous demand for coal and the distressing experience of last winter, when the essential war-making factories were beginning to speed up in necessary supplies, indicated that the bureau's studies in the utilization of fuel with greater efficiency would come into important use. In fact, with the experience acquired, and its wide knowledge of mining, milling and metallurgical practice throughout the United States, the bureau was in a position to conduct many special investigations that had military importance and to cooperate with the various agencies that were participating in the great task of converting the country from one engaged in peaceful industry to one seeking to throw its overwhelming strength into the struggle for the preservation of democracy.



VAN H. MANNING

Perhaps the most notable work of the bureau during the war was its development of a great laboratory in Washington for the study of the gases used in warfare. The work the Bureau of Mines is doing on poisonous and explosive mine gases, the use of rescue apparatus and masks, the exploring of noxious atmospheres, and methods of resuscitating persons overcome by bad air had its beginning under the Government about ten years ago. Early in February, 1917, when war between the United States and the Central Powers seemed inevitable, the bureau called the attention of the War Department to the organization and facilities that the bureau already possessed for the study of poison gases, gas masks, etc., and offered these facilities to the War Department for such work. At a conference between representatives of the War College and of the Bureau of Mines, the War Department gladly accepted the offer of the bureau and agreed to support its work in every possible way.

The Director of the Bureau of Mines immediately started investigations of these war problems, and until July 1, 1917, carried the work along with bureau funds. The first work was on the development of gas masks. On July 1, 1917, the staff consisted of 50 paid investigators, and the work had expanded from gas mask research to the study of poison gases and other chemical products used in warfare. In order to enlist the cooperation of the universities and research institutions in the United States, personal visits were made to practically all of the important ones. The response was most gratifying, and some extremely valuable work has come from these universities and institutions.

This gas warfare work was started through the small nucleus of men who had been engaged in gas study in connection with the mines. Before it was finally turned over to the War Department at the close of the fiscal year, this laboratory had grown until it employed a force of 1700 chemists.

The Bureau of Mines can fairly claim that because it started this work on gas warfare and received the hearty support of the army and the navy departments, the National Research Council, state, educational and private institutions, the country is months ahead of where it would otherwise have been; American soldiers have had gas masks and gases with which to combat the enemy. Further, the developments in gas mask manufacture by the Surgeon General's office of the army, in gas manufacture and gas proving-ground tests by the Bureau of Ordnance, and the chemical warfare program of the navy, including the use of smoke screens, shells, toxic gases, etc., are results of this experimental work.

It is sufficient to say that through the energy of the research organization of the bureau the large-scale production of toxic gases was far ahead of the supply of shells.

As to the work done by the Bureau of Mines on the gases of warfare, the Advisory Chemical Board said officially: "The efficiency, success, fine spirit and enthusiasm under the leadership of the Bureau of Mines is a matter upon which we wish to congratulate the bureau, as well as upon the splendid group of unselfish, self-sacrificing men who carried on this arduous and dangerous work. The organization is complex and delicate, but well articulated and working with an efficiency and enthusiasm which have impressed us greatly."

It was soon learned that the engineer regiments, if they were to take part in tunneling work, would need the aid of an efficient mine rescue breathing apparatus. The bureau felt that the Gibbs apparatus, the develop-

ment of which had been in progress under its direction for several years, had been shown to be superior to similar devices for use by men entering poisonous or irrespirable gases. The use of the apparatus was recommended to the army for men engaged in sapping and mining operations. Since the Gibbs apparatus had not been manufactured commercially, contracts were entered into by the Engineering Corps of the army, with a certain manufacturing company of high standing, to furnish apparatus for the army and to the public under license from the Bureau of Mines.

At the request of the Ordnance Department explosives problems were undertaken. Many of these investigations were for the purpose of ascertaining the relative sensitiveness of explosives to frictional and direct impact.



DEMONSTRATING THE EFFECTIVENESS OF THE GIBBS BREATHING APPARATUS IN GASSY MINES

Many problems arose involving substitutes for the scarcer and more expensive constituents of industrial and military explosives. Because of the growing scarcity, through military requirements, of certain ingredients used in industrial explosives, it was thought wise to undertake the testing, for mine and quarry use, of a long-known but little tried explosive—liquid oxygen in a cartridge with carbonaceous matter, fired by ordinary caps or detonators. Results of tests in driving the Simplon Tunnel, in Switzerland, had been successful, but the explosive could not be obtained then at a price to compete with dynamite. However, the method was revived in Germany in 1914 soon after the war began, and in 1915, according to a German mining paper, was being used in three mines in Upper Silesia at costs per unit of coal blasted equal to that obtained with dynamite at 12, 13 and 15 cents per pound. American observers in Germany before the United States entered the war reported that liquid oxygen explosive was then being used extensively for general blasting.

To obtain information as to the strength of the liquid oxygen explosive and the best methods of use, a series of tests was made in the bureau's laboratory at Pittsburgh, carrying and soaking apparatus was made, and favorable tests were conducted in a quarry. Results showed that a mixture of liquid oxygen (85 per cent. oxygen) with carbonaceous and absorbent material was equivalent in strength to 40 per cent. dynamite. The chief difficulty in use is that the liquid oxygen evaporates so rapidly that the cartridge must be used immediately after dipping in the oxygen, hence further investigation is needed to determine the best way in which the explosive can be used practically in mines and quarries.

Work was also done and a report prepared on the use of stenches as a warning in mines. Electric gongs have been used as a means of signaling fires or other serious danger, but have not proved wholly satisfactory. Hence, the use of a stench in the compressed air delivered to all parts of a mine, where it would escape either from leaks or in the exhaust of machines, is offered as a substitute for the electric signals. The minimum concentration at which odors of a number of stenches could be detected in a current of moving air was determined in the laboratory, and the more promising stenches were tested at the experimental mine. The results ob-

tained indicated that this method of signaling will be of great value for warning miners and in future may be the means of saving many lives.

At the request of the War Department, the bureau conducted experiments with microphones and geophones, listening devices, which have been in use to a certain extent during the war to disclose the location of enemy artillery and to detect the presence of enemy mining operations. These investigations were so satisfactory that the bureau has determined to use these instruments in connection with rescue work. As these devices record air and earth waves, it is thought that they will be of value at mine explosions in determining the location of men who may be entombed and thus facilitate their recovery. The fuel problem was one of increasing importance as the war proceeded. During the summer and fall of 1917 the growing realization of a possible fuel shortage brought a large correspondence and many requests from the public for advice and for special direction in fuel problems. The need of more information written in a popular style on fuel subjects was partly met by new publications. In September representatives of the bureau took part in a speaking campaign through Tennessee, the object being to arouse the manufacturers of that state to a realization of the necessity of using coal more carefully.



TESTING LISTENING APPARATUS TO BE USED IN MINES TO LOCATE ENTOMBED MINERS

A considerable part of the time of the chief mechanical engineer was spent at Washington in conference with representatives of numerous organizations undertaking fuel propaganda. For a time it seemed as though too many organizations would undertake to advise the public on fuel problems, and it was feared that this advice would not be properly coördinated and hence would be apt to perpetuate many fallacies regarding the use of fuel. Many of these organizations were giving much heed to methods of presenting information and little thought to what was to be presented, assuming that essential information regarding methods of using different fuels with most efficiency could be obtained at any time.

In order to meet an evident need the bureau endeavored to act as a central source of technical information and to see that the matter being given to the public was not contradictory or inconsistent. Many manuscripts from all sorts of organizations were submitted to the bureau for technical criticism; they ranged from those suitable for publication as Government documents to those that were of temporary usefulness in newspapers and magazines.

In order that the bureau might better perform its function of advising Government organizations in fuel matters and do this in such a way as to command a wider support, an effort was made to obtain the advice and coöperation of the engineering societies, and the engineering council was asked to appoint a committee advisory to the Bureau of Mines. This committee later became a general committee on fuel conservation of the engineering council.

It soon became evident that of the many organizations desiring coöperative connection the United States Fuel Administration was the only one likely to persist. In the early period of building its organization, the United States Fuel Administration referred questions of economy in the use of fuel to the Bureau of Mines, and for some weeks a large correspondence addressed to the Fuel Administration was handled by the bureau. With the development of the conservation section of the Fuel Administration under its own engineers, the bureau continued its relations in an advisory capacity as fuel saving. The bureau also arranged for coöperation with the Society of Heating and Ventilating Engineers. The fuel division of the bureau was also called upon to assist the Emergency Fleet Corporation in the designing and baffling of boilers suitable for the new vessels. As a result of the investigation of one type of boiler used on a certain class of ships, the boilers were so changed that six tons of coal did the work formerly accomplished by seven tons. It is not unnatural to expect that the savings instituted will continue to bear fruit in the months to come.

Severance of Alsace-Lorraine Will Have Effect on Industry

The impending severance of Alsace and Lorraine from Germany, and their return to France, likely will have an important bearing on industry, as these provinces are rich in important minerals. The smelting of the iron ore production, especially of Lorraine, involves large quantities of coke. The old exchange arrangement between France and Germany, whereby German coke was supplied to France in return for ore supplied to Germany, will likely undergo important changes. The reason France smelted little of the ore from these provinces probably was due to shortage of fuel; large quantities of this ore were exported. In the future, trade arrangements will likely undergo radical changes and the coke necessary for the reduction of these ores may be shipped from England. Both France and Belgium's coal mines have suffered severely due to Germany's destructive policy, and a rationing of raw materials among the needy nations may be arranged by the more fortunate possessors of such supplies.

Anthracite Industry in 1918

By EDWARD W. PARKER
Director of the Anthracite Bureau of Information, Philadelphia, Penn.

IN SPITE of adverse conditions such as in no previous time in its history has beset the anthracite industry, the production of hard coal in 1918 was maintained to at least 99 per cent. of the maximum yield of the region, that of 1917. It is estimated by the Anthracite Bureau of Information that including the coal sold locally, the colliery consumption, and the output of the Bernice basin, the production of anthracite in 1918 amounted to 88,815,000 gross tons, as compared with 88,939,117 tons reported by the U. S. Geological Survey as the output in 1917. The first of the adverse conditions that affected the industry in 1918 was the almost continuous zero weather that, beginning early December, extended practically without interruption through January, February and March, seriously interfering with the operation of the breakers and with surface transportation. Notwithstanding the abnormal weather conditions, however, production during these three months was well maintained, February shipments making the second best record for that month in the history of anthracite mining, while March made the record for any month, with shipments amounting to a little over 7,275,000 tons.



E. W. Parker

Frozen switches, car wheels and water pipes, snow drifts and other troubles incident to the worst winter in the records of the weather bureau were overcome, for following the wage bonus granted by the supplementary agreement of November, 1917, the mine workers had determined to make 1918 the record year of anthracite production, and thus further increase their earnings. This determination was encouraged by mine operators, who in addition to spreading "win the war" propaganda among the mine workers, expended millions of dollars in mechanical equipment and labor-saving devices in order to increase production.

Shortage of Labor in Anthracite Mines

The record made in the first three months of the year, showing an increase of more than 600,000 tons over the same period of 1917, would have been maintained and the production for the year would have shown a gain over the preceding year of from 2,000,000 to 2,500,000 tons, had the labor situation remained normal. But army and navy enlistments and drafts, and the lure of high wages and easy terms of employment in shipyards and munition plants, particularly those working on the iniquitous "cost-plus" plan, wrought havoc to the labor supply of the anthracite mines, it being estimated that not less than 33,000 men left the mining regions during the spring and summer months.

Those that remained, however, true to their determination to make coal win the war, continued to maintain the production equal to, and in fact, slightly in excess, of the previous year, until October, when the spread of influenza in epidemic and virulent form so reduced the effective labor supply that production fell off sharply, the shipments in that month being 835,000 tons less than in the corresponding month of 1917. November shipments showed a further decrease of 1,268,654 tons as compared with November, 1917, so that not only was the gain made in the first months of the year wiped out, but a decrease set up in its stead. By December the effects of the influenza had about disappeared, and production was at approximately the same rate as in December, 1917. The shortage of labor and the epidemic were responsible for a loss in possible production to such an extent that an anticipated increase of approximately 2,500,000 tons, based on the record for the first three months of the year, was changed to a decrease of about 135,000 tons.

The production efficiency per man employed in 1918 was worthy of particular notice. The average number of men employed during the year probably did not exceed 155,000. In some months it was considerably below that figure. These 155,000 men produced 88,815,000 tons of anthracite.

Government Control of Coal Industry Beneficial

The year 1918 was unique in the annals of anthracite, as in bituminous coal mining, in that it was a full year of practically complete Governmental regulation of distribution and prices. In many respects this control was beneficial, and was particularly so as compared with the preceding twelve months. At the beginning of Governmental regulation in the summer of 1917, the public was led to believe that prices would probably be reduced, as a result of which many postponed laying in their winter's supply. Prices, however, were not reduced, but on the other hand, as a result of the wage advance in November, were increased 35c. a ton. The mistake of not purchasing in time was dearly paid for, as, due to the necessities created by the entrance of the United States into the world war, the demand for all kinds of fuel became acute; and in addition to this an unusually severe winter set in at an unusually early date, resulting in extraordinary demands for coal which the mines were unable to supply or the railroads to transport. Famine and panic conditions existed throughout the entire winter of 1917-18 and much inconvenience and some suffering resulted.

It is hardly necessary to discuss at length the "heatless Mondays" and other radical measures adopted last winter for the purpose of conserving fuel. It is worth mentioning, however, that probably the most salutary effect of the action of the Fuel Administration in this regard was bringing to the mind of the people a realization of the fact that the United States was actually at war, a fact that many did not at that time fully appreciate. It was one of the first lessons and a good one, and it laid the foundation for the plans of anthra-

cite and bituminous distribution in 1918 that have been carried out with signal success.

Early in the spring of 1918 the task of working out the problem of distribution was placed in the hands of a committee. The preliminary work of this committee was the obtaining from all anthracite producers and distributors a record of the tonnage conveyed to every community in the United States during the coal year from Apr. 1, 1916, to Mar. 31, 1917, and upon this record the basis of the proposed distribution for the coal year 1918-19 was worked out. It was quite evident from the start that some decided, not to say radical, readjustments in the disposition of the country's

ALLOTMENT OF DOMESTIC ANTHRACITE COAL YEAR 1918-19 COMPARED WITH DISTRIBUTION IN COAL YEAR 1916-17

	1916–1917 Distribution (Gross Tons)	Allotment 1918–1919 (Gross Tons)	Increase Per Cent.	Decrease Per Cent
New England States:				
Maine	556,683	660,000	18.56	.....
New Hampshire	314,945	375,000	19.07	.....
Vermont	316,850	330,000	4.15	.....
Massachusetts	5,027,993	5,689,000	13.15	.....
Rhode Island	664,008	800,300	20.53	.....
Connecticut	1,952,900	2,476,700	26.82	.....
Total New England States	8,833,379	10,331,000	16.95	.....
Atlantic States:				
New York	14,169,809	15,855,300	11.89	.....
New Jersey	4,961,622	5,460,784	10.04	.....
Pennsylvania	6,815,650	8,059,700	18.25	.....
Delaware	223,503	245,853	10.00	.....
Maryland	933,889	1,027,317	10.00	.....
District of Columbia	517,760	665,800	28.59	.....
Virginia	256,000	102,400	.....	60.00
Total Atlantic States	27,878,233	31,417,154	12.69	.....
Central States:				
Ohio	585,626	246,250	.....	57.95
Indiana	710,274	284,110	.....	60.00
Illinois	2,215,122	1,750,585	.....	20.97
Michigan	1,589,002	1,201,000	.....	24.42
Total Central States	5,100,024	3,481,945	.....	31.73
Northwest States:				
Minnesota	1,071,532	990,000	.....	7.61
Wisconsin	1,181,926	1,024,000	.....	13.36
North Dakota	249,314	200,000	.....	19.78
South Dakota	207,416	166,000	.....	19.97
Total Northwest States	2,710,188	2,380,000	.....	12.18
Trans-Mississippi States:				
Missouri	129,289	.....	.....	100.00
Kansas	15,907	.....	.....	100.00
Nebraska	130,273	.....	.....	100.00
Iowa	352,496	.....	.....	100.00
Total Trans-Mississippi States	627,965	.....	.....	100.00
Embargoed States	137,966	.....	.....	100.00
Railroad Supply	2,481,754	2,481,754	.....	.....
Canada	3,856,021	3,602,000	.....	6.59
Miscellaneous Exports	51,930	51,930	.....	.....
Army and Navy Camps and Cantonments	.....	600,000	.....	.....
Total	51,677,460	54,345,783	5.16	.....

fuel supply, both as to sections and uses, were necessary, and this was particularly true in regard to the prepared or domestic sizes of anthracite. It was not deemed necessary or advisable to place any regulations on the distribution of the steam sizes, except for some restrictions on the use of No. 1 buckwheat. This has become somewhat of a domestic fuel and its use as such is steadily increasing.

The plan of distribution of the domestic sizes as worked out by the committee and approved by Dr. Garfield, was announced in an address by Mr. Dickson, chairman of the committee, at a meeting of the National Coal Association in Philadelphia, May 29, 1918. It showed the necessity for material increases into the New England and Middle Atlantic states, in order to meet the needs of expanded population in those regions, due to the increased activities of war-materials plants, shipyards, etc. In order to provide for this, shipment of the domestic sizes of anthracite was prohibited into all states south of the Potomac and Ohio Rivers, with the exception of Virginia, and into all states west of the Mississippi, except North and South Dakota and Minnesota. The allotment to Virginia was materially reduced as compared with the shipments made to it in the basic year, shipments to the Central States were reduced by approximately 32 per cent., those to the Northwestern States by a little over 12 per cent., and to Canada by 6.6 per cent.

Subsequently the allotment to Virginia was increased by 65,000 tons, Iowa was given 145,000 tons to be distributed in the northern part of the state, and a small allotment was given to the northeastern section of West Virginia.

So efficiently has the committee carried out its program of distribution that the Northwestern states had received their full supplies before the close of lake navigation, New England in nine months had received nearly a ten-months' supply, and at the end of the calendar year coal was moving freely into those communities whose quotas had been held back somewhat in order to provide the Northwest and New England with fuel before winter weather prevented. The situation has been materially aided by the mild weather that has so far prevailed this winter and which has been in striking contrast to the winter of 1917-18. The new year opens with no reported suffering because of a shortage of anthracite, and with excellent promise of sufficient supplies and adequate transportation facilities to meet all current needs, a condition radically different from that of a year ago.

Public Wanted Any Kind of Coal

In January, 1918, the public was clamoring for any kind of coal; size made no difference and white ash was as good as red ash, and red ash as good as Lykens Valley; the cry was for "anything that was black." At this writing the consumer is demanding stove and nut almost exclusively, and stipulating the grade as well. It is quite evident to those familiar with the anthracite trade that had it not been for the effects of the influenza which curtailed production to the extent of approximately 2,500,000 tons, there would be more anthracite on the market today than it could readily absorb. Even now in many sections the steam sizes of anthracite coal are literally a drug on the market.

During the last two months of 1918, prices for anthracite have been higher than at any time since the Civil War. The advance in price, however, has not inured to the benefit of the operators, but has been absorbed entirely by the increase in wages given as a war bonus with the approval of the Fuel Administrator in November and made retroactive to Nov. 1. In fact, the returns on the capital invested in the anthracite industry have probably been less in 1918 than under normal conditions. It cannot be said that the Fuel Administration has been partial to the anthracite operators. Prices have been strictly held to the added cost of production in labor alone, without allowance for the increased cost of supplies, and other added expenses due to war conditions.

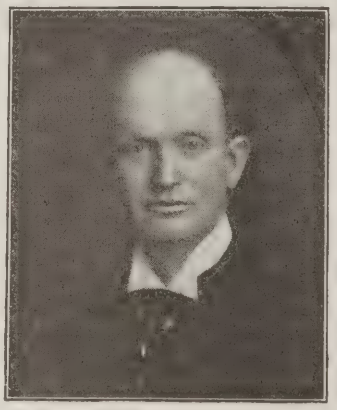
In November, 1917, when the second war bonus was granted, it was estimated that the average increased cost per ton would be 45c., and the Fuel Administration

was requested to allow that much to be added to the price. It permitted an advance of 35c., and although it was shown that the total average cost had been increased 78c., instead of 45c. following the November, 1917, wage increase, no allowance was made for it in adjusting the price following the new wage bonus in November, 1918, other than to permit the steam sizes to take the same advance as the domestic sizes. This was a questionable benefit, since at that time the steam sizes and become an oversupply and were being stocked in the storage yards of some of the larger companies. The industry absorbed the difference, and in addition assumed practically the entire cost of its own regulation by the Fuel Administration.

Readjustment Problems of the Coal Industry

By ERSKINE RAMSAY
Birmingham, Alabama

FORTUNATELY for mankind the work of making war is over and the reconversion of business to a normal basis should be done on some plan which will give the least possible shock to financial and industrial life. The transition from peace to war was quite painful, and unless the problems now confronting us are skillfully handled there is every reason to expect that the change back to peace will be equally as troublesome. The coal business is confronted with a serious situation; this comes from the fact that the coal operator during the war—from patriotic reasons, though knowing it was not good business—did his full duty and expended enormous sums of money in pushing development. Owing to this unusual development, made to win the war, the mine capacity is now far above the normal output of prewar times, and the capacity will further increase as the boys return home and resume their usual work. The present demand is not sufficient to take the output when running full. In the past such a situation always resulted disastrously for the operator. Before the war many mines were operated at a loss and unless prompt and effective steps are taken, this condition will return.



ERSKINE RAMSAY

It may be said that the public is not interested that any particular line of business should be operated without loss. With coal it is certainly different, as unprofitable mining with the necessity of low production costs and expenditures does not permit of the best methods of mine working being employed. Under such conditions necessary modern development and equipment required for economical mining and relatively complete recovery of coal cannot be provided. The more economically coal is mined and prepared, the cheaper the public will get its supply; as coal is one of the country's most valuable natural resources, conditions should be maintained which will insure the recovery of as near 100 per cent. of the coal as possible.

It is just as unfair to the country as a whole to permit coal to be sold at prices below the cost of production as it is for coal operators to take advantage of opportunities to make the consumer pay exorbitant rates; a way should be devised to avoid both such situations. We all remember how Mr. Peabody wisely started a scheme of voluntary price regulation, which work was later admirably carried on by Dr. Garfield, Director of the Fuel Administration, backed with full legal authority under the Lever Act. It will be a calamity to permit the abandonment of such war regulations before the signing of peace and before the National Coal Association, the United States Chamber of Commerce or some other competent agency works out an effective plan of regulation for submission to Congress, and which will insure stable prices and conditions, and friendly relations between business and government. The coal business has suffered greatly in the past by the railroads using their car supply as a bait for obtaining prices below the cost of production. In many cases the railroads have arbitrarily named prices and practically said "this or nothing"; when low prices were thus forced on the mines it went a long way toward pulling the prices on other things below cost.

The coal people of this country, in order to avoid wasting our coal deposits, must endeavor not to repeat the harmful practices of the past, which did great damage to both capital and labor.

The hundreds of thousands of men and women engaged during the war in making the many things required by the men at the front will now be compelled to secure other work. This readjustment of labor will necessarily call into play our greatest resourcefulness to successfully meet its difficulties and problems.

British Recapturing Business

BRITISH shipping interests are already making a great drive to recapture the ocean carrying trade which they were forced to relinquish during the war. According to information obtained recently in local shipping circles, British freight rates to South American ports have been reduced so heavily since the armistice was signed as to increase substantially the normal disparity between rates from Liverpool to South America and rates from New York to South America. As one instance it was stated by a member of a leading New York firm that the rate on general merchandise from Liverpool to Brazilian ports is now $10 a ton, or 66⅔ per cent. lower than the New York rate to the same ports, whereas before the war the difference was approximately $2 a ton, or 40 per cent. Advices received here are to the effect that the Liverpool rate to South American ports is around $15 a ton, against a range of $25 to $27.50 a ton for shipments from New York to the same ports.

Activities of the National Coal Association During 1918

A Resume of the Efforts Put Forth by the Association to Secure the Co-operation of the Bituminous Coal-Mining Industry with the Government in Its Prosecution of the War Program, and an Indication of What the Association's Work May Be in the Future

By J. D. A. MORROW
General Secretary, National Coal Association

A YEAR ago the National Coal Association was just getting under way in its effort to secure the fullest coöperation between the bituminous coal-mining industry and the government in the prosecution of the nation's war program. That effort occupied the attention of the association throughout practically the entire year. A brief review of what the organization accomplished in this respect is therefore quite appropriate. At this time also, with the association, the industry, and the nation facing the problems of peace and a world permanently changed in many ways, it is equally appropriate that we indicate briefly the direction which the association's work conceivably may take under these new conditions.



J. D. A. Morrow

A year ago the public had a right to expect that this industry would do its utmost to coöperate with the United States Fuel Administration, so that this nation and its allies might have the necessary quantity and quality of coal needed for the successful prosecution of the war. They also expected that this output would be placed in the hands of those who could use it most effectively for the same purpose.

The bituminous coal-mining industry has made good in meeting this expectation. It has produced a record tonnage estimated at 587,500,000 tons during the calendar year, more than 318,000,000 tons of which have been produced in the last six months of the year. Moreover, this tonnage has gone where the government wanted it to go, in full accordance with the plans of the Fuel Administration, the War Industries Board, the army and the navy.

The National Coal Association does not by any means claim all the credit for this memorable achievement. It has been the means, however, through which it was possible for Dr. Garfield at all times to keep not only fully in touch with the industry, but to have its thoroughgoing assistance and support. It was by utilizing in large degree existing machinery, built up by the constituent associations of the National, that the distribution plans of the Fuel Administration were carried out so successfully. Many of these local associations turned over their offices to the use of the Fuel Administration, including their secretaries, offices, employees and advisory committees. In brief, by utilizing these organizations in the industry, the Fuel Administration was able promptly to organize effective distribution machinery, relying throughout on the services of practical men who knew their own particular localities most intimately.

The record production of bituminous coal in this year was possible largely because the National Coal Association united all its energy with that of the Fuel Administration to remove every obstacle in the way of increased output, to increase the efficiency of the mine management, and to exert all pressure possible in order to produce coal. The result is historic. To me, it is just as remarkable a story as that of shipbuilding in the United States. Mr. Hurley and Mr. Schwab had a new industry to create. They were handicapped by many disadvantages and trials because it was new and had to be created from the ground up, but they also enjoyed the immense advantages of this same condition. They had every opportunity to revolutionize a little, mediocre, hand-to-mouth industry simply by applying the well-known principles of large scale manufacturing. That concept was one of striking genius, but the application of large-scale, standardized quantity production, not at all new in American business, produced miraculous results in a short space of time.

On the other hand, the bituminous coal-mining industry lost approximately 100,000 of its men to the army and still more to other industries; and with this reduction in its operating force it was called on to produce coal at the rate of 52,000,000 tons per month, which was 6,000,000 tons a month beyond the previous high record. Its task was to accomplish this result with 100,000 of its younger and finest employees absent from its ranks. Moreover, when this call came it was already a splendidly organized industry. The bituminous coal mines of the United States were by all means the finest in the world. They were better equipped with mechanical devices than any other. They were operated with all the practicable and tested advantages of American industrial achievement. This was a vastly different proposition from that of the Shipping Board. Beating the coal production record of 1917 was very much like asking a runner to beat a 10-sec. mark for 100 yards; the performance of the Shipping Board was much more like asking a trained sprinter to beat a 15-sec. record for the 100 yards.

Nevertheless, in the face of these conditions, which should be clearly understood to appreciate the magnificent response of the bituminous coal-mining industry to the nation's demand for coal, the production for the calendar year broke all previous records; from July 1 to Oct. 1, when peace negotiations and the influenza checked production, the output averaged approximately 55,000,000 tons a month, or at the rate of 660,000,000 tons a year. On Oct. 1, in spite of the handicaps of the beginning of the year, coal production was measurably up with war demand, and even had hostilities continued through the winter and requirements for coal for war needs continued as anticipated, everyone in Washington was confident that the bituminous mines would have produced the full tonnage asked of them before the coal year had ended.

There were moments, however, in the spring and summer when it seemed to be an open question whether the country would have as serious a shortage as last winter's or a more serious one. Every energy of the industry was then turned to maximum production. A census of bituminous mine employees was taken, revealing more than forty nationalities; an educational campaign was started in nine languages; and more than 12 tons of printed matter was distributed by the National Coal Association alone, through local associations and other agencies, to the miners. And the industry made good.

I dwell on this achievement of the bituminous coal-mining industry because we all take it too much as a matter of course. We are too accustomed to its tremendous achievements year by year to weigh properly such a record as it has made during 1918. It is the kind of thing that Lowell meant when he spoke of the "miracles of the commonplace." As this article is being written the directors in a meeting, at which prominent operators from all parts of the country will be present, are working out general plans for the activities of the Association under the conditions of reconstruction and peace. The task here is to make sure that the industry is amply equipped with the information and legitimate assistance that it may derive from a national federation of local associations, in such an organization as the National Coal Association.

NOT only has the National Coal Association assisted the soft coal industry during the last year in a truly remarkable fashion, but it has awakened the industry to a new sense of its dignity and power. For the first time the bituminous coal operators now have a national viewpoint and a national organization that has made itself known and respected throughout the nation. It has been the means of gaining for the industry a public recognition that was never accorded to it before. With a successful working out of the many plans now receiving the attention of the members of the association will come a finer spirit among the operators themselves.

In years gone by, one of the chief weaknesses of the industry was its lack of accurate information concerning market conditions. Hundreds of bituminous coal operators were strikingly ignorant of costs, selling prices, stocks and other market conditions. In consequence, they and the industry were at the mercy of rumors, uncertainties and deliberate falsehoods. Other leading industries of the nation, however, had made it their business to equip themselves thoroughly with the fullest kind of information that affected the production and marketing of their products. The individual member of these industries therefore was able to decide his production and marketing policies intelligently, and on the basis of definite facts and figures. On the other hand, the bituminous coal operator all too often decided his production plans and marketing policies on incomplete or incorrect information. To remedy this former weakness of the industry is a great undertaking, but it will receive the fullest consideration of the board; if it seems practicable some action will be taken to give the members of the National Coal Association and its constituent local associations the fullest possible information regarding market conditions.

A thoroughgoing knowledge of costs is recognized as the foundation of conservative conduct of any business. In this respect also the coal industry in years gone by his been wofully lacking. Such information is of equal importance with facts concerning market conditions. The National Coal Association has recently organized a Cost Accounting Department which is working in conjunction with a Cost Accounting Committee (of which T. T. Brewster, of St. Louis, is chairman) in an effort to devise with the help of the industry, the Treasury Department and the Federal Trade Commission a thoroughly sound and acceptable definition and classification of costs which may become the basis for uniform cost accounting in the industry.

If such a system can be worked out and established, it will save both the operators and the government much inconvenience and expense in making reports to Federal agencies, and it will also educate hundreds of operators to a better understanding of their production and marketing costs that they ever have had before. If such information, combined with the facts regarding marketing conditions, can be put generally in the hands of the industry through the medium of the National Coal Association and local organizations, bituminous coal operators will compete with each other for the first time in the United States on a basis of intelligence instead of ignorance. The future work of the association, therefore, lies along constructive lines for the permanent lifting of the industry onto a new plane of participation in American business. It means a coöperation with a half-dozen departments of the government. It means better coöperation through the industry. It implies a finer spirit among the operators themselves and it means a great deal of detail work to carry these efforts to successful realization. In the past year, the association has made a record of which it may well be proud, but its real work is only starting.

[As this issue of *Coal Age* goes to press reports come to hand of the meeting of the National Coal Association at Washington, at which bituminous operators from every section of the country took steps to place on foot the plans referred to by Mr. Morrow in the foregoing article.—Editor.]

Coal-Mine Fatalities in 1918*

By ALBERT H. FAY
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PRELIMINARY reports received from the state mine inspectors for the first eleven months of 1918 show a reduction of about 7½ per cent. in the total number of fatalities in the coal mines as compared with a like period for 1917. The total number of fatalities reported to the Bureau of Mines to the close of November is 2281 in 1918, as compared with 2471 in 1917. The principal decrease is in gas and coal-dust explosions. In these two items alone there is a reduction of 211 fatalities. There is also a reduction of 25 fatalities due to mine cars and locomotives, and a slight reduction due to hoists, cages and skips. A slight increase is shown in fatalities due to falling coal or rock, the use of explosives and electricity. With no serious disasters for the month of December, the net decrease for the year should be about 190, as indicated in the accompanying table.



ALBERT H. FAY

Complete figures for the number of men employed during 1918 are not yet available, but on account of war conditions the number undoubtedly will be less than in 1917, when there were 757,317 men engaged in coal mining. The number of days worked during the year will be in excess of previous years, and the tonnage won will tend to offset shortage of labor. In 1915 the average number of days active were 209; in 1916, 235; and in 1917, 251.

Concerning 76 of the 112 fatalities due to mine explosions, sufficient information was obtained to show that 51 per cent. were due to explosions caused by open lights and 37 per cent. were due to shots. The electric arc was responsible for about 6 per cent. This emphasizes the need of abolishing the open light in all doubtful mines, more care in the use of explosives and more thorough inspection and installation of electric lines.

In 1918 there were reported only three mine explosions and one mine fire, in each of which more than five men were killed, representing a total of 52 fatalities as compared with eight similar disasters in 1917 resulting in 256 fatalities. This indicates a considerable advance in the use of safety devices and appliances for the prevention of mine explosions.

FATALITIES DUE TO GAS AND COAL-DUST EXPLOSIONS

Cause	Number Killed	Per Cent.
Due to open light	39	51.3
Due to defective safety lamps	2	2.6
Due to electric arc	5	6.6
Due to shot	28	36.9
Due to explosions of powder	2	2.6
Total	76	100.0

A chronology of these accidents and their results is as follows: May 20, Villa mine, Charleston, W. Va., mine fire, 13 killed; Aug. 7, Harmar mine, Harmarville, Penn., explosion, 5 killed; Aug. 28, Burnett mine, Burnett, Wash., explosion, 12 killed; Sept. 28, North mine, Royalton, Ill., explosion, 22 killed. Fatalities due to electricity at coal mines increased 13 during the year, or about 15 per cent. Forty-six of the 87 fatalities may be segregated as indicated in the accompanying table, in which 28, or 61 per cent., were due to coming in direct contact with the trolley wire; 11, or 23.9 per cent., were due to contact with mining machines, while feed wires were responsible for 10 per cent. Fatalities such as these call for better installation of trolley wires, locating them out of reach of workmen, or, when this is not practicable, guards should be provided that will make it almost impossible for one to come in contact with the live wire. Electric haulage roads should not be used as manways where it is possible to travel along other entrances and exits. Mining machines and machine feed wires should be inspected frequently to see that the insulation is in perfect condition.

FATALITIES DUE TO ELECTRICITY

Cause	Number Killed	Per Cent.
Direct contact with trolley wire	28	60.9
Bar or tool striking trolley wire	2	4.4
Contact with mining machines	11	23.9
Contact with machine feed wire	5	10.7
Total	46	99.9

Accidents Due to Cars and Motors

Of the 431 fatalities due to mine cars and locomotives, the inspectors' reports covering 229 of them show

COAL-MINE FATALITIES FOR THE FIRST ELEVEN MONTHS OF 1918, COMPARED WITH THE SAME MONTHS OF 1917

Underground	January-November, 1917	January-November, 1918	Increase or Decrease
Falls of roof (coal, rock, etc.)	1,066	1,008	+21
Falls of face or piller coal	68	147	
Mine cars and locomotives	440	431	—9
Gas explosions and burning gas	172	73	—99
Coal-dust explosions (including gas and dust combined)	151	39	—112
Explosives	10	110	+9
Suffocation from mine gases	12	15	+3
Electricity (shock or burns)	74	87	+13
Animals	10	6	—4
Mining machines	16	18	+2
Mine fires (burned, suffocated, etc.)	2	18	+16
Other causes	70	53	—17
Total underground	2,182	2,005	—177
Shaft			
Falling down shafts or slopes	23	24	+1
Objects falling down shafts or slopes	5	9	+4
Cages or skips	16	9	—7
Other causes	4	3	—1
Total shaft	48	45	—3
Surface			
Mine cars and mine locomotives	86	70	—16
Electricity (shock or burns)	16	17	+1
Machinery	43	38	—5
Boiler explosions or bursting steam pipes	6	6	0
Railway cars and locomotives	16	23	+7
Other causes	74	77	+3
Total surface	241	231	—10
Grand total	2,471	2,281	—190

*By permission of the Director of the Bureau of Mines

sufficient details to make the following classification possible:

FATALITIES DUE TO MINE CARS AND LOCOMOTIVES

Cause	Number Killed	Per Cent.
Switching and spragging	3	1.3
Coupling cars	8	3.5
Falling from trips	27	11.8
Run over by car or motor	97	42.4
Caught between car and rib	48	20.9
Caught between car and roof while riding	9	3.9
Runaway car or trip	37	16.2
Total	229	100.0

It will be noticed that fatalities while riding on cars are still common, the number of deaths by falling from trips being 27, and those due to being caught between car and roof while riding being 9, or about 15 per cent. of the haulage accidents. Accidents while riding can be reduced by enforcing more strict regulations with reference to riding on the cars.

Another important item under haulage accidents are fatalities due to being caught between the car and rib, representing about 21 per cent. These can be reduced by widening the haulageways, or by cutting additional safety niches, at intervals of 50 to 100 ft., where it is not practicable to widen the entire haulageway. The figures in the table show that 16 per cent. of the haulage fatilities are due to runaway cars or trips. There is therefore still room for mechanical improvement to prevent such accidents.

FATALITIES DUE TO EXPLOSIVES

Cause	Number Killed	Per Cent.
Transportation of explosives	8	15.1
Charging	4	7.5
Suffocation	3	5.6
Drilling into old holes	2	3.8
Caps, detonators, etc	1	1.9
Returned too soon	13	24.6
Premature shot	6	11.2
Sparks from match, lamp, or candle	7	13.2
Delayed blast	2	3.8
Shot breaking through rib or pillar	7	13.2
Total	53	99.9

The total number of fatalities arising from explosives was 110, showing a slight increase over the previous year. Of this number 53 may be segregated as indicated in the table shown above.

The Business Outlook in America

By Charles S. Keith

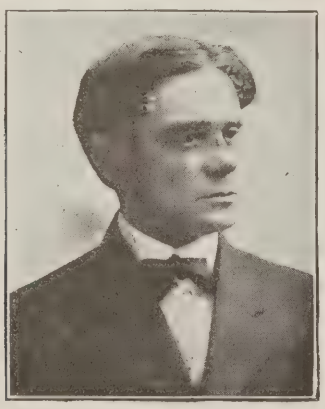
President Central Coal and Coke Co., Kansas City, Mo.

I BELIEVE the United States is in for several years of prosperous conditions. Here are the facts upon which I predicate such a conclusion:

1. Europe's supply of raw material, which she does not herself produce, has been depleted.

2. Farm products in the United States have been at a high price since 1914 and our farmers never were more prosperous.

3. Due to the price of wheat having been guaranteed for next year, and the world's shortage of fat, the prices of farm products will remain at a high level during 1919.



Charles S. Keith

4. Because of the immense shortage of shipping, Europe will purchase her supplies from the nearest sources of production. A ship can make three round trips between New York and Liverpool in the time required for one trip to Australia.

5. The United States is the only country financially able to assist the nations of Europe in their work of reconstruction and replenishment.

6. In the United States today the delayed building amounts to more than $3,000,000,000.

7. As each month passes more ships will be released from the work of transporting troops from France.

8. The present stocks of practically all commodities are low. In the matter of lumber only 46 per cent. of the normal supply remains at the mills, and but 75 per cent. of the normal supply remains in the hands of retailers.

In the face of such truths it is not logical to conclude that business is going to be poor.

Pulverized Coal for Metallurgical Use Should Possess Little Sulphur

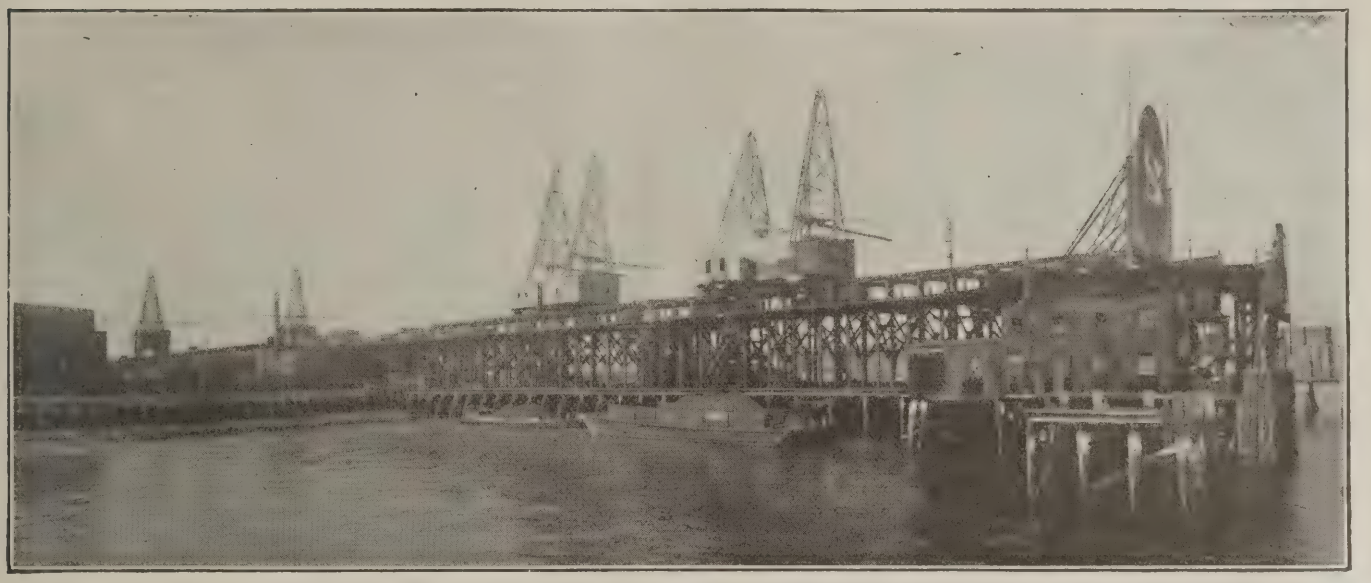
Pulverized coal for metallurgical use should have a low percentage of sulphur, for the sulphur of the coal has a remarkable way, especially in the open-hearth furnace, of entering into the finished product. The ash in anthracite, coke breeze and lignite, speaking generally, will slag at the same temperature as the ash in bituminous coal. Therefore, the furnace temperatures may rise higher than the fusing temperature of the ash in the fuel.

The reason why the fusing temperature of these fuels is not so important as the fusing temperature of bituminous coal is because, in general, the combustion of the other fuels when they have been pulverized does not produce so high a temperature as does pulverized bituminous coal. In a well-designed furnace, temperatures about 2250 deg. F. (1235 deg. C.) will be obtained with anthracite, coke breeze and lignite, and slags will be formed.

Much emphasis has been laid on burning all the coal to carbon dioxide. To do this a higher temperature is sought by diminishing the amount of excess air. But these high temperatures cause ash, slag and clinker to form on the tubes, checker work and furnace walls, and this is detrimental—*A. V. Adamson, Bulletin, American Institute of Mining Engineers.*

Trade Conditions in New England in 1918

By G. G. WOLKINS
Boston, Mass.



LIGHTERAGE PLANT OF THE METROPOLITAN COAL CO., SOUTH BOSTON, MASS.

THE distributing factors showed a splendid spirit of coöperation throughout 1918. The Fuel Administration had complete charge of the industry, but the trade loyally responded to every appeal, and there was gradually built up an understanding of ways and means that led to the heaviest tonnage New England has ever known.

The first half year there were grave doubts whether this territory could possibly get its quota. A breakdown was feared, and more than once the strong arm of the Government had to strike a balance; but in review 1918 will stand out distinctly as a year of maximum effort. The bill came high, but never was railroad service so adequate; never were so many ships; and never was so great a reserve piled up. In the light of balanced production New England industries were indispensable, and it was due to the remarkable teamwork of patriotic and capable men that this fact was recognized at Washington.

General Features

Confining our review to New England, there were situations and developments peculiar to the Northeast that ought surely to be included. To go beyond the intense cold that closed harbors and paralyzed train movement for days at a time, there was evolved the famous New England priority order of Jan. 3, designed to furnish an ample and continuing supply of emergency coal for distribution east of the New England gateways. Diversion of 1000- and 1500-car lots had already been accomplished en route to the Shippensburg bottle-neck, and to provide billing, etc., a unique system was devised. The New England wholesalers, all of whom were being regularly deprived of coal through intervening mandates of the fuel authorities, were invited to finance the whole arrangement, taking for their services, the credit risk, and mental suffering, a special indulgence of 15c. A staff was organized, something like 2,000,000 tons all told was handled, and now, a year later, the device is still in operation, for the straightening of accounts. Invoices were "allocated" as nearly as possible on an equitable basis; the merchant or "jobber" paid promptly and then looked to the consignee in each case for reimbursement. The scheme had many merits, not least among them the active interest it roused among trade veterans who might otherwise have sulked in their tents.

Another feature was the broadminded way in which distribution was effected, often without too much regard for decrees at Washington. Centers of population were not put out of business because their supporting industries happened for a time not to be on a "Preference No. 1 List," and good sense was shown in not interfering more than seemed necessary with the normal trade channels of supply. Early in January Boston was down to four days' reserve, and distracted retailers in several instances closed their doors to protect their property from angry householders. Distress was frequently averted by refraining from the wholesale diversions practiced in other sections. There was a weighing and balancing of the claims of different communities, a process in which experienced coal men were

RECEIPTS OF GROSS TONS OF ANTHRACITE COAL BY SEA AT BOSTON

	From Philadelphia		From New York Ports		Totals	
	1917	1918	1917	1918	1917	1918
January	32,019	10,122	65,042	20,600	97,061	30,722
February	16,575	21,754	45,619	24,082	62,194	45,836
March	69,375	68,966	91,652	39,349	161,027	108,315
April	44,689	34,132	87,511	66,923	132,200	101,055
May	41,985	41,111	78,455	99,860	120,440	140,971
June	51,332	28,644	87,627	104,290	138,959	132,934
July	53,299	31,934	90,767	101,943	144,066	133,877
August	50,274	46,411	92,850	79,776	143,124	126,187
September	57,425	4,825	85,188	106,064	142,613	110,889
October	28,696	5,569	73,733	81,502	102,429	87,071
November	28,185	2,448	63,149	72,829	91,334	75,277
December	.....	5,200	53,213	63,833	53,213	69,033
Total	473,854	301,116	914,806	861,051	1,388,660	1,162,167
1916	524,220		956,676		1,480,896	
1915	548,689		960,331		1,509,960	
1914	624,798		1,094,241		1,719,099	
1913	582,183		1,094,128		1,676,311	
1912	579,778		1,054,378		1,554,156	

in position to advise, and there was a general absence of that panicky disposition which could only have been disastrous. Coal was taken out of schoolhouses only when hospitals and families needed instant relief, and coal was withheld from important industries only when pumping stations and other vital necessities were operating on margins too narrow for the public security.

The bulk of the tonnage came through normal channels, much as usual, but a great deal more than the excess over 1917 was supplied as "emergency fuel." The increase from central Pennsylvania only made up for the zoning away of Pittsburgh output and the reduced volume from adjoining districts. The heavy movement over Baltimore piers during July, August and September was intended to replace coal usually furnished all-rail or transshipped at New York, as well as yield a part of that additional supply demanded for New England's absolute needs. The greater proportion of this emergency coal was furnished through the Shipping Board and other Government pool accounts at Hampton Roads, but in most cases after April and May it was shipped and invoiced by the usual trade agencies. Several of these shippers very largely increased their tonnage, while all-rail practically every New England house in the business showed a heavy shrinkage, after vicissitudes that for weeks at a stretch left the middleman high in the air. Many of the all-rail houses rebilled coal at invoice to themselves purely to hold customers in line, the fuel regulations having come in to prevent more than 15c. as compensation for a service often divided between two selling organizations.

The authority given fuel officials to requisition coal, a power often used only with regard to some specific case at that moment in view, resulted too frequently in disrupting normal, well-matured plans of distribution, and early in the year there was a marked tendency toward "emergency orders all-rail," much the less expensive route. When serious demurrage charges began to accrue on waterborne coal from Hampton Roads, the differential was in some instances $3, $4 and sometimes $5 per ton, but those New England consumers elected to pay the freight took their medicine rather more cheerfully than might have been expected.

In 1918 there were two well-defined periods, of six months each. In the first there was great anxiety lest the supply be interrupted. To get coal every expedient was tried. In May alone, notwithstanding the most binding of promises, the total loss was 530,308 net tons, as compared with May, 1917, an alarming figure when all estimates had been based upon heavy gains during the summer months. Ships were not to be had in sufficient number; submarine ventures were threatening; all the early programs fell short of being practical; there was wavering between state administrators and Washington as to what were to be made special cases, and what were to be left to individual action and to chance.

Receipts were steadily falling behind; there was need of cloth for uniforms, need for surgical dressings, shoes, gas masks, need for innumerable supplies to be had almost exclusively from this territory; and not until labor organizations and manufacturers' committees joined in shouting "No coal, no supplies," did there seem to be any effective response. At last, in July, ships appeared as out of the night, and coal in great junks, both by rail and by water, began literally to be thrown at New England. It was as if every unheard petition of months was suddenly answered, and in good measure, full up and brimming over. Enterprising industrials had used every means at command to get coal, and, as it seemed, every forlorn hope was now being made good. There is credit due the New England Fuel Administrator for perseverance during a trying season, but it should be remembered that among his associates in the Massachusetts Committee of Public Safety were gentlemen of far-reaching influence, who were able at the appropriate hour to turn the right key. And there came a time in September, when it took almost the same tremendous effort to get it stopped! For several weeks there was no Gargantua to turn off the spigot!

On Oct. 1 the official report charged Massachusetts with 19 weeks' supply, greater than any state but Minnesota. New England was plugged full; and for trade or market the balance of the year was nothing to talk about. Everything together, it is quite within bounds to add that never in twelve short months were there both famine and feast the equal of 1918.

In New England, as elsewhere, the mid-year change of outlook was due more than anything else to the great gain in car movement. The effective pooling of equipment made it possible to pass unbroken trains through the New England gateways. Thus the roads gave better service.

RECEIPTS OF GROSS TONS OF BITUMINOUS COAL BY SEA AT BOSTON, SHOWING PORT OF SHIPMENT*

	Baltimore		Norfolk		Newport News		Philadelphia		New York Ports		Totals (Coastwise)		Foreign†	
	1917	1918	1917	1918	1917	1918	1917	1918	1917	1918	1917	1918	1917	1918
January	73,854	41,238	240,422	182,079	96,131	22,750	31,544	8,004	5,092	10,237	447,043	264,308‡	24,612	17,334
February	28,393	44,102	206,088	237,412	56,939	47,570	3,459	8,653	4,838	4,433	299,717	348,030	27,706	20,334
March	61,522	60,244	305,606	395,411	66,840	38,149	4,198	7,588	4,198	6,319	442,252	442,252	22,664	15,556
April	58,015	53,454	328,193	319,106	42,397	13,600	.....	7,073	6,326	33,210	434,913	426,443	27,061	.....
May	68,104	88,540	276,394	420,332	38,780	49,537	.....	5,815	8,888	52,498	392,166	616,722	13,930	2,359
June	56,516	105,770	217,961	260,520	44,184	63,042	4,003	5,380	4,341	29,281	327,005	463,999	15,565	20,107
July	51,374	174,399	222,891	360,967	40,652	36,286	11,510	18,146	8,222	25,640	334,643	615,638	21,320	20,113
August	39,504	200,914	272,546	348,492	34,016	70,204	22,254	11,828	8,269	38,351	376,589	670,124	35,694	8,815
September	30,419	158,976	221,445	314,127	41,256	40,117	6,067	9,775	5,264	18,533	304,451	541,528	28,362	21,723
October	39,896	108,605	169,587	242,701	35,964	25,217	7,388	6,986	11,124	30,592	263,959	414,101	21,437	28,693
November	45,247	81,257	203,895	289,579	36,310	40,284	7,293	18,565	13,860	23,198	306,605	452,883	21,611	9,047
December	34,849	70,922	134,150	140,499	27,484	36,899	27,453	7,785	.....	13,834	223,936	269,939	15,650	.....
Total	587,692	1,188,421	2,799,178	3,511,225	560,953	483,655	125,169	115,598	80,422	286,126	4,153,289	5,525,967	275,612	164,081
1916	836,055		2,853,185		873,980		287,795		42,892		4,910,687		344,792	
1915	1,172,431		2,212,530		680,929		403,927		24,604		4,610,312		440,615	
1914	1,158,266		2,637,632		611,369		456,446		3,095		4,866,778		258,647	
1913	1,164,514		2,485,679		737,647		553,573		3,274		4,944,687		269,659	
1912	1,361,994		1,836,750		945,803		322,334		9,600		4,665,520		309,106	
1911	1,576,397		1,218,391		921,220		381,961		3,776		4,101,745		26,861	
1910	1,595,554		795,475		1,243,857		292,636		25,515		3,954,251		296,564	
1903	481,111		314,505		596,439		.....		.....		2,081,819		1,226,134	

* Courtesy of the Boston Chamber of Commerce, Statistics Department. † Almost exclusively from Louisburg, Cape Breton, except during 1903, when a large tonnage came from Great Britain to relieve shortage because of strike. ‡ Includes one cargo, 5,860 tons, from Charleston, S. C.

than consignees had ever known. The quota of 1,000,000 net tons monthly, Apr. 1 to Oct. 1, was exceeded, and yet in June, following the two heaviest months, it was officially stated by representatives of the Boston & Maine, the Boston & Albany, and the New Haven, that, based upon movement at that time through the western gateways to New England, there could have been handled an additional quantity of all-rail coal into New England of 450 cars per day. Certainly this is eloquent of enlarged capacity on the part of roads that too often have found themselves overburdened.

That was precisely the case in January-February, 1918. Congestion at Maybrook, N. Y., one of the five gateways, was unparalleled; 4000 loaded coal cars were backed up beyond, and congestion in several of the mining districts was something tremendous. Divisions normally moving 2000 loaded coal cars daily had 10,000 on tracks, and the average haul per day was down to 12 and 14 miles. The loss of car service through extreme cold and the comprehensive diversion to tidewater of coal originally routed all-rail seemed to make it clearly impossible in February to get adequate shipments, even in what had always been considered rail territory. It was also made clear that requirements in New England were increasingly dependent upon ships. It was taking six weeks for cars to come through to points like Worcester, Mass., and this fact together with the long hauls to remote destinations had a distinct bearing on the number of cars forwarded.

The Railroad Administration order of Jan. 3 requiring cars to be placed at designated mines in addition to the usual distributive share of the general car supply was a well conceived attempt to meet the emergency needs of a large number of important steam users in distress for dependable supply. Coal emanating on the Western Maryland and on the Baltimore & Ohio on a program of 200,000 tons annually was eliminated in June from all-rail movement upon the understanding it would reach New England by water through Baltimore and New York piers, a restriction that was not lifted until Dec. 20. In April the New England railroads were sending empties to the mines in an effort to build up fuel reserves, but apparently there was only one result—car shortage at the rehandling wharves at this end.

By May there was wonderful improvement. All operating embargoes against New England roads had been raised, and cars were coming through in eight or nine days to points like Worcester. Manifestly, congestion was being cleared up for the season, and yet so strong is the habitual cast of thought that there was

RECEIPTS OF ANTHRACITE COAL BY RAIL AT BOSTON

	1917	1918
January	30,379	33,453
February	13,874	23,188
March	21,425	42,526
April	12,343	23,256
May	23,546	20,482
June	15,527	15,527
July	19,215	33,420
August	17,196	28,581
September	13,504	26,259
October	18,502	29,348
November	16,275	17,630
December	15,622	20,740
Total	217,408	314,410
1916	292,599	
1915	192,442	
1914	192,426	

constant talk throughout the spring and summer of "zoning" consuming territory as between rail and water deliveries. Much hard work was put into this proposal. A hearing was held in Boston on June 4 by representatives of the Railroad Administration, and various opinions sought as to where the eastbound limits of all-rail bituminous should be drawn when congestion via the Hudson River gateways should become so great as to relieve them by diversion to water routes. It was plainly stated that the meeting was for the purpose of drawing the line in advance of the time of need and the Car Service Section gave assurances there would be no difficulty in providing cars, the saving of car miles in this case being unimportant.

There was one point in the discussion, however, that might have been of revolutionary importance. By railroad men present it was stated "that shippers forwarding coal all-rail should be ordered to ship their coal to the same consignees by tidewater, or possibly to ship it to other consignees in the all-rail zone in New England, so that New England would not lose the coal"! In a measure this was carried through when Somerset, Upper Potomac and Fairmont outputs were zoned out, but the aggregate tonnage affected was relatively small and confined very largely to points within Connecticut. To have enforced such a limitation on coal from central Pennsylvania, tidewater handling facilities considered, would have raised hob with conditions. The marvel is that such a fallacy persisted so long, and the trade is fortunate there was enough good sense at Washington not to put it through. A similar attitude prevailed when most extraordinary and expensive efforts were made to get cars unloaded with lightning dispatch, while at the same time empties were stored for weeks on New England lines because the connecting roads could not take them away. Since June the mining regions most accessible to this territory have been glutted with cars.





VIEWS AT THE WHARF OF THE BURTON-FURBER COAL CO., EAST BOSTON, MASS.

The best opinion inclines to present methods of distribution, unrestricted as to destination, whether from gateways or from tidewater ports. The fact that the nearly 12,000,000 net tons received last year went to make up deficiencies by water should be reason enough for allowing coal to come through normal channels. The anxiety of operators during June and July over possible congestion at the gateways was not borne out. Everything was comfortably handled. Not one coal embargo was in effect on New England roads from Apr. 1, and the fact that rail movement decreased during the fall was due first to a saturated market and later to very largely diminished output at the mines. Certain statistical reports intimating 50 to 60 per cent. car supply in central Pennsylvania were based upon archaic car allotments, based not upon normal output but on 100 per cent. effective—that is, a mine-worker in every place the full working day. Such a Utopian state never existed!

Water transportation was similarly the cause of much anxiety. In March the situation in that respect was thoroughly canvassed by the Shipping Board and the conclusion was reached that from April to December inclusive to move the 16,000,000 net tons at that time estimated to be required from Hampton Roads and Baltimore the shortage of steam tonnage was something like 170,500 D. W. tons. The tonnage then in service was an uncertain quantity. Much of it was assigned for temporary use and was subject to withdrawal. Many of the bottoms in service were Dutch, Norwegian or other neutral ships, almost impossible to discharge without maximum expensive delays, and rehandlers had a most uncomfortable time of it. Gradually, month by month, the available supply was augmented by new lake-built craft and by additions like the "Tuckahoe," until in July all fears for scarcity of tonnage had been dissipated.

At weekly meetings with an advisory committee of coal shippers, all of them experienced and conversant with every phase of the coastwise situation, a representative of the Shipping Board acting in conference also with the New England Fuel Administrator assigned steamers for charter; and in these friendly gatherings organized to make the best possible use of cargo space and available coal the steps were taken which effectively distributed the bulk of water-borne coal during the crucial months last spring when too many mistakes might have spelled calamity. The arrangement was faithfully carried out to the end of the year. In September, when instead of 238,000 tons the steamer tonnage aggregated more than 400,000 tons, the shippers made just as loyal exertion to keep them in operation as in the spring they had made to place each ship where its cargo would do the most good.

ANTHRACITE RECEIPTS IN NEW ENGLAND (NET TONS)*

Steam Sizes

	Rail		Water		Total	
	1917	1918	1917	1918	1917	1918
April	56,055	214,473	43,493	36,672	99,548	251,145
May	57,954	229,506	38,062	50,770	96,016	280,276
June	64,611	264,907	45,645	48,867	110,256	313,774
July	72,753	256,663	60,404	69,975	133,157	360,722
August	83,322	256,663	69,638	69,642	152,960	326,305
September	64,284	189,292	28,200	23,007	92,484	212,299
October	71,676	124,813	25,465	21,686	97,141	146,499
November	64,385	68,102	27,672	20,432	92,057	88,534

Rail Receipts—Domestic sizes eliminated on following percentage basis as determined by reports received from agents at gateways: 1918, April, 74 per cent., May, 73 per cent.; June, 75 per cent.; July, 73 per cent.; August, 73 per cent.; September, 78 per cent.; October, 84 per cent.; 1917, April, May, June, July August, September, October, each estimated to be 90 per cent.

Tide Receipts—Domestic sizes eliminated as follows: Both coal years, April, 89 per cent.; May, 89 per cent.; June, 89 per cent.; July, 86 per cent.; August, 85 per cent.; September, 94 per cent.; October, 93 per cent. Basis of elimination was the record of anthracite dumpings at New York, divided into domestic and steam sizes, beginning June, 1918.

* Courtesy of New England Fuel Administration.

The disparity in rates between all-rail and the water routes was never so glaring. Until June 25, rail tolls had been advanced only 15c. in ten years. The minimum rate from central Pennsylvania to Boston, for instance, was $2.60 (now $3.30) "to meet tide-water competition" when water freights were 50c.@75c. from Hampton Roads, and not $3.25, as in 1918. Output from West Virginia today has to stand $2 tolls plus $3.25 marine freight, and from central Pennsylvania via New York $2.15 tolls plus $2.50 marine freight, other charges applying in each case. The sum of tolls, water freight, and charges in each case compares with the $3.30 rate all-rail. The outlook for coal in 1919 turns very largely on the manner in which the differential is handled. Apparently it is up to the Shipping Board. They have withdrawn ships, but rates have not been modified.

Pocahontas and New River Grades

Based upon the expansion in war industries and depleted reserve stocks, representatives of the Fuel Administration and the Shipping Board estimated in March that New England would require an increase of 15 per cent. over receipts in 1917, rather than the 30 per cent. mark previously set by the New England Fuel Administrator. The 15 per cent. figure meant that of the 30,000,000 net tons for the coal year, 16,000,000 would be required from Baltimore and Hampton Roads, the increase from these ports alone being figured at 6,500,000. The heavy movement of water coal was to be developed during the months from April to October, to allow for light movement the remaining months, but of course anything like this schedule was not reached. It was far in advance of what representative shippers could imagine as a probability, and the event justified their opinion. The Fuel Administration provided that a large share of West Virginia output, particularly from the smokeless districts, should be held for tidewater movement, and with some shuttling to take care of byproduct plants like the Hopewell powder plant, this part of the program was reasonably well adhered to.

The price disparity of 35c. between Pocahontas and New River was a notable feature of 1918. Until the latter part of 1917 the two coals were on the same basis,

ANTHRACITE RECEIPTS (NET TONS) IN NEW ENGLAND—TIDEWATER AND RAIL*

Domestic Sizes

	By Months, 1917	By Months, 1918	Cumulative, 1917	Cumulative, 1918	Cumulative Schedule of Requirements 1918 60 Per Cent.—40 Per Cent.	Cumulative Schedule of Requirements 1918 50 Per Cent.—50 Per Cent.
April	856,393	907,134	856,393	907,134	1,157,072	964,227
May	829,544	1,031,296	1,685,937	1,938,430	2,314,144	1,928,454
June	950,802	1,190,097	2,636,739	3,128,527	3,471,216	2,892,681
July	1,025,831	1,215,939	3,662,570	4,344,466	4,628,288	3,856,908
August	1,144,513	1,054,561	4,807,083	5,399,027	5,785,360	4,821,135
September	1,020,368	1,031,574	5,827,451	6,430,601	6,942,432	5,785,362
October	983,398	943,384	6,810,849	7,373,985	7,713,813	6,749,589
November	897,703	734,379	7,708,552	8,108,364	.....	.....

* Courtesy of New England Fuel Administration.

and also closely competitive. Had price been any consideration the ruling would certainly have upset selling arrangements of long standing and caused no end of confusion. As it was, consignees took either coal so long as bottoms could be found to move it and so long as there was room for it in storage.

The smokeless shippers never enjoyed a more lucrative year. Compensation was liberal, if not lavish; and coal was shipped in record volume.

High Volatiles

Throughout the year there was difficulty getting the higher grades for illuminating, byproduct and malleable iron purposes. A large number of New England plants had their source of supply in the Pittsburgh and adjoining districts, and in the Fairmont region. To all practical purposes these coals were excluded from this territory. Fairmont was allowed to come through the Tidewater Coal Exchange, but gas-coal consumers are never partial to "low-sulphur screened" coal that comes through a pool. There was an indifferent effort to reduce the tonnage of highest grade gas coals appropriated for railroad use in fast-train service, but very little came of it. One road alone in New England uses 150,000 for this purpose.

As an emergency measure in July 200 cars daily were ordered out of westbound shipments from the Kanawha

COST OF HIGH VOLATILE BYPRODUCT COAL—POOL 7, NEWPORT NEWS, VA.

F.o.b. mines, gross ton	$2.912
Purchasing agent's commission	.168
Rail freight, mines to Newport News, plus extra charge, paid to shipping board pool	.825
Marine freight	3.25
Demurrage and tax	2.83
Insurance	069
Wholesale compensation, 23c. less 15c. per net ton	.0896
Discharging and weighing	.2163
Price f.o.b. cars, Boston, per gross ton	$12.5229

and other high-volatile sections on the Chesapeake & Ohio Ry. This was not so much a help to plants requiring illuminating or long-flame coals, for it was open to the same objections that apply on any coal pooled at Tidewater. Gas plants took more or less of this tonnage to make up arrears all-rail, but the bulk of it was delivered to steam plants on contracts originally written for Pocahontas or New River. The same circumstances were true of a large extra tonnage of Fairmont, Pool 34, moved via Baltimore piers.

The Westmoreland district was so heavily burdened with special orders for steel plants and the like that hardly better than 65 per cent. was averaged on contracts entered into with New England buyers. Consumption here, however, is now reduced and there is prospect that the remainder of the winter will find gas-coal requirements in much more comfortable shape than was feared.

Georges Creek

The tonnage of this once popular grade was practically nil in New England during 1918. Several thousand tons were caught in the Shippensburg diversion late in December, 1917, and the principal shippers responded to the New England order of Jan. 3, but thereafter deliveries were of no moment. The bulk of the coal, in Pool 1, at Baltimore, went either for export or for naval use. The fixed price for that region was not favorable to large output, and transportation ordinarily reserved for the movement coastwise of Georges Creek was diverted, often by order of the Fuel Administration, to load at Hampton Roads to help make up the deficiency there in cargo space the first half year. The large increase in receipts here from the Baltimore piers was due to Fairmont and other coals on the Baltimore & Ohio and Western Maryland thrown to Tidewater rather than all-rail. It is probable that in future Georges Creek in this market will disappear from the steam trade and be confined to smithing purposes.

Pennsylvania Grades

Central Pennsylvania was New England's most dependable source of supply during the lean season from January to June, 1918. It was the source of most of the coal shipped on the "New England order," the channel through which most of the emergency fuel came the first part of the year. As drawn at Washington the order called for 500 cars daily, and direct consignments for that number were furnished by the New England Fuel Administration; but on only one day did the actual yield exceed 300 cars, and the average for the 100 working days it was effective was little over 100 cars. That meant 500,000 tons, however, and in January, in particular, it averted what might have been some very acute situations.

There was also a fairly steady volume of emergency coal to the New York piers, most of which was used to relieve important needs inland from New Haven, New London and Providence. The surplus supply of box barges helped materially when motive power was short.

The great obstacle from a New England standpoint was the Preference No. 1 List and the drastic way in which Washington instructions were interpreted. This territory had a large number of preferred requirements, although in volume of coal used the needs were relatively small. Enormous industries in Pennsylvania were obviously entitled to preference, and it took no great effort on the part of anybody to get them on the list. Many important New England plants, however, were among the 10,000 or more represented in applications to the War Industries Board which were waiting action. Had this plan been followed implicitly, there would have been real disaster to many important industries and untold delays caused to the war program.

Happily, the Fuel Administration devised a new plan of distribution, early in June. The burden of deciding upon the disposition of what coal comes forward to any state was now shifted from district representatives to state administrators, following out the good theory that those on the ground were better qualified to exercise this function. On other accounts the previous program had to be abandoned. Steel and rolling mills had been favored with coal when small plants in New England had had to go without, although their output was just as necessary for war purposes, in many cases furnishing parts that were indispensable. Not enough emphasis had been placed upon "balanced production," and merely because coal requirements were relatively small was no reason for passing them over. In tons of material the output of Pennsylvania, for instance, is much larger, but in the number of men employed per ton of coal New England made a better showing. This territory was working from 65 to 75 per cent. on war

orders, and it was keen realization of necessity that so many officials high in the Government saw to it that New England got its share.

All through the season there were of course abundant instances of the abuse of regulations, price and otherwise. One of the most fertile fields for illicit practices was in the distribution of country-bank or wagon-loaded coal in box cars, a supply which seldom appears except in time of stress. Through illegal price exactions mine-workers were enticed away from standard wage operations and business flourished. To correct this situation and incidentally aid movement to New England all the wagon-loaded coal in box cars on the Pennsylvania R.R. in the central Pennsylvania district was taken over by the Fuel Administration and distributed at the scales by the district representative on consignments furnished by state administrators. This was effective July 22 and continued without pause until September, when a reduced movement to New England was in effect until Nov. 15. There were weeks when 800 to 900 box cars were sent to New England destinations. The method of paying cash on invoice on this coal through banks at Altoona was not calculated to discourage this movement, and it didn't! There was anxiety as to quality and greater anxiety to get the movement stopped, largely because of the 75c. extra price, and the tremendous volume of coal pouring in on New England from every direction; but it came, it was accepted, and it helped plug New England to the point almost of acute indigestion.

In August the all-rail passing figures mounted rapidly, and it was not until well into September that the flood began to subside. Exactly 83.5 per cent. of the rail bituminous for New England was scheduled to come from the central Pennsylvania district, the entire output of which, week after week, was in excess of 1,300,000 net tons. For his courage and initiative in carrying through a difficult program, the District Representative of central Pennsylvania deserves much praise.

A capable inspection force did particularly effective work in that district. Instances were many where cars for New England were withheld because of poor preparation, and more than a few careless operators have been taught that dirt and slate cannot be sold as coal.

By the end of the year the movement all-rail had dropped to 310 cars. The volume would probably not have been greater even had there been active request. It was a great year, and it remains to be seen whether another year will reach the same high mark.

There are so many uncertain factors in the outlook for 1919 that representative men in the trade are not only extremely careful about predictions, but they are reticent. They know that reserve stocks are larger than in any previous year on record; they know that practically every steam-user is figuring on less business; and they hear the extravagant talk about the future of fuel oil in this territory. All that is what everybody knows; but questions whether the Shipping Board will reduce coastwise freights or turn the commandeered steamers back to their owners and thus restore a "market rate," or whether the proportion of rail coal will increase, or whether buying will start in April or in July, or what will be the starting price—nobody knows, nor can anybody venture more than a guess. The disposition in New England, buyers and sellers alike, is to clean house and await developments. Who can say what sort of price the market will settle down to, the withdrawal of fixed prices and the present light output considered, and also who has a very clear idea today as to the offshore market, particularly in South America? These matters time alone will tell.



S.S. "NORFOLK" DISCHARGING POCAHONTAS COAL AT WHARF OF BURTON-FURBER COAL CO., EAST BOSTON, MASS.

What Well Known New York Coal Men Think of the Future—With Some Remarks on Coal Exports

TO OBTAIN an idea of what representative coal men believe 1919 will hold in store for the industry, *Coal Age* has invited comment from a number of large jobbers and shippers who maintain offices in New York City. The following statements are typical of the many answers received, and are reproduced to show the spirit of optimism possessed by men in the trade who are in position to know what they are talking about.

C. B. WYNKOOP, *President of Cosgrove & Wynkoop, Ltd.:*

IT IS odd to note the enthusiasm with which the average coal man of today discusses the possibilities of export and bunker business, while five years ago it would not have occurred to him to seek this outlet for his surplus production. A few of the big fellows had all of the bunker business, and the difficulties surrounding the export end—getting orders, arranging terms of payment, etc.—were so numerous that where an occasional order for export did come along, it was not given as much consideration as an order for a few cars from a little plant on Long Island burning less coal in a year than called for in the one export order. South America and European ports could only be grasped in a hazy sort of a way, and we could not adjust ourselves to the novelty of doing a mail-order business, and doing it in a way that would insure repeat orders.

If we show the same interest in supplying a suitable coal and rendering good service in every detail to the mail-order export customer that we do to the customer located on a line or tidewater point 30 miles from New York, America is destined to become the greatest exporter of coal in the world; and though the New River and Pocahontas coals for a time will undoubtedly come in for the lion's share, there is no reason why all of the better grade coals should not ultimately be in as great demand, if the coal man selling this coal will use the same judgment in the selection of the proper coal for each order that he would exercise for his line trade. In other words, when supplying the export customer if the coal is to be used in power plants which are obliged to burn low-volatile coals because of their boiler conditions, smoke or other good reasons, and high-volatile steam coal is shipped because the price is low and that individual order will net a larger profit, the coal trade is not going to figure in the enormous amount of general export business scheduled to be taken care of by America.

Of course, at the present time only coals going into certain pools are permitted to be exported, and these pools have been selected not because they cover all of the good coals suitable for export, but because the coals in these pools are sure to be good; but as time goes on this list will undoubtedly grow.

It has been suggested that the coal trade organize under the provisions of the Webb law, in which case "the proper coal in the proper place," could be handled as well as a great many other problems that will present themselves as we get further into the business. Many other lines are already reaping the benefits from such organization, and it is to be hoped that the coal trade will get together in some way to take advantage of the opportunities extended to us, as this is a proposition that requires teamwork and coöperation to a greater extent than has ever before been put up to the trade.

Good service and fair dealing in the export end of the coal business must be the watchword of all who are in it, as one irregular transaction will place the entire American coal trade in a bad light. Unfortunately the people of most foreign countries judge the entire American public by the few with whom they come in contact.

In most of the South American countries there are local English, Spanish and German newspapers, all of them constantly boosting the products of their mother country; but America is obliged to do her boosting through individual exporters, and this same condition holds good in many other countries.

It is going to be an uphill climb right from the start, as we will have lots of competition and plenty of criticism, and although it may hurt a little at the start, it will ultimately do us good. The organization of an export trading association that would absolutely guarantee quality and service and assist in securing proper legislation to insure better shipping facilities would almost immediately make us a most important factor in world trade.

C. ANDRADE, JR., *Treasurer of the Matlack Coal and Iron Corporation:*

PRIOR to Aug. 1, 1914, Germany and England divided between them the bulk of the export coal trade to South America. When the war started, Germany, driven from the seas, lost the business overnight; England for a time held it. But England was unable to furnish all that South America required. Thereupon South America turned to the United States; and the United States began in a small way to make a few shipments. To meet this situation, England established an ocean freight differential from Cardiff to South America below the going rates from Hampton Roads to South America, hoping in this way to meet or overcome the competition of the American coal. For a while there was keen and open competition between the English and American coals for the common markets of South America. Then slowly, but very surely, the American coals began to displace the English coals. Under free competitive conditions, the American merchant with his American coal won out.

It was not until the late summer and fall of 1917 that the United States Government began to exercise control over the situation. Three methods of control were devised:

First—The President issued his proclamation of August, 1917, fixing the $2 mine price for coal, and ending with the following beautiful thought: "Under them the industry should nowhere lack stimulation." As everyone knows, the $2 price, instead of stimulating production, curtailed it to such an extent that a few months later Dr. Garfield had to declare his famous

"heatless Mondays." The Fuel Administration had to raise coal prices before the country got back to normal production.

Second—The Shipping Board began to fix ocean rates. Instead of fixing a final rate and letting it stand, it made three or four successive reductions at intervals of a week or so apart, and thereby prevented the closing of many charters—the ships lying idle in many cases while cables were exchanged in an endeavor to keep up with the rapidly changing rates.

Third—The War Trade Board instituted a system of export licenses. The Export License Bureau of the War Trade Board has stood the ordeal of actual trial, and has come out with a clear record of patriotism, impartiality and real efficiency.

Thus, the export of coal was subject to the tripartite regulation of the Fuel Administration, the War Trade Board and the Shipping Board. At the outset the Shipping Board failed to coördinate its activities with those of the War Trade Board. That is to say, the fact that an exporter had secured an export license from the War Trade Board was no warrant whatever that he could secure a ship from the Shipping Board to carry the goods so licensed.

In February, 1918, the Shipping Board began to allocate a large amount of tonnage to one particular party in Rio. In May, 1918, the Shipping Board took over all the free tonnage and thus rendered it impossible to secure any vessels in the open market. In June, 1918, the Shipping Board concluded an agreement with Great Britain by which the British agreed to keep out of Rio, and the Shipping Board agreed to keep United States coal exporters out of the River Plate market.

American Exporters Out of Market

As a result of that agreement, the American coal exporters to the River Plate market have had to sit for the last six months and see vessels sail into Hampton Roads for British account, take American coal for British account, and sell that coal to the customers of the American exporters in the River Plate market. The situation was further aggravated by the drastic charter forms that were forced on the exporters by the Shipping Board.

American merchants had the export coal business of the world in the hollow of their hand, and it was struck down by the inexpert interference of their own Government. Whether or not America can regain this lost export coal trade is a question. It is a demonstrated certainty that she cannot gain it, or even hold it, if the regulation of it is left to the Shipping Board. There is just one thing that will enable the coal exporters to get back their lost trade: Free right to export, and free control of shipping by private owners. Government control is a demonstrated failure.

Wilbur A. Marshall, *of W. A. Marshall & Co., President of the Lincoln Coal Co. and chairman of the Bituminous Operators Committee of the Wholesale Coal Trade Association of New York:*

TO PREDICT with any degree of certainty the outcome of the coming evolution in the coal trade is a difficult matter. Predominating interest centers around the question of price, the labor situation, the possibility of securing foreign markets, the local demand and, with consumers, the question of quality.

There has been a great fear that coal prices would tumble and that there was a danger we would get back into the old rut of doing business without profit. Upon giving a little study to the situation, it does not appear that there is particular reason to fear such a condition. Giving consideration to the fact that there is today a tremendous stock of coal above ground, and that there is still an excess demand for the high-grade gas coal and for all of the higher grades of smokeless coal and that there is a greater desire on the part of consumers than ever before to secure quality, does it not stand to reason that the bidding for quality would cause good coal to advance if the price restriction was removed?

Poorer Grade to Bring Lower Prices

Taking another viewpoint: The Fuel Administration in fixing prices ignored entirely the question of quality, which resulted in the fixed price for Westmoreland gas coal, possessing a high standard of quality, being much lower than the high sulphur coals of the Fairmont region. With the removal of price restrictions it is readily seen that there will be an immediate advance in the price of coals from the Westmoreland district. That there will be a reduction in the price of poorer grades is evident, and it is quite in order with good economics. Reduction will depend largely upon quality and the decrease that may be brought about in the cost of production, which leads us to the consideration of labor.

Labor has been and is now independent. Wages in the coal-mining industry top any other that we know of, time employed considered. Miners are averaging upward of $8 per day of eight hours, and the daily average is nearer seven hours. The cheapest sort of labor generally gets 49½c. per hour, and usually works ten hours per day. Labor has announced that it will not accept a reduction in wages, and in the coal mines it is doubtful if there will be any material reduction in the rates for some time to come. Most mines have been and still are working with from a 50 to 75 per cent. supply of miners and many company men 60 years and over in age are doing work formerly done by young men. As a result the overhead is a burden on cost. This cost, through efficiency, will be cut with the return of younger men, except for one possibility. Many of the miners are of Austrian, Hungarian and Polish nativity, and a number of them have signified their intention of returning to the old country during the present year to see members of their families. Most of these will return in due time, but there is danger of a shortage for this year at least.

There is a constant and persistent effort being made to spread the control of unionism, with its usual effect in the way of petty strikes and interruptions, all for the sake of recognition or the gaining of special pay for some detail of work. This situation prevails mostly in Maryland, West Virginia and Kentucky, formerly nonunion districts. Short-time mining will be the best cure for this situation.

All Eyes Turned to Export

Everyone has his eye on the export situation, either with the hope of securing a part of the business or trusting it to take the excess of supply and help maintain the local market. Too much of this business cannot be expected. In the first place other commodities will be in as great demand as coal, and the available tonnage, being limited, must be divided. There is and will be a market for export coals of the standard export grades known to foreign buyers, but the limitations on shipping facilities will probably be a disappointment to even the shippers of those grades. It is doubtful if any material headway will be made by the novices during this year at least.

In this line consideration must also be given to the effects of trades accomplished by British traders, who have already by agreement and otherwise tied up a large amount of the business that might be expected to come naturally to this country. As a result English coal will be supplied when available and the overflow be bought and shipped by the British from here. Fuel oil for foreign use will probably be a large factor of competition than heretofore. The increased use of this fuel will depend largely upon the speed with which tank stations are installed, but in all probability no time will be lost in this direction.

Local demand will be limited until present stocks are consumed, which will be around Apr. 1. Following that there should be a healthy demand, especially for high-grade coal. There will be a limited demand for the poor grades, and the chances are that small mines opened during the past year and producing small amounts of poor coal will close down by the hundred.

As a final résumé, we look for a period of three months of uneasiness and uncertainty, following which we expect to see a good steady business at profitable figures, probably above the present fixed prices on good coal with a reduction in the production and price of poor coal ranging from slightly under the present fixed prices down to the cost of producton, and in some cases less than the cost of production, depending entirely upon quality.

C. C. HARRIS, *of G. D. Harris & Co.:*

A FORECAST of the future, so far as it affects the coal trade, is a difficult undertaking owing principally to the number of "ifs" that one is confronted with at every turn. I would not presume to predict the conditions which will be existing a year hence. Some look for unparalleled prosperity, while the darker side of the picture can be seen by many intelligent thinking men. However, there is no question but what with proper legislation, particularly as respects foreign trade, and with a fair settlement at the peace table of foreign relations, our coal trade certainly should not experience for many years to come the demoralized conditions which existed prior to and just after the war started. Neither should it be expected that the inflated market due to war necessities of other countries should ever have a recurrence here.

As to the immediate future, I am willing to venture the opinion that the same holds forth no encouragement for the ordinary coal man. The consumers of coal are readjusting their business to peace conditions. There is no question but what there is a decided slowing up of production all along the line, and even were it not for this process of reducing operations, the average consumer of coal is not under the strain and stress that he has been to negotiate for his future supply of coal. He will endeavor to secure his supply on better terms to himself than he has enjoyed for the past many months.

The consumer of coal who has been producing essentials for the Government has, of course, been taken care of by the Government; his every want and requirement has been supplied. He has obtained coal from here, there and everywhere, and has paid all kinds of prices for it. His stock yards are full to overflowing. He may not have the coal he wants, and he may be disappointed at the price paid. His first impulse therfore is to use up and get rid of these stocks. It is a well known fact that many consumers who required 1000 tons to see them through the winter have had 2000 tons shipped to them. Obviously this consumer is out of the market for months to come. Perhaps the concern that has supplied him for years has not had the privilege of shipping him one pound of his coal. This coal concern, therefore, has to find other customers.

An argument frequently heard is, that granting the essential consumer has been supplied and taken care of as stated above, he now becomes a non-essential, and the former non-essentials are now first-class preferentials. The logic of this is quite true, and it would be reasonable to expect that these former non-essentials were all of them desperately in need of coal. Is this a fact? Answer, It is not. Many non-essential plants which have no license whatsoever to have a stock of coal on hand today are filled up and not interested in any purchases at this time. It is very evident that the huge production of bituminous coal, together with the forcing upon the market of small steam sizes of anthracite and culm, has supplied all the essential plants; and there has been enough overflow to take care of the former non-essentials. The situation in the great consuming market of New England bears out this statement, and therefore until stocks are reduced it is going to be difficult for coal operators and distributors, except those producing the very highest grade of special coal, to find a ready market for their product.

PREDICTS PERIOD OF ACTIVITY

I do not say that there will not be a period of activity; the moral effect of bad weather, poor transportation and inadequate car supply will cause some apparent shortages, and will also produce a feeling of uneasiness in some directions, so that at times during the next three or four months there will be a good demand for coal and prices will be maintained. Should the Government restrictions be removed, there will probably be a little more freedom of action for the coal distributors who may be tempted to send out their salesmen once more and endeavor to move tonnage toward their usual customers, obtaining for the same a fair margin of profit above that which they are obliged to pay for coal.

With the continuation of Government control it is my opinion that it will be difficult to move tonnage. The operator naturally will endeavor to get the full price; the consumer will likewise very naturally not desire to pay any more, and the distributor will experience difficulty in finding his proper place in the movement of coal from the mines to the consumer. All of this may have a tendency toward the elimination of the wholesaler from the situation. This, if accomplished, would be a genuine disaster to all those concerned.

There is no good reason why the wholesaler cannot hold his place if he takes ordinary business precautions to protect his interests. This can be done through organization and coöperation, by taking advantage of the experience of other lines of trade, practically all of which are strongly organized, and following the lead of many other branches of industry, which have been in similar circumstances before this. Trade organizations are held in respect by all interests, and I believe looked upon with favor by the Government.

ARTHUR F. RICE, *Commissioner of the Coal Merchants Association, of New York City:*

IN ATTEMPTING to forecast the conditions likely to prevail during the coming months, we may think of some things as reasonably certain. While the Fuel Administration will automatically cease to exist with the signing of the peace treaty, there is little likelihood of that occurring before the end of the coal year, and Federal control will probably continue at least to that time.

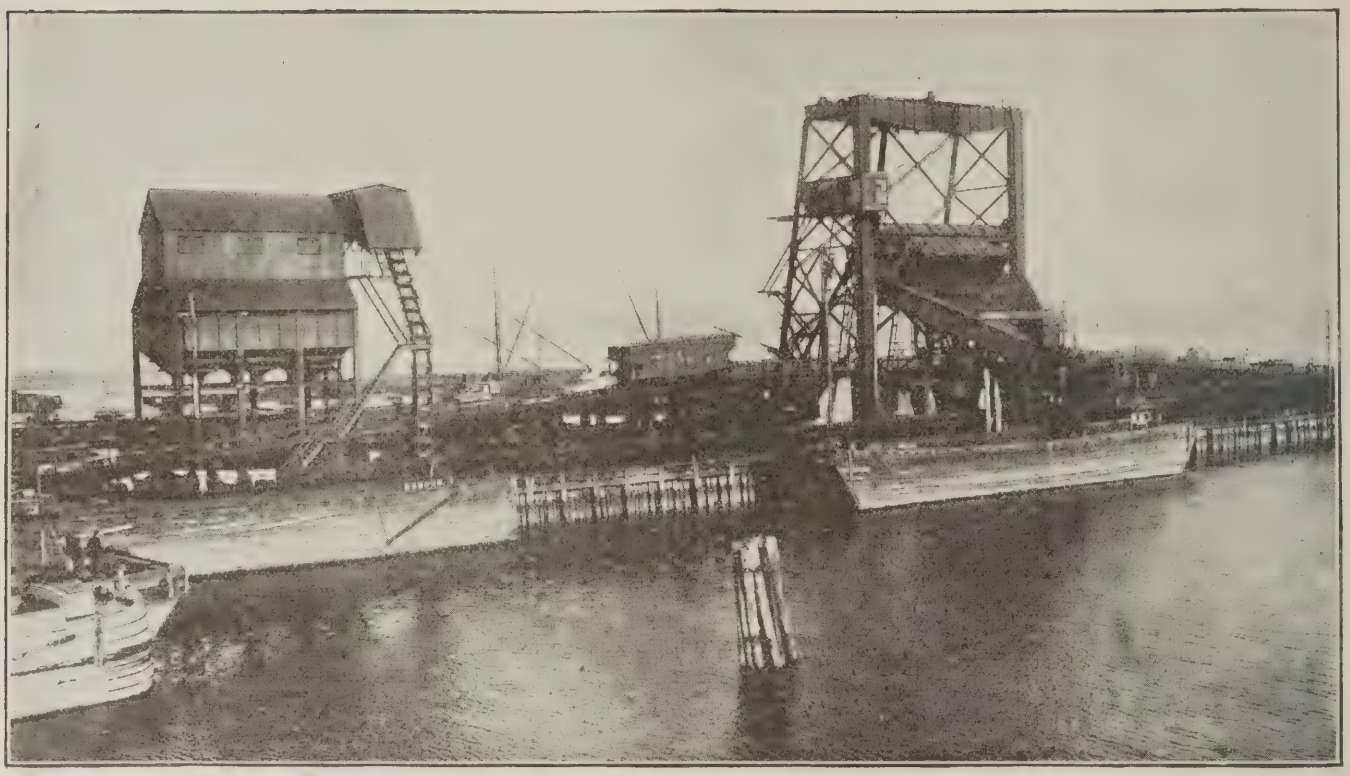
The increased production of bituminous coal, in the face of a decreased demand both here and abroad, will probably give the market all the soft coal it can digest—and some to spare—with a tendency to lower prices. With regard to the egg, stove and chestnut sizes of anthracite, the indications are that the absolute needs of the consumers will be met and that there will be an abundancy of broken and pea. On Nov. 26 there were 15,000 tons of broken and 45,000 tons of pea in the hands of the dealers in Manhattan and The Bronx, with practically no sales for these sizes. Normal conditions may be a long way off, but as they begin to arrive the prices for coal, which are unreasonably high, will come down of their own weight, and with a more plentiful supply the differential between "company" and "independent" coal will be apt to efface itself.

The things we shall have to guard against are a renewal of unrestrained competition and the old habit of scrambling for business without due regard for price or profit. And yet the situation is full of encouragement. Never in the history of the trade has there been such uniformly good feeling among the dealers, every one of whom is a member, in good standing, of this association. All have learned the cost of doing business, all have discovered that it can be transacted at a profit without violating the laws of decency and common sense.

War conditions and the Government have controlled our industry for the past two years, but there are strong indications that hereafter we shall be better able than ever before to control it properly ourselves.

Europe as a Market for American Coal

"Ships and freight rates are the governing factors in the matter of supplying Europe with American coal," says Walter E. Hope, who studied conditions on the other side. The situation in France is critical. The mines at Lens were completely destroyed. From one to three years will be required to reopen these mines. Frenchmen pay $17 a ton for household coal. Industries are charged $25. At least one-half of the coal supply of France must come from outside her borders. American coal is wanted, and a market is waiting if reasonable shipping rates are arranged.



LEHIGH VALLEY RAILROAD CAR DUMPING MACHINE AT PERTH AMBOY

New York Coal Trade in 1918

By R. W. MORRIS
Brooklyn, N. Y.

THE anthracite market opened the new year in vastly different condition than it did a year ago. Instead of record-breaking temperatures and a lack of coal, the weather reminded one of early fall temperatures, while there was enough coal in one place or another to take care of the situation for several weeks to come. Due to the insistent demand and the urgency of the Fuel Administration and coal dealers, everybody who was in a position to do so had at least a part of his winter supply of fuel in the cellar bins; and in most instances at least two-thirds of the orders placed with the local dealers early in the spring had been delivered. In some cases the remaining one-third had been cancelled by the consumer on the ground that because of the mild weather so far experienced it would not be needed.

The first of the year saw business at practically a standstill. Dealers had some orders on their books, but there was no urgency about deliveries, and the dealers were not anxious to pay the full price for "independent" coal when it was expected that with the lack of demand they could soon secure "company" product at 75c. per ton less than they would have to pay for "independent" product.

The retail dealers began the new year by granting an advance in wages to their drivers and chauffeurs of $6 per week, in addition to a nine-hour day. This was the second advance granted within twelve months, and naturally resulted in an increase in the retail price of coal.

It was early in the year that the Board of Aldermen adopted an ordinance giving the Mayor power to confiscate all surplus coal in the city wherever situated, the price to be paid to the owner to be fixed by the courts. If any coal has been seized under the power of this ordinance it has not been announced. However, the Police Department, under direction of the Mayor, made a survey of the coal situation throughout the city and secured gifts of $17,000 and 1000 tons of coal, which was distributed among the needy.

During the year many plans were suggested for overcoming conditions that existed in the city last winter. One scheme was to store coal in the Central Park reservoir, but this and many other ideas were never put into use.

Early in the year, in order to prevent extortionate prices being exacted, the County Fuel Administrator, Reeve B. Schley, established maximum prices for the peddlers, of which there are about 10,000 in New York City. At about the same time State Fuel Administrator Wiggin recommended the pooling of anthracite and a reduction of sizes. The latter had been advocated for several years. The first named recommendation was adopted by some of the shippers, but it did not continue.

DUMPINGS OF ANTHRACITE AND BITUMINOUS AT TIDEWATER PIERS IN 1918

	Anthracite	Bituminous		Anthracite	Bituminous
January	24,064	19,277	August	32,417	30,157
February	22,876	17,268	September	28,119	30,328
March	31,224	23,810	October	27,190	28,503
April	28,548	23,084	November	21,834	25,470
May	29,835	28,104	December	26,261	25,169
June	30,695	30,240			
July	32,228	31,155	Total	335,291	312,574

The local situation was not relieved until higher temperatures prevailed, and then the coal began to move easier. Meantime the Fuel Administration has been assisted in handling the situation by a committee of retail dealers.

Almost simultaneously with the warning issued by the Fuel Administration that consumers should place orders for winter fuel early, Dr. Garfield announced a reduction of 30c. per ton in the price of coal at the mines, which of course meant a similar reduction at tidewater. In a comparatively short time the retail dealers had received orders from nearly all of their customers, although there was no prospect that the coal could be delivered before fall or the early winter. Then followed the increase in freight rates, and a cut of 25c. per ton in the gross margins allowed the retail dealers, which in addition to the decrease in price announced by Dr. Garfield meant a reduction of 55c. by the retailers.

As a result of the heavy call for anthracite from all parts of the country, and the belief of the officials that New York, because of its nearness to the coal fields, could be supplied with fuel later in the season than could other sections of the country, shipments to this market did not come forward as rapidly as the trade desired.

After much time had been spent by various officials, dealers and others in explaining to the public that coal was being handled here as rapidly as received, the Labor League held a meeting in the City Hall and adopted resolutions insisting that the dealers store more coal, but not suggesting where the coal could be obtained.

The allotment of anthracite for New York State was announced by the Anthracite Committee as 15,855,300 tons, an increase of 11.89 per cent. over the 1916-1917 tonnage, of which about one-half came to New York City.

Early in the summer the city officials announced that they had closed negotiations by which this city was to receive 300,000 tons of anthracite coal, which would be sold to the poor. This coal was to be obtained from culm banks in Schuylkill County, Pennsylvania, but so far none of the coal has arrived.

Demand continued strong until late in November, when as the weather kept mild and consumers had no occasion to keep their furnace fires going at top speed, there was a lull, and dealers began to receive notices from their customers to cancel their orders. Even while this was going on Mayor Hylan ordered the Police Department to make another survey of the coal situation, and notwithstanding a strenuous protest from Dr. Garfield it was made, resulting in a report to the Mayor showing a deficiency of 3,577,261 tons in the city's supply.

In December business became inactive. There were plenty of most of the sizes to go around, but no surplus. Retailers who were buying considerable "independent" product cancelled their orders, relying entirely on "company" coal, which was purchasable at a price 75c. per



PENNSYLVANIA RAILROAD CAR DUMPING MACHINE AT SOUTH AMBOY

ton below what they would have to pay for the former product.

The situation with regard to the anthracite steam sizes is one of much concern and will likely remain so for some time to come. Since early summer these coals have been a burden to the market and toward the end of the year shippers had some difficulty in reducing their stocks. However, one benefit derived from the scarcity of the domestic sizes during the year and the educational campaign conducted by the Fuel Administration forces was the using of buckwheat No. 1 in household furnaces. Considerable of this size has been used in this city, and while it has already meant a considerable saving to householders, it will continue to do so for some time to come, and probably forever.

The bituminous market had many ups and downs during 1918. Instead of the scarcity of free coals available for the spot buyers and poor car supply that prevailed in January, 1918, the first month of the new year saw an overabundance of free coals here and a good car supply. Early in the fall, and just before the armistice was signed, consumers began to hesitate about adding to their holdings; and demand, which had been heavy throughout the previous months of the year, began to dwindle away. This was followed by an almost cessation of business when the fighting "over there" actually

BITUMINOUS SHIPMENTS TO NEW ENGLAND DURING 1918

	1917	1918		1917	1918
January	152,449	129,267	August	199,591	371,554
February	129,299	124,013	September	203,339	390,183
March	163,818	231,549	October	213,500	398,054
April	198,512	273,515	November	201,109	.....
May	228,091	336,072	December	124,735	.....
June	217,168	325,710			
July	190,328	356,314	Totals	2,221,939	2,836,231

stopped. Consumers who had been willing and only too glad to take anything that looked as if it might make steam, now stopped buying altogether and announced that they wanted nothing but the best grades, with the result that there soon was a surplus of the cheaper grades; and toward the end of the year there were concessions from the Government's maximum prices.

Not from January until well on toward the end of the year was there sufficient bituminous coal to take care of all demands. War requirements were of course taken care of first. This, together with what could be shipped to consumers who required the better classes of coal, took the entire output of the good as well as the cheaper grades of coal.

Bunkering of vessels took a considerable portion of the shipments to this harbor, and this was carried on on a larger scale than ever before. At one time it was estimated there were about 200 vessels here, most of which were waiting for coal, either for bunker purposes or for cargoes.

The threat to close theaters and moving picture houses in order to conserve fuel met with strenuous opposition from the owners, who contended that each day's closing meant a loss of $11,800 in taxes to the Government, while the value of the coal saved would be less than $163.

One result of the scarcity of coal was the extra demands made on the gas companies. The companies were doing the biggest business in their history for several weeks, so much interest being taken by the public that the newspapers published the number of cubic feet of gas manufactured and furnished to the public by the companies.

Although the miners were doing their utmost to keep the country supplied with fuel, additional emphasis was put on the need for increased production and better preparation by an allowance of 20c. per ton for clean coal. This tended to help matters some.

In June exporters and shippers who sent coal from Hampton Roads and other southern ports to points along the New England coast, and also to South America, were compelled to suspend shipments for a few days owing to the presence of enemy U-boats off the coast. Several loaded coal vessels were sunk nearby.

There were many changes made during the year in the pools and more changes are contemplated this year. A reduction of 10c. per ton in the margin granted jobbers for coal physically handled by them caused much discussion among the trade, but all gladly accepted the ruling. An early order had granted the jobbers a margin of 35c. per ton, but State Fuel Administrator Cooke soon after taking office reduced this to 25 cents.

The order issued in November allowing traction and lighting companies to accumulate 100,000 tons of coal relieved the local situation slightly by disposing of some

TONNAGE AND VALUE OF ANTHRACITE AND BITUMINOUS COAL AND COKE EXPORTED FROM THE PORT OF NEW YORK IN 1916, 1917 AND 1918

Anthracite Coal

	1916		1917		1918	
	Tons	Value	Tons	Value	Tons	Value
January	8,921	$48,477	7,934	$65,068	490	$4,223
February	8,740	43,573	4,981	35,362	1,184	8,177
March	8,231	46,325	13,720	105,657	2,607	20,050
April	19,257	100,023	8,339	53,106	7,107	49,785
May	17,809	94,613	16,714	133,327	4,444	30,158
June	20,949	114,510	14,693	106,173	6,761	43,991
July	19,489	106,756	15,967	108,986	9,340	62,824
August	40,671	223,842	3,942	29,317	10,460	72,264
September	6,800	37,396	26,988	205,470	13,602	96,204
October	36,235	208,630	3,288	21,956	11,656	80,688
November	7,751	61,545	10,856	75,502	.....	.....
December	9,474	62,298	6,831	47,254	.....	.....
Totals	204,327	$1,046,988	134,252	$987,178	68,651	$468,364
Average cost per ton	$5.12+	.....	$7.34+	.....	$6.82+	.....

Bituminous Coal

	1916		1917		1918	
	Tons	Value	Tons	Value	Tons	Value
January	893	$3,408	2,049	$9,246	530	$3,435
February	1,245	5,167	1,731	6,976	2,157	19,348
March	2,193	9,684	3,224	19,649	4,508	27,190
April	2,229	9,142	171	1,774	3,081	21,304
May	4,419	15,296	995	7,147	8,117	58,118
June	5,108	21,404	1,939	14,466	6,807	50,751
July	4,387	15,731	448	2,767	7,440	52,402
August	6,025	21,508	967	7,786	10,149	72,612
September	1,012	3,387	593	3,354	3,449	25,444
October	8,427	31,617	43	487	1,045	7,884
November	1,934	9,279	1,229	9,830	.....	.....
December	4,430	25,358	959	8,049	.....	.....
Totals	42,202	$170,881	14,348	$91,534	47,283	$338,488
Average cost per ton	$4.05+	.....	$6.42+	.....	$7.18+	.....

Coke

	1916		1917		1918	
	Tons	Value	Tons	Value	Tons	Value
January	136	$1,097	1,660	$10,902	1,599	$19,582
February	817	5,617	1,211	11,383	44	1,253
March	2,177	12,433	505	6,273	956	14,481
April	1,677	15,874	1,325	18,107	633	16,757
May	1,331	10,086	1,900	38,063	2,153	30,868
June	966	8,914	3,650	49,646	1,605	20,562
July	1,897	14,095	3,434	33,238	117	3,220
August	1,195	9,639	1,763	26,359	333	9,032
September	2,447	17,742	2,901	40,736	106	3,294
October	2,521	18,748	1,539	20,512	203	3,996
November	1,957	14,657	304	7,709	.....	.....
December	535	9,317	1,716	20,777	.....	.....
Total	17,656	$138,219	21,908	$283,735	7,749	$123,045
Average cost per ton	$7.82+	.....	$12.95+	.....	$15.87+	.....

coal that would eventually have found its way to the tidewater docks for public sale.

The number of cars of bituminous coal dumped at South Amboy, Port Reading, St. George, Elizabeth and Port Liberty, which are under the jurisdiction of the Tidewater Coal Exchange, during 1918, totaled 250,120.

The Harsimus Cove, Communipaw and Weehawken piers are not under jurisdiction of the exchange.

Coal Production in the United States in 1918

The following table has been compiled largely from data communicated by the various state mine inspectors, estimates having been made only where no such statistics were available, but in all cases upon the basis of reliable information. Where these figures differ from those given in the text of the reviews, the discrepancy is due to late telegraphic reports necessitating changes in the totals.

PRODUCTION OF COAL IN THE UNITED STATES

States	1917 Quantity Short Tons *		1918 Quantity Short Tons
Alabama	20,068,000		20,000,000
Arkansas	2,144,000	(a)	2,375,000
Colorado	12,483,000		12,713,000
Gerrgia	119,000		101,000
Illinois	86,199,000		89,325,962
Indiana	26,540,000	(b)	28,795,682
Iowa	8,965,000	(c)	8,250,000
Kansas	7,185,000		7,292,000
Kentucky	27,808,000		29,690,000
Maryland	4,746,000		4,759,000
Michigan	1,375,000	(e)	1,501,053
Missouri	5,671,000		6,000,000
Montana	4,227,000		4,700,000
New Mexico	4,000,000		3,990,676
North Dakota	790,000		900,000
Ohio	40,749,000		48,500,000
Oklahoma	4,387,000		4,489,064
Pennsylvania	172,448,000		180,000,000
Tennessee	6,194,000		6,916,000
Texas	2,356,000		2,800,000
Utah	4,125,000		5,302,070
Virginia	10,087,000		10,100,000
Washington	4,010,000		4,200,000
West Virginia	86,442,000		97,900,000
Wyoming	8,576,000		9,417,269
Alaska, California, Idaho, Oregon, South Dakota	97,000		122,000
Total bituminous	551,791,000		590,137,776
Pennsylvania anthracite	99,335,000		99,514,334
Grand total	651,126,000		689,652,110

*United States Geological Survey figures. (a) For fiscal year ending June 30. (b) Fiscal year ending Sept. 30. (c) Fiscal year ending Nov. 30. (e) Estimated.

The following table gives the total production of byproduct coke by states in 1918:

PRODUCTION OF BYPRODUCT COKE IN THE UNITED STATES*

State	1917 Production, Net Tons	1917 Per Cent. Total	1918 Production Estimated, Net Tons	1918 Per Cent. Total	Increase Tons	Increase Per Cent.
Alabama	2,740,761	12.2	2,676,000	10.2	—64,000	—2.4
Illinois	2,289,833	10.2	2,278,000	8.6	—12,000	—0.6
Indiana	3,540,718	15.8	3,870,000	14.7	329,000	9.3
Kentucky	531,539	2.4	522,000	2.0	—10,000	—1.8
Maryland	518,810	2.3	477,000	1.9	—42,000	—8.1
Massachusetts	595,113	2.7	542,000	2.0	—53,000	—8.9
Minnesota	490,272	2.2	742,000	3.0	252,000	51.4
New York	993,184	4.4	1,086,000	4.1	93,000	9.3
Ohio	3,546,476	15.8	5,283,000	20.1	1,737,000	49.0
Pennsylvania	4,095,605	18.2	4,691,000	17.9	595,000	14.5
Tennessee	35,246	0.2	121,000	0.4	86,000	243.7
Washington	26,346	0.1	30,000	0.1	4,000	14.9
West Virginia	511,033	2.3	612,000	2.3	100,000	19.7
Colorado, Michigan, Missouri, New Jersey, Wisconsin	2,524,344	11.2	3,334,000	12.7	810,000	32.1
Total	22,439,280	100.0	26,264,000	100.0	3,825,000	17.0

*Figures compiled by U. S. Geological Survey.
(—) Signifies decrease.

Petroleum Production and Exhaustion

By L. P. Breckenridge
Sheffield Scientific School, Yale University

The accompanying charts show some interesting figures on petroleum production and exhaustion. Fig. 1 shows how the production of the United States has compared with world production from 1880 to 1917. It will be noticed that since 1905 this country has produced between 60 and 70 per cent. of the crude petroleum of the world.

Fig. 2 shows the estimated degree of exhaustion of the known fields in this country. It will be observed that five fields—the Kansas-Oklahoma, North Texas, Gulf Coast, Wyoming-Montana and California—are less

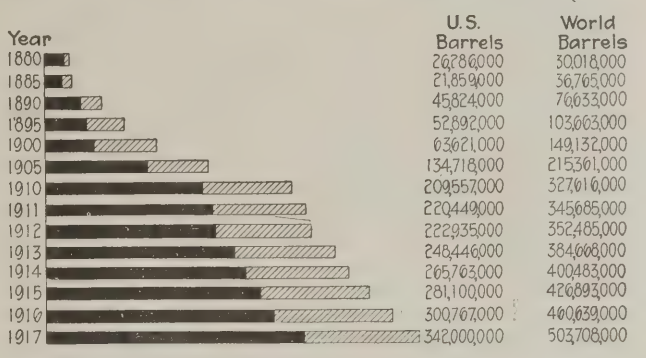


FIG. 1. PRODUCTION OF PETROLEUM IN THE UNITED STATES COMPARED TO REST OF WORLD'S OUTPUT

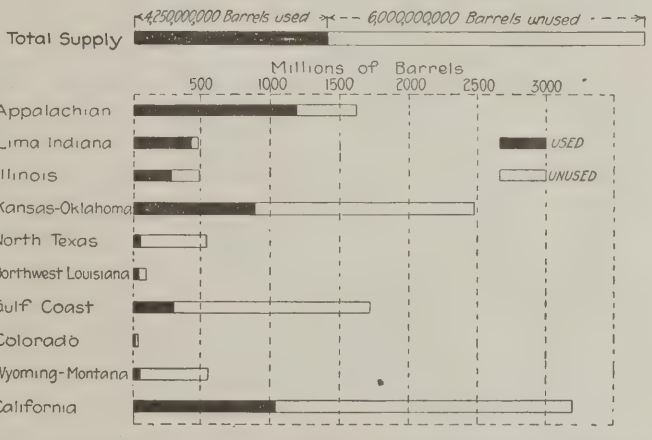


FIG. 2. ESTIMATED DEGREE OF EXHAUSTION OF UNITED STATES OIL FIELDS

than half exhausted. Some of the others, particularly the Lima-Indiana and the Colorado regions, are rapidly nearing complete exhaustion.

Such charts as these, while they must necessarily be more or less uncertain since they are at best merely estimates, serve as indications of what the future will certainly bring forth. Much of our modern industrial life as well as our pleasure depends upon the internal combustion engine that now uses petroleum or some of its derivatives as fuel. It would appear that the day is not far distant when this country must either import oil from other lands, must adopt a new fuel, must manufacture the present fuel from sources other than petroleum, or must seek means of motive power other than the gasoline engine.

Philadelphia Coal Trade in 1918

By CORRESPONDENT
Philadelphia, Penn.

THE year 1918 was truly historic in local coal annals, the outstanding feature being the fact that the business was practically taken over by the Government, both production and distribution, more particularly the latter. As time passes this phase of the situation will become more apparent as being a time when the distributors of coal worked directly under Governmental supervision. Yet today it is difficult to find a man connected with the trade who will be willing to say that it was not for the best; and even the consumer, when hard pressed, will admit that were it not for this supervision he would more than likely have been compelled to pay $25 or more a ton for coal during the zero days of January, 1918.

At that time the yards of the city were bare of coal, with the most severe weather the city had ever experienced. Despite urgings all the previous summer, most consumers had failed to take advantage of the opportunity to store coal. It was during this period that in some sections of the city the situation became so acute that people robbed the cars on the street before they could be delivered to the dealers' yards. Thousands of tons were taken in this way, the loss falling on the railroad companies, who later in the year reimbursed the dealers. The severe weather broke up in February and gradually moderated right on into spring.

Fuel Authorities Planned for Future

In the meantime the fuel authorities, profiting by their experience of the winter, had already laid plans for the following season. It was decided that all coal deliveries would be supervised by the County Fuel Administrator. He devised a system of card ordering, whereon each consumer was required to state the amount of coal used during the past season, together with details as to size and construction of his home, the kind of heating apparatus and the estimated amount of coal needed. These cards were checked through a central bureau, the expense of which was defrayed by a stamp tax of 2c. per ton.

With the approach of Apr. 1, it was for a time thought that the usual spring reduction of 50c. a ton, reducing 10c. each month until the circular price was reached in September, would be abandoned. However, the Fuel Administration decided upon a flat reduction of 30c. a ton from the circular price, the full rate being reached on Sept. 1, which would actually result at that time in the winter circular being 20c. higher than the previous winter.

A spirited and widespread campaign was started to urge consumers to store coal in the summer, and this was readily responded to by the public. As a matter of fact the orders piled up much faster than the dealers could handle them, and in the meantime the shipments during the summer fell off so much that the dealers for weeks at a time had their equipment idle for lack of coal. It was explained by the distribution committee that they were endeavoring to fill up outside markets, such as New England and the Northwest, and that this city would be taken care of in the fall.

All summer long the dealers clamored for more fuel, but it was not forthcoming. The administration also ruled that no consumer could receive more than two-thirds of his entire order prior to Jan. 1. Even though the dealers did not receive all the coal they could handle, it is a fact that more coal was stored in the cellars than ever before. With the coming of fall the weather continued quite moderate, and even right through December to the first of the new year the weather was such that the demand for coal fell off very considerably.

This condition was reflected later in the year by a lack of demand for egg and pea coal. The consumers became quite insistent upon receiving the sizes ordered, which at this time were principally stove and nut. The situation became so serious that the Fuel Administration endeavored to convert the public to the use of a mixture of egg and pea, using a series of advertisements in the newspapers for this purpose, but with little success in reducing the accumulation.

Profitable Year for the Dealers

Reviewing the year it must be said that it has been a most profitable one for the dealers, despite what they considered handicaps. It is true that individual effort was curtailed to a great extent, so that no dealer could go after trade, but was really confined to the business that he had been accustomed to in previous years. However, with the fuel authorities putting the business on practically a cash basis, all credit losses were stopped automatically. Also the fact that the administration fixed a gross margin of $2.50 on Apr. 1 made it exactly clear to the public that the dealers were not profiteering at their expense. The retailers are at this time in strong financial position, although there has been a feeling that due to the rapidly increasing costs toward the latter end of the year they were entitled to a greater gross margin than $2.50, especially in view of the fact that the wholesale price of coal was increased $1.05 on Nov. 1 by the national administration in order to meet the miners' demands for an increased wage scale. No part of this increase accrued to the dealers, although their capital investment was greatly increased thereby.

As to the future the retailers are much concerned to learn whether they can keep their business on the same firm financial basis. Even at this time, with the relaxing of war effort and the reduction of working forces in munition plants, there is an increasing demand for credit by the consumers, and many dealers are actually putting more money out in this way during the first few weeks of the new year than they did in the entire year of 1918. This matter is also giving the producing companies considerable concern, as they are extremely anxious to keep their accounts with the dealers closely paid up.

There can be no doubt when the Fuel Administration relaxes control some time between now and Apr. 1 there

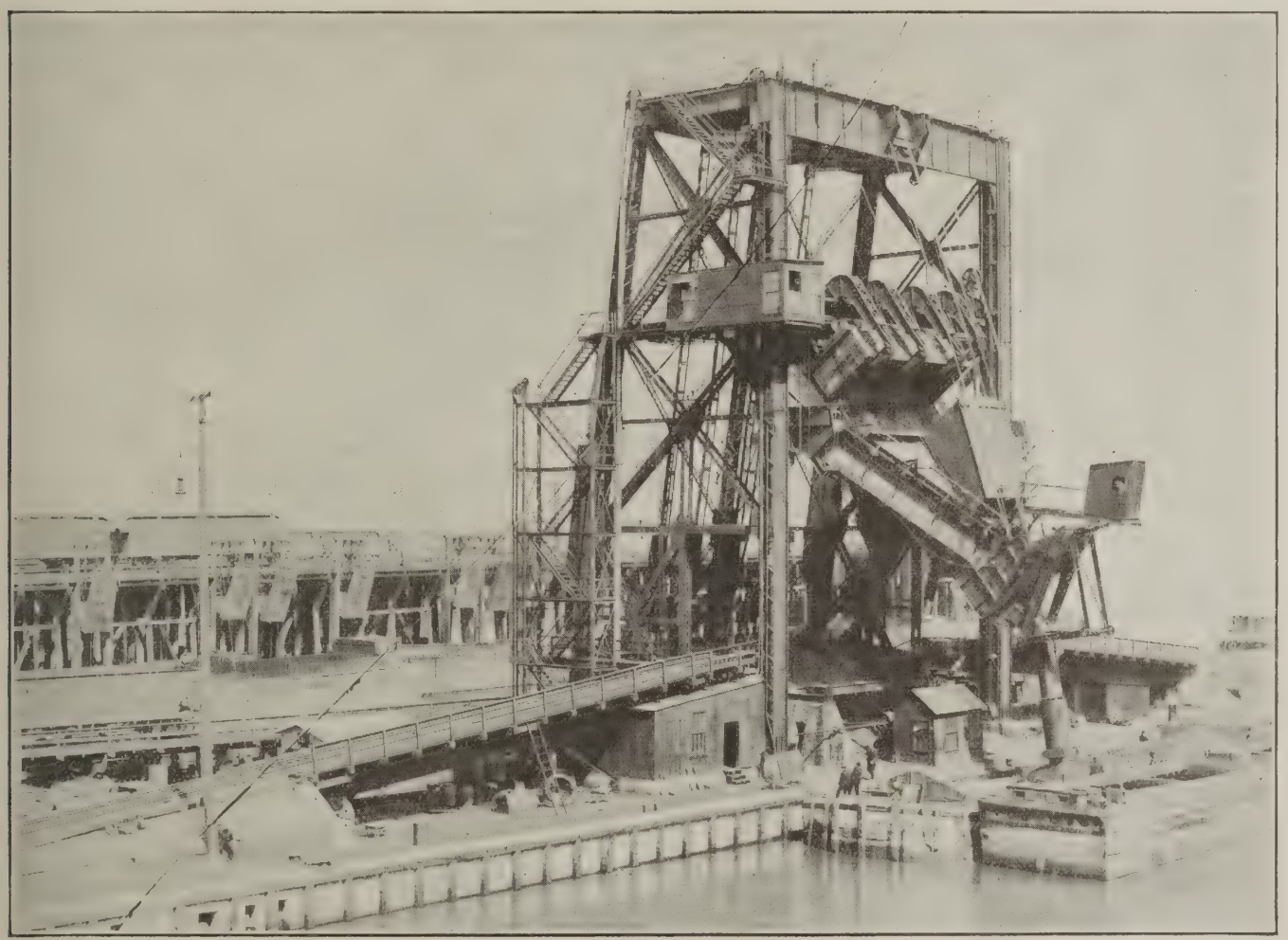
will be many changes in the trade. There is a general feeling that with the individual prices so much higher than the company prices there will be violent price shadings, particularly since the moderate weather up to the first of 1919 has made the production somewhat difficult to market. It is also thought that after Apr. 1 the operators will be in for some rather dull times, as there is not the least doubt that the consumers will be loath to lay in the same quantity of coal that they did during the previous summer, when our war effort was at its height.

In the steam trade there has also been remarkable changes. Early in the year the mines and washeries were far from able to meet the demand for fuel. In the effort to meet the fuel needs of the country thousands of tons of culm, which had lain in the banks at the mines for years, was shipped all over the country and mixed with bituminous coal, as high as $1.50 a ton being paid for it at one time. This extreme demand for steam coal broke early in the summer and there was a gradual tapering off, until when November was reached all sizes but buckwheat were actually a drug on the market. The larger companies were compelled to store rice and barley in their storage plants, while culm went completely out of the market. Even with the coming of the new year conditions in steam coal did not improve, and at this time the disposal of these sizes is becoming a serious question, with much talk of price lowering in order to move the coal.

One thing is certain, and that is the market has absorbed more anthracite steam sizes in the past year than it will again take for many a day, and it is altogether likely that numerous washery operations built by the big companies during the war will close down completely on this account. However, the matter of price is bothering the producers more than anything, and there are grave doubts whether in the face of increasing bituminous production they will be able to maintain during the coming year anything like the scale the smaller anthracite coals have enjoyed during the past twelve months.

The local market probably took more bituminous coal to fill its requirements than it did in any previous year. Earlier in the year, during the heatless days, it was necessary for the fuel administration to commandeer coal in order to meet the pressing industrial needs. While there was at the first much complaint made at the fixed price insisted upon by the Government, later events proved that this was really a saving feature for the bituminous trade.

As more open weather came on the production of bituminous naturally increased, together with a more efficient car supply, until early in the fall more coal was reaching here than the market could absorb. All the big industrial plants were piled high with reserve stocks, and when the war ended there was a sudden canceling of many orders for fuel, as the consumers were momentarily expecting a price reduction. All



PENNSYLVANIA RAILROAD CAR-DUMPING MACHINE AT GREENWICH POINT, PHILADELPHIA

the while, however, the high-grade coals were in strong demand, and the call was so heavy that no thought of price recession was entertained; but with the cheaper grades there was much price cutting, quietly of course, and at times some of these shippers had difficulty in getting $2.60 for their output, especially in the closing days of 1918.

At this time the soft coal men are hoping that the Fuel Administration will continue to supervise the trade until April, and at that time there seems to be no doubt that the coal business will once more be returned to the producers. On account of the many new openings in the region there can not be the least doubt that prices will fall much below the present Government schedule, and the shippers are at this time looking forward to that time with much anxiety. As a matter of fact many in the trade are strongly in favor of the Government keeping control of the bituminous situation, at least to the extent of maintaining prices so that the business can be conducted at a living profit.

Anthracite in New England in 1918

By G. G. WOLKINS
Boston, Mass.

SYNOPSIS — *Steady demand. Record tonnage by rail but receipts by water slumped materially. Grave situation in January and February. Costs mount high. Regulation carried too far and later into the season than necessary. "Emergency" coal in the fall puts trade to great inconvenience. More hopeful prospect for retailers. Heavy tonnage of steam sizes.*

A LARGELY increased tonnage, sharp advances in cost, and a sustained demand for domestic sizes were the leading features of anthracite in this territory in 1918. A long hard winter wiped out the reserves, whether in dealers' bins or in the cellars of householders. Distribution was made only through channels authorized by the Fuel Administration, and every shipment, every delivery by team, was assumed to be carefully scrutinized. Notwithstanding all the efforts to conserve and most drastic regulations designed to cover its use, more coal was passed around during the twelve months just ended than in any year in history.

For most of the year distribution was "spotty," but this condition righted itself toward the close when shipments came more easily. Throughout the twelve months the usual trade factors were but little more than cogs in a machine. The judgment of houses long in the business was seldom taken into account after deliveries were diagrammed on the basis of the year that began Apr. 1, 1916. In New England this worked hardship to many communities where forehanded dealers had taken pains early that year to get coal forward in anticipation of labor troubles in the spring. When increases in tonnage were granted and allotments left to state administrators, there was so much uninformed figuring that a good many towns would have been in a hard way but for the mild season and the indications in December that the fuel authorities would soon relinquish control.

In general, there was more anxiety over supply in those communities where there were dealers with weak connections. The larger companies had shipped full quotas by Dec. 1, but most of the "independent" shippers were in arrears. The Anthracite Committee seemed not to have the same effective control of the latter, and this came out very prominently during the summer and early fall. Difficulties arose from the tonnage placed during the basic year by chains of middlemen, all of whose dovetailing transactions were not easy to trace.

Another feature was the reduced tonnage by water. The further commandeering of tugs for the Navy, higher marine freights, and the difficulty of putting boats and coal together at the New York piers, all contributed to the increased movement all-rail. There are retail dealers always equipped to discharge boats whose entire receipts during 1918 were by rail, and at no time during 1918 was there such congestion as to make it necessary to place an embargo against coal for points far to the eastward.

During the record low temperatures in January practically the only supply of domestic sizes for ten days was in special trains from the mines. One trainload was diverted from Camp Devens to meet pressing emergencies in Boston. The famine was so acute that temporary fuel stations were opened in the poorer districts. Wealthy citizens had coal taken from the cellars of their country houses and hauled over the road for use in the city. Meanwhile receipts by water were extremely discouraging. The Delaware River froze tight and dumping at New York slowed up, so that it was increasingly difficult to run the gantlet of watchful New York retailers. Both the big city markets were after coal strong, and it was not until after the weather moderated that barges again came forward in any number. Cargoes were ill-assorted; stove and chestnut were very scarce, and retail prices were advanced in Boston from $9.85 to $10.25. Not only were several retailers there without a ton of domestic sizes, but there were several towns and some cities where householders were forced to use bituminous at about the same range of price.

Even in March there were retailers usually in favorable position who were without anything like a continuous supply. The movement improved very gradually. Loading was better, although normally it would have been considered very poor. There was renewed anxiety about tugs. One company alone had 24 barges at one time waiting in the Delaware, and but three tugs en route. In another month it looked impossible for both rail and water movement to speed up enough to give

New England the increased percentages promised, in addition to the 1916 basis. The Eastern dealers, in particular, were alarmed over the outlook.

"Spring prices" were announced in Washington early in April, and when to these were added 50c. increase in freight tolls from mines to tidewater June 25, 35c. on Sept. 1, and $1.05 effective Nov. 1, it was realized that anthracite was getting to be a very expensive fuel.

The year developed an even wider variation in marine freights in company-owned barges. The rate on anthracite in Reading barges from Philadelphia to Boston was advanced from $1.25 to $1.50 on Jan. 28, and again 30c. on June 25, being operated by the Railroad Administration. On Dec. 28 a further advance of 30c. applied on all cargoes delivered east of Newburyport, Mass. The present rate to Portland is therefore $2.10 as compared with the 75c. rate that prevailed less than two years ago. At the same time the rate on barges owned by the Lehigh & Wilkes-Barre Coal Co. was $1 (plus docking) until May 11, when an advance of 50c. applied, since unchanged. The Lehigh Valley R.R. barges held to a level rate of $1.30 to Boston from Perth Amboy until Dec. 28, when it was scaled up by the Railroad Administration to be on a parity with the Reading.

Settled weather during June helped toward better movement of tows. Rail receipts were also improved. Output was reported on a 90 per cent. basis, although stocks in retail yards were 25 per cent. less in Boston than in 1917. Under instructions of the Anthracite Committee points farthest east and up the rivers were favored in shipments the first of the season, although later on it was evident that the movement of barges was so slow that no special gain was made.

At the end of May it was announced by the Fuel Administration that 1,250,000 net tons monthly of domestic sizes would be furnished New England, distribution to continue on the 1916 basis. This was a decided marking up of quota, but it was several weeks before the trade felt the result of restricting domestic sizes from the Middle West and from the South Atlantic states. When in July a tow of barges was fired on by a U-boat, shippers were instructed to increase all-rail deliveries to points ordinarily served by water. Receipts by the latter route sagged notably.

Retailers were further disturbed over the strict way in which fuel committees ruled that apartment houses having over a certain boiler equipment should be obliged to use bituminous. The effort at Washington to shut off domestic sizes from industrial plants was loyally supported by state administrators here. It took a good deal of enlightening argument in many cases to get "exemptions" and "permits" in favor of manufacturers who were in every sense retail dealers in anthracite for their own communities, but gradually most of the cases were straightened out. The regulating spirit died hard, however, and at the end of December, a time when many shippers were soliciting orders, the Fuel Administration was keeping a tight grip on domestic sizes that shippers wanted to send to factories, etc., for the use of employees, as they had done from time out of memory.

A mild sensation was caused during July by the long telegrams sent from Washington by the statistics division to "retail dealers" who were alleged to have neglected making reports. The number of delinquents, however, was entirely misleading. The names of 1200 "dealers" must have been based upon cumulative lists of consignments of from one car up for several years. The names had not been checked by anyone conversant with New England trade, and besides the many who had consistently made reports there were scores who had gone out of business eight and ten years before.

To a surprising extent the owners of box barges showed throughout the year a disinclination to charter for Boston. Rates supervised by the Shipping Board allowed $2.50 to Boston anchorage at the same time that $2.15 was the rate to New Bedford. The lack of towing service through Cape Cod Canal was a factor in making outside barges scarce for Boston.

On July 18 Boston retail prices were advanced 75c., to $11 for broken, egg, stove and chestnut to cover increased freight charges, and 40c. instead of 25c. began to be charged for basketing. There was the usual agitation in Boston and other cities over iniquity in the coal business and in favor of municipal yards, etc. A mere advance of 25 per cent. by the Government management of railroads meant nothing to city fathers, who showed surprise and resentment over any advance in retail prices.

APPROXIMATE COST OF READING COAL ALONGSIDE BOSTON DURING 1918

White Ash	Jan. 30	May 1	July 1	Sept. 15	Nov. 15
Broken	$7.86	$7.84	$8.66	$8.96	$10.01
Egg	7.76	7.44	8.26	8.56	9.61
Stove	8.01	7.69	8.51	8.81	9.86
Chestnut	8.11	7.79	8.61	8.91	9.96
Pea	6.51	6.19	6.96	7.26	8.31

Through the latter part of the year the whole question of distributing the increased quota was much tangled. There seemed no settled policy and awkward questions were not answered. Retailers inland were generally better supplied than in 1917, but at tidewater ports there was much confusion over the grouping of figures. Distribution had never been absolutely restricted to town lines, and where so much was built upon 1916 deliveries there should have been better comprehension of local conditions.

In August, ostensibly to reduce the towing distance, Reading barges began to load at Port Reading, N. J., instead of at Port Richmond, Philadelphia. Later this was the rule, only barges from the Port Richmond repair yard clearing from Philadelphia. The order to do this issued from the Railroad Administration at Washington, but in the judgment of those longer familiar with such problems the result was a loss, not a gain. Reduced tug mileage was not the whole story. The general lack of facilities at Port Reading, the fact that barges of that size can only pass through Hell Gate on a daylight tide, and the storing of cars in a most congested area, are only some of the reasons that readily occur. The records show that it has taken as long to reach Cape Cod from New York as from Philadelphia, and one would suppose the experiment would soon be brought to an end. The repairs occasioned by barges bumping into each other at Port Reading should alone be reason enough for abandoning the innovation. The whole Reading organization is geared to handle these barges from Port Richmond.

A distinct falling-off in receipts early in the fall led to special requisitions of egg, stove and chestnut to

be distributed by the New England Fuel Administration from the New England gateways. The original provision was for 50 cars daily; but when this mark was not reached the order was increased to 100 cars per day to make up arrears. The "independents" had been making no better shipments, and because of this the companies were struggling not only to meet their own obligations but to ship the extra tonnage piled on them by the Anthracite Committee, usually to make up the deficiencies of "independents."

The "free coal" for New England was to be more equitably distributed than was assumed possible through trade channels. The program was for each retail dealer applying for coal to send his check in advance to the New England Fuel Administration and bind himself to accept whatever size was sent him, regardless of preference. In other words, it was "anthracite," no distinction being made as to size or grade or price. A lot of dissatisfaction followed, naturally, and gradually the order was reduced, chiefly through the inability of the fuel authorities to dispose of it. At the end of the year it was dropped to five cars daily. While "free coal," egg, stove, and chestnut was being worked off in this manner, state fuel administrators frequently soliciting consignments, the regular coal factors were placing the surplus broken and pea that the New England Fuel Administration did not want. The bulk of the "free coal" was furnished by shippers of whom less complaint could be made, and it was granted to make up the arrears of shippers who were justly complained of.

Shippers with established connections had a favorable year, on the whole. A heavy tonnage of buckwheats helped make up deficits in the tonnage of domestic sizes. Retail dealers, on the other hand, passed through an extremely trying period. Too much in the way of regulation was attempted and a too finely graduated measuring stick was used too often and for too long a time. But out of it all have come benefits. Dealers know more about accounting; and so does the public about costs! It has been shown what happens when an outside impartial authority steps into the coal business to regulate it. And credits are better.

Anthracite figures for 1918 are misleading, unless they show clearly the large tonnage of junior sizes shipped into New England, especially during the summer, to help make up the shortage in bituminous. At times the movement of buckwheat, rice, barley, and culm reached 35 per cent. of the anthracite total. Beginning in the summer there was more discrimination between grades than last winter, when so much "fireproof" was poured into this market, and by October the movement had sagged to less than 16 per cent. Considering that the use of these coals was new to most steam plants, and that it was difficult to get improved stokers suited to the purpose, New England, from a conservation standpoint, shows a good record in this respect.

At the present time the rate on general merchandise shipments to England from New York is $2.50 per cubic foot of ship space, or $100 a ton, against a high record rate during the war period of $6 per cubic foot, or $250 a ton. The pre-war rate on this class of business was 25 cents per cubic foot, or about $10 a ton.

Pittsburgh District in 1918

By B. E. V. Luty
Pittsburgh, Penn.

The Pittsburgh coal district had a history quite its own in 1918, the war placing special responsibilities upon it. In the first place, the district normally serves a large part of the iron and steel industry, not only as to the production of iron and steel, but also as to its fabrication into various finished products, and nearly all the large machine shops of the district were converted into munition factories. In the second place, the burden of the lake coal movement to the northwest fell unusually heavily upon the Pittsburgh district, because of the heavy demands of the Navy for the smokeless coals of West Virginia and Kentucky. In midsummer the Pittsburgh district was suddenly called upon to "help out" in the matter of lake shipments and furnish a much larger tonnage than had originally been set down as the district's quota.

River Traffic Makes a Spurt

The Monongahela River coal traffic, which had been rather a decadent affair for years, as the outcrops on the river had been worked back as far as was feasible, took on new life in 1918 and materially helped to curtail the scarcity of coal, means being found to bring coal by rail short distances to the river. From a tonnage standpoint, however, the most important development along this line is that by which many mines in the Connellsville region, hitherto serving their beehive ovens, have had their facilities rearranged so that they can ship Connellsville coal by water to byproduct coke ovens in the Pittsburgh district, particularly the 640-oven plant of the Carnegie Steel Co. at Clairton. The Jones & Laughlin Steel Co. ships large quantities of coal from its mines on the Monongahela River to its beehive ovens at Woodlawn, on the Ohio River, and many mills along the rivers receive gas and steam coal by water.

Labor conditions in the Pittsburgh district in 1918 were on the whole relatively satisfactory. Almost all through the year there was a shortage of labor, but it was due more to depleted forces than to slackness on the part of the men remaining on the payrolls.

Traffic conditions in the first two months of 1918 were indescribably bad, coal production being greatly interfered with by "car shortage," which of course did not mean that there were not enough cars, but that they did not make their round trips fast enough. If there had been fewer cars in service it is possible the daily supply at mines would not have been less. In the spring the cars began to move better, and some cars belonging to the region, blocked all winter in the east, returned to their usual occupation.

The general policy of the Fuel Administration, that coal consumers should stock up during the summer, could not be carried out with respect to the Pittsburgh district, because the coal could not be spared. On account of the heavy demand for lake coal, particularly toward the close of the season, the local coal distributor was required to shut off coal to consumers caught stocking it, and at times consumers were encouraged to draw upon stocks previously accumulated. Toward the close of the lake season a shortage in domestic coal developed, and the lake market seemed to be in fair way to be

well supplied, so that a slight diversion of coal from the lake trade to the domestic trade was permitted.

The year opened with Government prices for the district at $2.20 for slack, $2.45 for mine-run and $2.70 for screened. In the spring, when the arrangement was made that railroads should pay the full prices, the Government limits were reduced 10c. This was better for the operators than for the higher prices to obtain on most trade, with the railroads paying the much lower prices the Railroad Administration had had in mind.

With the signing of the armistice Nov. 11 and the general slowing down in industrial operations, Pittsburgh district coal did not become nearly as plentiful as was the case with coal in many other districts, particularly Ohio, Indiana and Illinois. This was due chiefly, no doubt, to the fact that very little Pittsburgh district coal had been stocked, but operators in the district were disposed to contend also that their coal is better and that when consumers were again given a choice they were disposed to take Pittsburgh coal. Another factor was the demand for gas coal, which hardly let down at all, and a large portion of the district's output is of that variety. The result of all this was that even in the closing weeks of the year some gas coal consumers were willing to pay dealers the Government brokerage allowed, in addition to the set price, while there was very little steam coal sold at less than the set price, concessions as a rule being merely in the form of producers allowing a margin to dealers, so that they could sell to consumers at the regular Government limit.

That coal prices will recede somewhat seems very probable to leading coal operators in the district, but the operators contend that there will be less decline in the district than in the majority of the districts, and that if lake demand proves fairly good in 1919 the district's output will be absorbed fairly well.

Prosperity Insured if Capital and Labor Co-operate

By John H. Jones
President Bertha Coal Co., Pittsburgh, Penn.

Our country is facing the greatest era of permanent prosperity known, providing the people coöperate to bring about such a condition. Capital should give intensive thought to the problem and render to labor the highest returns possible in payment for labor performed. Labor in turn should coöperate with capital, permitting capital to receive fair returns on its investment, keeping in mind the constant and steady employment of labor and capital.

Through such coöperation we will be kept constantly busy; growing and moving crops to feed other countries as well as ourselves. This will require coal, steel and other products mined and manufactured. Labor will be employed steadily on a large scale, and the resultant prosperity of the country will be in direct proportion.

The time necessary to bring about this condition will depend upon the teamwork of employees and employer. Leaders of labor should advise their following carefully and not intimidate capital by trying to impose unfair conditions. Capital must study conditions carefully and pay the highest wages possible, consistent with good business, and in all cases, keep in mind the cost of living, as labor is worthy of its hire and should receive its share.

During the present adjustment period coal will be plentiful, but within a few months when industries are operating to their full capacity it will require every effort on the part of the miners and operators to supply the demand.

More coal will be required in 1919 than in any year in the history of the world. The railroads alone will use 200,000,000 tons. Potteries, glass, cement and so-called non-essential industries will require much more coal than during any year of their existence.

We, as American citizens, must urge our statesmen to pass such legislation as is necessary to have employers agree on a selling price for their product under the supervision of the Government, so that they will be able to pay labor the highest wages possible and at tht same time receive a fair return on their investment. By so doing we will stabilize business, preventing either a destructive minimum, or a prohibitive maximum. If such condition is not brought about, we will have two extremes in selling prices in the year 1919.

Coöperation will sustain confidence; confidence will stabilize business; and business stabilized will bring prosperity and happiness.

Output of South African Coal Mines in 1917 Shows Increase Over 1916

The annual report of the Government mining engineer of the Union of South Africa for the calendar year ended Dec. 31, 1917, gives the following tabulation of coal mined for the years 1916 and 1917:

Province	Coal Mined Short Tons	Coal Sold Quantity Short Tons	Coal Sold Value	Coal Sold Per Ton
Transvaal	6,936,418	6,641,229	$7,724,121.94	$1.16
Cape	11,510	8,300	28,976.50	3.49
Orange Free State	897,654	843,095	1,058,212.04	1.25
Natal	3,103,604	2,890,296	7,140,900.48	2.47
Total in 1917	10,949,186	10,382,920	$15,952,210.96	
Total in 1916	12,281,796	10,007,502	13,342,168.55	

The variation in the price is due to competition rather than to the great difference in the quality of the coal. The following table gives information about the number of coal-mining machines in use in the Union of South Africa for 1916 and 1917:

	NUMBER OF MACHINES			
Province	Electrical	Compressed Air	Total	Percentage of Work Done to Total Tonnage Mined by Collieries Using Coal Mining Machines
Transvaal	6	382	388	31.47
Cape	..	...	...	.....
Orange Free State	..	15	15	34.93
Natal	22	162	184	56.78
Union of South Africa, 1917	28	559	587	71.21
Union of South Africa, 1916	20	517	537	75.82

In 1917 there was a decrease in the percentage of coal mined by machines compared with that similarly produced in 1916; this was due to the fact that the total tonnage mined by such collieries increased in 1917 by some 11 per cent. over the previous year. The total number of employees in the coal mines of all the provinces of South Africa in 1917 was 1463 whites and 30,025 (55 female) colored workers.

Detroit Coal Market in 1918

By E. E. DUNBAR
Detroit, Mich.

WITH many of its residents experiencing hardship and suffering because they were unable to obtain coal, Detroit welcomed the coming of 1918 with reservations. In the twelve months that have intervened, more than in any previous year in the history of the city, public interest has centered about the coal trade and problems of coal supply. For consumers and dealers, the greater part of the year has been a period of anxiety, uncertainty and strain, with the confusion at times seemingly heightened rather than alleviated by mandates and regulations put out by the Federal and state fuel administrations.

Detroit's visible supply of anthracite when the year opened was virtually limited to the cargo of the lake freighters "B. F. Berry" and "R. J. Reiss." Ice conditions had prevented delivery of the coal at the upper lake port that was their destination. Shortage in supply was aggravated by a condition of railroad congestion that permitted delivery of only a few cars daily of either anthracite or bituminous. One consignment of twelve cars was two weeks en route from Chauncey, Ohio, to Monroe, Michigan.

So serious was the situation that early in the year it was reported 3500 homes in Detroit and its environs were without fuel supply or had only sufficient fuel for one or two days. Heatless street cars were an incidental feature. The coal supply was so low that even the operation of cars became uncertain, while for a time the companies supplying the city with electric light, power and gas were daily facing the probability they would have to suspend operations within a few hours.

Gas and Electric Plants Kept Running

Fortunately for the people of the city, whose inability to get coal was adding to the burden of the gas and electric companies, these utilities were kept in operation, the efforts of the coal trade and fuel administration procuring small supplies of coal to keep the plants running from day to day.

The hardships of the public and the difficulties of the dealers and transportation men were increased by a long stretch of near zero weather in January, the temperature one day dropping to 16 below, a degree of cold practically unprecedented in Detroit.

In the endeavor to make the small supply of coal at hand go as far as possible the Detroit police department undertook supervision of distribution to domestic consumers, receiving applications, making small allotments and communicating the orders to such of the dealers as had coal. It was reported early in the month that the yards of 19 retailers had closed, their owners being unable to get coal and unwilling to meet the frantic appeals from customers.

Attempting to curtail consumption, reductions were made in the city's street lighting and the routes and manner of operating the street cars were altered. Edgar B. Whitcomb, then chairman of the Wayne County fuel committee, announced that priority should be given domestic consumers, with public utilities also taking precedence over factory requirements. His appreciation of the coöperation of local dealers during the crisis was demonstrated in his making public an "honor list" showing 129 dealers had filled 46,685 applications, while five dealers had served more than 2000.

With the purpose of bringing about equitable distribution of coal coming into the city, and with the approval of Mr. Whitcomb, the Detroit coal pool was organized by a number of dealers and opened for business Jan. 11, with Edward J. Parks, an experienced traffic man, as manager. Operating in conjunction with similar organizations in other cities, the pool was continued until about the middle of February. A freer movement of coal had then developed and the pool was dissolved. Its operation brought criticism from some of the retailers that their shipments were held back by being put through the pool. Some of the steam-coal buyers complained also that the coal sent to them was of less desirable grade than the stock shipped under their contracts with the mines.

Enforces a Nine-Hour Workday

On Jan. 15, 1917, W. K. Prudden, Michigan's fuel administrator, issued an order making nine hours the maximum business day for practically all mercantile places, office buildings and most other business establishments. This was followed by the Federal Fuel Administration's order for five days shutdown, which threw about 200,000 Detroit workers into idleness.

Because of their having exhausted coal on hand and their inability to renew their supplies, thirty Detroit factories were reported on Jan. 24 to have discontinued operation, while others, including some of the largest in the city, were said to be facing the necessity for similar action.

Considerable friction between Detroit and the state fuel administrator developed about that time, due to reports that Mr. Prudden was diverting to other parts of the state coal that was consigned to Detroit. The dealers also were complaining of the unprecedentedly heavy losses incurred from coal cars being raided by thieves on tracks in the city. One dealer reported receiving a car containing 300 lb. that was billed to him at 38 tons.

The local situation had improved little in early February. Some of the local industrial plants working on war supplies were reported closed, and on Feb. 5 it was announced 54 retail yards were closed because their owners were without coal. On Feb. 6, the public schools of Detroit were closed. They did not reopen until Feb. 18.

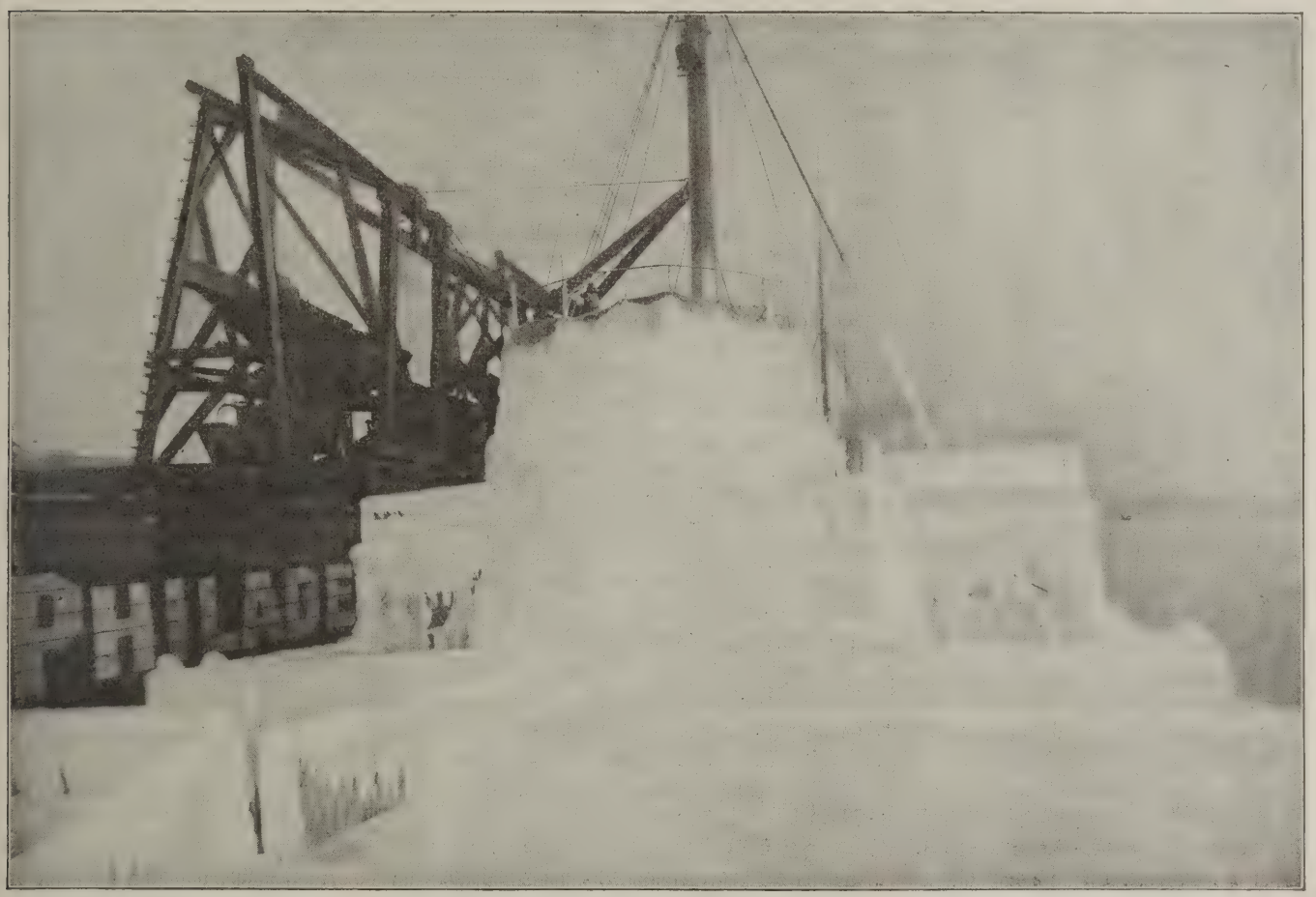
Events during the early weeks of the year apparently were shaping toward elimination of the jobbers as factors in the coal trade. Cognizance of this situation was taken in a meeting of the manufacturers and jobbers with the state fuel administrator in Detroit in March, when a number of prominent manufacturers expressed the sentiment that jobbers are a necessary adjunct, performing efficient and valuable service for their cus-

tomers. Protest also was voiced against the zone system, which the Federal Fuel Administration was reported to be outlining and which the Detroiters feared would cut off their supply of coal from West Virginia and Ohio, substituting the product of Indiana mines. W. B. Horne, an agent of the Federal Administration, while in Detroit about that time, announced Detroit consumers would receive no smokeless coal and might get little or no anthracite. As practically 95 per cent. of the domestic trade depends on anthracite, the announcement occasioned much gloom.

Another controversy between Detroit dealers and the state fuel administrator developed in May, when Mr. Prudden announced the gross margins permissible to dealers supplying domestic trade. Mr. Prudden made the population of various towns the basis for determining the margin for dealers in those towns. His first announcement gave Detroit dealers a margin of $2.25, which was later raised to $2.50, but still fell short of the amount the dealers sought.

Dealers contended they could not do business on a margin of $2.50. The Detroit Board of Commerce intervened in the matter, with the desire to effect an arrangement which would speed the movement of coal to Detroit. After an extensive investigation of dealers' costs, the Board of Commerce recommended that Mr. Prudden fix the margin at $2.50 a ton on anthracite and $3 a ton on bituminous. Though he was understood to have approved the investigation, Mr. Prudden apparently disregarded the recommendation, retaining $2.50 as the margin on anthracite and disposing of the allowance on bituminous by fixing maximum prices for delivery of high and low grade coal of that type.

In July the Board of Commerce again undertook to accelerate shipments of anthracite by appointing a special representative to be stationed in Washington. As neither the state nor the Federal Fuel Administration accorded recognition to this agent, his work was soon terminated. The Board of Commerce, however, continued its interest and on Aug. 14 sent a delegation of prominent business men and manufacturers to Washington. The delegation was accorded hearings before representatives of the Fuel Administration, the War Industries Board, Secretary of War and other branches of the Government, without, however, being able to obtain any increase in the city's allotment of anthracite. The allotment of 601,000 tons was a reduction from the amount actually shipped into the city in 1917-18, when coke and smokeless coal also were used extensively as substitutes, while the 1918 allotment to the state represented a reduction of 24.42 per cent.



LAST COAL BOAT OF THE SEASON AT ONE OF THE LAKE DOCKS

Though unable to obtain a larger allowance, the Board of Commerce committee was promised steps would be taken at once to immediately expedite shipments under the city's allotment and to increase the supply of a good quality of bituminous coal. This assurance was followed by modification of the zone regulations permitting shipment of Kentucky, West Virginia and Ohio coal into lower Michigan for the use only of domestic consumers, gas or byproduct plants and railroads. The priority regulations covering shipment of coal from these districts for the lake trade served as a check on

shipments of domestic lump and prepared sizes to Detroit and the most immediate outcome of the order was the cutting off from Detroit steam-coal users of the coals most favored in their operations. To offset this loss, shipments from certain districts of Indiana and Illinois were increased. Fearing they would be able to get no other supply, the consumers of steam coal and many of the retailers accepted the advice of the fuel administration and stocked up heavily with the Illinois and Indiana coal. Both classes of buyers are reported to be having much trouble disposing of this stock.

Prior to the modification of zone regulations described in the foregoing, the Federal Fuel Administration had aroused vigorous protest in Detroit by cutting off shipments to Michigan from the Kanawha and Coal River districts of West Virginia, from which Detroit in normal times is said to receive about 2,500,000 tons of coal annually.

Throughout the first half of the year, the feeling that the state fuel administrator was discriminating against Detroit or at least not giving the attention to the city's needs that circumstances seemed to demand, was growing and differences also were developing between the state fuel administrator and his representative in Detroit, Edgar B. Whitcomb, chairman of the Wayne County fuel committee, the latter's support of the Detroit retailers in their appeal for a higher margin apparently widening the breach.

Mr. Prudden on June 7 requested Mr. Whitcomb to resign. The latter took no immediate action. Detroit coal men, the Board of Commerce, common council of the city and various other local organizations rallied to the defense of Mr. Whitcomb. Their efforts to bring about the dismissal of the state fuel administrator were unsuccessful, as was also the attempt to have Wayne County detached from the remainder of the state as a separate fuel administration district with Mr. Whitcomb in charge. Mr. Whitcomb finally retired, and Mr. Prudden, on June 13, appointed as his successor James Couzens, then Detroit's police commissioner, who with Charles A. Dean had been associated with Mr. Whitcomb on the Wayne County fuel committee. After some opposition had been expressed to Mr. Couzens' acceptance of the appointment, matters quieted down. Mr. Couzens, having received the Republican nomination for mayor, retired from the committee in September. As Mr. Prudden had decided to move his headquarters from Lansing to Detroit, and actually did so Oct. 7, no successor was named for Mr. Couzens. His resignation was said to have been influenced by a desire to give undivided attention to the campaign which resulted in his election for mayor of Detroit.

In the effort to obtain definite information on Detroit's anthracite needs the state fuel administration set apart the first ten days of September for receiving applications from domestic consumers dependent on hard coal base-burners. Some 23,000 applications were listed. With those previously submitted to dealers the total is estimated at 53,000. The allowance of anthracite, originally fixed at six tons each, was subsequently reduced to a maximum of four tons.

The closing weeks of the year were featured by an inactive market for either steam or domestic bituminous, due to the large stocks held by many of the steam plants and retail dealers. In the case of the dealers distribution was impeded by the fact that mild weather continued practically without a break to the end of the year, and also by the fact that much of the coal in dealers' yards is better suited for factory use than for household heating plants.

Many of the dealers are apparently confident that removal of zone restrictions and retirement of the various fuel administrations will make possible a smoother and more satisfactory operation of their business during the coming year than was experienced in 1918.

Toronto Coal Trade in 1918

By Phillips Thompson
Toronto, Canada

The coal market during the earlier months of the year just closed was characterized by a great shortage in the supply of domestic fuel. The yards were empty and deliveries light, and dealers only filling orders in small lots to supply immediate requirements. This condition of affairs was aggravated by severe weather and the difficulty of obtaining help.

With the opening of spring dealers were overwhelmed with orders from consumers, who, warned by the experience of the previous season, were anxious to lay in supplies early, as they were urged to do by the Fuel Controller. The usual practice has been for the larger consumers to give their orders and arrange for deliveries from time to time as required, but last year nearly every householder requested immediate delivery of his year's supply. The consequence was that dealers were in receipt of orders which would keep them busy for months ahead.

Deliveries were made direct from the cars and very little coal stored in the yards. The difficulty of distributing the supply was much increased by labor shortage, which continued until late in the fall. The taking of orders was suspended from time to time in order to enable dealers to overtake delayed deliveries. These conditions induced a general feeling of apprehension on the part of the public and an impression that a serious shortage in the supply prevailed. That this was unfounded is shown by the figures furnished by the Fuel Controller giving the total shipments of domestic anthracite received in Toronto for the year ending Nov. 30, at 417,156 gross tons, as compared with 428,000 gross tons for the previous year.

The receipts of bituminous during 1918 considerably exceeded those of 1917. The total consignments to the port of Toronto from April to the end of November were 1,001,709 net tons, as compared with 867,836 net tons during the corresponding period of 1917; but these figures cover the supplies for an area within a radius of about 60 miles round Toronto. Owing to the greatly increased demand for industrial consumption, there was at times a pronounced scarcity of soft coal, but toward the close of the year the market was overstocked with it and prices fell somewhat below the rate fixed by the government.

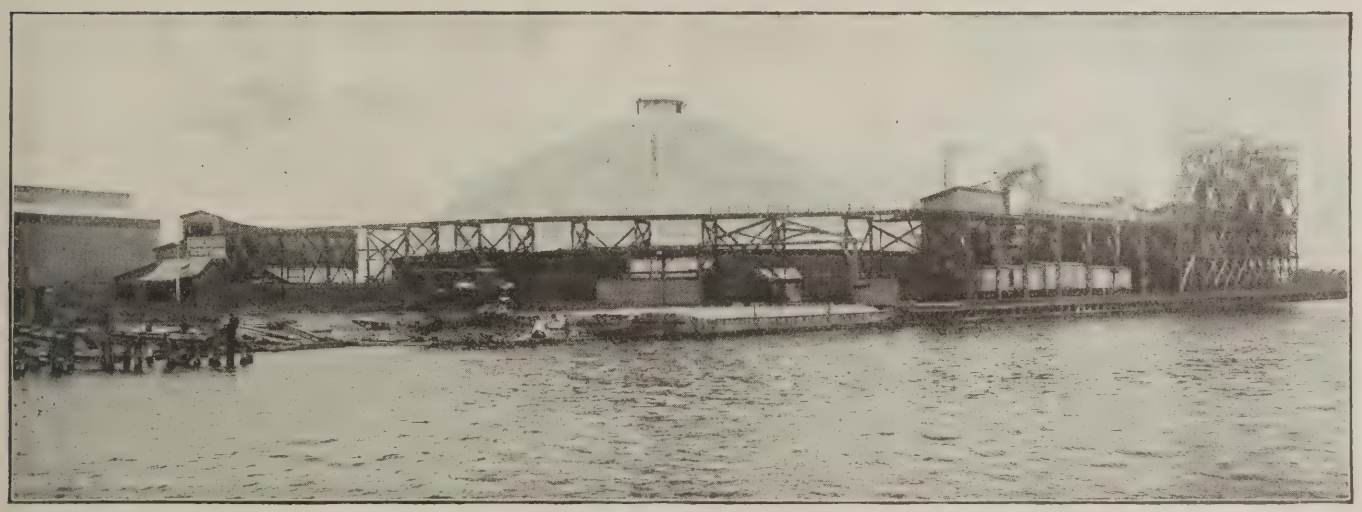
The general feeling in the trade as to the prospects for business during the new year is decidedly optimistic. The domestic trade is rapidly getting back to normal conditions. All danger of a serious shortage during

the remaining winter months is believed to have been averted by the limitations imposed by the Fuel Controller. Owing to the fact that so large a proportion of consumers have their winter's supply stored in the cellars, the domestic trade is likely to be lighter than usual for some weeks. As soon as the season opens an increased volume of business as compared with the last few years may be expected, as with the return of the soldiers from overseas many new homes will have to be provided for.

The demand for industrial coal which is at present quiet, is dependent upon the reconstruction of industries upon a peace basis, and while the future cannot be forecast with any degree of certainty, there seems every likelihood that the present year will witness great activity in the staple lines of manufacturing. A large number of the workingmen displaced by the closing down of the munition plants in Toronto have already been absorbed by shipbuilding, agricultural implement, tractor and other industries. Many new enterprises are projected in view of the opportunities presented by the export trade, and though the process of getting down to a peace footing is necessarily somewhat retarded by present high cost of material and labor, in view of which some contemplated undertakings are being temporarily delayed, it is regarded as assured that the heavy domestic and foreign demand for the staples of production will insure a busy and profitable season for the manufacturer, and a resumption of activities means a strong demand for fuel.

Buffalo Coal Market in 1918

By JOHN W. CHAMBERLAIN
Buffalo, N. Y.



LEHIGH COAL SALES CO. DOCK AT SUPERIOR, WISCONSIN—NOW BEING REBUILT

AS BUFFALO is a jobbing bituminous market it was hit hard by the conditions in 1918. Only here and there did a jobber do anything like an active business, while not a few of them confess that they did not make a living. The reason for this is plain. Unless there is a surplus of coal most operators sell their output direct to consumers. The jobbers knew this well, and though they complained, they clung closely to the office routine and waited till the old conditions should return. Only one or two suspended entirely. James A. White did practically no business and finally closed his office and went away. Harry F. Butler kept the office of the Century Coal and Coke Co. open, but did no business there. The company could sell coal in Montreal, and it did so. Both of these offices expect to reopen this year.

Never did the bituminous trade change front with the rapidity it assumed last November. While the experts were still crying that coal was to be scarcer than ever before, it began to become plentiful and almost in a day it overflowed; first in Canada, keeping the Buffalo jobbers in hot water paying demurrage, and then in general, with most of the members of the local trade still with their feet on the desk, waiting for the producer who would sell to them. From all sides salesmen reported that the consuming yards were piled full, and yet the jobbers had sold but little of this coal and had made next to nothing out of it. Before the end of the year there were salesmen here, offering coal from territory not before tributary to this market.

The future of this trade is a problem, for nobody knows what can be done with the increase of bituminous capacity created by the war demand, and said to be at least 25 per cent. more than it was. Will home industry and export take care of it all? The Buffalo jobber does not see how this can be done. While everyone is hopeful, and is prepared to make the fight for all he is worth to regain his suspended tonnage, it is no exaggeration to say that if this new capacity cannot be shut off somehow, the bituminous trade will go back to the control of the consumer, where it was before the fall of 1916. This means selling on a 10c. margin and producing at about cost.

Buffalo is not a jobbing center only. A big tonnage passes through this city that is not even sold here. There is a good producing tonnage here also. About

an even dozen companies, with offices in Buffalo, last year turned out 2,631,867 gross tons of bituminous coal and there is good prospect of more this year. Capitalists spent good money last year, looking for mines that they did not find, and they will resume the quest when the trade settles down a little.

Buffalo ships about four-fifths of the anthracite in the lake trade, sending it all to ports on Lakes Michigan and Superior. Some is still shipped from Erie, Penn., but the ports of Lake Ontario have dropped the upper lake trade for the present. The amount of anthracite shipped from Buffalo by lake in 1918 (customhouse figures) was 3,594,803 net tons, as against 4,237,904 tons in 1917. The operations were on an allotment prepared and enforced by the general anthracite committee, which maintained W. C. Blodgett, an old anthracite man, to look after it. As the season neared its close it was found that the shipments were behind the allotment, but an extra effort was made and the amount was moved.

This rush of anthracite to the lakes late in the season kept the city supply very short and complaints were many, though no actual distress was reported, thanks largely to the activity of the local fuel administration office. Late in the year even the anthracite demand became easier. December beheld the fuel administrator's office announcing that the supply would be normal by Jan. 10. The fuel office had now nothing to do! The sudden change of front in anthracite was largely due to the warm season. The year went out with the thermometer up to 50 deg. Only about 20 days had shown freezing temperature, the lowest being 19 deg. But for a bad shortage of natural gas, the situation would now be of the best.

Milwaukee Coal Trade in 1918

By HERMAN BLEYER
Milwaukee, Wisconsin

THE story of Milwaukee's coal market in 1918 is devoid of anything of unusual interest. Dealers agree that it has been satisfactory in every way, but much will depend upon weather conditions during the remainder of the season. The winter thus far has been mild and with little snow. With prices fixed for both wholesaler and retailer by the Fuel Administration, and with restrictions as to delivery, the coal business of the year thus far has lacked every element of marketing and lapsed into a routine of simply keeping things moving.

The closing months of last winter were unusually bitter, and storms retarded deliveries for weeks. With the tribulations of that period in mind, coal handlers entered the new season on Apr. 1 with a determination to get in all the coal they could as soon as possible and to hasten the output to consumers in every possible way. The westward movement by lake began alarmingly slow, but by persistent effort on the part of dockmen the flow was accelerated to such an extent that when navigation on the Great Lakes closed the docks in Milwaukee harbor held full supplies of bituminous coal and all the hard coal that had been allotted to the district by the administration.

Summer deliveries were made on an unusually large scale both to manufacturers and householders, the



UNLOADING A BIG STEAMER—TYPICAL SCENE IN THE MILWAUKEE COAL DISTRICT

SHIPMENTS OF COAL BY RAIL OUT OF MILWAUKEE DURING 1918

	Hard	Soft
January	12,727	97,801
February	16,458	80,521
March	12,313	76,676
April	1,978	38,052
May	899	33,841
June	5,686	52,604
July	17,830	95,745
August	17,470	99,733
September	15,098	101,280
October	15,074	168,239
November	13,695	116,260
December	35,307	93,060
Total	164,535	1,053,812
Total, 1917	200,465	772,770

former, in many instances, accumulating large stock piles in the vicinity of their plants. The signing of the armistice between the warring nations was followed by an almost complete cessation of orders from the larger consumers, however, and business has been dull ever since.

Prices of all grades of coal ruled high during 1918, but consumers accepted the situation gracefully, and were seemingly satisfied if they got the supplies they needed. Federal regulation has proved popular. Small dealers say the Government has treated them very fairly, and in so doing has helped the big fellows to a better profit. There is no complaint on this score. Regulation has stabilized business and taught some valuable lessons as to cost of doing business. It has also brought dealers together and wiped out little burdens accumulated during years of keen competition. Opinion is unanimous that regulation should be continued at least until the end of the coal year in spring, as stocks have been purchased on the basis of schedule prices, and the entire business directed in accord with Administration rulings. Were regulation to be suddenly withdrawn, there would in all probability be a slump, which would be disastrous to those with large stocks bought at war prices.

Everybody in the coal trade at Milwaukee predicts a prosperous new year and are facing the future with a feeling of optimism. They base this judgment on the ground that every industry will be taxed to its utmost to supply things needed to make up for the wanton destruction during the war, and that factories will demand maximum supplies of fuel. It is expected that the policy inaugurated by the Government of stimulating the production of Illinois coal will make producers in that section livelier competitors in the Milwaukee field in future, as many who had never used western bituminous before have become wedded to it. Whether this will be so when Government restrictions are removed is problematical.

RECEIPTS OF ANTHRACITE AND BITUMINOUS COAL AT MILWAUKEE BY LAKE, RAIL AND CARFERRY DURING 1918

Month	By Cargo		By Carferry		By Rail		Grand Total	
	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft
January	.....	.....	4,631	5,734	113	69,446	4,744	75,180
February	.....	.....	907	3,237	20	62,727	927	65,964
March	.....	.....	7,417	32,406	46	73,524	7,463	105,930
April	.....	.....	8,801	45,368	.....	63,586	8,801	108,954
May	85,700	389,547	12,630	9,747	.....	53,851	98,330	453,145
June	53,947	434,094	20,467	6,251	128	56,981	74,542	497,326
July	106,037	554,711	3,972	3,675	326	55,658	110,335	614,044
August	119,293	768,060	3,955	464	120	65,803	123,368	834,327
September	96,451	621,265	4,429	1,082	60	52,731	100,940	675,078
October	98,541	383,452	11,116	10,855	73	53,153	109,730	447,460
November	115,879	251,754	4,238	2,068	259	53,651	120,376	307,473
December	126,417	29,500	9,891	8,341	100	66,495	136,408	104,336
Total	802,265	3,432,383	92,454	129,228	1,245	727,606	895,964	4,289,217
Total, 1917	922,538	3,025,558	64,047	174,144	2,521	984,992	989,106	4,184,694

Ohio Coal Trade in 1918

By J. W. Lehman
Columbus, Ohio

The year 1918 was a most peculiar one in the coal trade in Ohio territory. It differed from any preceding year in the fact that the change from a strong market to a rather weak demand, which took place during the closing weeks of the year, was probably the most rapid transition in the history of the trade. Of course, the usual events brought out by the world war were something without precedent, and consequently the striking effects of the signing of the armistice were without precedent.

The year, with the exception of the final five or six weeks, was one of the most prosperous in the memory of coal men in Ohio. This is especially true of the producing end of the business, which was running at high speed throughout the year and which reports an output far in excess of that in any previous year.

An analysis of the market conditions which prevailed during the year reads similar to many other lines of business, with the exception that the decline was probably more rapid than that experienced in other lines of endeavor. The year opened with an exceptionally strong demand, not only for steam, but also for domestic grades. This continued pretty much throughout the year, and every one was at top speed, so to speak, until the end came suddenly.

With the opening of 1918, domestic demand probably monopolized the attention of producers, distributors and retailers alike. The railroads were tied up and retailers were clamoring for fuel with which to make deliveries to customers. There was a marked shortage, which was partially relieved by the fuelless days designated by Fuel Administrator Garfield. This condition lasted for the greater part of the winter season and was only relieved by warmer weather.

Due to the efforts of the state and county fuel administrations, suffering among householders was held at a minimum and there were no actual cases of extended suffering.

The steam business during this period was in pretty much the same condition. Steam grades were scarce, and users vied with each other to get deliveries. It was a scramble to get fuel sufficient to operate plants and also to keep the public utilities going. In fact some of the public utilities were put on short fuel rations, in order to help the war program along.

With the coming of warmer weather, which relieved

the domestic situation, there was more fuel for steam users, and little trouble was experienced from that time on. But frequent warnings of the Federal and state fuel administrations caused steam users to continue buying in order to accumulate a surplus stock for the coming winter.

At the same time domestic users were urged to lay in their winter's supply of fuel early, and that helped to maintain the strong demand. When the fall season arrived, a much larger proportion of winter coal had been stocked by householders than ever before. Steam users had thousands upon thousands of tons of coal laid by to guard against emergencies.

Buying continued strong right up to the day of the signing of the armistice. Then suddenly purchasing agents stopped to look around and size up the situation. Retailers who had accumulated large stocks found that as the production at the first of the year, when it was reduced to that level through car shortage and transportation congestion.

As to the outlook for 1919, there is a wide divergence of opinion among producers and jobbers. Generally speaking, however, the larger and more established operators do not look upon the future with many misgivings. They claim that when present steam stocks are consumed and business gradually gets on a peace basis there will be a good steady demand for fuel.

One of the larger operators, who is a prominent member of the National Coal Association, fairly spreads optimism in his discussion of the future of the coal trade in Ohio, as well as in other parts of the country. He banks a great deal on the undoubted foreign demand which is bound to develop with the reconstruction. He believes that the country will recover rather rapidly



MILWAUKEE'S LARGEST DOCK YARD FILLED TO CAPACITY—UPWARD OF 200,000 TONS

the weather was unfavorable for an early moving of their stocks. Many orders were cancelled and the slump started. As time passed, the slump gained momentum until at the close of the year there was a greatly reduced demand for coal. In fact steam grades were almost a drug on the market, as steam consumers were following the policy of using their reserve stocks and were only buying when they had to.

Some price-cutting resulted, but the larger producers continued to hold their product at Government prices. As a result there was no general demoralization of the market. Of course, production was cut under these circumstances, but toward the latter part of the year it was about 50 per cent. of normal, which was about the same from the effects of the world war and that the coal industry will assume a more responsible position than ever before. He believes, however, that there will be a period of slack demand which is inevitable under present conditions. The larger and more substantial operating concerns will emerge in good shape and in a position to go on and improve their status. Those who were pessimists at first have changed their views.

It is true that there was a great spurt in development work in Ohio, as in other coal-producing states, and many of the newer operations were conducted at a high overhead cost. Many of these will fall by the wayside, and the substantial concerns which are operated efficiently and with a low overhead will survive.

Production in Colorado in 1918 and the Outlook for the Coming Year

By F. W. WHITESIDE
Denver, Colorado



ACCORDING to Mr. Whiteside, who is chief engineer of the Victor-American Fuel Co., of Denver, Colo., and a man of broad vision, there is every reason for the belief that this country is face to face with a period of renewed prosperity. Much of the trade that has come to this country from South America and other foreign countries, Mr. Whiteside believes, will be permanent, and he is certain that a vast tonnage of coal will be required to transport all this material and merchandise. Colorado will without doubt receive a fair portion of the increased business in coal and other products, prophesies Mr. Whiteside, as soon as business again assumes its normal activity.

THE coal mines of Colorado during the year 1918 produced over 13,000,000 tons of coal, which is the greatest output in the history of the state. This tonnage was made possible by the efforts of 176 companies operating 223 mines and employing an average of 14,377 men. The previous year the production was 12,515,305 tons of coal, produced by 234 mines owned by 178 operating companies and employing an average of 13,970 men. With the demand for fuel during the year just passed, every possible effort was put forth to bring the production of all mines up to the maximum. The local representative of the Fuel Administration kept in close touch with all the operators and organized a system by which committees were appointed at each mine, consisting usually of six men designated lieutenants. At some of the properties the committees were composed of both local mine officials and miners, at others the entire personnel of the committee was made up of coal miners and others employed in and about the mine. The duties of the committee at each place consisted in keeping in close touch with the men, investigating all absence from work and exhorting each individual to put forth his best efforts toward securing the greatest possible output. While in some localities the result sought was not achieved, in the main a considerable stimulus was given to the men and the result desired was realized to a considerable extent. The average production per man was therefore above that of the preceding year.

The supply of empty railroad cars for loading was not always dependable, and a considerable tonnage was lost on account of the inability to run the mines steadily, arising from the shortage of cars. This was especially true in the northwest portion of the state known as the Routt County district.

Colorado suffered, as has every other state in the Union, from the Spanish influenza epidemic, which caused a situation so serious at some of the properties that work had to be suspended temporarily. At more than one operation the number of men incapacitated exceeded 25 per cent. of those employed. Most of the mines continued to work in spite of the epidemic, but the efficiency of their operation was seriously affected and their production consequently reduced. Profiting by the experience of last winter, when so much suffering and distress resulted from the scarcity of coal, all consumers were urged to stock up during the summer and early autumn months; this advice was followed to so great an extent that at this time the railroads, industrial plants and many private consumers are buying but little fuel and are depending upon their storage supply. This has caused a decline in the demand for coal, especially for the smaller sizes, and a number of operators have been obliged to dump upon the ground all sizes except lump coal. Consequently few, if any, of the mines have been running full time for the past two months.

The weather conditions always exercise a marked influence upon the demand for coal, this being especially true in the lignite districts; it is often said that a cloudy day or even the weather man's forecast of an approaching storm will stimulate this business. As the fall and winter months up to the first of the present year have been unusually warm and pleasant in the regions where this fuel is consumed, the demand for lignite coal has been light, causing many of the mines to suspend operations three and even four days of each week.

Some of the most popular domestic and steam coals produced in the state are shipped from Routt County. The entire business of this district is handled by the Denver & Salt Lake R.R. This line crosses the Continental Divide at an elevation of 11,660 ft. through a land of perpetual snow. Operating this line with its present 23 miles of 4 per cent. grade over the Divide is a difficult proposition. An unfortunate fire destroyed several hundred feet of snow sheds on the summit in November and caused a suspension of service for a considerable period during their rebuilding; furthermore, a serious cave-in in Tunnel No. 16 tied up all operations for over a month, and the production of this territory has accordingly been seriously curtailed.

It is always difficult to predict business conditions with any degree of certainty, even the best or most carefully planned estimate fails in view of the unknown factors which enter into all such calculations. The present lull in activity is but the inevitable pause

which must be expected to come with the termination of the effort we have put forth for the successful carrying on and completion of the war. It is a common human attribute in a time like the present for enterprises and individuals to rest upon their oars waiting to see what is going to happen When the forward movement again begins they join with the rest, and business will again assume its normal activity.

There is just reason to look for a period of renewed prosperity in this country for a considerable time to come, as much structural and building material must be manufactured here.

A great deal of the trade with South America and with countries over the seas which has come to our doors since the beginning of the war will be retained, and a vast tonnage of coal will be required to transport this merchandise and material to its destination. Much of the building and commercial activity which has been silenced during our participation in the world conflict will be again resumed, thus producing a still greater demand for structural supplies.

Numerous adjustments will have to be made with labor during the coming year. Some of these will not be accomplished without strikes and other delays. It is to be hoped that they will not seriously reduce the coal production.

The question of the operation of the railroads is one which will have a bearing not only upon coal production, but upon all lines of business activity. If the management of the railroads again reverts to their original owners there may be a somewhat serious, though temporary, shortage of cars which will, in turn, affect the coal production.

However, when one considers the efficient manner in which the Government has handled the business of waging war, not forgetting the individual efforts put forth by corporations and individuals alike, there need be no serious apprehension felt for any condition that may arise in the event that the Government ceases to operate the railroads, and any ill effect of this transfer to individual control will be of but a temporary nature and will be soon remedied. It must be remembered, however, that during the strenuous times experienced while the country was at war the control of the railroads enabled the putting into effect of the zoning plan, which not only saved thousands of car-miles at a time when transportation facilities were at their worst, but also enabled the coal industry to meet the manifold demands made upon it.

With labor more plentiful and operating conditions more favorable, the coming year should be one of prosperity in every line of industry. Colorado should receive a fair portion of the immense volume of business that seems assured in coal and all other products, and in the coming year should produce 13,500,000 tons of coal.

The Future of the Coal Industry

By F. S. PEABODY
Chicago, Illinois

I FEEL that there can be no doubt that the coal industry must eventually return to the point where natural laws will once more apply. But this must not come too quickly. There must be no massacre of the industry where the slaughter will be indiscriminate.

Just as the Government, out of necessity, created an artificial situation, so must it of necessity see to it that conditions become normal again. When we entered the war the Government found the coal industry contemplating a hill too steep to climb, and lent a helping hand. We must not now be deserted on the summit. We must be eased down the other slope so that there may be no disaster.

But the Government cannot accomplish this if it is forced to deal with an unsympathetic or unorganized industry. Of all the lessons this war should have taught us, the benefit of concerted action is by no means the least. But with the end of Government control, this road will be closed to us because the anti-trust laws will then resume their functioning.

The President is now abroad, ostensibly for the purpose of showing the world that unrestricted competition, as between nations, is no longer possible. But it will exist in our own country, no matter how disastrous the results may be, so long as the Sherman Law is on the statute books in its present form. We must "clean house" so that we may be fit to take our place in the new scheme of world trade.

If the Government will continue its present form of control until the declaration of peace, and then be ready with an anti-trust law so amended as to allow reasonable cooperation among the members of our industry, we can well take care of ourselves, unless we have failed to be impressed by the great lessons of the war. We already have the machinery we need—the National Coal Association, the National Coal Jobbers Association and the National Retail Coal Merchants Association. And when these bodies, working under a new law, have been made thoroughly representative of the industry, provided only that they continue to be harmonious, and will cooperate they can, and should, become the guiding spirit that is needed.

Lacking some such safeguard as this. the future is not pleasant to contemplate.

Connellsville and Byproduct Coke Industries During 1918

By B. E. V. LUTY
Pittsburgh, Penn.

THE Connellsville coke trade was uneventful in 1918 in the matter of market conditions, for it was under Government price control and there were no changes in basic prices. Furnace coke was limited to $6 a net ton at ovens; foundry coke, 72-hour selected, to $7; and crushed coke to $7.30. One change was made during the year, the size of screen for crushed coke being reduced in June from 1-in. to ¾-in. In August a regulation was made limiting the price of clean screenings, over ½-in. screen, gained from old dumps, to $5.50, this material finding its market chiefly as domestic fuel. It is almost needless to say that furnace and foundry coke commanded the full Government limits throughout the year. Screenings declined fully 25c. under the Government limit in December. Operators were unwilling even to allow brokers any commission on furnace coke, and as Government regulations did not, contrary to the case of coal, permit brokers to charge a brokerage to consumers, there was no margin for the broker. In foundry coke the operators frequently allowed brokers a margin of 25 cents.

Operating conditions in the Connellsville coke trade were altogether unsatisfactory throughout the year, but there were wide variations. The great railroad tie-up of the winter of 1917-1918 scarcely affected any industry or region more disastrously than it did the Connellsville coke region, and yet there was scarcely any railroad freight service more important than that of moving Connellsville coke; for on it depended in great measure the pig-iron production, and consequently the steel production of the country, when steel was an essential for winning the war. Practically every ton of curtailment in Connellsville coke meant a curtailment in steel output.

Poor Traffic Conditions Hinder Output

During the major portion of 1916 the Connellsville region shipped an average of over 425,000 tons of coke a week. In 1917 the average dropped, chiefly on account of traffic conditions, to 336,000 tons a week, which was bad enough; but in 1918, up to the middle of February, shipments were less than 250,000 tons a week. Gradually conditions improved until by the middle of the year shipments were running at 350,000 tons a week. The car service was practically satisfactory, but labor was in short supply, and there were heavy drafts upon the coal resources of the Connellsville region in favor of byproduct coke ovens. As a war measure, on account of the byproducts, every effort was made to put coal through byproduct ovens rather than beehive ovens.

In the late months of the year production of Connellsville coke was seriously interfered with by the epidemic of influenza. Many men were attacked, while on account of the scarcity of help many men stayed at home to nurse members of their families who were affected. Inoculation was practiced to a considerable extent and results from inoculation were quite favorable. So great was the curtailment in output that despite the slackening in the iron industry that occurred after the signing of the armistice Nov. 11, there was a distinct shortage of coke and a few blast furnaces were forced to bank at times, while many operated at reduced blast pressures to conserve their meager supplies of coke.

Connellsville Coal for Byproduct Ovens

The time was, but a few years ago, that the typical Connellsville coke operator could not see but that the demand for Connellsville coke would continue until the coal was exhausted. Any suggestion that the coal would be shipped in large quantities for conversion into coke by byproduct ovens was scorned. The thought of Connellsville coal going through a byproduct oven was regarded almost as an insult to the coal. Eventually events proved otherwise, and in no year was there such a great diversion of Connellsville coal to the byproduct coking process as in 1918. This arose from the double effect of the completion during the year of many byproduct ovens directly tributary to Connellsville coal, and the necessity of operating all such ovens in full oven if beehive ovens had to be closed, because the byproducts were needed for war purposes. For a time the shipments of Connellsville coal averaged 250,000 tons a week, chiefly for byproduct coking. This represented about 40 per cent. as much coke as the Connellsville region had itself made in its best days.

The most important single operation in byproduct coking directly associated with the Connellsville region was the Clairton plant of the Carnegie Steel Co. This plant was projected several years before, and it had been expected to get it in operation in 1917; but the first coke was not made until 1918, in which year the whole 640 ovens originally projected were completed, leaving under construction 128 ovens of a second batch of 640 ovens, the construction of which will proceed slowly.

The Clairton operation contemplated complete elimination of rail movement in both coal and coke, the coal to be towed down the Monongahela River to barges, and the coke to be distributed first to the Carnegie Steel Co.'s blast furnaces that are reached by its inter-plant road, and then, as output grew, to be distributed by water to various other Steel Corporation blast furnaces in the Pittsburgh district. Owing to war exigencies the necessary river craft were not altogether available, and there was much rail movement of Connellsville coal to Clairton. As the plant was being operated with particular reference to byproducts, the coal used was chiefly Lower Connellsville, running about 65 per cent. as to volatility, while the old basin coals run about 70 per cent. The normal operation will be more largely with old basin coals.

In the case of the Clairton operation, as with several

other byproduct plants in the Pittsburgh, valley and lake front districts, the byproduct ovens have been built with the direct purpose of supplanting beehive ovens in the Connellsville region, owned by the same interests, so that the same coal will be used, and by the same interests. In some cases coal from other districts will be used to an extent. In one or two instances blast furnace interests formerly purchasing Connellsville coke have built byproduct ovens, and simply buy coal instead. In one notable instance the furnace interest, being in doubt as to the date of completion of its byproduct ovens, made a contract which should automatically turn from coke to coal upon completion of the ovens.

While the war halted much new construction work, it stimulated work on byproduct ovens, the Government being so much interested in the byproducts, and work was pushed despite the great difficulties. As a result, no less than 2085 byproduct retorts were completed in 1918, against 739 in 1917. In ten years previous the average increase had been about 375 ovens per year, but a few more than that were built, as some ovens were abandoned.

Increase in Number of Byproduct Ovens

According to a statement compiled by one of the largest interests engaged in building byproduct ovens under contract, there were 6756 byproduct ovens in the United States at the beginning of 1917, and the 739 built in that year brought the total at the close of the year to 7495. With the 2085 built in 1918 the number on Jan. 1, 1919, was 9580, with 1620 additional either in course of erection or definitely projecting, pointing to a total in the not distant future of 11,200.

The weekly reports of the byproduct industry, compiled by the U. S. Geological Survey for the purpose of stimulating byproduct coke manufacture as a war measure, furnish interesting information as to both the capacity and the output of the industry and indicate the causes of loss of production. The Survey required that each operator report weekly his capacity and production, assigning causes for loss of production—coal shortage, labor trouble, repairs to plant, no market, and miscellaneous causes.

The coke reports of the Survey were instituted at the beginning of 1918, and a study of the reports through the year suggests that as the weeks passed and operators had occasion to assign causes for the difference between rated capacity and actual production they scaled down their ratings somewhat. Their reports at the beginning of the year indicated a total rating for the country—a few plants did not report at the outset—of 500,000 net tons of byproduct coke a week. This agreed exactly with builders' estimates of 26,005,400 tons annual capacity for the 7495 ovens that had been completed to Jan. 1, 1918, while at the close of the year the operators' ratings totaled about 650,000 tons a week, or 33,800,000 tons annually, while the builders' estimate for the 9580 ovens then completed was 35,211,200 tons.

The reports in the early months of the year showed coal shortage as a predominating influence in restricting output, but later, when there was a fairly adequate coal supply, though frequently not of the description of coal the operator would have preferred, plant repairs, occasional labor trouble and miscellaneous causes were so uniformly sprinkled over the weeks that one is disposed to conclude that a reasonable expectation of output is about 90 per cent. of rated capacity. Taking this at 650,000 tons weekly, the actual commercial capacity of the byproduct coke industry Jan. 1, 1919, was about 30,420,000 net tons a year, with more than 6,000,000 tons in prospect through new construction, pointing to an eventual commercial capacity of 37,000,000 tons, the makers' rating of capacity being 42,800,000 tons. These comparisons would be entirely misunderstood if they were taken as suggesting any criticism of either coke-oven builders or coke-oven operators. In this industry, as in many others, "capacity" is merely a standard to be approached as closely as circumstances permit, and the comparisons made suggest how close the approach can be expected to be.

The rapid growth of the byproduct coking industry exceeds the pace at which new blast furnaces, the chief consumers of coke, are built; and as byproduct ovens will operate if necessary at the expense of idleness of beehive ovens, there must be some idleness of the latter. Taking the beehive capacity at 35,500,000 tons, the 1916 output shown in the table having been the record output in the history of the industry, and the prospective byproduct output of 37,000,000 tons, as computed above, there is a total of 72,500,000 tons.

COKE PRODUCTION IN THE UNITED STATES

	Beehive, Net Tons	Byproduct, Net Tons	Total, Net Tons
1893	9,464,730	12,850	9,477,580
1900	19,457,621	1,075,727	20,533,348
1910	34,570,076	7,138,734	41,708,810
1915	27,508,255	14,072,895	41,581,150
1916	35,464,224	19,069,361	54,533,585
1917	33,167,548	22,439,280	55,606,878
918	30,406,000	26,264,000	56,670,000

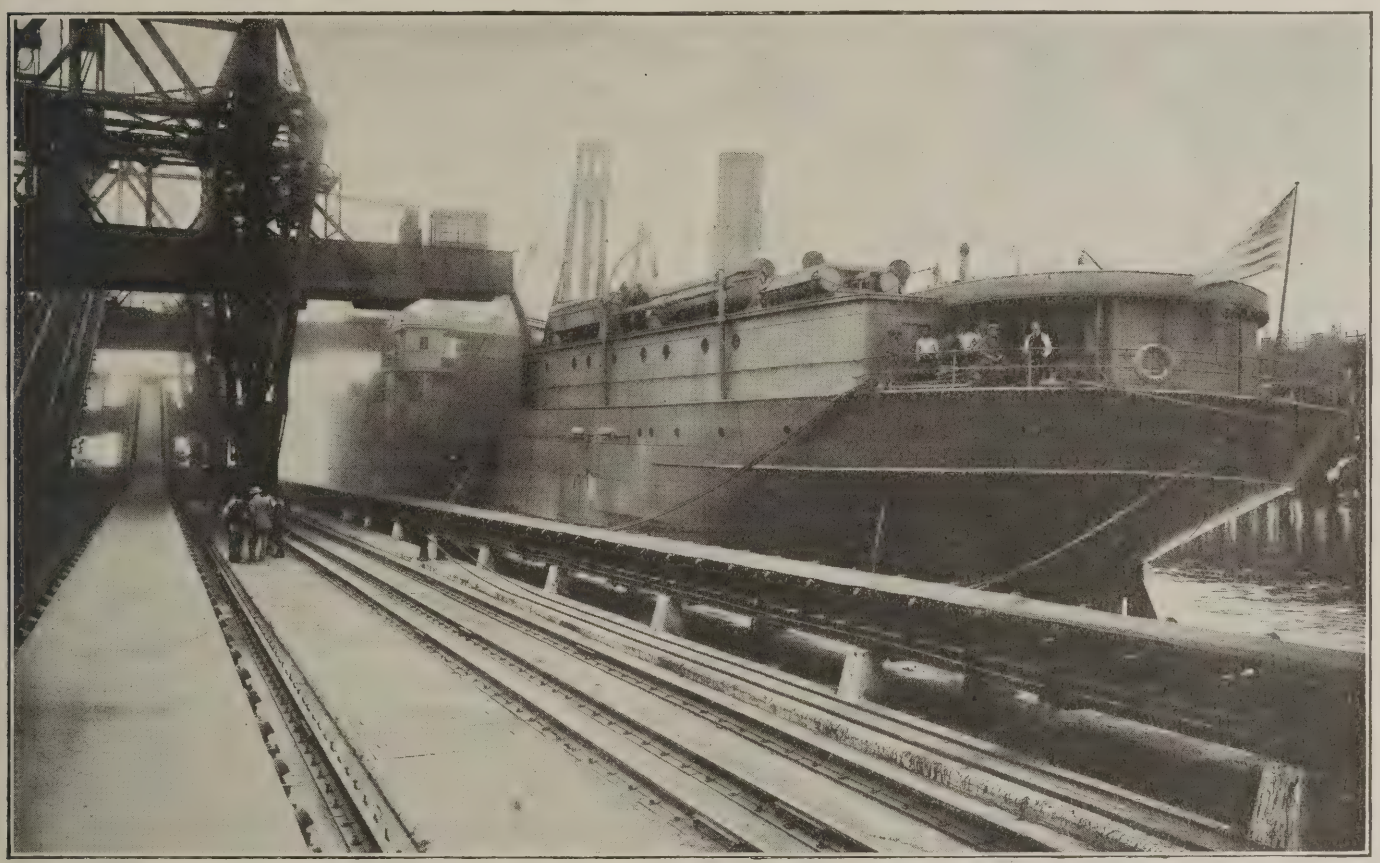
The possible consumption can be estimated with considerable closeness. In 1916 the blast furnaces produced 39,534,797 gross tons of pig iron and consumed 44,431,905 net tons of coke, which was 80 per cent. of the country's output, the balance being used in nonferrous metal blast furnaces, in iron foundries and for various heating purposes. The present blast furnace capacity is a trifle under 45,000,000 tons, and with the completion of furnaces now under way it will be about 46,000,000 tons. With the blast furnace industry running full, therefore, it would require about 52,000,000 tons of coke, and with this at 80 per cent. of the country's total consumption the total would be 65,000,000 tons, while as just noted there will be capacity to supply 72,500,000 tons. The slack will be taken up by idleness of beehive ovens, and the shipment of their coal to byproduct ovens. This movement, indeed, began long before 1919.

Next to the textiles, mining is the principal industry in Poland, especially that of coal, which was considerable in the years before the war. The quality of coal mined in Austrian Poland is better than in the German portion. Before the war Russia started to open some mines in Poland, but the work was never completed. Under the German military government the work has progressed, although, of course, it is not possible to make the technical installation as perfect in Poland as in Upper Silicia.—*Commerce Reports.*

Northwest Coal Trade in 1918

By W. L. KIDSTON
Seattle, Wash.

WHILE the abdication of crowned heads in Europe last year proved popular with coal operators of the Northwest, as it did with the rest of the country, it cannot be exceeded by the mine owners' great satisfaction in the way King Coal in this section came into his own, or in the knowledge that the coal mines of the Northwest contributed mightily to the overthrow of Autocracy. While no one expresses much enthusiasm over the profits (or lack of profits) to the trade for the past twelve months, mine owners of this district are justified in expressing pride over the records established in keeping production abreast of the unexpected and enormous demands made upon them by transportation lines, shipyards and war industries.



COLLIER "TUCKAHOE" MAKING A RECORD COAL LOADING IN 2 HOURS 50 MINUTES, MAY 25, 1918, AT THE CURTIS BAY (MARYLAND) PIER

And as they express great satisfaction over their achievements during the past year, they are unanimous in the opinion that this will bring its reward in the years to come—with greater production and consumption than ever before, and with more settled labor conditions and more equitable profits, all of which will contribute to the prosperity of the entire trade. Coal-mine operators are agreed that the trade in the Northwest will never again return to the conditions which obtained before our entrance into the world war.

There are many reasons why the coal trade in the Northwest in the future should be more desirable and profitable, but to understand this it is necessary that a brief review be given of conditions which the coal trade in this section formerly operated under.

Previously to last year, the coal trade here had more than its share of competition. Hydro-electric energy in the Northwest in recent years has been developed rapidly, and as time has passed electric power has been sold here cheaper than in practically every other section of the country. California fuel oil has of recent years been a particularly aggressive competitor, and due to its cheapness it rapidly supplanted coal burners in many of the industrial institutions of the Northwest, as well as taking the place of coal in the operation of the great fleets of ships which ply the Pacific. Due to the lower wage scale obtaining in British Columbia, and the fact that Canadian coal could be brought into the Northwest duty free, Northwestern coal-mine owners where rapidly losing much needed sleep worrying about where they would turn next to make both ends meet. Great activity in the lumber camps and lumber mills of this section in 1917 resulted in the production of an enormous amount of slab wood, which sold by the cord far under the price for a ton of coal; and as practically every community in Oregon, Washington, Idaho and Montana has from one to several lumber mills, the fuel consumer turned to the cheaper commodity.

However, these conditions changed with great rapidity for the better. Early in 1917 the Government

contracted for practically every barrel of surplus oil from the California fields, and the factories, apartment houses and ships which had been converted from coal burners to oil reversed the procedure and once more became coal burners; and it is not likely they will ever go back to the oil-burning basis. Great increases in British Columbia industry shut off the competition from there somewhat, as well as from the lumber mills, which off and on were tied up by labor disputes. War industries and new manufacturing, and shipbuilding plants grew almost overnight, and the coal trade of the Northwest suddenly found that it could no longer meet the demand. Prices rose to greater heights than in many years and continued high until the office of the Federal Fuel Administration was established.

Unlike many Eastern cities, which witnessed the growth of purely war industries that will now be closed down because of the lack of demand for their products, the cities of the Northwest that added to their manufacturing strength during 1917 and 1918 will retain them; for practically all were established to supply the natural demand of growing communities, and they accepted war orders only as they overflowed from the Eastern centers.

Large Increased Population in Northwest

The population of such cities as Seattle, Portland, Tacoma, Spokane, Butte, Boise, Salem, Pocatello and others has increased phenomenally in the past year, which means that the household consumption of coal will be as great as it was last year. It is freely predicted by both shipping interests and coal operators that the increase in foreign trade passing through Puget Sound ports this year will grow so greatly that coal from Washington mines delivered to ships will approximate 50 per cent. more than in any previous year. Industry will take as much if not more coal than it did last year. Northwest coal operators are not expressing any fears over competition from British Columbia mines, for from all reports increased industry in the provinces is taking practically all surplus coal from the mines at home.

Industry throughout the west has increased as greatly as has the population, and coal production has advanced accordingly. While 1918 will probably prove the banner year for the tonnage of coal mined in the West, it will also prove the banner year for consumption of coal in this section. Figures furnished by the mine inspectors of the various Western states show that the Pacific Coast can be independent of the rest of the country as far as fuel is concerned, the estimated production of coal mines in the eleven Western states being 40,339,000 tons for last year, as compared to an estimated consumption of 26,017,348 tons. These figures compare with the 1917 figures as follows: Consumption in 1917, 23,256,707 tons; production, 37,896,380.

The Northwest had to draw largely upon Utah last year to fill the coal bins of the householder and the industrial plants. The figures given in the table accompanying this article show that the coal production in Washington, Oregon, Idaho and Montana was but 9,039,000 tons, while the consumption was 12,592,848 tons, a difference of over 3,500,000 tons. This means that the Northwest coal mines could have produced over three million more tons of coal and disposed of it in their own localities during the year. Had the mines of the State of Washington had the facilities to produce this extra amount of coal, which was shipped in from other communities, they could have secured this business; but operators are of the opinion that it will be a long time before the coal mines of the Northwest will produce sufficient coal to equal the demand.

No new development work to speak of was undertaken in the Northwestern states last year, primarily because of the shortage of labor, the high price of equipment and materials, and the operations of the War Industries Board, which controlled the opening of new mines. Operators in this section are of the opinion that during the next two years there will be greater development of coal mines in Washington, Oregon and Montana than ever before in the history of these states, due to the fact that there is such a great demand for fuel, and the

PRODUCTION AND CONSUMPTION OF COAL IN THE WEST

	1917		1918 Estimated	
	Production	Consumption[b]	Production	Consumption[b]
Arizona	*a*	240,000	.....	400,000
California	*	721,190	*	800,000
Colorado	12,433,129	10,158,467	14,000,000	10,750,000
Idaho	*	725,000	*	895,000
Montana	4,400,000	5,378,202	4,400,000	5,500,000
Nevada	*	*d*250,000	*	434,000
New Mexico	4,113,544	270,000	4,200,000	325,000
Oregon	43,000	686,446	39,000	786,446
Utah	4,051,210	400,500	4,100,000	450,000
Washington	4,002,749	*c*4,161,402	4,600,000	*e*5,411,402
Wyoming	8,847,748	265,500	9,000,000	265,500
Totals	37,896,380	23,256,707	40,339,000	26,017,348

a No producing mines. *b* Figures include both domestic consumption and coal consumed by railroads operating through the state. *c* 356,000 tons imported from British Columbia and east. *d* Does not include railroad fuel. *e* 180,000 tons imported from British Columbia. * Denotes total production of states so designated as 5000 tons.

further reason that so little development has been undertaken in the past three years. Considerable activity is already indicated at Roundup and Bozeman, Mont.; in the Teton Valley, near Boise, Idaho, and at the coal fields near Chehalis, Cle Elum, Bellingham, Cokedale and Colville, Washington.

Coal operators generally throughout this section are emphatic in their declaration that there is no longer a necessity for the continued functioning of the Fuel Administration, though admitting that during the past year the operation of the Government body has resulted in the introduction of certain features and economies which have materially helped the coal trade. One of the likely developments in the Northwest where large coal mines are in close proximity to large cities, operators believe, will be the locating of steam power plants at the mouths of mines instead of in the cities as heretofore, doing away with the extra handling and hauling of fuel. Another economy which will be carried along after the war will be the elimination of so many retail dealers. The shortage of both labor and railroad cars has awakened the trade to the vital need of storage facilities in the cities. Some communities like Seattle, Tacoma, Portland, Boise, Butte and others where large tonnage was consumed had little or no facilities for the storing of coal last year, and the seaports were backward in bunker facilities for loading ships. Operators and dealers state that this condition will not exist again.

Coal operators likewise predict that the next few years will witness great strides in the burning of

powdered coal in industrial plants of the Northwest, which was the first section of the country to undertake this method of fuel use on a general scale. In the City of Seattle two large power plants, several office buildings, department houses and industrial plants are now burning powdered coal. These formerly used fuel oil. All reports are most favorable to this new method of power and heat generation, the users stating that the powdered fuel is not only cheaper but is more easily handled and gives greater heat per unit than either oil or other classes of coal. Powdered coal is now delivered to the boiler rooms that use it in air-tight auto tank cars, similar to the familiar oil truck. It is the increased development of this method of fuel consumption which will prove one of the big things next year in this section.

Coal operators are not anticipating any serious difficulties with labor. The manager of one of the largest employing mines in the State of Washington states that he does not believe wages will go any higher, and that there will be an abundance of help for Northwestern coal mines. Under the present scale of wages obtaining at the mines a coal miner can earn more than the shipyard worker, now that the Macy award has been decided. The latter is not earning by 20 per cent. what he was when the attractive wage drew hundreds of coal miners to the coast shipyards. The miners are returning in great numbers, and Martin Flyzik, president of the United Mine Workers of America, District No. 10, who early in the year estimated that fully 1500 miners had left Washington mines, states that he does not think more than 380 of these are still out of the mines.

Operators also predict that the mines of the Northwest will produce at least 15 per cent. more tonnage this year than last, and that it would not be surprising if the mines of Washington produced 25 per cent. greater tonnage. With those estimates in mind we may expect a production of coal in the four Northwestern states of at least 10,000,000 tons this year, which would compare with 9,039,000 tons for last year and 8,445,749 for 1917. The coal trade of the Northwest is likewise satisfied with the outlook, due to the fact that it does not anticipate competition with Eastern coal for a long time to come, as a result of the high freight rates obtaining. The new year is being faced with optimism.

Middle West Coal Trade in 1918

By H. A. REQUA
Chicago, Ill.

A REVIEW of the coal industry of the Middle West, during the year 1918, will of necessity deal in extremes. There has existed no normal condition which ordinarily marks the transition of one period to another period diametrically opposite it. The year just ended has been a hectic one for producer and distributor alike. It has been a year of a feast and a famine, with so short a time between the two that there was little if any time for readjustment.

A year ago saw low-grade screenings, loaded from some Indiana or Illinois stock piles, which have been exposed to the weather for years, received by retailer or manufacturer alike, with tears of gratitude. Last week saw these same parties refuse the best coal this territory has to offer, on the shallowest possible pretext. A year ago the mines in Illinois, Indiana and Western territory were unable to take care of the tremendous demands made upon them. Today it is fair to say that the mines in the producing districts just mentioned could run from one-third to one-half time, and still manage to keep the public supplied with plenty of coal. Last January there was, in the Middle West and all over the country, a tremendous shortage of coal-carrying equipment. This year the terminals of the great coal-carrying railroads are cluttered up with strings of empty coal cars, because there is no demand for them at the mines. Twelve months ago the office of the state fuel administration in Chicago was besieged with people begging for coal. A few days ago we read in the paper that the state fuel administration has had to threaten these same people with legal action to make them take in coal ordered during the summer for winter delivery. It has, in truth, been a year of contrasts.

No synopsis of the past year would be complete without mention of the United States Fuel Administration and its activities. During the early months of 1918, each state had its own fuel administrator, appointed by Dr. Garfield at Washington. It was the duty of these state administrators to see to it that their respective states were kept supplied with coal, and that all available coal was divided fairly. In these first days of the year, numbers of the ablest operators and distributors of coal in Illinois and Indiana, in fact the whole Middle West, voluntarily left their respective businesses, and with an unselfishness which was a credit to the nation and the coal industry, placed themselves at the disposal of their state fuel administrators. Their help was invaluable, as their knowledge and familiarity with the coal business was of the greatest assistance to the state fuel administrators, who were usually men without previous experience along these lines. It is not an exaggeration to say that the best brains of the coal industry in the West could be found any time at the offices of the state administrator, working from 8 to 15 hours a day. Although their own businesses needed them as never before, these men placed themselves unreservedly at the service of the administration, and to them belongs the credit of successfully bringing us through a crisis in face of almost insurmountable difficulties. So much for the early days of the administration.

A little later in the year, the various state administrations were well organized, and were coördinating with a high degree of efficiency with the district representatives, who had been appointed by the administration at Washington to look after the production end of the industry, thus allowing the state administrators to give

their attention exclusively to the distributing end of the industry. High praise is due to such men as Dr. Honnold and Raymond E. Durham, of Illinois; W. K. Prudden, of Michigan; Evans Woollen and C. G. Hall, of Indiana; C. E. Reed, of western Kentucky; and W. N. Fitzgerald, of Wisconsin; as well as others too numerous to mention. These men, by their energy, discretion and ability, soon put the coal industry in their territories on a basis that relieved the public from any further worry, so far as an immediate coal famine was concerned.

The rapid changes that have taken place have been vastly interesting to watch, and the eventual development of them will no doubt leave a permanent impression on the industry. For instance, high-grade eastern coals, not including anthracite, will never be as strong in the Chicago market as they were before the war. People have learned, through necessity, of the high quality product from our own coal fields; for example, the Fourth Vein district, around Clinton, Ind. and the producing fields of Franklin, Williamson and Saline Counties in Illinois. This is also true of numerous factories in Indiana and western Michigan, which will undoubtedly continue using coal from our own Mid-Western producing districts, rather than a more expensive product from Ohio or West Virginia.

The history of the coal year has automatically divided itself into three periods, starting with the first of January, 1918, and consisting of four months each. These three divisions may be termed the period of shortage, of plenty, and of overproduction.

The first four months of the year were a record of the struggle on the part of the coal producers to keep up with the tremendous demands made upon them. Difficulty after difficulty appeared and was finally overcome. The supply of coal cars at Mid-Western mines was at a low ebb during all the early months of the year, but this particular situation was most serious during the last half of January and the first weeks of April. Labor was scarce and hard to hold, and it was almost impossible to get the necessary machinery for mining coal, or replacing old and worn-out parts. During this time the public was demanding coal and more coal from the Fuel Administration.

Record-Breaking Tonnage in Summer

From May to August, inclusive, the tonnage of coal supplied by the mines of Illinois, Indiana and western Kentucky was stupendous. The Fuel Administration had, by this time, established its zone system, and this, to a great extent, steadied the industry and put it on a more efficient footing. The public, in the meantime, were buying coal as it never had been bought before, and they were urged on in this by propaganda from the Fuel Administration at Washington, ably seconded by our own state administrators. Soon the zone decreed for the Illinois, Indiana and western Kentucky producing districts had absorbed about as much steam coal as it could hold, although the demand for domestic fuels kept up without abating. In July it was deemed necessary to enlarge our zone, and as a result we were allowed to ship steam coal to points in Michigan, Indiana and Ohio heretofore closed to our products. The bogey of a coal famine was feared, and in order to stimulate further coal production, the Fuel Administration appointed district production managers, whose duties were to see to it that more coal was mined. These men went to work with a will, and the Fuel Administration at Washington was gratified to note the substantial increases in coal produced. All indications showed that the public were buying strong, and all business was booked strictly on a basis of Government price current at the time of shipment.

During the last period, from September to the end of December, the apex of production was reached, and it has brought to light the fact that the zone decreed for us was not extensive enough to absorb the coal we were producing. Early in September there was a decided weakening in the market. At first, as was logical, this affected only the poorer grades of coal, and the demand for our high-grade products continued nearly as strong as before. Gradually, however, the demand lessened, until toward the end of the year there was practically no market for any kind of coal. It is said that during the first two weeks of December one of the best mines in the whole territory, from the standpoint of both quality and preparation of its product, ran only two days. The market started early in October to become serious for the operator, and the gravity of the situation has been increasing from day to day ever since.

Prices Well Maintained at Government Maximums

There is one noticeable feature, and that is, taking all things into consideration, there has been surprisingly little price cutting. The operators feel, and rightly, that our zone is practically glutted with coal, and it won't help, either individually or collectively, to cut prices. There are only two cures for an overproduction, the first being new markets, which unfortunately are unavailable, and the second, underproduction. Underproduction seems the only logical solution of the present problem, as the coal we have produced in excess of normal needs must be consumed before any strengthening of the market can be looked for.

It is almost impossible to forecast what the coming year has in store for the coal industry in the Middle West. At best it is largely a matter of personal opinion. It is pretty generally thought, however, that conditions will eventually adjust themselves, and that the situation will be, in all probability, near to normal long before the end of 1919. The Mid-West coal fields serve one of the richest manufacturing districts in the world. Europe is without a supply of all kinds of finished manufactured articles. The United States must fill this need, and the Middle West may be relied upon to get her share of the business.

It is safe to say that we may look for a period of great industrial activity in the near future. Again, it must be borne in mind, that outside the United States, Canada and Australia, there is practically a universal coal shortage. This means that eventually our eastern coal fields will be called upon to export millions of tons of coal, with the result that our mid-western mines will have to take care of districts logically in our territory, but now served by eastern mines. With one or two prominent exceptions, the larger operators and distributors are inclined to be optimistic as to the future, and as for a present policy, they echo the sound advice of one of our Western bankers, which is, "Until our reconstruction program is well in hand, do nothing hastily."



National Coal Association Now Planning for Peace Activities

With twenty-eight of its thirty-seven members present, the board of directors of the National Coal Association, as a result of meetings held in Washington Jan. 8 and 9, has mapped out a program of peace activities which will be more extensive than the war work done by the association. The board approved of what is expected to be the most extended cost-accounting activities ever undertaken in the coal industry. Traffic matters were recognized as being of unusual importance at this time. Every effort is to be made to see that the interests of the coal industry are considered in each step of the present movement, which may result in fundamental changes in transportation policies.

Arrangements were perfected for close coöperation between the National Coal Association and local associations in the carrying out of the association's plans. The local associations are to be relied upon to furnish the Government with statistical data so as to make possible the availability of the complete information which has been gathered during the war. Through the coöperation of the local associations, the National Association will furnish a market information service which will be national in scope. The meeting also was the occasion for submitting a concrete plan for an export coal association under the Webb Act.

The market service, which was authorized by the board of directors, was explained as follows by J. D. A. Morrow, the secretary of the National Association, in recommending that the service be furnished:

One of the most important things we can do is to give the industry full and accurate market information. This would mean daily advices to the National Association at Washington and branch offices from each local association and a return summary sent back to the local associations. Many other industries are conducting open price reports of this general kind on a national scale, such as cement, brick and lumber manufacturers, steel-furniture makers, pressed-steel manufacturers and others. Coal operators could do likewise, should they consider such action advantageous.

In making this suggestion of trade bureaus, price reports on closed transactions, etc., with national bulletins, I would not, nor would you, of course, countenance any activity that would transgress the anti-trust laws. Everything of this nature must be, and would be conducted in accordance with the advice of competent counsel and in a manner to make it obviously proper and legal.

These local associations could not only collect information with respect to prices, but should also obtain information with regard to production and distribution of their output, car supply, transportation conditions, etc. Information of this kind, which would be of general interest, should also be reported to Washington and would be included in the market bulletins of the National Coal Association along with any data released by the Geological Survey or other Government agencies.

It may be found advisable also to obtain similar information from the chief consuming centers such as New York, Boston, Buffalo, Cleveland, Pittsburgh, St. Paul, Minneapolis, Chicago, Omaha and other cities, and that for the purpose of interchanging such information—it being understood throughout that the information would relate only to past transactions—branch offices to be established at such points as Columbus, Chicago, Kansas City, and at least two other cities, one in the south and the other in the east.

The export coal association necessarily must be an entirely separate organization from the National Coal Association. The purpose is to develop a market for American coal abroad to all operators producing coal of the proper quality. The recommendations in this connection were made by the Foreign Trade Committee, of which George H. Barker, of Columbus, is chairman. The committee recommends the incorporation of the American Coal Exporters, Inc., under the laws of Delaware or New York. It is suggested that the organization be formed without capital stock and that its members pool their export interests in a manner which the committee describes. The plan is to be considered by the operators interested at a meeting to be held in the near future. An extract from the suggested plan of the committee is as follows:

If no capital is required other than such amount as will finance the expense of handling at tide and the expense of keeping records of the association, it would seem that the corporation might be organized not for profit and without shares of capital stock of any kind, in which event the corporation would have members instead of stockholders and the membership would consist of such coal operators as desire to avail themselves of the privileges and undertake the duties of membership.

Privileges, Terms and Conditions of Membership

Any operator or any local association of operators formed for the purpose of becoming a member of the association and approved by the association producing coal of quality suitable and available for export through Atlantic coast ports shall be eligible to membership in the association.

Each member shall be entitled to one vote.

Each member shall furnish the association such reports as the association may require, giving information, among other things, as to the following items: (a) Total production for the period covered by the report. (b) Tonnage consigned to the association. (c) Car numbers, weights and all necessary information concerning shipments made. (d) List of any and all contracts made for export coal, together with copies thereof. (e) Such other statements as the association may require with reference to the export business of the members. (f) From time to time, as called for by the association, information concerning market, labor,

car supply and other transportation conditions and all other items that are liable to have influence upon the members' production during the succeeding two months.

Each member shall sell its coal at its own expense, subject to the approval of price and terms of sale by the association.

The association is to receive the coal of all its members at tidewater, transfer it to vessels, and keep accurate, detailed accounts of all its transactions. The handling charges accruing at tidewater will be paid by the association and prorated monthly at each port among members on the basis of tonnage moving through that port during the current month.

Each member of the association is to pay its own railroad transportation charges to tidewater and is to pay direct the ocean freight and subsequent charges where coal is sold c.i.f.

Each member of the association is to be responsible for coal shipped to the pool and for demurrage and any other charges accruing in connection with the members' own shipments.

C. E. Lesher, the geologist in charge of coal statistics for the U. S. Geological Survey, and who has been in charge of the statistical work done by the Fuel Administration, addressed the meeting of the local secretaries and outlined some of his plans for the collection of statistics which will be helpful to the coal industry. Mr. Lesher has just been made head of the coal section of the mineral-resources division of the U. S. Geological Survey, which is preparing to extend importantly its work in gathering statistics and information of value to the various mining industries.

George W. Reed, of the Peabody Coal Co., of Chicago, was made chairman of the Railroad Relations Committee of the National Coal Association, and Thomas T. Brewster, of Illinois, was appointed chairman of the Cost Accounting Committee.

Director General of Railroads Indorses Coal-Zoning Plan

Stress is placed on the coal-zone plan as one of the most important factors in enabling the railroads to meet the coal situation, in a report by the Director General of Railroads which was delivered to the White House Jan. 7 for transmittal to the President. The zones, he says, have compelled the greater use of western coal and have resulted in the conservation, for war purposes, of eastern coal as well as permitting the greater production of both by avoiding useless waste of transportation. Continuing, he says:

The experience of the railroads under private ownership, especially with a demand for coal far in excess of the tonnage produced, was that shippers reached out into markets far beyond the territory in which their particular coal had normally been sold in previous years. The result was a very considerable waste of transportation, in that a much greater car mileage, reasonably estimated as running into millions of car-miles, was necessary to supply the country with its normal coal requirements than would have been the case had shippers chosen to content themselves with normal markets.

To meet this situation the Railroad and Fuel administrations jointly established what has come to be known as the bituminous coal zone plan of distribution.

Under this plan the various bituminous coal mining districts east of the Rocky Mountains were separated and each assigned a definite territory wherein it could market its coal. It was further provided that coal from any district could be shipped to destinations beyond the zone allotted to that district only upon permit of the Fuel Administration, which was recognized by the Railroad Administration as constituting exemption from the railroad embargoes which were laid down to give force and effect to the zone plan. This permitted proper distribution beyond zone lines of certain special grades of coal, coal for by-products use being a specific example.

The coal-zoning plan, however, did not merely save car-miles, and thus permit the production and transportation of several millions more tons of coal than would otherwise have been possible; it furnished, in addition, the means of utilizing coal produced in the Plains States, which would not otherwise have been produced. This was made possible by prohibiting the shipment of certain eastern coal to territory in the West which the war program required to be kept in the East.

In analyzing the situation and in telling of the unprecedented quantities of coal handled Mr. McAdoo says:

The most serious situation presented itself in the case of bituminous coal. This condition was the result of three factors:

1. An actual shortage of cars at the mines on account of the number delayed under load in the congested area and the limitations upon transportation due to the extraordinarily blizzard weather;

2. The lack of a systematic distribution, such as the Fuel Administration was arranging to provide; and

3. The dislocation of the New England supply, which was the result of the withdrawal of coastwise steamships, and which presented, on Jan. 1, 1918, the most serious single situation.

The bituminous coal production for the preceding year had been the largest in the history of that industry, approximating 544,000,000 tons, an increase of about 12 per cent. over the preceding year. The severe weather conditions prevailing in January, 1918, resulted in a decreased production, almost entirely due to car supply, of 65,294 carloads. Immediate and drastic steps were taken to remedy this situation and, notwithstanding the fact that the weather continued to be unduly severe throughout February and part of March, the railroads got on their feet, and in February produced an increase of 24,366 cars of coal over the preceding February, and for the succeeding months increases over the respective corresponding months of the preceding year were as follows:

	Cars		Cars
March	38,202	July	150,288
April	64,824	August	130,686
May	87,036	September	128,942
June	92,734	October	89,882

or a net increase for the 10 months of 741,666 cars, or approximately 37,083,300 tons.

New England's necessities have been fully met and the largest tonnage of coal ever known—28,153,317 tons—has been moved to the Lake Erie ports and transported to the northwest, compared with 26,826,000 tons in 1917; 24,692,000 tons in 1916, and 21,507,000 tons in 1915.

For the Lake season of 1917, 479,058 cars of coal were dumped into vessels at the Lake Erie docks, with an average delay of 2.3 days per car, which was the result of the first year's effort at coöperation under a single nongovernmental control between the railroads, the coal producers, and the Lake carriers.

For the season just closed 542,380 cars of coal were dumped into vessels at Lake Erie docks, with an average delay per car of 1.45 days. This very satisfactory result was attained through the coöperation of the coal producers, ore receivers, and the Lake carriers, with the Railroad Administration through the formation of the Cleveland Ore & Coal Exchange.

With regard to the New England situation, the report says:

The budget for New England coal for the coal year beginning Apr. 1, 1918, after exhaustive conferences with

the Fuel Administration and its New England representatives, was decided upon as follows:

Bituminous:	Tons	Anthracite:	Tons
All rail	9,182,200	All rail	5,165,500
Rail and water	20,504,900	Rail and water	5,165,500
Total	29,687,100	Total	10,331,000

Up to Nov. 30 the following tonnage had been moved:

Bituminous:	Tons	Anthracite:	Tons
All rail	7,502,463	All rail	3,887,981
Rail and water	12,228,041	Rail and water	3,058,304
Total	19,730,504	Total	6,946,285

It will be noted that as to anthracite the performance has exceeded the eight months' program by 58,949 tons, while the bituminous has fallen behind 60,896 tons.

Referring to the reconsignment of coal at Chicago, Mr. McAdoo says:

In Chicago terminals, it has been the practice under private control to reconsign practically all coal after arrival. By coöperation with producers, 66 per cent. of the coal arriving at Chicago, in August, was consigned direct to consumer from the mines, and cross-hauling coal between terminal lines was greatly reduced through the same coöperation, whereby coal was used wherever possible upon the rails of the individual road over which it arrived.

With the railroad's fuel bill amounting to $473,000,000 annually and representing the largest single item of operating expense, other than labor, the report devotes considerable space to the fuel conservation division of the Fuel Administration. It says:

This section was created May 1, 1918, with Eugene McAuliffe as manager, and representatives who had had practical experience in the use of locomotive fuel, as well as in its production, were asssigned to each region.

There has been constant coöperation with the Fuel Administration, and a consistent effort has been made to improve the quality of coal purchased for locomotive use, as well as to instruct enginemen in proper and economical firing. The cost of fuel to the railroads, now aggregating about $473,000,000 annually, exclusive of road haul on users' rails, represents the largest single item of operating expense other than labor.

The response made to the work of this section on the part of both officers and men has been of the most extraordinary and gratifying character. Meetings have been held throughout the country, which were attended by railroad officials and men; coal-mine operators and representatives of the Fuel Administration lending their presence and support.

The marked improvement in the measure of supervision and supervising methods established and the specific attention given to the selection and inspection of coal at mines, as well as the economical use of same on locomotives and in stationary plants, has resulted in very material fuel savings on the several railroads, and the revised methods of distribution which have been worked out will result in economy in road hauls.

Every change worked out under the advice of the Fuel Conservation Section has received the fullest approval of the regional directors and the various operating heads, with the result that methods established will be permanently maintained.

While deprived of the stimulus of war necessity, work in the Fuel Conservation Section will move along continuously broadening lines, the recent extraordinary increase in fuel costs rapidly bringing this angle of railroad-operating expense into such marked prominence as to warrant continual refinement in purchasing, operating, and maintenance methods. The determination of the most economical grade of coal for use on heavier-type locomotives, the selection of the best method of obtaining the maximum return in fuel economy from use of the locomotive superheater, the possibilities of the locomotive feed-water heater, and the determination of methods that will reduce the stand-by fuel losses of large locomotives are problems worthy of the most serious consideration.

Fuel Administration—European Commission Reports on Foreign Coal Conditions

The coal situation in Europe is such as to retard reconstruction in Europe to a marked degree, to say nothing of the discomfort and unrest that are arising out of it. This conclusion is based on the observations of the Fuel Administration's commission, which just has returned from a first-hand investigation of the fuel situation in Europe.

No European country has enough coal, the commission states, but the situation in Italy and Switzerland has reached an alarming stage of acuteness.

"The war emphasized the importance of coal, not only as an essential commodity, but as a diplomatic weapon of no mean proportions" the report said. "The present prospect is that it will prove no less a factor to be dealt with in the reconstruction period that is to follow—at least so long as the present potential shortage continues.

"For example, coal bears a very close relation to social unrest. The populations of the European belligerents have, during the war, suffered privations in varying degrees through lack of fuel. Will they continue to endure similar privations in peace times without active protest. Again, should the shutting down of factories, either directly through lack of coal, or indirectly through lack of transportation on account of failure of coal, result in throwing thousands out of work, will not a fertile field be provided for Bolshevism? Italy and Switzerland are today confronted with this situation, and it is an active possibility elsewhere."

With regard to the French and English situations, the report says: "France's production has for some time been 20,000,000 tons per year short of her consumption, and she is today calling upon England for that amount. Belgium during normal times produces 3,000,000 tons a year less than she consumes, but at the moment has in prospect a sufficient supply on account of the prostration of her industries. England, which has always supplied the needs of Italy and France, has suffered a falling off in production from 287,000,000 tons in 1913 to less than 230,000,000 tons in 1918. Her coal for export fell from 77,000,000 tons in 1913 to 37,000,000 tons in 1917.

"It is of interest to note that while all other great belligerent countries suffered a severe falling off in their coal output during the war, the yearly production of the United States is now approximately 100,000,000 tons greater than in 1913."

Other portions of the report will be made available in the near future.

Imports of coal in Hongkong, China, are much below normal and will continue to be so as long as high mine costs and high freights result in extraordinary prices to consumers in that city and in Canton. There has been increased mining of local coal deposits in various districts of Kwangtung and Kwangsi, but the output has not yet reached Hongkong in a commercial way.

Anthracite coal miners to the number of 6000 have been designated for discharge from the army. This figure is given by General March as of Jan. 4.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The year past has ended without any of the general strikes which sometimes appeared likely to materialize. It would seem that the industry should jog along pleasantly from now on, for the worst rut has been passed and the road is smooth beyond. The rut referred to is the general union election on Dec. 10. The various aspirants for office just before the election have to manufacture sentiment. If the feeling is unfavorable to the corporations and the wage scale, there is sure to be some one to take advantage of it and develop it as "the tide that leads on to victory."

So in every section of the country at the union election there is a flood of oratory in which the coal companies are treated most contumeliously. Those wanting reëlection show how valiantly they have assailed "corporate greed" and those who are postulants for the first time declare that if elected they will rectify all injustices. Both parties have to show up the horrible characteristics of the evil they have fought or which they pray that they may be allowed to fight.

Election Over, Discontent No Longer Aroused

The turbulence of all that oratory is over. Possibly it was not so bad this year as in other years, but in any event we sail smoothly once more into a more pacific sea. However, while the direct reason for scolding the operator is gone, the soreness which that scolding has caused still exists, and of that the insurgency in the northern field of the anthracite region is a symptom.

All of this refers to the unionized regions. In the nonunion sections the election period is relatively a time of peace, for the leaders and the aspirants for leadership are at home seeking from their following a warranty for their activity. They are busy "fixing their fences" to use a political phrase. We may expect that along the Great Sandy and in the western Kentucky region there will be a recrudescence of effort as soon as the results of the election are known. The nonunion sections are getting so few that the forces of the union every day become more potent to subdue them. The fight is apt therefore to be quite strong and the strikes that occur are likely to be generously financed.

Several War-Time Leaders Succeed Themselves

The election returns are coming in. In a short while, the outcome can be given in detail. There is a danger in premature announcement. Frank E. Waite of DuBois, for instance, was confidently declared to be the president of the great central Pennsylvania district, but now the district tellers have completed their work it shows that John Brophy, the former president, a Nanty Glo man, has renewed his term of office. James Mark and Richard Gilbert succeed themselves as vice president and secretary-treasurer respectively.

In Ohio, Subdistrict No. 5, the district where the Pittsburgh or No. 8 coal is mined in that state, William Roy and Frank Ledvinka are elected president and secretary respectively. This fact has been duly announced from headquarters though at an earlier date the opponents of these two candidates vigorously denied it. In Mason County, West Virginia, an unimportant mining county with about six mines, the election was held Dec. 4 instead of Dec. 10 as ordered. An investigation is being set on foot, but it is likely that only irregularity and not any actual dishonesty will be found.

The Elkins section has been transferred from District No. 16 to District No. 17. The former district had its offices at Cumberland, Md. By the transfer 13 unions come under the jurisdiction of the Fairmont office.

The anthracite region is experiencing some small strikes. At the Marvine colliery of the Hudson Coal Co. in North Scranton about 900 men went on strike Dec. 28. Some of the contract miners complained that something akin to a reduction in wage had been imposed on them, but on Jan. 1 they had a conference with Edward McGlynn, the superintendent, and went back to work.

At the close of the expiring year a strike was called by the machinists in the electrical mining department of the Delaware, Lackawanna & Western R.R. Co., Coal Department. The machinists wanted the same pay that is paid machinists in the railroad department, but Vice President Inglis refused them this concession.

Same Job But A Different Mule

The soldiers and sailors have been promised their jobs back now that the war is over. What that means Albert Bryant has been trying to determine. Albert Bryant had been working for the Pittsburgh & Cleveland Coal Co. at the Gaylord mine, near Martins Ferry. He left to join the army and later came back for his old job and was duly restored to his former place. Then he found that another man was driving his mule and was going to be allowed to drive that mule indefinitely. He got into an argument which resulted on Saturday, Dec. 28, in a strike of all the men employed. The strike ended, however, on the Monday following.

Want Accident Compensation and Cost of Living Equalized

An operator in southern West Virginia is urging that larger compensation be given to miners and laborers out of the compensation fund. He says:

"I am heartily in favor of any change in the compensation laws that will give the laborer his proper proportion of the money now on deposit at Charleston. We operators are contributing millions of dollars to the compensation fund which is being rapidly piled up and is doing no one any particular good. People can no longer live on the $6 or $10 per week which is the maximum amount allowed.

"When the law was made, board at the mines cost $15 per month. At this time the same accommodation costs from $30 to $37 per month, and this rate is likely to continue for some time to come. We should amend the compensation law so as to take away from the compensation commissioner his great power which now permits him to do what he pleases with the fund without question from anybody.

"We should increase the maximum rates of compensation. We should so amend the law that if a man is injured he can be sent to the nearest hospital, the state paying the proper charge. As the law now exists, if a man on the Winding Gulf is injured it takes two days to get him to a state hospital.

"If the man is sent to any other hospital close by, either the company or the man has to pay the bill. If a man has his teeth knocked out, his eyes injured or his face disfigured by powder the state hospital cannot handle the case and he has to be sent to a specialist to be treated, and neither the company nor the individual is required to pay for his treatment.

"As stated before, the coal companies are now contributing enormously to the compensation fund, because their payrolls are double what they used to be, while the rate is unchanged. Where they used to contribute $100 to the fund, now $200 must be contributed."

KEEP YOUR LIBERTY BONDS

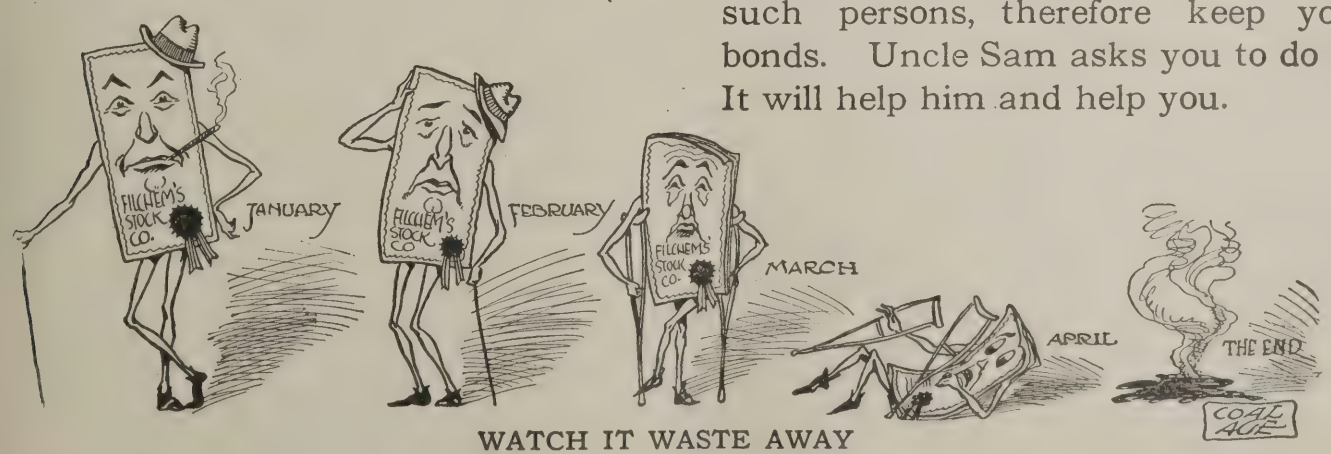


SEVERAL dishonest persons know that you have bought Liberty Bonds, and they want to get them from you. They are plotting to exchange them for worthless mining or other stocks which they say will bring in big dividends. If you exchange your good bonds for the valueless stocks of these slick people, you will lose the bonds and never get any interest.



Even the best of stocks are none too good. On September 4, last year, fifty of the best stocks were selling at an average price of $90.45 a share. On December 20 of the same year the same stocks could be bought for an average of $57.43. These were all good securities. There are more that are selling at $90 today and will be entirely unsalable four months later.

Don't be a fool and waste the money you work so hard to earn. Play safe or you will come to grief. If the smooth rascals who are trying to sell you these bonds had such a good thing why didn't they go to some one who had money enough to send an expert to look the ground over? Some men will put their money out with somebody they *don't* know at Borrioboolagha who wouldn't think of trusting it with somebody they *do* know in a nearby village. Did you ever know anyone who cleaned up anything investing in one of these distant ventures? You know well that you can't recall any such persons, therefore keep your bonds. Uncle Sam asks you to do so. It will help him and help you.



WATCH IT WASTE AWAY

EDITORIALS

Who Attacks Corporations, Attacks the State

THE Senate and the House of Representatives, together with the President, subject to the Constitution, pass laws enlarging or creating organizations such as the Army, Navy and Fuel Administration and giving them large administrative powers. Practically under the present law these organizations may not be criticized at all. That law has been administered wisely for the most part, and no attempt has been made to suppress constructive comment. Vicious, ill-intentioned, unmeasured, destructive criticism in the interest of our enemies has rightly been condemned and even prosecuted. The line is hard to draw between the two kinds of criticism. No two men would draw it alike, but the line is drawn somewhere, rightly or wrongly, by the secret service and the courts.

There are other organizations which, subject to the Constitution, owe their existence to the action of the Senate and House of Representatives, together with the President—such organized bodies are the corporations. There are also institutions legalized by the articles of Constitution such as private ownership of property. The institution just mentioned and the corporations, as also the Army, Navy and Fuel Administration and like creatures of our organic and statute law can all be legally swept away if we will. There is no radical change that we cannot make by appropriate legislative action.

However, just at present attacks on Government institutions are considered dangerous. It is felt that we attack not only the institutions themselves but the very life of the people for whose advantage and at whose behest the institutions were framed. When we attack them we attack the people—the state. Such attacks are contrary to public safety.

Some people are of the belief that the Army and the Navy and such institutions as the Fuel Administration, won the victory over our enemies. Back of the Army and Navy however stood industry without which the military forces of the nation would have been ineffective. The Fuel Administration merely marshaled the producing corporations. The Government departments all did a great work, but they could not have done it without the productive work of industry.

That productive work might conceivably have been done under direct Government management. For the nonce we are not discussing the question whether the Government would have done it better or worse than any other instrumentality, public, private or benevolent. The point is that to corporations and to private ownership we committed the work of providing the nation with the means of producing the wherewithal for war. They were the implements of industry to which the nation looked to back up the actual fighters. To attack those corporations and their officers unfairly and in a manner to inspire hatred was actually therefore to attack the instrumentalities by which the Government in its death struggle with Germany secured its needs.

Reference has been made to the war now past, but it must be remembered that times are still quite straitened. We still need to watch our steps, and it behooves us still not to assail unreasonably and unconstructively those institutions upon which the nation is relying to do its work. To attack the corporations is to attack the state. To expose the shortcomings of some of them in a reasonable manner as *Coal Age* has often attempted to do is not offensive but rather a duty. It tends to rebuild what is amiss, but we do as ill to criticise them destructively as to impute to the representatives of the Government offenses of which they are not guilty.

Much of the criticism of today is not based so much on the offenses of corporations as on the "greed of envy," as one of the greatest of our past Presidents termed it shortly before his death. That greed is at least as dangerous to the public as that "greed of arrogance" that a moiety of the corporations possess.

We all admit that those who attack the corporations unjustly offend against the corporations, but we sometimes fail to see that such injustice does not hurt the corporations much more than it does the people. Everyone should be interested in knowing the whole truth. A lie is an offense to the body politic. It is a false and mischievous diagnosis of the ills besetting the state. An evasion in telling the facts is also against the public policy. It may well hew at the base of the tree on which the public depends for its shelter.

The downfall of Russia did not so much result from the Government collapse as from the corporational disintegration that followed. Russia would have been a respected nation today if it had been contented merely to unship its Government. But the attack on the corporations has killed it almost irremediably. Not because corporations are essential to economic life. Some kind of existence is possible even under "politician ownership" if the politicians can be compelled to be reasonably responsive to their too often lightly made and lightly borne oaths.

But the politician ownership of Russia was not a responsible ownership, for the politicians of the Soviets who took charge were the least responsible of men and they put men in charge of industry purely for political and not for industrial reasons. Because a man had served a corporation and was not a politician was often considered to be a sufficient reason why he should be prevented from continuing the direction of a intricate and delicately adjusted plant, while a cunning politician, however ignorant of the industry—a mere broom wielder or porter—might hope for preferment to manager if only he vociferated with due diligence and fervor against the man who intelligently conducted that office.

It is because William G. McAdoo realized the excellence of corporational managements and largely retained the corporation men in control, it is because

the public was not so enraged at the railroads as to demand new officials in every department, that has given Government ownership of railroads its present success. However, credit must also be awarded to the spirit of coöperation to which the war gave birth and also to the habit of efficiency that one year of orderly politician ownership under the chiefs of the corporation ownership period (in this case we do not use the word "politician" disrespectfully) could not destroy. If we leave the railroads a few years under real politician control without the war stimulus, without the leadership of such corporation men as McAdoo, with all the disintegrating effects of politics, we shall have a horde of men inefficiently operating the railroads, neglecting their work for the politics of railroad operation, tangling themselves in red tape and treating the public with the arrogance which too often goes with civil-service jobs.

The trouble is that such careful readjustments as Mr. McAdoo has made do not in any degree appease most of those who so busily criticize private ownership. They frankly admit the work is only barely begun. The scrambling of the railroads, they would have, would be the end of railroad operation. Jobs would be given to those who want them, not to those who deserve them. Criticism such as is daily heard would raise wages and lower rates to a degree possible only in a world that neither knows the force of gravity and friction nor is bound by the law that "Two bodies cannot occupy the same space."

Removing Coal Mining from the List of Seasonal Occupations

IF ONLY we could stabilize the coal business so that a little decline in the immediate use of coal would not involve the closing of our plants, we should do a great deal to make conditions in the mines more satisfactory and equitable. If the miner is industrially undisciplined, it is because of the operation of the economic law which we may call the law of the "retention of the shiftless."

Any man who wants steady work will not stay at an excessively seasonal, unsteady job. He needs a daily round of toil to stimulate him, to meet his natural craving for activity. He resents the loss of pay which idleness causes. As a result, where work is unsteady the shiftless are retained and the energetic are lost to the industry. Association with shiftless men and conditions favoring the development of the shiftless spirit gradually create in the steady man that shiftlessness which enables the operation to hold the man to the job despite its many drawbacks.

Steady work makes men reliable workers and enables an industry to retain such men. But with coal (a relatively unstorable commodity that slacks on storage, catches fire and sometimes turns white from the presence of pyrite; that costs so much to store and so much more to load; that takes up so much valuable room near the market and often finds place for storage so rare near the mine) it is hard, though by no means impossible, to provide for storage in such measure as will make summer a time of preparation for winter demand.

The mines are in many ways the ideal places to store coal. A coal-using corporation must in most cases pile its fuel some distance from the point at which it is consumed. To transfer it when needed, it is necessary usually to employ a wagon or a wheelbarrow train, both of which means of transportation are expensive. At the mine the coal can often be dumped near the railroad track without trouble and can be loaded by a conveyor into cars on the track nearby.

The cost of loading is much lower because the work is on a large scale, whereas in a big city the loading may have to be done by shovel because the work to be accomplished is so small that it does not pay to invest in a conveyor. Especially is storage expensive when a corporation has to stock coal on one lot in order to use it on another. If the place chosen for stocking is near a railroad, river or harbor dock, the double haul is saved; but the rental cost of storage is apt to be prohibitory. If it is in a vacant lot, the rental may be quite low, but the double haul and the loading and unloading will make the labor cost of storage unreasonably higher.

This consideration makes the mine seem the ideal place, but there are several disadvantages which militate against its choice as a storage ground. There may not be available ground near the mine; there is the risk that coal stocked at the mining plant may have to stay there because of such inadequacies of railroad and trucking transportations as arise from equipment shortage and strikes; there is the probability that in the event of a mine strike the mine workers will not load the coal, and there is the likelihood in case of a winter of light demand that the purchaser will not pay the storage charge.

He certainly will not pay it unless competition makes him, unless indeed he has been guaranteed that the coal will be stored to his order and not delivered to any other purchaser. Only by such a guarantee will he feel he is insured against the risks of a fuel famine. It might seem on first consideration that if the mine owner were to make a contract with this kind of guarantee he might find it profitable. A price might be made for coal to be delivered in December, but to be mined in the summer and specifically set aside for the use of the consumer so contracting.

The trouble arises that the operator having only a partial supply of cars would not want to surrender the use of them to the purchaser of his summer coal, thus closing down his mines in the winter. The railroad might be asked to concede extra cars for such stored coal, but its interest is all the other way. It desires that all the coal possible be hauled in the summer and a minimum in the winter. It would do nothing to aid summer storage at the mine, and it would be right, for its interest in the matter would be identical with that of the general public.

Clearly then seasonal price variation is the best cure for the seasonal demand. This rewards the summer buyers for the expenses of storage and its interest cost. The railroads and mine workers should assist in creating this variation in price by freight and wage-rate differentials. The operator has always made seasonal concessions and will undoubtedly continue to do so.

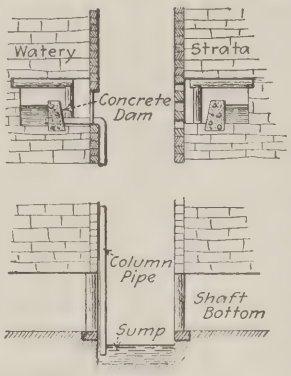
If there is to be any let up in the whole year it should be in the winter, when work on the surface is least endurable, when transportation is most difficult, when embargoes are most usual and when holidays are most frequent. Yet it is precisely when work is coldest and cruellest and in the day of festive celebration that we speed our operations to the limit.

DISCUSSION BY READERS

Freezing of Shaft in Winter

Letter No. 7—Kindly permit me to present what, to my mind, is the only efficient way to handle water in a wet shaft and prevent the freezing of the shaft in cold weather. I offer this in reply to the inquiry of a superintendent, which appeared in *Coal Age*, Nov. 28, p. 1004. My plan is to keep the water from the shaft curbing and there will be no difficulty on account of freezing in winter.

In the accompanying figure, I have illustrated the method of dealing with this trouble, which I believe is the best plan to adopt. It consists of making an opening in the shaft curbing, at a point just above the hardpan and at the bottom of the water-bearing strata. Excavate the strata, here, by driving an opening around the shaft, either next to the curbing, as I have shown in the figure, or back in the solid strata. If the opening is made close behind the shaft curbing it will be necessary to build a concrete dam encircling the shaft, so as to form a basin where the water will collect. This dam is sunk a short distance into the hardpan forming the floor of the opening, so as to make a watertight joint at the bottom of the dam.



DRAINING A WET SHAFT

As shown in the figure, the column pipe passes through the dam close to the floor, thus providing for the draining of what water collects behind the dam and conducting it to the sump at the bottom of the shaft.

In making the excavation around the shaft, it will be necessary to properly support the roof with timbers, either by hitching one end of the collar into the rib, as shown in the sketch, and supporting the other end on a good leg, or by other suitable timbering.

Rawdon, Que., Can. C. McMANIMAN.

Letter No. 8—In connection with the interesting discussion regarding the freezing of shafts in winter, permit me to instance two cases where I had to contend with the same trouble as that described by the Illinois superintendent, whose experience started this discussion. Although I fear that my experiences will simply be a verification of the editor's opinion, as expressed in the reply to the inquiry, I will give them for what they are worth.

The first case was that of a newly-opened, nongaseous mine, ventilated by a temporary, nonreversible fan of antiquated type. The fan was operated as a blower, and supplied about 20,000 cu.ft. of air, against a water gage of less than ½ in. The fan was set at the side of the air shaft with which it was connected by a concrete air drift 7 x 8 ft. in section.

As the water came into the shaft throughout almost the entire depth, it was not possible to collect it at any point before reaching the bottom. In cold weather, this water would freeze so that it was necessary to dig out the ice formed, with picks, every few days. To use the cage for this work was, of course, out of the question, and a swing scaffold had to be lowered into the shaft to support the men while at work.

To remedy the ice trouble, in our shaft, someone suggested the idea of turning the exhaust steam of the fan into the shaft, and this was done, with the result that the next morning the whole shaft was lined with a beautiful coat of frost about 2 in. thick, which showed the folly of that plan.

We next tried putting two radiators in the fan drift, between the fan and the shaft. These were each formed of eight rows of 2-in. pipe 40 ft. long, making 640 ft. of pipe in all. One radiator was placed on each side of the drift. Steam was supplied to the radiators at a pressure of 95-lb. gage. If the radiators had any effect to reduce the freezing of the shaft it was so slight that it could not be noticed. The result was that the pipe was soon after taken out and put to better use, as the men were still compelled to dig out the ice in the shaft, as before. When I left that mine it was the intention of the company to install a modern reversible fan.

Air Reversed in a Mine Generating Gas

The second case that I will mention was that of a mine ventilated by an up-to-date fan of the multiblade type, supplying 65,000 cu.ft. of air per minute against a 3.4-in. water gage. Normally, the fan exhausted the air from the mine, and the main shaft was the intake. In cold weather, not only did ice form in the shaft, but also on the track of the main partings and in the entry where water dripped from the roof, and cars were constantly derailed.

Since this was a mine generating both gas and dust, and the latter was highly inflammable, there was some hesitancy about tampering with the ventilation, even for the purpose of doing away with the ice nuisance. Owing to these conditions, the question of the probable effect of reversing the fan was much discussed, the general conclusion being that the change from exhausting to blowing would increase the mine pressure and hold back the gases; but any change from blowing to exhausting would have the opposite effect and cause a greater emission of gas.

It was decided, however, to adopt the experiment, and duplicate doors were then installed on all the main air-courses. These were hung to open in the opposite direction from the doors already in use, the idea being that one door could be set open and blocked, while the other was in use. Less important doors were supplied

with latches to keep them shut against the air, a nail being driven under the latch to hold it up when the latch was not needed.

These arrangements being completed, the fan was reversed on a Saturday night, after the shotfirers had come out of the mine. The examination of the mine the following morning by the fireboss showed the condition to be perfectly normal, there being no undue accumulation of gas in the workings.

The fan was only run as a blower for a short time. As soon as the ice in the shaft was thoroughly melted, the fan was again reversed and run as an exhaust, until the ice trouble again required its reversal. The exhaust system of ventilation was preferred, not only because of the danger of doors being left open in the mine, but for the reason that it was considered safer to haul the coal on the intake air, owing to the generation of gas and dust in this mine. I remember that it was necessary to reverse the fan and run it for a few days as a blower eight times during the winter.

Effect of Reversing the Fan on Generation of Gas Not Observable

Twice it happened that I was in the mine when the fan was reversed. With a safety lamp, I carefully watched the effect produced in a gassy working place, but could detect no change whatever in the quantity of gas escaping before and after the change was made, as indicated by the lamp. Naturally, my conclusion was that the difference in pressure caused by the reversing of the fan was so slight, as compared with the pressure of the occluded gases in the coal, that the effect of the change was practically *nil*.

In closing I will say that, after the doors were once installed on the main roads and the latches placed on the other doors, the reversing of the fan was no trouble. Firebosses and bratticemen were, of course, instructed to watch carefully for doors being left open at times when the fan was run as a blower and the air traveling in the opposite direction to normal.

Floresta, Colo. M. M. Watson.

Iron vs. Wood Mine Cars

Letter No. 7—In the recent discussion in *Coal Age*, concerning the best type of car to use, the question has been asked whether an iron or wood car has been found to be the most practicable for the average mine, with ordinary shop facilities.

The consensus of opinion, I believe, has been that an all wood car will give much better satisfaction than an all iron one. It is claimed that wood cars are more easily repaired when a wreck has occurred, and we all know that these are frequent enough to cause a great deal of trouble. It has also been argued that wood cars are easier on the track, because they are not as rigid as iron cars.

Comparatively little has been said, however, about the composite type of mine car, by which is meant the car with a wood bottom and steel sides. That, to my mind, is the most practical type of mine car that can be devised.

We know that one of the lightest and yet, at the same time, one of the sturdiest automobiles manufactured utilizes a wooden frame instead of an all steel framework, so as to take advantage of the resiliency of the wood. The service records show that such cars have not racked themselves to pieces as quickly as some others. But an automobile is not a mine car and it may be said that the above comparison does not apply here. Still, I would like to hear expressions of opinion from some of our readers who have used the composite type.

Owing to a policy of our management over which I have no control, I have never found it possible to try out any of the composite type of car, in our mines. But, since the question of new cars will very shortly come up and call for action, I would like to be fully posted, so that I can do my part to secure the best car that can be made. I want to ask, also, What type of wheels have given the longest life? By longest life, I mean the life of the tread, flange and hub.

W. Va. Progressive.

Blackdamp on Pitches

Letter No. 2—From my own experience with gas in pitching seams, it is quite clear to me that the gas found at the face of a pitch of 35 deg., in the Buck Mountain seam, as described by "Miner," *Coal Age*, Sept. 19, p. 568, is blackdamp. It would seem, however, that our friend has the idea that blackdamp, like carbon dioxide, is always heavier than air.

As has been explained in the reply to this inquiry, the common blackdamp of coal mines is made up of a mixture of nitrogen and carbon dioxide. In other words, it is mine air deficient in oxygen and containing more or less carbon dioxide, but the nitrogen is usually in excess, as has been shown by the analysis of different samples of blackdamp. The analyses of blackdamp that I have seen show the nitrogen varying from 85 to 88 per cent.; and, in one case, it reached 94.75 per cent. of the blackdamp mixture.

It is easy to see, from many analyses made of blackdamp taken from mine workings, that the mixture is much lighter than carbon dioxide. Also, as is sometimes the case, a small amount of methane present in the mixture will make the blackdamp even lighter than air, in which case it will naturally accumulate at the face of a pitch, or in rise workings.

Temperatures Taken With a Thermometer

After reading the interesting letter of Joseph R. Thomas, Oct. 17, p. 753, I was desirous of making the same experiment that he describes, in our own mine. Securing a thermometer, I proceeded up a gangway to a point where places were being driven on a pitch of 55 deg. One of these places was about 30 ft. above the first crosscut. There was not much air traveling at the face and blackdamp had accumulated there, so that an oil lamp was quickly extinguished and a carbide light became very weak.

After exposing the thermometer for ten or fifteen minutes on the gangway, where I found it registered 47 deg. F., I climbed to the face of the pitch just mentioned, but could remain there only five minutes, as I became very weak. In that time, however, the thermometer registered 57 deg. F. and was still rising when I started down to the gangway.

A little later, I erected a brattice that turned the air and conducted it to the face of this pitch. It was not

long before the gas was removed and the place clear; but a few days later I found the place again filled with blackdamp. This time I reversed the air, forcing it to the face of the pitch, and the gas was removed without any trouble, although the temperature of the return air at that time was 59 deg. F.

Strange as it may seem, on another gangway, where places were driven to the dip, I found the temperature on the gangway 40 deg. F., while at the face of the dip workings the thermometer registered 50 deg. F. Here, also, the mixture extinguished my oil lamp. The gas, however, was quickly removed by turning the fresh air into the place.

As before, we found, a few days later, the place was again filled with the same mixture. At that time, I found greater difficulty in attempting to remove the gas by turning the return current into the dip workings. I have since arranged to have the fresh air current sweep both of these places and there is now no trouble from gas in either of them. JOSEPH LAWRENCE.

Tomhicken, Penn.

Arrangement of Track Scales

Letter No. 1—In reading the article that appeared some time ago in *Coal Age*, the question arose in my mind as to what arrangement of mine-track scales would afford the greatest efficiency in the operation of the mine. Having due regard to expediting the work and, at the same time, securing an arrangement that would effect the greatest economy, the question presented is: Should the track scales at a coal mine be located under the tipple or elsewhere? In expressing my own opinion in this regard, I would like to hear from operators who are using track scales.

As we all know, in the majority of mines, there are usually three or four grades of coal to be loaded; namely, lump, nut, slack and, in some cases, egg and pea coal. When the scales are placed under the tipple it becomes necessary to install a scale on each track, in order to obtain the weight of each car of screenings, as well as that of the lump coal loaded.

DISADVANTAGE OF LARGE TRACK SCALES

Moreover, in order to comply with the requirements regarding the increasing capacity of the cars, these scales must be 72 or 74 ft. in length, which greatly increases the first cost of the installation over that of a regular four-section, 50-ft. scale. The increase in the cost of building the foundation large track scales is no small item.

Consider for a moment a mine that has four grades of coal dumped over the screens, and assume that four 72-ft. scales are installed under the tipple. To keep these scale platforms clean, so that correct weights of the coal can be obtained, will require the services of at least two men and, even then, in bad weather, two men will hardly be able to keep the scales clear. Allow me, here, to make a suggestion that appeals to me as being practical, hoping that it will be discussed and we may learn what others think of the scheme. It is as follows:

Install two 50-ft. scales, one at the head of the empty or storage tracks, where the weights of the empty cars acn be ascertained and recorded as they enter the yard; and the other at the point where the loaded tracks converge, where it will be possible to weigh each loaded car before it is shipped. With this arrangement it will take the weighmaster at the upper end but a few minutes in the morning to have enough cars dropped over the empty scale to run the mine at least half a day. When this is done he can perform the same service at the lower end of the yard, where each loaded car is weighed as it passes over the scale at that end.

SAVING OF TIME AND LABOR MEANS ECONOMY

To my mind, this plan would greatly increase the efficiency of the service. Time and labor would be saved in the weighing of the coal, which means economy. There would be less difficulty in keeping the scale platforms clear, which would mean greater accuracy in the weighing of shipments. Since cars are not continually standing on the scales, but merely pass over them, the life of the scales would be increased.

Those who have had experience with box-car loaders realize that it is especially difficult to maintain a scale in perfect order, under such conditions, owing to the operation of the loader keeping the platform of the scale in constant motion. The wear on the bearings of the scale is such as to greatly shorten the life of the bearings and impairs their accuracy. The bearings of a scale that is not subject to the same jar and motion will greatly outlast those that are subject to the severe service incident to loading the coal.

LITTLE DANGER OF OVERLOADING THE CARS

It may be argued that where the scale is not placed immediately below the tipple there will be danger of the cars being overloaded. To my mind, this is not a serious question, however, as it is practically impossible to overload an open car of 80,000 or 100,000-lb. capacity, and there is never any danger of overloading box cars of over 60,000-lb. capacity. There is frequently a margin of 10 per cent. over or under the marked capacity of cars, and, in this case, the man running the loader soon becomes expert enough that he does not often miss the limit.

In closing, allow me to state my conclusion that the extra cost of 72-ft. scales over those 50 ft. in length, together with the greater expense for foundations, both in respect to labor and material; and, in addition, the greater number of scales required where several grades of coal are to be loaded, make it certain that practical economy and more efficiency are secured when the track scales are not placed under the tipple. I hope to learn the opinions of others. E. C. DODGE.

Denver, Colo. Scale Inspector, American Fuel Co

Locating the Coal Beyond a Fault

Letter No. 7—In mining practice, faults are always annoying and costly to a greater or less degree, depending on the kind and size of the fault. It sometimes happens that, by following certain practical rules that are laid down, the lost seam can be located and development work continued without much delay. In other cases, the work of finding the lost seam is much more difficult and may prove a very expensive operation.

A common rule whose application, however, is restricted to normal or slip faults, is the following: If the fault is first met in the roof and recedes toward the floor, it is a downthrow; but if the fault is first met in the floor and recedes toward the roof it is an upthrow. This is only another way of putting Schmidt's rule, which is "Follow the obtuse angle in the faulted strata beyond the fault line."

It is quite evident that these rules will not apply to an overlap or overthrust fault. In such a fault, it would be necessary to reverse the rule and follow the *acute* angle, in the strata beyond the fault.

Applying the Rule Fails to Check Boreholes

Now, on examining the data and cross-sections shown in Fig. 1 on p. 797, where the correspondent states that the cross-sections shown are taken "looking at the right rib," it appears that this fault was first struck at the floor of the seam and receded toward the roof. Then, according to the rule just given, this should be an upthrow fault, running in a northeasterly and southwesterly direction. However, as proved by the finding of the coal by the boreholes, at a lower level than that in the mine, it is clear that the fault, in this case, is a downthrow.

Putting these facts together, I am of the opinion that this is an overlap or overthrust fault. This opinion is further strengthened by the statement that the appearance of the strata at the face of the main heading, in the fault, shows that the measures had been subjected to a tremendous pressure, as the rock there was much broken.

When a fault is encountered in a mine, it has been my custom to drive through the fault a short distance and examine closely the character of the strata beyond the slip. I would then compare this with the strata passed through in sinking the shaft. In the present case, however, the mine is a drift opening, which gives little opportunity to make such a comparison, although it may be possible to obtain some information from shaft mines in that vicinity if there are any.

Precautions Necessary When Drilling

Where no information is obtainable from this source, it is necessary to resort to drilling. Instead of sinking boreholes from the surface, however, I prefer to drill up or down, in the mine heading. Before doing this, the heading should be driven at least 50 ft. beyond the fault line, and enough top shot down to give sufficient headroom to insert the drills.

The fact that the coal found in the first drillhole was 3 ft. 9 in. thick while that in the second drillhole was 2 ft. 10 in. in thickness, in my opinion, means nothing in respect to determining whether the coal struck belonged to the X seam or the Y seam. It seldom happens that a seam of coal maintains its normal thickness when approaching a fault on either side. I have known cases where the coal beyond the fault would be thinner and other cases where it would be thicker than the seam worked, and this change in thickness will often be observed a distance of 50 ft. from the fault line. My belief is that the coal struck in the borehole belonged to the X seam and that, had the hole been sunk deeper, it would have found the Y seam just below.

West Frankfort, Ill. George Bowker.

Efficiency of Mine Officials

Letter No. 1—I have read a great deal in the columns of *Coal Age* in regard to the efficiency of mine foremen, but have seen little in reference to the efficiency of superintendents, which is a subject that I would like to see discussed by readers, or by some of the superintendents themselves.

My position brings me in contact with both efficient and nonefficient mine superintendents. Some of these have a reputation for efficiency, which to my mind they do not deserve. To judge rightly one must have first hand information. For instance, we see a superintendent on the street each day, with a white collar and seemingly having little care, and we are told that he is 100 per cent. efficient; he is producing coal several cents cheaper than another fellow, both in respect to labor and material.

There must be some reason for this; he must have an excellent organization, first class mine foremen, machinists and labor bosses, who thoroughly understand their duties and business. But you happen to know them personally and know they are not. I have, myself, visited some of these efficient plants. The mine usually has an excellent top, and little water to contend with, which accounts for the low cost of labor and material.

In such a case the superintendent knows little of what is going on at the plant, although the foremen keep reports in detail for his information, I find in many cases he sees these reports, but can he rely on them.

What a Close Examination Reveals

A close examination of many such plants, showing a low cost per ton of coal produced reveals the most wasteful methods in use. Such a condition may be attributed either to the inefficiency of the superintendent, or the failure of the company to provide the necessary labor and material.

Among the many inefficient things that one finds at these plants is the machine gang, where one man is working and two or more looking on. The boss carpenter is ready to sit down half an hour and tell you how things are going around the plant. Pumps need packing, which is generally due to the lack of packing rings or glands. Loss of coal results from water in the working places, the men being unable to work.

At many plants there is a lack of steam power, because of the formation of scale in the boilers, which makes the tubes to leak or the boiler to bag, causing a loss of coal of which no mention is made in the reports. One of the biggest losses underground is due to not having proper supervision of rib falls, and some means of removing posts and rails that have been partly covered up. The foreman generally has a good excuse ready when you see one of these places that should have the rails and posts removed. He will tell you that the rib boss is doing something else and will be here shortly; but he seldom gets there until it is too late.

I might mention several other ways in which waste occurs in mines, but the superintendents of the larger companies, these days, have many things to contend with that require, besides efficiency, some education, tact, a good judge of men, and broadminded, experience. However, I am not sure whether this is so necessary or not, with our uptodate methods in training men. It

has not been so long ago that a young fellow, in a barber shop, shaved and cut my hair. A few months later I found him superintendent at a good sized operation. I have been wondering ever since if this young fellow has some remarkable ability and how his superiors discovered his genius.

I believe that we have too many men in charge of our mines who lack the necessary experience and ability. After a year or more as superintendent they either lose their position or obtain another in time to prevent a complete tie up of the mine by reason of their poor management. Some of the larger companies, who keep an inspector for each department, manage to keep a superintendent who lacks knowledge if the foremen makes up for that deficiency.

Mine foremen, however, often prove failures; and it is at this stage that the superintendent requires tact to get rid of the foreman without incurring the ill will of the mine inspector. There are often young men working in mines who could fill these jobs, and what is lacking can usually be supplied, in some manner or way, so that the operator should not be compelled to go outside to get a man to manage his mine. Let us hear from many and try to learn where the fault lies, and where so much effort in man power and money is wasted, both in coal and in the material used in its production. There is no other business that will compare with coal mining, in respect to money invested and the amount of money lost. Yet we find the most inexperienced men in charge. Let us see if we cannot help in some way to correct the evil and learn just where the fault lies, with the operators or the men.

Uniontown, Penn. WM. GORMAN.

Waste of Coal

Letter No. 2—It was with deep interest that I read the letter of Russell Exline, *Coal Age*, Dec. 26, p. 1176. It was, indeed, a surprise to see the yearly wastage of coal published in such a mathematical summary. It is my belief that many who read the original report and never gave the waste of coal a second thought will be awakened to realize the true situation. While I do not fear a country wide famine of coal, it will be well to adopt the slogan, *We will never miss the coal, till the fire goes out and the bin is empty.*

Mr. Exline, in his letter, suggests a discussion of this question, from a practical standpoint; and let me say that I fully agree with him in the hope to see the ideas of other men on a subject of such vast importance.

It is a well known fact that many people do not consider it worthwhile to save anything that is plentiful. For just that reason, many miners' families waste as much coal in one year as a city family would use in the same time. This waste is carried on in two ways that are very noticeable. The first and most common waste occurs because many families never clean up the coal that the driver spilled while unloading their coal at the shed, but allow it to be washed away with the rain.

Again, by observing the ashpile of many of these families one will see that they are poor firemen, and that they fail to get the heat value out of the coal that they should. When their attention is called to the matter they say that it is the fault of the grate, which passes the coal unburned. It is just here that a good sound discussion of this topic will show the plain facts and teach such people the lesson of, "A dollar saved is a dollar earned." The truth is that, with a proper burning of their coal, they can save the cost of new grates many times over, and learn to be thrifty and better-living people.

There is, unquestionably, a large amount of coal wasted in mining the same. While it is an evident fact that all of the coal mined cannot be marketed, because there is bound to be some waste in its handling and shipment, yet I want to emphasize the fact that a good mine foreman, who insists on his miners cleaning their places well after every blast, will be saving more coal than a person would ever imagine.

Shiftless Habits in Mining Wastes Coal

The proof of this statement is shown at a mine where one compares the car accounts of chambers in the same vein and taken to be the same in all dimensions. Having watched with great eagerness the difference in the totals of two such chambers under my charge not long ago, I can truthfully say, that one miner when finishing his chamber had produced 575 cars of coal, while the man in the adjoining room, who was working under my guidance, for the proof of my idea, loaded 618 cars of coal, making a difference of 43 cars of coal in working a single chamber. I am proud to say, here, that the miner who loaded the most coal, in the case just mentioned, used three kegs of powder less than the other miner, who worked so carelessly, and that it took him one whole week longer to finish his chamber. He never cleaned his road, which was dirty and derailed his cars, compelling him to work harder than the miner who followed the instructions given him.

Later, when I made known to the careless miner the difference in the production of the two chambers, he asked for permission to work company work in cleaning his chamber. I granted him this, and when he recovered but 19 cars of coal he claimed that I had made a mistake in my accounting. It was then up to me to show him where the difference was. As he had not driven his chamber with even ribs and the full width, we both measured the width, in a few places, and he quickly saw where the difference of 43 cars in the two chambers existed. He admitted that he did not work to get the most coal per keg, which also gives the foreman a maximum production with a minimum cost. In closing, permit me to say that mine foremen who are working to get the coal out today, under the impression that they may not be on the job the next day, are neither working in their country's interest, nor that of the operator; but practicing a false economy. The sooner such a foreman abandons the idea of losing his job, the better record he will have for producing coal, when he finally resigns his position. The day is past when such a "flash in the pan" foreman can fool his company.

Plymouth, Penn. JOSEPH R. THOMAS.

[Referring to his letter on the "Freezing of Shafts in Winter," which appeared in *Coal Age*, Dec. 26, p. 1175, Jack L. Ball wishes to correct the statement in regard to the weight of the cages, in the next to the last paragraph on page 1175. He writes, "I unintentionally stated that the cages 'weighed between four and five tons.' These cages weigh three tons."]

INQUIRIES OF GENERAL INTEREST

Steam-Heating Plant

Kindly permit me to submit for consideration in the columns of *Coal Age* a question concerning a heating plant that we have installed at our mine. The plan, as proposed, is similar to that of a house-heating system, each radiator has a return-pipe connection leading to the boiler furnishing the supply of steam.

The plant is intended to heat three buildings and dry sand. The arrangement is such that the boiler is below the level of all the radiators and the return, at present, enters the bottom of the boiler. The lowest point in the return pipe is seven feet below the surface of the water in the boiler, and to come to the same level the water must back up 75 ft. in the return.

When starting this plant we filled the boiler with water, leaving the return valve open so as to permit the water to assume the same level in the return pipe as in the boiler. We then opened the valve in the steam pipe and started the fire. As the steam pressure rose, the water began to leave the boiler and, fearing trouble, we attempted to force more water into the boiler. By this time, however, the steam gage indicated a pressure of 40 lb. and the inspirator would not work against that pressure.

We were obliged to abandon the scheme and seek help in solving our difficulty. Allow me to ask whether the return pipe in such a heating system should enter the bottom or the top of the boiler. Please explain the reason the plant failed to work. MAC.

———, Mo.

In a steam-heating system such as described in this inquiry the return from the radiators should always enter the top of the boiler and never at the bottom. Apparently, this was the chief and probably the only cause of the failure of the plant to work.

The fact that the return pipe, in this case, entered the boiler at the bottom allowed the water, as stated, to back up in the return till it found its level 75 ft. away. This completely choked the pipe and prevented the circulation of the steam from the boilers through the radiators and back again to the boilers, as water of condensation. This condensation takes place more rapidly because the lack of circulation prevents quickly heating the pipes.

Now, regarding the water leaving the boiler as the fire was started and steam generated, the steam supply valve being opened, steam entered the pipe system and the cold radiators, where its condensation caused a partial vacuum on the return side. This explains the fact of the water leaving the boiler and being drawn into the radiators through the return connections.

The success of a steam-heating system depends absolutely on a free and unobstructed circulation of the steam from the boiler, through the steam pipe and the radiators, returning as water of condensation to the boiler. Not only should the return pipe enter the top of the boiler but it should then extend downward till the end of the pipe is well submerged in the water in the boiler, at or near the bottom. Without this submergence live steam would enter both the supply pipe and the return alike, which would effectively prevent circulation and block the system.

An Extraordinary Water Gage

Allow me to refer to an examination question answered in *Coal Age*, Oct. 24, p. 798, the next to the last question on that page. Following is the question:

What pressure and power would be required to produce and maintain an air volume of 150,000 cu.ft. per min., through an airway 8 x 10 ft. and 3000 ft. long? What would be the total power exerted by the fan engine if 70 per cent. of the power was expended on the air?

The calculations of the pressure and power required to produce this circulation appear to be all right, and yet the pressure shown (95 lb. per sq.ft.) is far too great for actual practice in coal mining. It represents a water gage of $95 \div 5.2 = 18\frac{1}{4}$ in. and I want to ask where the trouble lies, as something must be wrong. Still, I have checked over the figures and find no mistake.

Common practice, I have always understood, is to ventilate a coal mine, under a water gage of two or three inches at the most. Is the question a practical one; or is it intended to mislead a candidate and cause him to think his calculation is wrong? Such a water gage could not be measured with the ordinary mine gage, which seldom reads more than four or five inches. One would need a tube fashioned after the style of a standard mercurial barometer, about a yard long.

Springfield, Ill. CANDIDATE.

We are glad to have this inquirer draw attention to this question, which any practical man realizes does not represent actual ventilating practice in coal mining. To carry a velocity of 1875 ft. per min. a distance of 3000 ft., including the return, would not be considered by any operator of experience.

We do not wonder that our friend suggests the possibility of the question being intended to test a candidate's confidence in his calculations. There are good practical men who, on obtaining a result showing an 18-in. water gage, would conclude that their work was wrong and throw it aside, ashamed to submit it in answer to the question.

We believe this question is an unfortunate oversight of the examining board, who did not stop to consider its impracticability. No examining board charged with the duty of examining practical men, to ascertain their individual fitness for the positions they seek, would be justified in asking a question intended to mislead a candidate. It would be a deception for which the candidate is wholly unprepared, and as such is unfair to many whose chief asset is their practical knowledge.

EXAMINATION QUESTIONS

Miscellaneous Questions

Answered by Request

Ques.—To what extent is coal dust found in the mines of Illinois? State fully the cause of its existence and how you would protect life and property from the dangerous effects arising therefrom.

Ans.—The mines of Illinois are, as a rule, dry and dusty to such an extent that special precautions have to be taken, in the operation of the mine, to prevent disaster.

The cause of dust, in coal mines, is primarily due to the soft and friable nature of the coal. The trouble is greatly augmented by the practices followed in the mining of the coal, however. Machine mines are almost invariably dusty mines, because of the large quantity of machine cuttings, "bug dust." The excessive use of powder in blasting the coal; shooting off the solid; failure to properly mine a shot are all causes of the undue prevalence of dust in mines.

To properly safeguard a dusty mine everything should be done to reduce to a minimum the quantity of dust produced in mining, blasting and hauling the coal. Remove promptly all accumulations at the working face; enforce strict regulations regarding blasting; clean and sprinkle roadways and air-courses and use dustproof cars.

Ques.—Two airways, one circular and the other square, each have an area of 81 sq.ft. and a length of 2500 ft.; what is the difference in the rubbing surfaces of the two airways?

Ans.—Since the circumference of a circle is equal to 3.545 times the square root of its area, the perimeter of a circular airway whose area is 81 sq.ft., is $3.545 \sqrt{81} = 3.545 \times 9 = 31.9$ ft. For a length of 2500 ft., the rubbing surface of this airway is $2500 \times 31.9 = 79{,}750$ sq.ft.

Each side of a square airway having an area of 81 sq.ft. is 9 ft. in length. The perimeter of this airway is, therefore, $4 \times 9 = 36$ ft.; and the rubbing surface, for a length of 2500 ft., is $2500 \times 36 = 90{,}000$ sq.ft. The difference in the amount of rubbing surface of these two airways is $90{,}000 - 79{,}750 = 10{,}250$ sq.ft.

Ques.—What instruments are necessary for a mine foreman, in the performance of his duties in the mine?

Ans.—The mine foreman should have and use the following: An anemometer for measuring the velocity of the air in a mine; a watch for observing the time; a tape for measuring the size of the airway for calculating the quantity of air in circulation. He should have and use a water gage, for determining the unit of ventilating pressure or pressure per square foot producing the circulation in the mine or any split or section of the mine. He should have a barometer to observe changes in atmospheric pressure, and a hygrometer to determine the degree of humidity of the mine air. The foreman should have a good safety lamp for observing the gaseous condition of the mine. He should have a compass to determine the direction of rooms and headings and to give sights. In an inclined seam, he should have a slope level for determining the degree of inclination or pitch of the seam.

Ques.—Supposing there are two airways, one is 4 x 12 ft. and the other 8 x 8 ft. in section; how much more air will pass in the one than in the other, with the same pressure?

Ans.—Assuming these airways have the same length and the perimeter of each being the same, for the same unit pressure producing the circulation, the quantity of air will vary as the square root of the sectional area. In other words, the quantity ratio will equal the square root of the area ratio. Therefore, the ratio of the quantity of air circulated in the second airway to that in the first airway is $\sqrt{64} : \sqrt{48}$; or 8: 6.9, which shows that the 8 x 8-ft. airway will pass $8 \div 6.9 = 1.16$ times the quantity that the same pressure will pass in the first airway.

Ques.—The velocity of the air in an airway is 5 ft. per sec. and it is required to increase this to 8 ft. per sec., what increase in pressure will be required?

Ans.—For the same conditions in the airway, the pressure producing a given circulation varies as the square of the velocity. In other words, the pressure ratio is equal to the square of the velocity ratio. But, the velocity ratio, in this case, is $8/5 = 1.6$, and the square $1.6^2 = 2.56$. Therefore, in order to increase the velocity of air from 5 to 8 ft. per sec., the pressure must be increased 2.56 times the original pressure.

Ques.—How would you approach the burning section of a mine, in case the conditions necessitated the sealing off of the burning section? What steps would you take to insure the safety of the workers and the success of their work?

Ans.—Without a further knowledge of the situation in the mine, the location of the section that is burning and the headway gained by the fire, this question can only be answered in a general way. The safety of the men and their prompt withdrawal from the mine is the first consideration, while there must be no delay in taking steps to arrest the progress of the fire and extinguish the same, if that is possible. Assuming, however, as the question states, that it is necessary to seal off the burning section, experienced men must be selected for this work. Equipped with the necessary tools and material, they must proceed to approach the section from the intake side. Only safety lamps must be used, and no attempt to seal off the section must be made until all the men have been withdrawn from the mine except those to be employed in the work. Wherever it is practicable to do this, the building of the necessary stoppings should be started at the return end, so as to reduce the liability of an explosive mixture forming in the inclosed space. Much will depend, however, on the conditions surrounding each particular case.

COAL AND COKE NEWS

Harrisburg, Penn.

United Mine Workers of the Lehigh field are not in sympathy with the insurgent movement started by some of the men in the Lackawanna and Wyoming Valleys, according to reports received from that section. Leaders of the union state that reports claiming an attendance of 300 delegates at a recent convention were exaggerated, and that only 114 men were there, and these not fully accredited from their locals. Miners here feel that action of the insurgents would tend to split the organization.

With the settlement of their grievances, the 900 striking employees of the Marvine Colliery of the Hudson Coal Co., in North Scranton, who have been out since Jan. 3, returned to work on Jan. 7.

Report of the Anthracite Board of Conciliation for the coal year ended Mar. 31, 1918, just issued, makes a volume of 363 printed pages. It shows that during the period all manner of grievances as to working conditions, rate scales to apply, payment and work in dispute were formally brought to the attention of the board. There came before the board 175 formal grievances, 154 from employees or their representatives, and 21 from the operators. Of the 175 cases considered, 39 were voluntarily withdrawn by complainants, 42 adjusted amicably, 47 withdrawn without prejudice. There went to the umpire 57 cases. He decided 23 against the mine workers and 22 in their favor. There was no answer to the board for decision in one instance, and one case was pronounced retroactive. In addition 34 cases are held under advisement during the year.

Operators cannot evade the payment of specified wage rates by calling an occupation or a place by some other name, ruled Charles P. Neill, umpire of the Anthracite Conciliation Board, in a decision handed down on Jan. 9, sustaining the complaint of contract miners at the Halstead colliery of the Delaware, Lackawanna & Western, Coal Department, at Duryea. The ruling is retroactive and carries with it a large amount of back pay.

The miners claimed a higher rate for gangway work. The company, it is alleged, set up a highly restricted interpretation of what a gangway is and tried to create the issue that the passages where the complaints worked were airways.

The umpire said that he understands fully the difference between gangways and airways, and while he admits that the passages in the controversy were not so wide as the usual gangway, he asserts that the tunnel was used for the purpose and he refuses to read into the language of the anthracite wage agreement meanings that were clearly not in the minds of the parties who made and signed these contracts.

The Anthracite Board of Conciliation announced on Jan. 9 that it has denied the request of coal operators for the abrogation of the war-time rule that $150 be paid the families or heirs of miners killed or fatally injured at work and that, in consideration of the payment, the colliery shall not suspend the day of the funeral.

Protests have been filed with the Labor Department by International President Frank B. Hayes, of the United Mine Workers, against the importation of Mexicans into the mining regions. He cites action of certain operators in bringing Mexicans into the anthracite fields.

Uniontown, Penn.

Sales of coal lands in Green County aggregating $2,500,000 were approved this week by Referee in Bankruptcy J. G. Carroll upon petition of the trustees in bankruptcy of J. V. Thompson. Involved in the sale are what is known as the Rockwell and Dorsey deals. The sale price averaged $450 per acre.

Denial that J. V. Thompson dominates the liquidation of his vast estate is made in the answer filed by the Thompson creditors committee to the petition made here in equity asking for the dissolution of the committee. The answer sets forth that the estate is under the jurisdiction of the court and that it only can permit or prevent the trustees in bankruptcy in carrying out its provinces. The petition was made by the trustees in bankruptcy of Isaac W. Semans and executors of the estate of George L. Hibbs, heavy creditors of Mr. Thompson.

After floating several miles down the Monongahela River, the tipple of the Redstone mine, Pittsburgh Coal Co., lodged against the abutments of the Sunny Side tipple. The structure was virtually undamaged, but will likely be broken up and rebuilt at Redstone. The tipple was loosed by the recent high water on the river.

Morgantown, W. Va.

The United States railroad administration has removed the differential in freight rates on coal shipped on the Monongahela and the Baltimore & Ohio from Monongalia County, and henceforth the rate prevailing on the Baltimore & Ohio will be in effect. This differential amounted to 15c. a ton in favor of the shippers on the old road and in the Fairmont district. Coal from the Tait mines at Randall, for instance, could be transported across the river and shipped for 15c. a ton less than on the Monongahela, the road which should logically handle it. For some time the North American Coal Co. and other companies on the Monongahela have been fighting for the removal of this differential. The new rates apply to all that part of the region south of the West Virginia-Pennsylvania state line.

Ever since the Monongahela was constructed, shippers on the lines of the Baltimore & Ohio from Fairmont, Clarksburg, Philippi and intermediate points have enjoyed what is known as the West Virginia regional rate. This was 15c. a ton less than the rate for shippers on the Monongahela, and necessarily placed the Monongahela operators at a great disadvantage. According to the schedule of tariffs now issued and made effective, Monongahela shippers will get the West Virginia regional rate, 15c. a ton less than they are now paying. This applies to practically all points, east and west, though there are possibly a few exceptions of no great importance.

The rate to coal operators on the Morgantown & Wheeling is now the same as the rate to shippers on the Monongahela. This removes a charge of 40c. a ton to the Scott's Run operators, and with the removal of 15c. a ton on the Monongahela gives the Scott's Run region the benefit of a total of 55c. a ton.

Fairmont, W. Va.

Prepayment of freight will not be exacted from operators of the Fairmont region as originally determined upon by the Railroad administration, at least for the present, protest against such prepayment of freight having been registered by the Northern West Virginia Coal Operators' Association, with C. H. Markham, Philadelphia, regional director of the Allegheny region of the United States Railroad Administration.

F. J. Patton, secretary of the association sent the following telegram to Mr. Markham: "This association, representing production of twenty million tons annually, requests that the instructions providing for prepayment of freight on coal not be made effective Jan. 1, and further that such instructions not be made effective at a future date, until hearings are held and producers given an opportunity to be heard."

In commenting on the protest Mr. Patton said: "All operators in the Fairmont region who have coal to be shipped to tidewater points would be obliged to prepay the freight if the new order became effective. All cars are billed at Keyser and would have caused no end of inconvenience to the local operators because the freight payment would have to be made at Keyser."

Charleston, W. Va.

Production in the Pocahontas and Tug River districts reached its lowest point at the end of 1918, only 156,838 tons being produced. This is only about one-third of the capacity of the district. The tonnage lost reached a total of 211,152, the biggest factor in such a loss being labor shortage which cost 194,430 tons. From car shortage there was a loss of 6586 tons and from mine disability 5127 tons, while no market was responsible for a loss of 5000 tons. The market for Pocahontas coal is unusually quiet. There was a material reduction in the coke output, only 30,166 tons being produced.

With a supply of cars in excess of any seen during the whole of 1918, and with a ready market for its product, conditions in the Fairmont district, contrary to conditions existing elsewhere in the state, are very satisfactory, the only serious factor in holding back production being a shortage of electric power. As showing how liberal the car supply has been it is only necessary to point out that during the week ending Jan. 4 the supply was never under 2000 cars a day and ran as high as 3300 cars a day. It was impossible of course to load all the empties furnished.

With the removal of certain embargoes against tidewater shipments from the New River district and with the prospects of additional coal-carrying vessels being available, the outlook in the New River district was somewhat brighter although embargoes still in effect tended to cut down production. There was no trouble experienced with the car supply and there was no shortage of labor. Existing embargoes, as stated, were responsible for holding production down to 81,984 tons during the first week of the year. A slow market and a large number of men out also held down production.

Conditions existing throughout December in the Kanawha district remained unchanged during the first week of the year, even a cold spell, general throughout the country, failing to stimulate the demand to any great extent, reserve stocks, according to Kanawha operators, being sufficient to meet any immediate demands. With coal still debarred by zone restriction from many markets and with buying at low ebb, business in the Kanawha district is unusually quiet, so much so that production for the week ending Jan. 4 was cut to 84,247 tons, though allowance must be made for the fact that only 50% of the mines filed reports, all of which showed 2639 working hours with a total loss of 1637 working hours. Of that loss 849 hours were due to labor shortage; 78 hours were due to car shortage; 225 hours were due to mine disability and 340 hours to no market.

McAlester, Okla.

Coal mines and local shippers are overwhelmed with orders for coal from Oklahoma, Kansas, Colorado and Texas. Orders have more than doubled since the recent severely cold weather set in. Mines are working overtime, and where during the summer and fall months there was threatened abandonment of the mining camps due to departure of miners to seek other employment, there is now a wild scramble among the miners, each seeking to get all the work and put in all the overtime possible.

While many operators blame the people for not heeding the advice of the Fuel Administration and laying in a supply of winter fuel during the summer months, others declare it is due to the shortage of natural gas, which has been used extensively for heating. The heavy demands have so reduced the supply of natural gas that many families have abandoned it as fuel for heating and are depending on coal.

With the decline of the natural gas production, coal operators see a great future to the coal-mining industry. Vast undeveloped deposits of coal underlie much of the land of Pittsburg and adjoining counties, and capital is needed for their development. With the growing demand for coal and large profits from the money now invested, additional investment is sure to follow and new mines will be opened.

As indicating the extent of the coal mining operations in the immediate vicinity of McAlester, it is disclosed that the payroll of the coal mines amounts to $850,000 every fifteen days, or 1¾ million dollars a month.

PENNSYLVANIA

Anthracite

Jeddo—The G. B. Markle Coal Co., one of the largest independent concerns in the anthracite field, has put another gang of Mexican laborers at work at the mines. A month ago 100 Mexicans were also given employment by the Markle Company.

Oneida — Through effective preventive measures taken by the Lehigh Valley Coal Co., influenza outbreaks that menaced fuel production at a number of small mining towns around have been squelched. There are only a few cases in these towns at present, and danger of another epidemic has passed.

Beaver Brook—Owing to the high rate of wages paid drivers, runners and company hands about the mines, there is a scarcity of contract miners according to operators. The men prefer "company work," because they are assured of a regular income and are not exposed to the dangers encountered by the men who blast the coal.

Lansford—Six federal and state fuel administration investigators have arrived in the Lehigh region to investigate the cause of habitual absenteeism on the part of some of the miners and to suggest methods of correcting the trouble, which has hindered production to a considerable degree. They are scrutinizing the time sheets at the collieries, and it is understood that "pay-day drunks" will receive special attention.

Plains—M. J. Healey won a substantial verdict in his suit against C. C. Bowman, of Pittston, when the jury awarded him $13,019 on his claim of $14,000 on overpayments under a coal sales contract. In the trial of the case, which lasted for three weeks and was bitterly contested, Mr. Bowman presented as a set-off a counter demand of $32,000, alleged to be due him as commissions and other fees, but this claim was ignored.

Pottsville—The pay for the middle of January throughout the anthracite region will mark the delivery of paid-up Liberty Loan Bonds to the various workers who have completed their payments under the schedule arranged at the time the bonds were purchased. Some of the coal companies will have its paymasters hand the bonds to the workers when paying their wages. A congratulatory speech will accompany each bond.

Wilkes-Barre—The school for miners at the Y. M. C. A., which has been successful during the past ten years, postponed from Oct. 15 to Jan. 7, has opened. The school is for men working in and about the mines, who want to better understand the principles of their work and be prepared for advancement. It is a course covering three regular years' work with an extra year of preparatory work men for who have had the privilege of a common school education. The fact that a man has his fees returned to him upon graduation ought to encourage a large number of ambitious men to take this course.

Scranton—Since the Davis mine cave law went into effect, back in 1913, only three companies operating in the city have complied with its provisions relative to supplying the city with maps of the mine workings underneath the streets. This fact was brought out at council meeting on Jan. 7.

A steam main supplying the school administration building in the 400 block Washington Ave., has been broken, due to mining operations, it is thought. For several weeks heavy blasting has shaken the building, and it is believed that slight settlings have been the cause of the cracking, although a close inspection has failed to reveal any evidence of settlings in the building itself.

Bituminous

Pittsburgh—The Consumers' Fuel Co. is rebuilding its tipple at Downs Station, W. Va. Roberts & Schaefer Co. of Chicago, have been awarded a contract for the necessary changes.

Big Run—McClure Brothers have opened a new mine near here in a vein of coal which has never been worked to any great extent in this section. A switch from the Buffalo, Rochester & Pittsburgh R. R. has been installed and shipments begun.

Greensburg—The Pittsburgh Coal Co. has completed negotiations for the purchase of two tracts of coal properties, comprising 2200 acres of Pittsburgh seam coal, fronting on the Youghiogheny River, and about 1400 acres in the Rehobah Church section, both in Rostraver Township.

Homer City—The new mines of the manufacturers Coal Co., on Yellow Creek, near Meco, are fast rounding into form. The incline plane and tipple has been completed, and it is expected that coal shipments will be begun in January. The mine is located on the Snyder to Possum Glory branch of the Pennsylvania Railroad.

Evans City—Edward Empfield, who has been general manager and actively engaged in the supervision of the Big Creek Coal Mining Co. mines near here, has sold his interest in the company to Pittsburgh capitalists and retired from the mining business. John L. Lowther has been made superintendent of the Big Creek mines since Mr. Empfield retired.

Du Bois—Unless a way is found to put under control the blaze now raging in a large tract of coal on the Black Diamond Mining Co.'s operation; four miles beyond Luthersburg, thousands of tons of coal will be consumed. The fire, which has been burning for more than two months, started in an airshaft, and is believed to have been caused by boys. An attempt is now being made to install a stationary pump to work until the fire is put out.

Greensburg—The Pittsburgh Coal Co. has purchased two big blocks of the Pittsburgh seam of coal in Rostraver township, one of 2200 acres fronting on the Youghiogheny River, and the other of 1400 acres, in the Rehobah church section of the same township. The latter tract runs almost to the Monongahela River, at Webster. For the 2200-acre block the coal company paid Mrs. Elizabeth Moore, of this city, $4,000,000, and $1,000,000 was paid for the other tract. This land was purchased 25 years ago for an average price of $50 an acre.

Harmarville—The Inland Collieries Co., has begun experimenting with a cement gun in its mine near here, to ascertain whether a coating of gumite on the roof will prevent spalling and roof falls by keeping the air from acting on the roof. The workings are in what is known as the Double Freeport vein, with a slate roof, and troubles with roof falls are frequent in various sections of the mine. Cross I-beams, which at present are being used on nearly all headings, will be eliminated if the gumite accomplishes the purpose intended. Thomas G. Fear, Harmarville, Penn., is general superintendent.

Punxsutawney—The Onondaga Coal Mining Co., which is reopening the old Onondaga mines of the Buffalo & Susquehanna Coal and Coke Co. near here, have installed two large buckets in place of the cages. These buckets, with a capacity of fifty barrels each, are hoisted at the rate of one per minute. In addition to this method of dewatering the mine hydraulic pumps are being used, and the water is gradually going down. A contract has been awarded for a new steel tipple, including preparing machinery, rock disposal plant and power house equipment. The plant is expected to be in operation this spring.

WEST VIRGINIA

Williamson—Fire visited the plant of the Steele Coal Co. at Mossy Bottom on Jan. 3, destroying the store and office buildings. An overheated stove set fire to the building. The loss entailed amounted to about $20 000.

KENTUCKY

Willard—The Little Fork Coal Co., after running into a fault in its first location, has recently opened a new entrance and started shipping again. Robert Gunning is manager.

Ivel—The Regal Block Coal Co. is ready to ship coal from its new plant, which is equipped with machines for cutting from a 42-in. seam. Pocahontas field interests are behind this mine.

Willard—The Lick Creek Coal Co. has installed a compressor outfit and is ready to operate a coal-punching machine at its local mines. J. W. Kitchen, of Ashland, Ky., is general manager of the company.

Lexington—The Zella Mining Co., after being promoted by R. D. Clere, of Ashland, Ky., was recently sold, and the new owners are now in shape to start shipping from a new operation on Beaver, near Lachey, working a 5-ft. gas coal seam.

Sutton—General construction work is now in progress in connection with a number of improvements being made at this place by the Frank Coal Co., of which H. H. Frank is superintendent. This company has also built a large number of new houses.

Prestonburg—Arrangements are being made by the Colonial Coal and Coke Co., operating at Prestonburg, Ky., to enlarge the company's operations, new territory having been acquired near the present operation. It is proposed, however, to use the same tipple for both operations.

Frankfort—It is reported that the Long Fork Coal Co., one of the new operations on the Baltimore & Ohio R.R. extension, in Floyd County, Kentucky, along Beaver Creek, has recently changed hands, and is now under the active management of W. E. Jones. The plant is located at Drift, Ky.

ILLINOIS

Springfield—Mine A of the Citizens' Coal Mining Co. has resumed operation after a shutdown of two months. About 100 of the old employees returned to work; there are vacancies for 50 more, which will be held open a reasonable time. The mine has a capacity of 1000 tons a day.

Carbondale—George R. Sheldon, of New York, for eight years treasurer of the Republican National Committee, is in a serious condition as a result of injuries sustained while inspecting a mine at Dowell on Jan. 8. Mr. Sheldon, who is a director of the Union Colliery Co., at Dowell, was crushed between a coal car and the rib of the coal.

O'Fallon—Eight St. Clair County men passed a mine examination at Springfield this week. They were Sam Hoopway, of O'Fallon, and Arthur McGee, of Marissa, mine examiners; George Grainger, Belleville, mine manager; Marshall Orr, Belleville; J. E. Copeland, Marissa; Arnold Steinkamp, Mascoutah; Harry Luechtefeld, Lenzburg, and Edwell Eddings, hoisting engineers.

Springfield—The closing of mines in Sangamon County, as a result of overstocked coal conditions, has caused considerable hardship among the miners, many of whom have lost much time because of the influenza epidemic. Of the 29 mines in Sangamon County, only two were said to have worked every day in December. A number of the miners worked two and three days, with the result that there were seven thousand miners in Sangamon County out of work for all or part of the time.

Marion—The Wickham-Burton Coal Co., of Chicago, has purchased the White Ash mine here from the Johnston City Washed Coal Co. This is one of the oldest operating mines in Williamson County.

The new mine of the Orchard Coal Co. east of here, near Pittsburg, and one of the most up-to-date in southern Illinois, has recently hoisted its first coal. It is an entirely new field, heretofore considered impracticable for mine development.

Belleville.—The Missouri-Illinois Coal Co. has filed an injunction suit in the Circuit Court here against the White-Sergent Coal Co. to restrain it from suspending operation of the Wilderman mine, leased by the plaintiff company to the White-Sergent company. Under the lease, which runs for 21 years, it is alleged that the White-Sergent company bound itself to mine all the coal in the mine and not shut it down. But the mine is now idle, and it is alleged that the equipment in the mine is being ruined by the accumulating water. Under the lease the White-Sergent company pays the Missouri-Illinois company 2½c. per ton for all coal removed from the mine.

Carlinville—What indicates another large enterprise for Macoupin County is now under way. A drill for the testing of the coal under a tract of 12,000 acres in Hilyard, Polk and Brushy Mound townships in Macoupin County, and also lands in Madison County, have been placed in the field by the Sullivan Drilling Co. for A. W. Crawford. One drill is located on the Anderson land near Plainview and another has been received and will soon be located in another section. This is the initial work of developing this 12,000 acre coal field, and if the drilling tests show a good thick vein with a good rock roof, it is said that options will be closed for the land and the field purchased and developed by some large corporation. Mr. Crawford is the man who promoted the sale of 30,000 acres of coal rights to the Union Fuel Co. and also 30 000 acres to the Standard Oil Co. of Indiana, the latter company now developing its field. The Union Fuel Co. has not done any developing, but it is rumored on good authority that this field will be opened within the near future.

Foreign News

Berne, Switzerland—An arrangement has been perfected between France and Switzerland by which the latter is to be furnished with 60,000 tons of coal monthly from the newly occupied mines at Saarbrucken. Switzerland requires 200,000 tons of coal monthly, and as she is getting virtually none from Germany, is in dire straits for fuel.

Sydney, N. S.—The opening of a new mine on the Cumberland coal areas of the Dominion Coal Co. is announced by President Mark Workman, of the Dominion Steel Corporation. At the new mine, which will be known as the workman mine, coal has been reached a few feet below the surface. Other new sections of the company's extensive areas will be opened up as circumstances permit.

Personals

John Madill has resigned his position as superintendent of the Stanley Smokeless Coal Co. mines at Dias, near Indiana, Penn.

A. A. Straub, general manager of the Connellsville office of the Superba Coal and Coke Co. has been transferred to the Pittsburgh office.

George A. Cokely has resigned his position as superintendent of the Tide Nos. 1, 2 and 3 mines of the Tide Coal Mining Co. near Homer City, Pennsylvania.

Joseph W. Wear, Philadelphia, Penn., formerly general secretary to local Fuel Administrator Potter, has been appointed assistant fuel administrator for Pennsylvania.

William Reid has resigned as mine foreman for the Cowanshannock Coal and Coke Co., at Yatesboro, Penn., to become superintendent of the new mines of the Dor-Mar Coal Company at Savan, Pennsylvania.

John E. Evans, formerly assistant sales manager and general purchasing agent of the Bell & Zoller Coal Co., of Chicago, Ill., has been appointed general sales manager of the Mikesell Brothers Co., also of Chicago.

L. B. Lewis, better known as "Doc" Lewis, has resigned as superintendent of the Acme Coal Mining Co. at Rimersburg, Penn. He will devote his time to looking after his personal operations in Clarion County, Pennsylvania.

H. K. Schoch, chemist, late of the National Bureau of Standards, Washington, D. C., and **George R. Cowan,** briquetting engineer, late of Ellington Field, Texas, have resumed their positions with the General Briquetting Co., 25 Broad St., New York, N. Y.

S. T. McMillen, formerly superintendent of the Fulton Run shaft of the Jefferson and Clearfield Coal and Iron Co. at Ernest, Penn., has accepted a similar position with the Caldwell Smokeless Coal Co. at its several mines near Heshbon, Indiana County, Pennsylvania.

C. B. Rowe has been appointed manager of the Superior Fuel Co., near Russelton, Allegheny County, Pennsylvania, effective Jan. 1, 1919, to succeed **Cavel Robinson,** whose resignation was recently announced. Mr. Rowe was formerly with the Consolidation Coal Co. in West Virginia.

John Stone, mine foreman of Coal Run No. 1 mine of the Coal Run Mining Co. at McIntyre, Penn., has been promoted to superintendent of the Tide Coal Mining Co. mines at Tidedale, Penn. Mr. Stone was formerly mine foreman for the Penn-Mary Coal Mining Co. at Heilwood, Pennsylvania.

Lieutenant George Hodges, former superintendent of the H. C. Frick Coke Co. at Collier, Penn., has received an honorable discharge from the service and has been named superintendent of the Frick mine at Continental No. 1. **R. H. Barry,** superintendent of that mine, has been transferred to Colonial.

William E. Lohm has resigned as general superintendent of the Ellsworth Collieries Co. The duties of the office are now and will continue to be filled by W. A. Luce, general manager, who has transferred his headquarters from Pittsburgh, Penn., to Ellsworth, to be more convenient to the operations.

E. S. Harman, Pittsburgh, Penn., assistant to Richard W. Gardiner, local fuel administrator, production manager of bituminous coal in the Pittsburgh district, and commissioner of the Pittsburgh Coal Producers' Association, has resigned to become sales agent for the Carnegie Coal Co., with headquarters in the Oliver Building.

F. D. Baker, late chief engineer for the Colorado department of the American Smelting and Refining Co., and from its inception in 1906 engineer of construction for the Carbon Coal and Coke Co., at Cokedale, Colo., retired Jan. 1, 1919, after twenty years' service. Associated with his sons, Mr. Baker will do a limited consultation work in Denver.

Col. C. A. Burrell, who before the war was chief chemist of the Bureau of Mines, and who, since this country entered the war, has been engaged in the important war work of developing the various noxious gases used by the allies, and who was recently discharged from the army, has allied himself with the Mine Safety Appliance Company, of Pittsburgh, Penn.

C. J. Brown, who has been connected with the sales divisions of the R. D. Nuttall Co. for the past three years, has become associated with Frank M. Erb, representing in the Pittsburgh district the Silver Manufacturing Co., National Forge and Tool Co., Horsberg Forge Co., and Meadville Malleable Iron Co. Mr. Brown will be located at 902 Second National Bank Building.

George H. Cushing has resigned as editor of our contemporary, *The Black Diamond,* to assume the position of Managing Director of the American Wholesale Coal Association, with headquarters at Washington, D. C. We believe that the American Wholesale Coal Association are to be congratulated on the choice of their Managing Director, as Mr. Cushing has long been identified with the coal industry. In his official capacity as editor of *The Black Diamond,* he has come in contact with both the producer and jobber of coal, and in our opinion is singularly qualified to fill with satisfaction the new position he has accepted.

Obituary

Howard G. Dewey, president of the New York State Coal Dealers' Association, died on Jan. 6, at his office in Gloversville, N. Y.

Benjamin R. Whitcomb, aged 57, owner of the mine of the Vermilion County Coal Co., died of Bright's disease Dec. 31. Mr. Whitcomb owned much other valuable real estate in and about Clinton. A widow, four sons and a daughter, survive.

T. H. Wilding, superintendent of the Wickham and Mabscott mines of the New River Co., died on Thursday, Dec. 26, of pneumonia which followed a severe case of influenza. He was ill less than ten days. A wife and twelve children survive him. Mr. Wilding was 46 years old. He had been associated with the New River Co. for eight years.

John E. Williams, Federal Fuel Administrator for the State of Illinois from the inception of Federal control to July, 1918, died Jan. 2 at his home in Streator, Ill. Mr. Williams, who was 65 years of age, was born in Wales, his parents emigrating to America while he was yet a boy. His life, which started with 15 years' work in the coal pits of Illinois, was concluded with his occupying a high place as labor arbitrator and in other public service.

Industrial News

Charleston, W. Va.—The Imperial Coal Sales Co., of this city, announces the reopening of its Western office, in the Union Central Building, Cincinnati, Ohio, effective Jan. 1, 1919. G. M. Kearns is Western sales manager.

Washington, D. C.—Removal of all restrictions as to shipments of anthracite coal of "egg" and "pea" sizes is announced by the Fuel Administration. This action was made possible, it was explained, by an increased supply and accumulation of these sizes.

Louisville, Ky.—Closing of all distilleries and breweries is being felt at the present time, as these concerns were good consumers. From present indications there is little chance of getting this business back again, as the prohibition movement appears to have settled the fate of the industry.

Washington, D. C.—All orders and regulations as to fuel conservation, except one relating to natural gas, were withdrawn on Jan. 10 by the Fuel Administration. Regulations as to zones and prices and some others remain in effect, but in accordance with the announced policy of the administration the question of fuel saving is now once more a matter for individual determination.

Louisville, Ky.—The R. E. Wathen Co., large consumers of coal when operating the R. E. Wathen Distilling plant, will again be in the market for coal, as the concern has turned its attention to corn milling, and erected a new corn mill adjoining the distillery on the Illinois Central tracks, south of Louisville. Power will be furnished from the power plant of the distillery.

Lexington, Ky.—The Colonial Coal and Coke Co. has arranged to spend $50,000 on improvements on the Chesapeake & Ohio, facing the Big Sandy River, near Prestonburg, Ky., where it is developing 1000 acres of high-grade domestic splint coal. An aërial tramway is planned for this mine. The mine now operated is one of the oldest in the district, but is slowing down in production.

Charleston, W. Va.—An effort is being made to have a miners' hospital established at a point convenient to the Coal River mining section, operators in that field being behind the effort to have this hospital established. Operators in the Guyan field are also behind a move to have a state miners' hospital established at Logan by the Legislature. It is claimed that none of the present miners' hospitals are accessible to either of these fields.

Hazard, Ky.—The annual dinner meeting of the Hazard Coal Operators' Exchange has been postponed until Jan. 21. It was found that a great many of the operators belonging to this organization would be unable to be present on the date first set for their meeting, as it was necessary for them to be in Washington on business connected with the National Coal Oeprators' Association. R. A. Hord, the Secretary of the Exchange, is expecting 100 per cent. attendance on Jan. 21.

Harrisburgh, Penn.—The Public Service Commission has recently handed down an interesting decision in a case brought by McPhilomy & McPhilomy, trading as the Franklin Coal Mining Co., Brisbin, Clearfield County, against the Pennsylvania Railroad Co. for refusal of permission to load coal into cars from wagons. The commission holds that the action of the railway company was "unjust, unreasonable and discriminatory," and has ordered the payment of the sum of $500 for damages.

New York, N. Y.—The Wilkes-Barre Coal Co. has contributed $50 to the New York County chapter of the American Red Cross in compliance with the request of Delos W. Cooke, Federal fuel administrator for the State of New York, dated Dec. 23, 1918. This penalty was exacted for delivering coal without a permit to the customer of another dealer, such delivery being a violation of the rules of the United States Fuel Administration. The Wilkes-Barre Coal Co. waived its right to have this case reviewed at Washington.

Buffalo, N. Y.—The Buffalo Wholesale Coal Association was organized on Jan. 8 with W. D. Ward, president; J. Bert Ross, vice president; F. J. Durdan, secretary and treasurer, and the officers and C. L. Couch and E. C. Roberts, directors. A constitution and by-laws were adopted. Meetings are to be held every second Wednesday. The association is the resultant of the Bituminous Coal Committee, which was maintained as a sort of semi-organization for some time, with E. C. Roberts as chairman. He declined to become the president.

Oklahoma City, Okla.—Oil and gas wells now being drilled in Okmulgee County, Oklahoma, reveal extensive coal beds underlying almost the entire county. At least two veins of coal have been encountered in every hole drilled, and in many wells more and thicker veins are found. Coal has also been found under Tulsa, Creek, Wagoner and Muskogee counties, and plans are now being perfected for the organization of several mining companies to exploit these coal deposits in connection with the oil industry.

Cleveland, Ohio—An important meeting of Ohio operators was held at Cleveland recently when action was taken to oppose the methods of the purchasing department of the United States Railroad Administration in breaking the price of coal when buying for railroad fuel. A resolution was adopted by the representatives of about forty large operators providing for the naming of a committee of four operators to coöperate with a similar committee of miners in Ohio and also to coöperate with operators' and miners' committees in the other three central competitive states. These states are Illinois, Indiana and Western Pennsylvania.

Springfield, Ill.—One bill of interest to miners which will be introduced in the next session of the Illinois legislature will be the establishing of safer appliances in Illinois mines. The abolition of the carbon lamp may be asked, on account of its danger in igniting gaseous air. Electric lights on miners' caps may be required. It is said that the electric lamp has never been much favored by Illinois miners because of the expense in upkeep. Alterations will be asked in the child labor law, the workmen's compensation act, and changes in various wage scales for organized laboring bodies. The legislative committee of the Illinois State Federation of Labor and the United Mine Workers are busy preparing a number of other bills to be introduced.

MARKET DEPARTMENT

Weekly Review

Coal Industry Marking Time—Indications Point to Early Resumption of Activity—Bituminous Demand Inactive—Anthracite Market Without Any Snap—Mild Weather Militates Against Urgent Demand for Coal.

UNTIL the nation's reconstruction program is well in hand the coal industry can expect no such period of prosperity as preceded the signing of the armistice. At the present moment the demands for bituminous steam coal are few. A number of large consumers who have cut into their reserve stocks are making inquiries, though of real active buying there is *nil.* The better grades of soft coals can naturally find a more ready market than coals of an inferior grade, of which there is a surplus. It is now a buyer's market instead of a seller's.

Indications would justify the conclusion, however, that these conditions will change for the better beginning late in February or early in March. By that time the country's readjustment plans will have been formulated and placed in motion, industry will have reorganized on a peace basis, the Government will have relinquished its control of coal, and export demand for coal and manufactured products will be unprecedented.

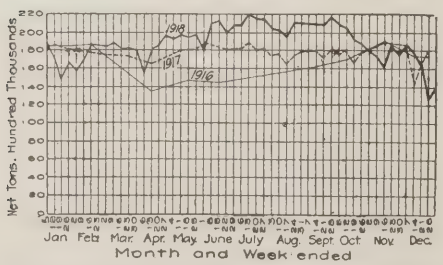
The output of soft coal, in the meantime, though nowhere near the maximum capacity of the mines, is still sufficient to take care of current needs. This does not apply to high-grade fuel, the demand for which exceeds the supply. During the week ended Jan. 4 the production of bituminous coal is estimated at 8,414,000 net tons, bringing the total production for the coal year to date to 456,243,000 net tons.

The anthracite market is without any snap, and dealers and consumers both are buying in a desultory fashion. This can be attributed chiefly to the remarkably mild weather for this season of the year. Restrictions have been removed by the Fuel Administration on egg coal, and this size can move untrammeled wherever a demand for it exists. Pea coal is as plentiful as ever, and there seems to be no shortage of either stove, egg or chestnut. Only a long-continued spell of severe wintry weather would serve to tighten the anthracite market.

During the week ended Jan. 4 the output of hard coal is estimated at 1,389,000 net tons, which brings the total production for the coal year to date to 75,219,000 net tons, approximately a million and a half net tons below the output of last year.

WEEKLY COAL PRODUCTION

Bituminous — Considerable improvement occurred during the week ended Jan. 4 in the production of bituminous coal, the output being estimated at an increase of 1,954,000 net tons, approximately 30 per cent. above the production during the week preceding. Estimates place production during the current week at 8,414,000 net tons, and while in excess of the production during the week ended Dec. 28, which amounted to 6,460,000 net tons, fell below production of the week ended Jan. 4, 1918, by 1,020,000 net tons, or 11 per cent. The daily average during the current week, based on five-day operation of the mines, is estimated at 1,402,000 net tons, one-half million net tons behind the daily average of the coal year to date and approximately 350,000 net tons behind the similar period ending Jan. 5, 1918. Total production this coal year to date, estimated at 456,243,000 net tons, exceeds that of last year by 34,248,000 net tons, or 8.1 per cent.



Anthracite—Anthracite production during the week of Jan. 4 improved to the extent of 100,000 net tons over the week preceding and is estimated at 1,389,000 net tons, as against 1,317,000 net tons during the corresponding week of 1918. The daily average during the current week, based on a five-day operation of the mines, is estimated at 278,000 net tons for the coal year to date and 320,000 net tons for a similar period of last year. The total production for the period Apr. 1, 1918, to Jan. 4, 1919, is estimated at 75,219,000 net tons and falls below production of the 1917-18 coal year through Jan. 4 by approximately a million and a half net tons.

Loading reports received from the carriers for the week ended Jan. 4 show an improvement in all fields compared with the week ended Dec. 28. The central and western Pennsylvania, Cumberland-Piedmont and Somerset and Fairmont fields, in which the demand for all coal mined is good, were also the only fields to show improvement in the number of cars loaded over the corresponding week of 1918. In the Illinois, Indiana and western Kentucky district the decrease in cars loaded, compared with the week ended Jan. 4, 1918, was approximately 10,000. The new calendar year figures begin with this issue.

New England Shipments—Shipments of bituminous coal to New England during the week ended Jan. 4 are estimated at 295,991 net tons and exceed the shipments during the week preceding by approximately 53,000 net tons. The receipts through the rail gateways, as well as shipments from each of the harbors, show considerable improvement.

Tidewater Shipments—Shipments by tidewater also increased considerably, estimates placing the tonnage for the week at 662,476 net tons, as compared with 583,072 net tons during the week ended Dec. 28. Considerable improvement occurred in the tonnage shipped from New York, Philadelphia and Baltimore, while shipments from Hampton Roads declined approximately 16,000 net tons, or 7 per cent.

Beehive Coke—The production of beehive coke in the United States for the week ended Jan. 4 is estimated at 496,000 net tons, as compared with 440,000 net tons during Christmas week. The current week's production, while an increase over the week preceding, fell 72,000 net tons or approximately 13 per cent. below production of the corresponding week of last year. In the Connellsville district of Pennsylvania operators produced 253,923 net tons of beehive coke during the week of Jan. 4, operating their plants at 69.8 per cent. of their full time as compared with 68.2 per cent. during the week ended Dec. 28.

Byproduct Coke—Necessary repairs to byproduct plants during the week of January caused production of byproduct coke to decrease approximately 14,700 net tons compared with the week ended Dec. 28. The current week's production, however, was far in excess of the production during the corresponding week in 1918, the increase amounting to approximately 162,000 net tons, or 42 per cent. The plants of the country were operated at 84.6 per cent. of their full time during the week ended Jan. 4 and out of total losses of 15.5 per cent., 9.1 per cent. was attributed to repairs to plants, 3.2 per cent. to lack of market and 2.5 per cent. to other causes. During the week of Jan. 5, 1918, the byproduct ovens of the country were operated at 80.4 per cent. of their full time and were limited in their operation at that time mainly by lack of byproduct coal, of which today there is practically no shortage. Considerable fluctuation in operating conditions occurred during the week in Alabama and Maryland.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running lower than for the corresponding week of 1918. Road sales for immediate delivery were in excess while for future delivery they were less compared with the same week of last year. More customers were in the house. Collections are good.

American Wool and Cotton Reporter—Justas soon as a basis of wool values can be established many believe it will be possible to sell cloth in at least moderate quantities. The minimum prices established in Great Britain are no fair indication of what values will be on a supply and demand basis. The stocks of wool are so large, and the prices have been so high, that there may be difficulty in disposing of the wool. In the cotton market there has been a greater amount of strength insofar as the details of supply and demand are concerned. There is no justification at all for higher prices for raw material. The exports are at least 250,000 bales less than they were at the corresponding period one year ago, and a more or less similar condition is noted for the stocks in warehouses.

The Iron Age—The pig iron production of 1918 was 38,506,249 tons. The December output was 3,433,617 tons, or 110,762 tons daily, and thus at an annual rate of 40,428,000 tons, but there were five months of last year in which a higher rate was maintained. The momentum of war effort is responsible in part, for December, 1918, exceeded the existing December record, that of 1915, by 7429 tons a day. The severe winter of 1917-1918 cut down the year's total. The November daily average make was 111,802 tons. The pig iron output of 1917 was 38,185,981 tons and of 1916, 39,039,356 tons. The rate of production on Jan. 1, however, was 109,675 tons per day, against 111,330 tons on Dec. 1. In the month 11 furnaces came in, but 21 went out and the number in blast on Jan. 1 was 350, or ten less than on Dec. 1.

Dry Goods Economist—The difficulty experienced by the Government in selling wool at the price it desires to realize, together with the removal of all restrictions on the importation of wool, points strongly to lower figures for this important raw material. Raw cotton has shown considerable fluctuation, but within a narrow range. Within a brief period the future course of the market will depend largely on acreage reports and new crop prospects, as well as on the development of the export situation. The latter has so far proved disappointing to those who figured on higher prices.

Bradstreet's—Trade at wholesale and with jobbers ranges fro monly fair to distinctly quiet, most animation being visible in the west and south, and most marked hesitation being noted at the large eastern centers close to large primary production. Industry is even quieter than in preceding weeks, with a greater percentage of capacity idle awaiting the readjusting process, which moves but slowly. Where readjustments have been completed as in a few lines, activity is being resumed guardedly. Of the three great departments of business activity, retail trade shows relatively most animation, due to clearance sales, which are extensively advertised, though decidedly colder weather overspreading the country has given a long-needed stimulus to final distribution of winter-wear goods.

Atlantic Seaboard

BOSTON

No inquiry. Railroads cutting fuel receipts. Problem to place few remaining steamers. Smokeless mines embargoed. Conferences between representatives of different Hampton Roads interests. All-rail movement slopes off again. Several shippers content to wait developments. Surplus of better grades at the New York piers. Anthracite receipts improve, although cold snap and tie-up in New York cause uneasiness. Restrictions off on broken and pea as well as egg. Local regulations off in Boston except as to price.

Bituminous—A thorough first-of-the-year canvass of the market discloses no buying interest whatever. A few scattering sales are made of high grade coal, but these are confined to retail dealers who now and then find outlet for a few cars. Coal at destination, however, particularly in cases where originally confined to some industrial, is next to impossible to dispose of. There have been a good many instances where coal requisitions filed through Government channels last summer have been taken out of pigeon holes by sundry operators and shipped regardless. There is practically no way of checking this until cars reach the consignees, and what remains of the New England Fuel Administration is kept busy with such cases. In Connecticut so little market is apparent that cars have been allowed to remain on sidings for weeks at a time and then turned over to the railroad for disposition. A more hopeless looking market at this writing would be hard to find.

The railroads that are usually the mainstay when such situations develop not only ceased buying but are declining to receive fuel coal on contracts. General traffic is so very light and the winter relatively mild that several thousand tons less every day are being used than a year ago, and it is only natural that with all the money invested in high-priced water coal during the season that the managements should now cut off shipments by water before those all-rail. This has been done quite generally the past fortnight. Shippers who have made continuous deliveries by steamer over long terms of years are now withholding deliveries. The result is that little coal is loading for New England at either Baltimore or Hampton Roads. Receipts of provincial coal from Cape Breton have also practically ceased.

More and more steamers are being tied up from week to week. Boats that were assigned on contract business in place of modern colliers owned here that were taken several months ago for overseas transport are many of them on the shippers' hands, and strenuous efforts are made to place them with the agencies who still have orders in hand. It should be noted that most of these ships are not on the regular Shipping Board terms, calling for $3.25, Hampton Roads to Boston, but that private arrangements were entered into based upon the cost of service by the boats that were commandeered. The Shipping Board has been looked to for some statement of policy, but the impression here is that nothing can be definitely decided until some understanding can be reached with the owners of foreign tonnage.

Because of the great surplus of coal at Hampton Roads over vessels entered to load two or three of the railroads have declared embargoes against tidewater movement and coal is not now reaching the piers in such heavy volume. At the present rate, however, it will take time to clear up the coal now waiting at the three piers.

The Boston trade is much interested and pleased to hear of the recent appointment of W. B. Calkins to be engineer-in-chief of the Tidewater Coal Exchange. Mr. Calkins has won a high place for himself for his thorough knowledge of coals and their origin, and his splendid work as chief inspector for the central Pennsylvania district since last spring does him great credit.

It is still extremely difficult to place coal arriving by water. All reports agree as to the extremely large reserve stocks everywhere in this territory, and where mill output has declined so the past 60 days the time is set farther and farther ahead when any active interest in the steam coal market can be anticipated. This state of things is decidedly awkward for the Pocahontas and New River agencies who want to be in favorable position with their operators this coming year. There are some hopes built upon the export and bunker trade, but on analysis that branch of the business is not so encouraging as might be supposed. At most points the differential is in favor of Welsh grades and the extent to which miners in Great Britain are returning to work it is fair to suppose that certain markets in South America will not be obliged to appeal to this country for their supplies. All of these questions are being discussed from time to time by the different Hampton Roads interests, and out of all the conferring it is hoped some sort of program will be laid down.

Once again the daily movement of bituminous all-rail has shown a falling off. This partly because of the railroads and their reduced consumption, but it is also due to cancellations being made by industrial plants all over the territory. There has been a lot of change in this respect since Dec. 1, and undoubtedly the mild temperature has had its effect. Then, too, a good many plants with Government contracts were rather expecting they would be permitted to keep up full operations until more goods could be accumulated. The Government, however, has made it clear that no consideration of the sort is to be shown, and many of the textile mills of Fall River and New Bedford have had to shut down for a day at a time because finished products are practically impossible to place and it would be a doubtful policy to continue heavy borrowing of money to keep plants in operation.

Meanwhile, a number of the Pennsylvania shippers are taking on what few orders they are able to pick up for spot shipment, and those who have first quality on their side feel optimistic over price developments when the restrictions are removed. Doubtless it will mean that a number of producers of inferior coal will simply have to close down for lack of orders. The market here, when it opens, is bound to be very discriminating.

At the New York piers there was such congestion, even of the better grades, that certain of the pools were embargoed. This applied mostly to mines in central Pennsylvania and in the Somerset regions. In territory adjacent to Long Island Sound trade is extremely dull. Stories are told of the great difficulty coal factors have in placing coal throughout Connecticut.

Anthracite—Receipts of domestic sizes continue to improve. The dealers are in fairly comfortable position, although price considerations and the uncertainty of demand the next three months lead them to be sparing in their arrangements for future deliveries. The result is that a cold snap like the present causes some uneasiness among retailers. They are apprehensive over the tie-up in New York and the fact that the same cold weather is likely to diminish the supply of stove and chestnut for New England. Those sizes are still in short supply and only a relatively small proportion is alloted to each cargo. Regulations as to broken and pea are now removed, but the demand from gas companies and from industrial plants is nothing like what might have been supposed. A very limited inquiry has developed for barley, but this is only spasmodic, for the steam situation in general would not permit heavy shipment of anthracite screenings.

The trade here is encouraged by reports that the movement of Philadelphia & Reading barges will soon be restored to Port Richmond, Philadelphia. Ample car storage, trackage and terminal facilities have been allowed to lie almost idle for months because of a fancy on the part of somebody in the Railroad Administration that Port Reading loading would very much increase the efficiency of tugs and barges. The distance is less, but every other element in the situation at port Reading contributes to long and expensive delay.

NEW YORK

Strike of marine workers has little effect on coal situation. Coal in retail dealers' yards sufficient for two weeks. Demand slow and "independent" product hard to move. Restrictions removed from egg. Bituminous market uneasy. Plenty of coal and manufacturers defer buying.

Anthracite—That New York is a "weather market" has been well demonstrated within the past week, as demand picked up slightly while the inhabitants shivered and fell off rapidly as soon as the weather moderated. The three-day strike of the marine workers had very little effect either one way or the other. Although no coal came from the loading docks, the retail dealers did not worry, most of them having plenty of coal in their yards for several days and some of them for two weeks. Their customers are also well prepared for the cold days.

The strike of the boatmen had its benefits, as well as its dangers for the coalmen. Some believe it proved to be the salvation of the shipper and dealer handling "independent" coal. The market was feeling groggy from the surplus coal on hand, and with dealers refusing shipments, fear was entertained that concessions would soon follow if any of the domestic sizes were to be moved. With the strike continuing a few days, agents and shippers predicted that the mines would have to suspend operations because of the embargoes placed on shipments, and that in the meantime the drain on the retail dealers would result in supplies being reduced so much that when the traffic on the bay and rivers was resumed demand would be urgent enough to take care of the coal at the docks at current prices.

For four days no coal was shipped from the railroad docks, but there was no anxiety on the part of the dealers who realized that the strikers would return to work before the coal supply had dwindled sufficiently to cause any fear of a coal famine.

Following a few weeks of inactivity and the refusal of dealers to accept shipments of "independent" coal when they were willing to depend upon shipments of "company" product, which they can purchase for 75c. per ton less than they are quoted for "independent" product, there was plenty of the domestic sizes available. This was not only true of "independent" product, but also of "company" product. Salesmen were sent out to arouse the dealers to the advisability of keeping their bins filled so as to guard against bad transportation problems, but they met with little success, many dealers preferring to take a chance rather than fill up on high-priced coal. Dealers are now counting the weeks and not the months before the winter will be practically over and the possibility of being able to make purchases below the current schedule.

This market may be relieved of much surplus coal now that restrictions as to shipments of egg, pea and smaller sizes have been removed and that these coals can now be shipped to such markets as may be found for them. The restrictions on anthracite shipments now apply only to stove and chestnut.

The steam coal situation is quiet. There is no movement and a rapid accumulation of the various sizes has followed. Individual shippers have met with some difficulty in moving their holdings and heavy concessions have been heard of.

Reports show that for the week ended Jan. 10 there were 5627 cars of anthracite dumped at the local docks as compared with 5546 cars the previous week, an increase of 81 cars.

Retail prices of coal in Manhattan and The Bronx advanced on an average 25c. per ton this week, as the result of the increase in wages of $6 per week and a nine-hour day secured by the drivers, yardmen and engineers of the dealers. This was followed by an increase in gross margins allowed the dealers by the Fuel Administration.

Bituminous—The bituminous situation continues dull. There is no demand and manufacturers and other large consumers are using their reserve stocks. Fortunately the market feels the after-effects of the holiday season, and production will not resume its normal pace until the middle of January, when the Church days following the Christmas holidays will be over.

Frequent labor troubles, besides the disinterestedness of workmen, interfere with mining operations; but under existing conditions the loss resulting has not caused any alarm because of the lack of coal. The result has been just the opposite. The

trade feels that the market is in better shape today than it would have been if production had kept up, and that instead of there being an entirely upset situation as regards prices the conditions are at least satisfactory, even though concessions for the cheaper grades are heard.

The only fear expressed at the danger of a prolonged strike of the marine workers was the shortage of fuel by the various traction and lighting companies, but the return of the men to work on Sunday obviated any curtailment of power supply, arrangements having been made for shutting off the heat in the cars of the traction companies.

The accumulation of stocks at the piers had become such that embargoes were placed against most of them. Fear that prices on the cheaper grades might be shattered by an over-supply of coal was not entirely removed by the stopping of shipments from the docks, but shippers early this week expressed the hope that demand might increase sufficiently to take care of much of the surplus.

Consumers are becoming more particular as to the quality of the coal delivered to them, and this accounts in great part for the present supply of the cheaper grades. The open season has been favorable to consumers and the demand between now and Apr. 1 is not expected to be favorable for heavy selling especially when it is believed that Dr. Garfield wil remove the price restrictions shortly. The demand for high grade coals continues to be greater than the supply. The change in bunker rules has had little visible effect on the situation.

The local dumpings of bituminous coal reported for the week ending Jan. 10 were 4996 cars as compared with 5451 cars the previous week, a decrease of 455 cars.

PHILADELPHIA

Anthracite market inclines to dragginess despite colder weather. Dealers advertise for business. Pea consumption below normal. Egg now allowed to be sold in any market. Stove and nut active. Spring outlook unpromising. Steam prices weak, with some price shading. Bituminous shows little change. High-grade coals scarce; others plentiful. Little buying.

Anthracite—It is growing more apparent each day that this market must have a continued cold spell to brace up the coal business. A light snow and a few comparatively cold days made some improvement and really kept the market together for a week longer, but failed to effect any permanent change. The indications are that dullness will once more overtake the dealers.

Numerous advertisements in the newspapers show the dealers need orders, but there are many in the trade who disapprove of advertising the fact. One of the largest retail companies by this means endeavored to acquaint the people with the fact that there would be an actual shortage if real cold conditions should arrive, as this market could only depend upon the tonnage alloted to it. It is believed this statement was only made to put the company on record in case the unexpected does happen, for the people certainly are not buying any more freely. It is also argued that with the present high prices the consumers will not buy until they actually need coal, especially if they are led to believe there is no scarcity and that they can obtain a supply on short notice.

It is not to be supposed that business is to remain dull until spring, as the winter is only young as yet; and if there should be an unusual snowfall or severely cold snap there would in all probability be a sudden demand, with many people all wanting coal at the same time. If instead of soliciting business now the dealer would allow the market to appear stronger, the householders would be more likely to buy gradually. It appears now that business is better with the suburban retailers, and it is a fact that their supplies are shorter.

The trade of the individual operators appears to be well cared for, while that of the big companies is more or less short of certain sizes. It is strange how the demand for pea coal has fallen off. Dealers report that their sales of this size are far below other years, but that the demand for chestnut has increased proportionately. Pea is free with most shippers and chestnut short with practically all. This market has always demanded an enormous tonnage of pea coal (which has been termed the poor man's fuel) for domestic use. It may be that with more money to spend the poorer class bought chestnut and find it more economical, and as the difference in price is less than $2 per ton, will continue to do so.

Egg coal is easy and no dealer can be found who is short of it. That it was becoming a problem to move is shown in the recent action of the United States Fuel Administration in removing all restrictions on it but price, even to the states barred since last spring from receiving any domestic sizes. No one will be at all surprised if the same action is taken on pea coal before the end of the month. It looks from this that the Fuel Administration is inclined to follow the line of least resistance, and as the season approaches we expect to see them remove the restrictions on one size after another, and then, as a final act before their retirement, cancel the regulations as to prices.

Stove and chestnut continue to have the call. While stove does not display the same strength as chestnut, still there is a most active demand for both sizes, for the reason that the stocks of these sizes are low in all yards.

The individual operators are not showing much concern as to how they can continue to market their product at their premium prices. No evidence of their cutting on the domestic sizes is obtainable, and it has probably not reached that stage as yet. They are hoping for weather that will carry them through until spring, for beyond that time no one will hazard a guess as to what conditions will be. Even the dealers are inclined to be pessimistic as to conditions after March, and there is a great deal of thought and discussion upon the subject. They feel at that time they will be unable to persuade a public that is tired of the coal question to purchase their winter's supply of coal in he spring and summer at a nominal reduction from the present circular. It is also being pointed out that any radical reduction in rates will surely bring on trouble with labor.

We have this week talked with some of the representatives of the largest mining interests, both company and individual, also with the most successful retailers of the city, and it is a fact that might as well be admitted that they all predict the dullest summer in the history of the trade. On the part of the operators it will be no surprise if they close down their mines and make repairs which have been neglected for the past two years.

We also gather that probably the Fuel Administration was never so popular as now, and that all hands would welcome a positive announcement that it will continue to dominate the coal trade until Apr. 1. Of course, this is because there would be no telling what would happen to prices if the business were suddenly returned to its old competitive basis.

As a matter of record we quote the delivered prices of the largest retail concern: Broken, $11.20; egg, $10.80; stove, $11.05; chestnut, $11.15, and pea, $9.45.

The steam sizes are in bad shape. All the trade seems to be trying to sell buckwheat. It can be bought from individuals at company circular and has been offered at 25c. less. The smaller sizes are comparatively weak.

Bituminous—The demand is still centered on the best grades of fuel, with the supply far from equal to the call. Industrial consumers are almost indifferent to taking any further supplies so long as they have such heavy stocks ahead and often stored in the most out of the way places, which they want to clean up before adding to their holdings. In addition these piles are on fire on account of having been stored too deeply.

Of course, those concerns requiring high grade fuels are actively in the market for more coal, but owing to the railroads continuing to take heavy tonnages, together with the shipments needed at tide for bunkering, it is very difficult to meet the demand on these grades. On the other hand the market is full of ordinary grades, and while salesmen are making many calls, they are meeting with but the slightest success in moving the coal.

BALTIMORE

The local market is flooded with coal, much of good grade, and takings fail to absorb. Embargoes declared against piers and some line points stopped. Prices break. Hard coal is plentiful also.

Bituminous—Coal is plentiful in the Baltimore district. The piers became so jammed several days ago that embargoes were placed by the railroads in an effort to clean up. At Curtis Bay, in order to release some of the rolling stock, coal was dumped by the rights-of-way in some cases. Line points for the most part were blocked also. Refusal to receive more coal was noted in numerous sections. Not only is it hard for the moment to dispose of immediate coal here, even though much better grades are now offering freely, but few industries will talk futures.

The representatives of numerous mines are now in the field for new connections. In such a market it is but natural that there has been at least a temporary break in prices, and coal is offering cheaper than for many months. As soon as business is shaken back to near-normal, however, the trade expects to see good coals all absorbed readily at fair prices. There is little thought that there can be anything like a permanent price for better coals much below the Government maximum, in view of the greatly increased overhead charges. Industries here report being pretty well stocked up by reason of the fact that their reserve depletion has not been so rapid on the present after-peace reconstructive basis.

Anthracite—The Maryland Fuel Administration has made the announcement that it has removed all restrictions on delivery of domestic coal. It warns, however, that there must be no move to raise prices above those last established by the Government agency. The move leaves the trade absolutely free as a whole to carry out the plan which had already been started by a part of the dealers to deliver the full third remaining undelivered on household orders. This at least where the consumers will accept the coal in full or in part, the mild winter and conservation moves having cut down the usual total consumption figures for the fall and early winter.

All sizes, with the exception of nut, are in liberal run, and pea and buckwheat are in too plentiful supply most of the time. With the return of supplies at times beyond their order needs of the moment the dealers here are hustling not only to get back old customers, but in many cases to hold those they picked up under coal famine conditions where regular dealer-connections could not supply even old-line customers. In this connection the Baltimore Retail Coal Exchange has issued an appeal to both dealers and the public to resume old relations of business as the fairest course. In many cases this will not be done, however.

Lake Markets

PITTSBURGH

Production adequate. Standard grades bring full price. Steel industry demands decreasing sharply.

Coal production in the Pittsburgh district last week was interfered with by celebration of the Greek Church Christmas, with its calendar 13 days behind the Gregorian, but the curtailment in production was not felt, as supplies are in general proving adequate to requirements.

The last of the coal allocations disappeared Thursday of last week, when those in favor of the Pennsylvania R.R. were rescinded by R. W. Gardiner, distributor for the district. The maximum taken for the railroad in a week during the period of control was 1152 cars. The movement now drops to normal proportions, and the railroad will get about 500 cars a week from the district.

Pittsburgh district steam coal has been fairly plentiful in the past two or three weeks, and there has been no decided change in the situation. Gas coal has continued decidedly scarce and consumers are kept busy securing sufficient coal for their requirements. Brokers report that in many cases they are still able to collect their full brokerage, beyond the set price, in the case of gas coal. Steam coal they are generally able to sell at the set price, securing a margin from the producer. On some off-grade coals there is shading, but in general standard grade Pittsburgh coal is bringing the full Government limit, frequently with brokerages in addition in the case of gas coal.

On account of the rather rapid slowing down in steel mill operations, which hardly began until this month, the demand for gas coal is likely to experience a great decrease, although public service companies will of course want as much as ever. Production of steel in December was actually at a greater rate than in November, but within a few weeks steel mill operations are likely to be at less than 60 per cent. of capacity, and perhaps at less than 50 per cent.

The market remains quotable at Government limits for standard grades: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

TORONTO

Business conditions back to normal. Plentiful supplies of all grades on hand. Shipments arriving promptly. Bituminous market continues quiet.

Business shows increased activity with the setting in of colder weather, and conditions are now practically back to normal.

There are abundant supplies of all grades of coal on hand to meet present demands, which are somewhat lighter than usual at this season on account of the great majority of consumers having laid in their supply. Shipments from the mines are received promptly, as there have so far been no transportation difficulties. The prices fixed by the government are well maintained, excepting that some brokers having large supplies of bituminous for which there is little demand are ready to make sacrifices to effect sales.

BUFFALO

World of bituminous coal. Consumers do not want it. Take long time to use up the surplus. Anthracite becoming more plentiful. Everything dull.

Bituminous—So odd that the world could be filled with coal before anybody knew it. It was all along declared that the shortage was going to be worse than ever before, and then, suddenly the deluge. Shippers say that it will be midsummer before the present surplus is gone, unless the production is cut down materially. That a heavy reduction of output is next to impossible is realized by everyone, so the prospect is for very dull trade. It is that already, so that the only hope is to hold the price where it is now. Operators say that they are not making profit enough to enable them to stand a serious reduction of the price.

Jobbers are doing a small business and feel themselves lucky if they are not loaded up with coal in Canada that they cannot sell. The chance of making a double profit there was so alluring that all but the few wary ones have been spending much time lately trying to get rid of the coal they shipped there. As fast as they are able they are giving up their Canadian offices and drawing out of that trade, for they see no activity in it for a long time ahead.

There has been some railroad stagnation, due to the slow absorption of the coal sent out from the mines, but the complaints on that score are not so great as they were. At the same time the railroads are not buying liberally, and most of them are refusing to help a shipper out where he has cars on track that have been shipped wrong or refused by the consignee. It does not look as if the trade was going to change for the better right away. An increased dullness and stagnation appears to be the rule. The operators are casting about and holding meetings to find a way of reducing production, for that seems to be the only way out.

Anthracite—The supply is adequate. After that there is little to say. The city is not yet able to understand how it came about in so short a time. It had been promised by the coal authorities, but the consumers were afraid that the territory to be covered would turn out to be so great that it would be a long time before everybody was satisfied. The supply was so large, though, that no complaint was heard from the time the lakes closed.

The prospect now is for a sufficient supply right along. Members of the trade see no reason for further shortage, even if the natural gas gives out, as it has to a great extent already. The plan is to cut out the gas from large consuming plants and turn it over to families that have no other means of heating. The fuel administration has reduced the price of gas-retort coke a few cents, but keeps up the price of anthracite, though the independent anthracite operators are already finding it difficult to sell their coal at full prices.

CLEVELAND

What No. 8 operators term "strong arm" methods of the railroads to batter down the price of railroad fuel has aroused much criticism and a determination to protest to Washington. Steam coal demand, while far from heavy, shows signs of improving; and with the mines still off because of the holidays, overproduction has been less noticeable of late.

Bituminous—Vigorous protest is to be made to Washington heads of the Railroad Administration against the attempts of Ohio carriers to break down Government maximums. Operators are not so averse to making a concession of 10 or 20c. a ton to the railroads as they are to helping insert a wedge that is bound to bring about reduced prices all along the line. In some instances railroads have gone a step farther than to inquire concerning a concession, and this has prompted some caustic criticism. Some was voiced at a recent meeting of Ohio operators at Cleveland, when, among other things, John Moore, president of the Ohio Mine Workers, declared that the mine workers will not stand for a cut in their scale; and operators were firm in their conviction prices cannot be reduced unless railroad rates or wages are reduced.

Real winter weather has arrived at last, and this has increased, probably by one-third, the domestic demand for bituminous. More and more buying has been done by steam-coal users, although they have been attempting to satisfy urgent requirements only but the time draws nearer and nearer when considerable buying will become imperative. Except over the holidays, when inventory was taken, few industries in northern Ohio have suffered greatly from a lack of market, and stock piles have melted a great deal faster than expected.

The matter of price continues to open the doors to many statements, but Government prices seem to be holding with surprising strength. Many small domestic dealers are selling stripping coal at quite reduced prices, and a fair amount of standard No. 8 coal is going to steam coal buyers, quietly of course, under the maximum. If prices do not break before lake coal again is sold, operators believe they will have been tided over the worst. Indeed, from the standpoint of both demand and price, many operators believe steady improvement is bound to set in from the middle of January on.

Car supply accorded members of the Pittsburgh Vein Operators' Association of Ohio in December averages 78.20 per cent. as against 79.65 per cent. in November. In December lost production, due mainly to car shortage, amounted to 322,900 tons; in November it was 341,550 tons. For the week ending Dec. 31 the car shortage averaged 23.86 per cent. and lost production was 59,700 tons. Shipments by members of the association amounted to 3368 cars in the week ending Dec. 31. The week previous shipments were 4195 cars.

Anthracite—Receipts are now the largest of the season, and are growing larger from week to week. Anthracite is not at all plentiful, but for the first time in practically a year retailers are advertising they have an ample supply.

Lake Trade—The steamer "Edwin N. Ohl," of the Becker fleet, Cleveland, has loaded the first lake cargo of 1919. At Ashtabula she took on a load that was mainly coal in transit on a lake shipper's account when the 1918 season ended. Reports from the upper lakes are to the effect coal is moving off the docks very slowly, and dock piles in the spring are likely to be larger than in the spring of 1918 or 1917. This may cut the 1919 lake movement to as low as 26,000,000 tons, some lake shippers fear.

DETROIT

Because of heavy stocks in the local market, Detroit jobbers and wholesalers find it difficult to interest buyers in bituminous coal for either steam or domestic use.

Bituminous—Jobbers and wholesalers operating in the Detroit market say that disappointing lack of success attends their efforts to interest either the users of steam coal or the retail dealers in their offerings. The volume of business is described as far short of normal, though figures are apparently unavailable to show the exact disparity compared with previous years.

The reason for the aloofness of buyers is found by the jobbers in the presence of large stocks of bituminous in the reserves of steam-coal users and the stock piles of the retailers. In many cases the heavy supplies are occasioning unrest to the possessors as well as serving as a check on business. Jobbers hear that the manufacturing plants are having considerable trouble with their fuel, because a large part of it consists of a poor quality of coal that was sent into Detroit a few weeks ago to replace stock of a better grade that had been zoned out of the city.

The heavily stocked retailers also are suffering much anxiety. They too have a lot of the low-grade coal in stock, and some of them are holding a considerable amount of mine-run and slack, which was bought when the Fuel Administration, giving warning of a probable shortage, advised the purchase of any form of coal that could be obtained. Because of the high temperatures that have so far prevailed, retailers have found their customers dilatory in placing orders. The fact that coal of better grade, in lump and other sizes better suited for household use, is now coming into the market freely does not tend to brighten the outlook for the retailers, who face the possibility of finding a large part of their stock still on hand when spring comes.

Anthracite—Moderate temperatures have afforded opportunity for domestic consumers to use anthracite sparingly, with the result that supplies are better than anticipated. There remains, however, a large potential demand, which cold weather would stimulate and which would speedily clear the market of the anthracite on hand. The situation created by the deficient supply of anthracite has been greatly improved from the viewpoint of the domestic consumer by a large increase in the supply of coke and by a reduction of $1 a ton in coke prices, ordered by the state fuel administrator.

COLUMBUS

The colder weather of the past ten days has stimulated the retail trade. Steam business is still slow, and little tonnage is moving. Some price cutting, especially in steam grades, is reported. Considerable West Virginia coal is arriving in the local market.

The feature of the coal trade in Ohio has been the larger volume of West Virginia coal arriving, which has the effect of reducing the movement of Ohio-mined varieties. The West Virginia shippers are cutting quotations below the Government figures. This has not yet demoralized the market, as the larger Ohio operators are holding firm, preferring to shut down rather than shade quotations. This applies more particularly to steam grades, although there is a large amount of domestic sizes arriving from West Virginia.

The lower temperatures have stimulated the retail trade and dealers generally are now busy making deliveries. Retail stocks are still pretty large, and the activity induced by colder weather has not been reflected on the operating and distributing ends of the business to any extent. Consumers are asking for the fancy grades such as Pocahontas and splints. Retail prices are generally well upheld and little cutting is reported. Hocking lump sells at $5.75 and other grades at corresponding levels. Householders generally have larger stocks than ever before, and consequently the rush because of the cold wave is not so pronounced as in past seasons. Anthracite is practically out of the market and there is little domestic coke to be had.

The steam business is slow and reports indicate large stocks in the hands of consumers. Purchasing agents for manufacturing plants are not disposed to buy under present unsettled circumstances. The policy followed is to use up surplus stocks before buying more. Public utilities are well supplied, and the same is true of public institutions. The Michigan market is still overstocked and little relief is expected in that quarter.

Production is now to a low point, principally because of lack of orders. Some car shortages is also affecting the output in certain districts. It is estimated that the production in the Hocking Valley district has been about 40 per cent. and in Pomeroy Bend about the same. Eastern Ohio has had a fair run, with about 50 per cent. production.

LOUISVILLE

Colder weather improves domestic demand slightly, and demand from small heating plants. General steam demand sluggish. Low grades hard to sell at any price.

Slightly colder weather has resulted in some small improvement in demand for small lots of domestic, but domestic consumers are so thoroughly stocked that very little demand is looked forward to until the latter part of February. Zero weather has not been experienced as yet, and consumption for the fall and winter to date has been considerably under normal.

The local steam demand is practically nil, as industrial concerns are using up stocks on hand, which were stored last summer or fall. They are not buying until present stocks are cleaned up, when they expect to enter on a competitive market basis. Neither mine-run nor nut and slack is in any demand, and fine screenings are dull.

Many mines throughout the field are down at the present time and have little expectation of resuming until they can dispose of coal on board cars and secure additional orders. Wagon mines are rapidly dropping out of competition, as the big selling organizations are scouring the market so thoroughly, and have so much coal to dispose of that there is no room for the wagon mine.

Labor and car supply are showing a general surplus all over the state at the present time. Mines are having no trouble in getting all the labor desired, in spite of layoffs, as there is not the heavy demand previously experienced, and the closing of wagon mines is helping the situation.

River coal shipments during the past few days have been small, as the Licking, Big Sandy and Ohio, as well as other rivers, have been at flood stage, too high in fact for successful handling of tows due to heavy current. For a time it was thought that mine operations would be interfered with. Some railroads were under water, but a

freeze checked the rise and no danger is now feared.

The market as a whole is firm, with few reports of price cutting of any moment. The big operators are endeavoring to hold up prices, and locally the retailers are working nicely.

BIRMINGHAM

Severe weather conditions and shortage of supply create strenuous demand for lump coal. Steam also in good demand from all classes of consumers. Mine workers slowly returning to work and production far below normal.

The local market is experiencing the strongest demand for domestic coal in the ten months. There is scarcely any coal in any of the yards in this district, and brokers and distributers are being besieged with requests for more liberal shipments, while consumers are camping on the trail of the dealers. A survey of the yards in old Birmingham last Saturday showed a total of less than 300 tons of domestic coal on hand. The severe weather of the past few days, when the thermometer registered uncomfortably close to zero, found many of the poorer classes and some of the better element without coal and able to secure only a nominal amount, if any at all. Cities and towns throughout the state are without any stocks.

Inquiry for steam coal is also good and in excess of the production at this time. The demand is general, railroads, mills, industrial plants and public utilities being the most urgent buyers. Some Illinois coal has been diverted to the Mobile trade during the past week.

The output at the mines is only about 50 to 75 per cent. normal, and the situation is improving very slowly. There is still some sickness in the camps, but this is responsible in only a small way for the shortage of labor and the irregularity of the men in reporting for work. The weather conditions of the past week had a very disastrous effect on coal production, accentuating the labor shortage and crippling the machinery at the operations. The output for the week ending Dec. 28 was the lowest yet recorded by the Government representative here, being 109,179 net tons.

Coke

CONNELLSVILLE

Coke supplies increased but market still steady. Labor performance improved.

An easier tone pervades the whole coke situation, as production is showing an increasing tendency, with better labor performance, and the blast furnace requirements are tending to decrease. The Fuel Administration's control of prices continues, and it is established that the control will continue to Feb. 1 and quite possibly until Apr. 1, the end of the coal year. It is understood that the Fuel Administration will give at least a fortnight's notice before relinquishing control. This advance notice has been urged by the blast furnace interests that have contracts requiring negotiation in case the Government price disappears. Other coke contracts provide that the Government price shall continue to the end of the contract in the event of the control being removed. Coke operators who have the latter form of contract regard its as favorable, but the operators who have contracts involving negotiation are satisfied with their form also. They maintain that if the open market should decline much below the Government level there would be difficulty in enforcing the $6 contracts, as furnaces would be disposed to blow out and the contracts would not operate, since they are simply "requirement" contracts.

Despite all the holidays, both the regular holidays, on the Gregorian calendar and the other holidays, 13 days later, on the Julian calendar, some coke operators report that their labor supply began to improve with the week beginning Dec. 23 and that conditions now are much more satisfactory than at any time since the beginning of the influenza epidemic. There are not only more men on an average each day, but they are more disposed to work, realizing that their jobs are no longer absolutely secure.

Practically no furnace coke is being offered on the open market, and probably but little would be absorbed if offered, unless at a cut price, as the furnaces are fairly well supplied. One stack resumed operations last week after being banked about two weeks. Offerings of foundry coke are of moderate volume, and sales are not altogether as readily effected as formerly, although there is no shading except to middlemen. The market remains quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30 per net ton at oven. Screenings from old dumps sell with great difficulty, and $5.25 is the highest price obtainable, the Government limit having been $5.50.

The "Courier" reports production of coke in the Connellsville and Lower Connellsville region in the week ended Jan. 4 at 253,980 tons, an increase of 21,790 tons, and shipments of raw coal at 173,568 tons, an increase of 45,853 tons.

Buffalo—The demand is not so heavy as it was, but a recovery is looked for as soon as the manufacturing trade generally is adjusted; for the need of iron in the country is as great as it was and the supply is small and many staples are hard to get at all. On this account the lake vessel owners are looking for the same big flow of ore down the lakes next season as during the one just past, and at practically the same price and same rate of freight. Fuel coke is dull, even when it competes with anthracite, as it is used for the most part when anthracite is hard to get or where it can cut the price slightly.

Middle Western

GENERAL REVIEW

Cold weather stimulates demand for domestic coal. Steam coal users not purchasing. Question of prices now to the fore.

The Middle West has enjoyed for the last five or six days its first spell of really cold weather, the temperature in some instances going down as far as ten to sixteen degrees below zero. This change in the weather has not brought about any great activity in the market. It has, however, stimulated to some extent the purchasing of domestic coal, especially through Iowa, northern Illinois and Wisconsin. The purchasers of steam coal are continuing to hold themselves aloof from the market until such time as they adjust themselves to the new conditions, which they will have to face. In the meantime, they are not burning as much coal as usual on account of decrease in manufacturing, and they are even less interested than they were two or three weeks ago in purchasing any kind of steam coal.

The recent cold snap, however, has to some extent increased the purchasing of coal on the part of the railroads. We do not mean that they have gone into the market and placed new orders, but they have instructed various operators to forward coal a little more rapidly than heretofore on the orders they have already placed.

The price question in the Middle West is getting to be a more important one every day, and many conjectures are made as to what the probable future of this question will be. As a matter of comparison, take a coal from the Springfield district of Illinois and a coal from the Franklin County district of the same state. These two coals cost practically the same at the mines, and one is a vastly superior product to the other, for nearly all purposes, yet they sell for exactly the same price at the pit mouth. This state of affairs, under ordinary conditions, will not stand to reason, and as a result some change will have to be made. A man is not going to buy a cotton coat if he can buy a woolen one for the same price.

There has not been any radical change in market conditions in the past week, except perhaps the demand for steam coal has decreased, if such a thing is possible. The operators, furthermore, are not looking for any change until at least another month, or perhaps the first of April.

The labor question is being discussed with more and more frequency and seriousness as we approach the spring, and it is freely conjectured that this labor question will be a more and more important one, so far as the coal consuming public is concerned, before next April.

CHICAGO

Retail trade stimulated by cold weather. Anthracite situation clearing up.

The retailers in Chicago have been buying a little more coal than usual. The intense weather we have had for the last six days seems to have stimulated trade to a great extent, and they have been buying rather freely as a result.

The United States Fuel Administration at Washington recently made a ruling to the effect that Eastern domestic coal could be shipped to points in Chicago, or anywhere in Illinois, provided the dealer got a permit covering such shipment. This permit, according to the Fuel Administration orders, could be obtained from the State Fuel Administrator. Since this ruling was made known, a great many retailers applied to the State Administration, but were told that no permits had been granted, or would be granted for some time, as it was up to Illinois to reduce her own surplus storage coal before any of the higher grade Eastern product could be used.

The anthracite situation seems to be clearing up, as the average householder has no trouble now in having his order for more coal filled at his convenience.

ST. LOUIS

Warm weather prevails with no steam demand and a light domestic call. All sizes on all grades heavy. Prices gone to pieces. Country orders fair. First anthracite coming in.

A warm wave after a few days of cold weather maintains a condition that is hard to describe. The cold weather was of such short duration that it had no effect on prices. There was a noticeable movement over what was considered normal, but it faded away with the return of summer weather. The oldest coal man cannot remember a winter such as this. The winter of 1877-78 was a mild one, but nothing in comparison with the present.

There is a fair country business on domestic sizes. This is mostly for Carterville, although a fairly good tonnage of Mt. Olive is going out. The outside steam inquiries are light. Locally there is an overloaded steam market from all fields, and there is no prospect of relief in sight for steam. Even if cold weather comes there will be a greater production than the local market could absorb under the most strenuous condition, for the increased call for the larger sizes would be just twice what it is now, if not more.

The Standard field is in bad shape. Many mines are idle because they cannot move screenings, or it may be nut or egg at some other operation. There is apparently a surplus of all sizes when the entire field is considered.

Cars are not plentiful on the Illinois Central R. R., although the movement is fair. On other lines there is a good supply of equipment.

The Mt. Olive district is beginning to feel the effect of the weather. The mines are idle, and there is a general slowing up, with plenty of unbilled coal on track. There is, however, a good movement from this field into country districts, and Chicago and the north continue to take liberally, everything considered. There is a light movement of Standard north, with most of it going to Chicago.

The Carterville and Du Quoin fields are faring very much alike. There is a surplus of coal, even though the railroads are taking liberally on their contracts. Domestic orders get prompt shipment now, and the steam demand is about equal to the supply. There is a marked preference shown for the mines that do not assess a preparation charge for a doubtful preparation. The buyer in this market feels that the coal is no better prepared than in pre-war times, and it had to be clean then to find a market. The opinion is that the Administration permitted itself to be subjected to a strangle-hold and had this jammed down as a sop to a certain class whose patriotic spirit resembled a love of dollars more than a love of country.

The Williamson County field is shipping heavily to the south, but the St. Louis tonnage from Williamson and Franklin County, as well as Du Quoin, are light. There is a good storage supply of this in St. Louis.

Little Arkansas moving in and those who have it in storage are going to take a loss of at least $1.50 per ton. This because on Jan. 7 the ban on anthracite egg for St. Louis and the west was lifted, and about 100 cars were ordered, all that was available then. The mine price on about half was $5.22 net, and a dollar more on the remainder. With the freight of $5 gross this made a St. Louis price of $9.70 and $10.70; adding a $2.50 gross margin for the retailer makes it $11.35 and $12.35 to the consumer. This size, when it ceased to move in last spring, was selling at $10.75.

The coming of anthracite shot the coke market all to pieces. Byproduct coke came down to $12.35 from $13. It will be hard to sell at that. The gas house market is slower, but is easy.

Standard prices on the market are: 2-in. screenings, $1.30 to $1.50; nut, $1.75 to $1.85; egg, $1.75 to $1.85; 2-in. lump, $1.60 to $1.75; 6-in. lump, $1.75 to $2.25. Mt. Olive is breaking slightly, although the big producers are standing pat. Carterville stays up pretty well to the Government maximum.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations (compiled by The Matthew Addy Co.), are f.o.b. cities named, unless noted otherwise.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$37.60	$37.60
Northern Basic	34.80	34.80
Southern Ohio No. 2	35.80	35.80
NEW YORK, Tidewater delivery		
Penna. 2X	39.55	39.15
Virginia No. 2	41.70	41.70
Southern No. 2	41.70	41.70
BIRMINGHAM		
No. 2 Foundry	34.00	34.00
PHILADELPHIA		
Eastern Pa. 2X	39.15*	39.15*
Virginia No. 2	40.50†	40.50†
Basic	36.90*	36.90*
Grey Forge	36.90*	36.90*
Bessemer	39.10*	39.10*
CHICAGO		
No. 2 Foundry Local	34.50	34.50
No. 2 Foundry Southern	39.00	39.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	35.40	35.40
Basic	34.40	34.40
Bessemer	36.60	36.60

*F.o.b. furnace. †Delivered

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.27	$4.19	$4.27	$4.27
Channels, 3 to 15 in.	3.00	4.27	4.19	4.27	4.27
Angles, 3 to 6 in., ¼ in. thick.	3.00	4.27	4.19	4.27	4.27
Tees, 3 in. and larger	3.05	4.27	4.19	4.27	4.27
Plates	3.225	4.77	4.44½	4.52	4.52

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.50	4.85	4.47

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.37	$5.11	$4.37	$4.75	$5.35	$4.75
Cut	5.00	6.50	5.61	6.50	.....	5.75	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅜-in. and larger	$3.70	$6.00	$4.50	$5.30	$6.15	$6.00	$5.55
Track bolts	4.90	8.90	5.50	Prem.	7.50	8.00	6.55
Standard section angle bars	....	....	4.45	Prem.	5.15	....	4.95

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	+7%	+9%	+15%	+30%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$6.25	$7.25	$6.50	$6.25	$8.00	$7.25
Assorted	6.40	7.75	6.50–7.00	6.40	8.25	7.50

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$70.70	$70.70	$59.50	$69.80	$63.00	$85.50
6 in. and over.	67.70	67.70	56.50	66.80	60.00	82.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$57.00	$38.00	$67.00	$38.00
Standard openhearth rails	55.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	3.135 (100 lb.)	43.50	3.135 (100 lb.)	43.50
Light rails, 12 to 14 lb.	3.09 (100 lb.)	49.00	3.09 (100 lb.)	49.00
Light rails, 25 to 45 lb.	3.00 (100 lb.)	30.00	3.00 (100 lb.)	30.00

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$28.30	$28.00	$33.00
Stove plate	30.21	21.00	25.50
No. 1 machinery cast	29.30	27.00	20.50
Machine shop turnings	13.14	13.00	18.50
Cast borings	13.14	14.00	18.50
Railroad malleable cast	24.25	26.00	32.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.19	$0.18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	16c.	15c.
Hollow	24c.	...	...

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜	47%	20%	⅛ to 1¼	36%	20%
½	51%	36½%			
¾ to 3	54%	40½%			

LAP WELD

2	47%	34½%	2	29%	15%
2½ to 6	50%	37½%	2½ to 4	31%	18%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	43%	25½%	⅛ to 1¼	36%	21%
½	48%	35½%			
¾ to 1½	52%	39½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	45%	33½%	2	30%	17%
2½ to 4	48%	36½%	2½ to 4	32%	20%
4½ to 6	47%	35½%	4½ to 6	31%	19%

Stocks dicounts in cities named are as follows:

	New York Black	New York Galvanized	Cleveland Black	Cleveland Galvanized	Chicago Black	Chicago Malvanized
¼ to 3 in. steel butt welded	40%	28%	43%	26%	41.1%	26.1%
3½ to 3 in. steel lap welded	36%	25%	39%	23%	37.1%	23.1%

Malleable fittings. Class B and C, from New York stock sell at list + 15%. Cast iron, standard sizes, 5% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
*No. 28 black	4.70	6.22	6.52	9.445	6.00	6.22	6.22	6.445
*No. 26 black	4.60	6.12	6.42	9.405	5.90	6.12	6.12	6.405
*Nos. 22 and 24 black	4.55	6.07	6.37	9.295	5.85	6.07	6.07	6.285
Nos. 18 and 20 black	4.50	6.02	6.32	9.245	5.80	6.02	6.02	6.245
No. 16 blue annealed	4.10	5.37	5.72	10.645	5.20	5.37	5.37	5.645
No. 14 blue annealed	4.00	5.27	5.62	10.545	5.12	5.27	5.27	5.545
No. 10 blue annealed	3.90	5.17	5.52	10.445	5.05	5.17	5.17	5.445
*No. 28 galvanized	6.05	7.57	7.77	11.695	7.25	7.57	7.57	7.695
*No. 26 galvanized	5.75	7.27	7.47	10.395	6.95	7.27	7.27	7.395
No. 24 galvanized	5.60	7.12	7.32	10.245	6.80	7.12	7.12	7.245

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	$0.80	$1.00	$1.25	$1.40	$0.98	$1.05
Hot pressed hexagon	.80	1.00	1.05	14.0	.78	.85
Cold punched square	2.50*	1.00	.75	.75	1.00	1.50
Cold punched hexagon	2.50*	1.00	.75	.75	1.00	1.50

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	50—10%	40%
Chicago	50%	60%
Cleveland	50—10%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	40—10%	40—10%	40%
Larger and longer up to 1 in. by 30 in.	20—5%	20—5%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York, $2.00 Cleveland, $1.25 Chicago, $1.75

For cast-iron washers the base price per 100 lb. is as follows:
New York, $6.00 Cleveland, $4.25 Chicago, $4.50

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ½ and smaller	40%	45—5%	40%
Tinned	30%	45—5%	40%

Biloer, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York..$5.675 Cleveland...$5.15 Chicago....$5.67 Pittsburgh...$4.65

Structural, same sizes:
New York..$5.775 Cleveland...$5.25 Chicago....$5.77 Pittsburgh...$4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.59	$1.28	$1.30	$1.30	$1.77	$1.26
5-gal. cans	1.84	1.38	2.00	1.40	1.97	1.35

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	14.00	14.50	12.25	12.50	14.00	12.50
25 and 50-lb. kegs	14.25	14.75	12.50	12.75	14.25	12.75
12½-lb. keg	14.50	15.00	12.75	13.00	14.50	13.00
5-lb. cans	.....	.....	14.25	14.00	16.00	14.50
1-lb. cans	.....	.....	14.25	14.50	17.00	14.50

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$16.75	Birmingham	$15.00
St. Louis, salmon	12.00	Denver	12.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L.C.l.	C.l.	L.C.l.	C.l.	L.C.l.
No. 1 grade	$1.35	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.45	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs per $2.40 roll in carload lots and $2.65 for smaller quantities.

Shingles, red and green slate finish cost $5.75 per square in carloads, $6.75 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots		Less Than Carload Lots	
	N. Y.	Chicago	N. Y.	Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$64.00	$57.00	$65.00	$58.00
Tar pitch (in 400-lb. bbl.)	21.00	18.00	22.00	19.00
Asphalt pitch (in barrels)	36.00	36.00	41.50	41.50
Asphalt felt	67.50	67.50	72.00	72.00

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0.056	$0.11	$0.162
Cincinnati	.086	.165	.218
Seattle	.09	.175	.30
Los Angeles	.079	.144	.181
New Orleans	.14	.20	.29
Pittsburgh	.....	.14	...

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$38.25	$34.00	$36.00
Birmingham	33.00	33.00	28.50
Denver	43.25	35.00	43.00
Cincinnati	42.00	41.00	36.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder
New York	.....	$0.29½	$0.34½	.....	$2.50
Boston	$0.23¾	.26½	.31½	$0.35¾	2.50
Cincinnati	.10¾	.22¾	.26¾	.....	2.45
Kansas City	.20½	.25½	.30½	.38½	2.55
New Orleans	.20¼	.24¼	.28½	.....	2.70
Seattle	.....	.25¾	.32¾	.....	.....
Chicago	.18¾	.22¾	.30	.36	2.45
St. Paul	.19	.24¼	.30¼	.....	2.55
St. Louis	.19	.25¼	.30¼	.36¼	2.15
Denver	.17¾	.24	.29	.35	2.50
Dallas	.21	.25	.29	.39	.....
Los Angeles	.23	.29	.37	.....	3.10

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	6.9	8½	14½
Fiber or sponge	8	13	8½	18
Transmission	7	13	0	20
Axle	4½	3.9	3¾	5¼
Gear	4¼	9.5	8	9
Car journal	22 (gal.)	4.5	5	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	87.00	70.00	80.00	80.00	75.00	70.00
Commercial	42.00	40.00	21.50	21.50	15.00	25.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	85c. per ft.
Common, 2½-in.	25%

Air

	First Grade	Second Grade	Third Grade
½-in. per ft	$0.65	$0.40	$0.30

Steam—Discounts from list

First grade, 15% Second grade, 25% Third grade, 33⅓%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	30–50%	35%
Denver	35–5%	40%
Birmingham	35%	40%
Chicago	45%	35%
Cincinnati	40–10%	30%

RAWHIDE LACING—25% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.99
Asbestos for high-pressure steam	1.76
Duck and rubber for piston packing	1.10
Flax, regular	.99
Flax, waterproofed	1.21
Compressed asbestos sheet	1.10
Wire insertion asbestos sheet	1.30
Rubber sheet	.66
Rubber sheet, wire insertion	.99
Rubber sheet, duck insertion	.55
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.21
Asbestos wick, ½- and 1-lb. balls	.75

MANILA ROPE—For rope smaller than ½-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅜-in., 8 ft.; ½-in., 6; ⅝-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ½-in. and larger, in 1200-ft. coils:

Boston	$0.25¾	Birmingham	$0.26½
New York	.23	Denver	.22
Cincinnati	.23½	Kansas City	.23
Chicago	.21½	Seattle	.24
St. Paul	.24	St. Louis	.24
San Francisco	.22	Los Angeles	.22½

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard List Per Lin. Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1 -in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2 -in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05
85% magnesia high pressure			List
For low-pressure heating and return lines		4-ply	58% off
		3-ply	60% off
		2-ply	62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½ lb. rolls	48c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
	Single	Double		Single	Double		Single	Double	
No.	Braid	Braid	Duplex	Braid	Braid	Duplex	Braid	Braid	Duplex
14	$17.00	$21.00	$39.40	$12.00	$16.00	$33.00	$13.00	$17.40	$36.80
10	25.65	28.90	64.75	27.20	31.00	69.00	21.40	24.40	42.75
8	36.45	40.25	88.45	38.00	42.00	78.00	42.35	44.35	.....
6	57.40	61.70	.....	.....	65.00	130.00	64.60	74.60	.....
4	83.40	88.70	.....	.....	93.00	.....	101.75	106.05	.....
2	126.60	132.80	.....	.....	140.00	.....	151.50	163.00	.....
1	164.15	172.40	.....	.....	182.00	.....	201.00	208.50	.....
0	206.80	206.80	.....	.....	242.00	.....	276.00	285.00	.....
00	278.80	278.80	.....	.....	290.00	.....	317.00	330.00	.....
000	341.65	341.65	.....	.....	360.00	.....	417.00	428.50	.....
0000	417.05	417.05	.....	.....	435.00	.....	516.00	516.00	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.30	New Orleans	$0.38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	.49½
Denver	.99	Pacific Coast (all rail)	1.25*
Kansas City	.59		

Note—Add 3% transportation tax. * Minimum carload, 80,000 lb.

COAL AGE

Volume 15 New York, January 23, 1919 Number 4

Coal, Railroads and the Government

NOW that there seems to be a strong indication that the five-year extension of Government operation of the railroads will become a reality, a problem of great significance confronts the coal industry as a whole. During the war period, the attitude of the operators and middlemen (however they may have designated themselves) was one of patriotic resignation of personal interests to the national welfare. Competition was succeeded by a generous cooperation in all national policies. Furthermore, the demand for fuel so exceeded the supply in those strenuous days, that the sole anxiety of both producer and distributor was simply to increase production.

With the hectic days of war over and the first steps in the nation's reconstruction program being taken tentatively, the coal industry must watch and prepare itself for such a peculiar situation as the probable five-year extension of Government operation of the railroads is certain to bring about.

Whether Government operation of the railroads will prove advantageous to the country or not is not pertinent to the present discussion. What is of considerable importance, however, is how it will affect the coal industry. The railroads are the largest individual consumers of coal, and they have always been catered to because of their enormous consumption. In a certain sense they have been the barometer of the coal trade as the steel business is of the country's whole industrial life. Now that these large individual customers are about to be welded into one gigantic customer, with a purchasing power that can shape the destiny of the coal industry as surely as if it were a majority stockholder, how prepared is the coal industry to adjust itself to this new situation?

Do the policies which all producers (and particularly those mining locomotive fuel) are laying down for future business expansion include a careful consideration of the potential part that the Government may play? Any sort of stability and any return to the prewar basis of doing business in the coal industry is out of the question until the Government's action in the matter of the railroads and its attitude toward the coal trade are definitely settled and outlined. The new order of things is bound to alter and destroy many of the established relations and customs of the trade.

Perhaps those who have most cause for alarm are the middlemen. Will their functions and services be entirely eliminated by the Government when purchasing coal for the railroads? This gives rise to several other germane questions: Will the Government continue to employ the regional purchasing committee plan in supplying the railroads with their fuel requirements, as it has signified its intention of doing, or will it at some not far distant date have the purchasing done by a central committee for all the railroads? Will prices be hammered down by the mailed fist of concentrated buying until the margin of profit is so reduced that invested capital will no longer be interested in coal mining?

All this, of course, as already intimated, applies principally to producers of the locomotive grades of coal. Producers of the steam grades will not be so materially affected, though they are certain to meet keener competition in that many producers of the locomotive grades will branch out into their field, where investments will be more remunerative.

If producers feel that they can dispose of their product in foreign markets to better advantage than at home, and can secure this foreign business, will the Government restrict the export of those grades of coal which it requires? Is it not possible that Government ownership may be extended to the coal mines within a short time, particularly to those mines which will be called upon to supply the railroads?

Regarding the situation of the New England railroads, will the Government retain enough boats of its Emergency Fleet to move the coal from the Southern fields to the New England ports? Or will it endeavor to supply its New England requirements by rail, to the detriment of all other New England coal consumers who will be obliged to take tide shipments?

The problem is so vast and so full of possibilities that the further one dips into it the greater it seems to become; and one soon is lost in a vortex of questions and still more questions. These, however, must all be given due attention, and the sooner the trade realizes this and makes ready to meet and solve each question as it arises the less panicky will be the work of reconstruction and adjustment. Foreign trade looms up as a solution to many a vexatious difficulty, and it is certain that the United States will in the next few years make tremendous strides in the conquest of foreign markets. How will this affect the coal industry?

Readers of COAL AGE are invited to discuss the matters touched on in the foregoing article, as upon the proper answers to the questions asked rests in a great measure the future prosperity of a great part of our industry.

IDEAS AND SUGGESTIONS

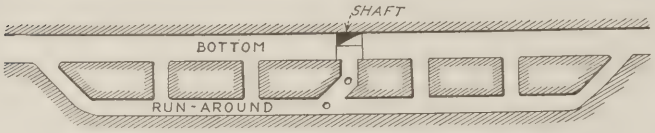
Sump-Cleaning Tunnel Proves Successful in Several Illinois Mines

BY H. GOODNOW
DuQuoin, Ill.

Cleaning coal out of the sump at the shaft bottom is a job for which there is ordinarily little competition, since this work combines a maximum of work with a minimum of comfort. More serious than this, however, are the frequent delays to hoisting arising from a car running into the sump or from reckless hoisting prematurely filling up the sump with spillage until the cage cannot land.

In order to provide easy access to the sump for the quick loading out of spilled coal, a tunnel driven from the run-around to the sump bottom and large enough to pass a car has proved a big success at several Illinois mines.

To secure a good grade and curve it has been found advisable to start in the run-around at such a point



METHOD OF BUILDING TUNNEL FROM SUMP

that a 45-deg. slant will come opposite the sump in the center of the pillar, from which place the tunnel may be driven straight for the sump bottom. After a little grading a track can be laid and a car passed through this tunnel to the bottom of the sump and loaded at any time. A locomotive in the run-around can then easily pull this car out with the aid of a short cable.

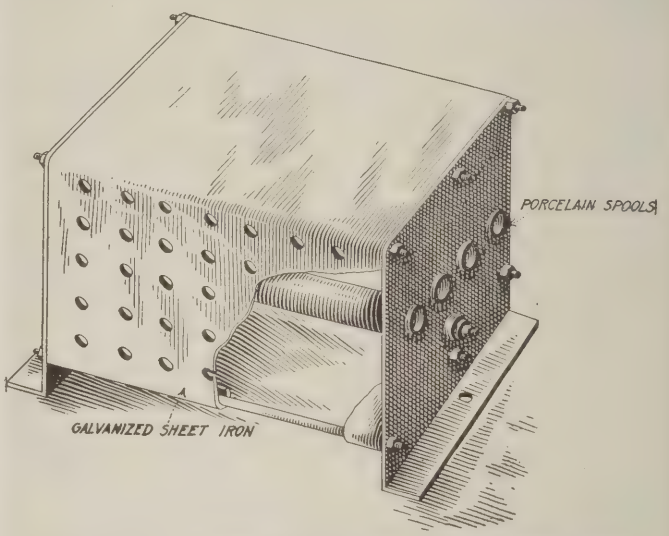
At one southern Illinois mine such a tunnel saves 16 hours' work each night. It has also enabled the cleaning up of a wreck, when two loaded cars had gone into the sump, to be accomplished in 6 min. To do this a chain on the bottom of the cage was used to turn the cars over and empty them, after which they were raised and swung to their place on the track. In the meantime two cars in the sump-cleaning tunnel were loaded out and the mine resumed hoisting in what was really record time.

Automobile Headlight Proves Serviceable for Use on Mine Locomotives

BY J. J. NOLAN
Linton, Ind.

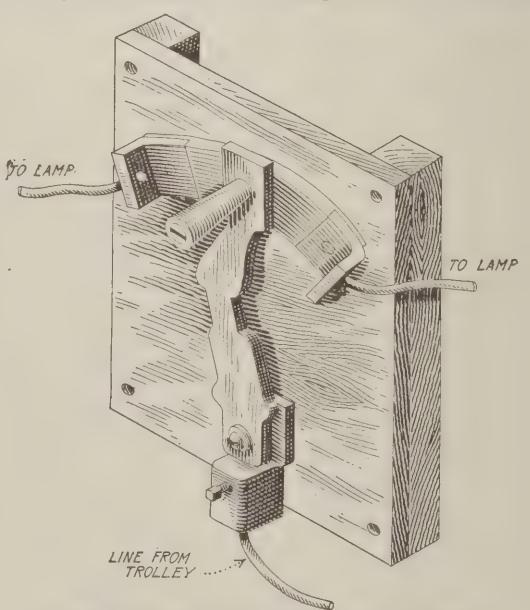
The illustrations shown herewith are of a locomotive headlight, resistance and switch that has been placed in service on more than thirty locomotives in sixteen mines belonging to the largest coal company in Indiana. These changes were made after the upkeep of carbon filament and luminous arc lamps for locomotive use had been found excessive due to the rough treatment given them.

After completing the lamp proper (which is one used on a popular make of automobile), the question of the proper size of wires, length, etc., that would carry the current safely received attention. The length finally adopted and the size and ohms per 1000 ft. (using a 6- to 8-volt, 2.5-amp. bulb on a 250-volt circuit) are



DETAILS OF RESISTANCE USED WITH HEADLIGHT

as follows: Size, 0.025 in.; number of feet, 110; ohms per 1000 ft. 820. This was found to carry the necessary amperage, as the lamps were tested for 300 hour continuously, the same bulb being used without change.



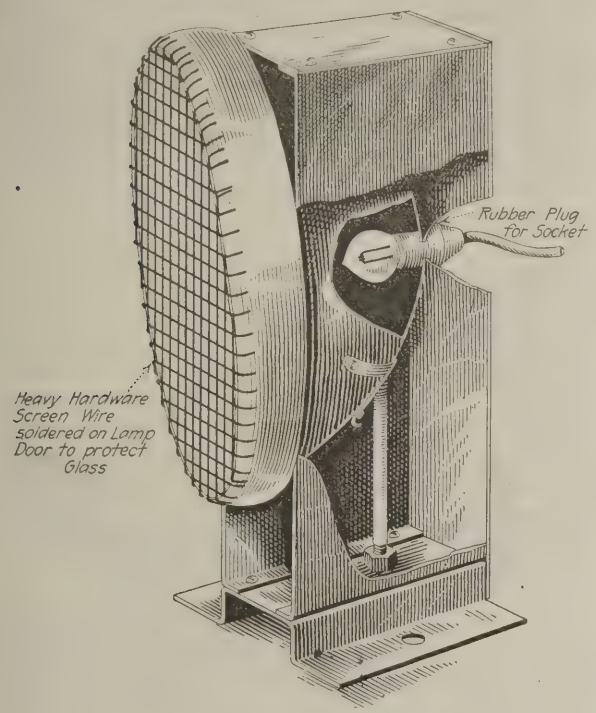
SWITCH FOR USE WITH HEADLIGHT

To use the lamps in series would have required less resistance; but being on series would mean to burn the lamps on both ends of the locomotive at the same time instead of only one when it was needed.

The base of the lamp is of a suitable size, and it is drilled to fit the threaded holes in the locomotive frame

that formerly held the common arc or luminous arc lamps. Two $\frac{5}{8}$-in. holes on $10\frac{1}{2}$-in. centers were drilled in the base. The light given by the lamp is satisfactory when the drop in voltage is not too great. If kept clean, and in proper repair, the lamps give little or no trouble. Furthermore, when it becomes necessary to change certain parts the renewals can be made at comparatively little expense.

A lamp of higher voltage would have required less resistance, but the filament would have been lighter,



DETAILS OF COMPLETED HEADLIGHT

and due thereto the lamps would have been unable to withstand the heavy jars and higher voltages to which they are subjected near the shaft bottom or when in proximity to the source of power.

The resistance requires a space $9\frac{1}{8}$ x $7\frac{1}{8}$ x $4\frac{1}{2}$ in. The resistance tubes, which are of porcelain threaded on the outside and measure $7\frac{1}{2}$ in. in length, can be procured from a well-known firm that manufactures resistances for various purposes. The porcelain bushing and terminal or binding post can be secured from the same firm. A durable switch that will answer the purpose may be made from spare parts of mining-machine contacts and brushes, or from fingers mounted on a fiber base. This material can be found in almost any mine repair shop.

Observations of an Old Trackman on the Proper Driving of Spikes*

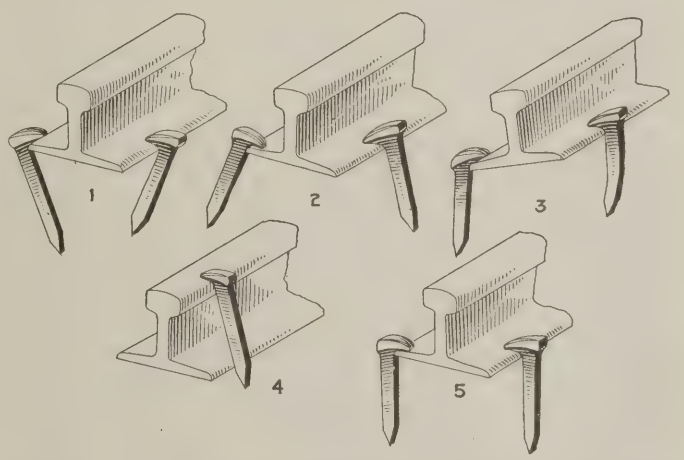
In my younger days I often watched mine trackmen lay switches and straight track, and it was really amusing to see how they distorted the spikes in driving them. Fig. 1 shows the manner in which spikes are often driven. One trackman assured me that he drove the spikes in that manner so as to keep the rail down on each edge. This is a poor way to drive a spike, as it is not so tenacious as when driven straight, and the head is likely to be broken off. Fig. 2 shows where the spikes were driven slanting. When the head got down to the rail base only the edge of the head touched the rail. This also is a poor method.

Fig. 3 shows a rail that is sprung. Here the trackman drove the first spike down, then drove the second spike and bent it before it was half driven, in order that the whole of the head might have a bearing on the rail. When the spike gets down to the base, the trackman gives several heavy blows, seeking to "pull the rail down." This invariably pulls the head off the strike and is obviously a poor method. Fig. 4 shows a spike started too close to the head of the rail. As the spike is driven past the rail head it is bent and weakened. It is likely to bend in against the web of the rail after which, of course, it is useless. It must be pulled out and another put in.

Fig. 5 shows spikes driven correctly. It will be noticed that the spikes are started perpendicularly. In consequence the head of the spike has a full bearing on the base of the rail.

Very few trackmen notice it, but a careful observation of a spike will reveal the fact that its head is sloping on the under side, and when the spike is driven tight the entire length of the head will fit into the contour of the rail at the point of contact.

On account of the present high cost of material, we should exercise great care in the driving of spikes. They are not only expensive, but at times it is practically impossible to get them. The waste in spikes is enormous. It often makes a man ask: "Where do they



FIGS. 1 TO 5. DIFFERENT METHODS OF DRIVING SPIKES

all go?" I believe that if they were driven straight in the first operation and handled with a little care we could recover twice as many as we do.

Look about your track in the rooms and headings, and notice the freakish appearance of things that once were spikes, and observe what the chances are for their being reclaimed, and you will never ask anybody again "Where do the spikes all go and why?"

*From *Our Own People*, Davis Coal and Coke Co. publication, January number.

Nearly nine-tenths of the total estimated coal deposits of the United States, or about 3,550,000,000,000 tons, are stated to lie at a depth not exceeding 3000 ft. below the surface.



FIG. 1. COAL-LOADING MACHINE THAT DOES AWAY WITH DOUBLE SHOVELING AND COAL CARRYING

Mining Coal by Machinery

By N. D. LEVIN
Columbus, Ohio

SYNOPSIS — *Many attempts have been made to load mine cars with coal from the face by machinery. In order to obtain the best results from such equipment it is necessary to lay out the mine in such a way as to adapt it to operation by means of such machines. Then and only then will the best results be obtained.*

MUCH money and effort have been expended in past years in an attempt to load coal by means of machinery. Nevertheless an insignificant percentage of the coal mined is handled by loading machines; more than 99 per cent. is still loaded by shovel. The reason for this is that in many mines there exist unfavorable conditions, which may be enumerated as follows: A vein that is too low; the roof may be poor, and there may be dirt seams in the coal; roomnecks are narrow; not enough coal is obtained from each room; coal cannot be shot down on the floor in shape for the machine to pick up without breaking to such an extent as to seriously reduce the percentage of lump; conditions may be such that empty cars cannot be supplied without causing delay to the machine.

The machine shown in Fig. 1 has been developed with the end in view of using it in mines having conditions like those mentioned. This machine is light (it weighs about one ton), can be handled by one man if necessary, but more conveniently by two. It can be made for almost any height of bed, provided there is sufficient room between the top of the car and the roof for the lumps to pass.

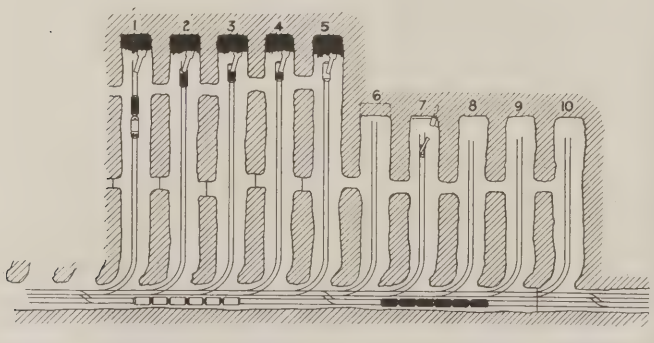


FIG. 2. SYSTEM OF MINING SUGGESTED FOR ADOPTION WITH COAL-LOADING MACHINES

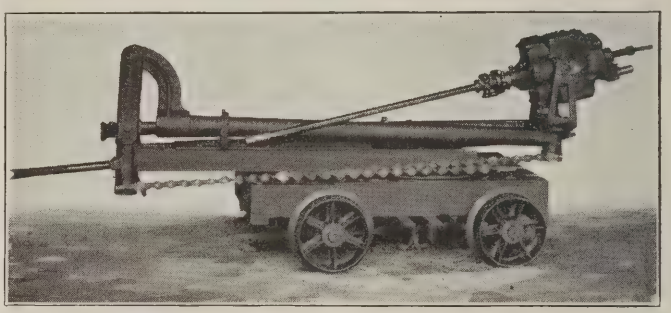


FIG. 3. DRILL MOUNTED ON TRUCK CAN BE MOVED TO ANY PART OF FACE BY ONE MAN

The machine does not pick up the coal from the floor. Where the shooting is done during working hours, it saves work to shoot the coal directly onto the loader, and thus several tons often can be obtained without any shoveling whatever. The coal can also be pulled down from the face directly onto the loader, and large lumps rolled on, eliminating some work in breaking up, and at the same time giving better lump coal. If this machine is used in a systematic manner, the regular output of the mine can be obtained from a greatly reduced mining territory.

Following is an example of a mining system which may be employed where conditions are suitable, and something along similar lines may be worked out for other conditions. The assumptions are: Height of coal, 6 ft.; width of rooms, 20 ft.; undercut, 7 ft.; capacity of mine cars, 4 tons. It is preferable to have the track in the center of the rooms. A mine car of 4 tons capacity is, of course, larger than is found in most mines, but it is recommended that large cars be used with loading machines in order to facilitate the gathering. There are assumed to be 10 rooms in the system.

Referring to Fig. 2, five rooms—Nos. 1, 2, 3, 4 and 5—have the coal shot down, and a loading machine in each. There are two men with each machine. Rooms 6 to 10 are being undercut and drilled. It is assumed that the shooting is done during working hours and the coal is not shot down until the loading machine is in position. There being ten rooms in the system, rooms 6 to 10 would be undercut and drilled, say in the forenoon, and rooms 1 to 5 would be undercut and drilled in the afternoon.

From each room undercut there would be obtained about 34 tons of coal. It is found that two men can readily load this amount in 4 hours with the assistance of the machine; therefore, rooms 1 to 5 would be loaded in half a shift, while the other rooms are being prepared.

The machines are then moved, and rooms 6 to 10 are loaded out in the other half shift. It will be noted that the ten rooms would give about the right amount of work to keep two men with a shortwall machine busy undercutting. It would also keep a gathering locomotive busy handling the cars for the five pairs of loaders. The cars being large, there would be only nine cars required from each room, or 90 cars per shift. It should not be much trouble for a gathering locomotive to bring in the requisite number of empties expeditiously to the five loading machines.

If the cars were smaller, there would be some question as to one gathering locomotive being able to serve all the loading machines promptly. We may go further; if the cars were, say, only one-ton capacity, I do not think it would be possible by means of any system to handle the cars so that the machines would not be delayed; therefore I mention this, because the importance of large cars has not been fully appreciated in the past where loading machines have been tried.



FIG. 4. PIPE SCREW POSTS

Figs. 3 and 6 show a drill mounted on a truck in such a manner that it is never necessary to detach it therefrom. It is suspended on a double hinged arm so that it can be moved to any part of the face by one man, without any heavy lifting. By means of this equipment one man could do all the drilling and assist in cleaning up, timbering, and other like work.

It is also important that the track be laid in the rooms before the machines are moved in. Sections of track of convenient lengths should be made up permanently, complete with steel ties, and have a fishplate connection so that all that is necessary is to drop the sections into place. About three sections, each the third of a length of rail, should be a permanent fixture for each room. When the third section has been used, all three will be taken up and replaced by a length of rail. In this manner it will only take a few minutes to extend the track, and this would not delay the machines.

Unless the roof is exceptionally good, there should

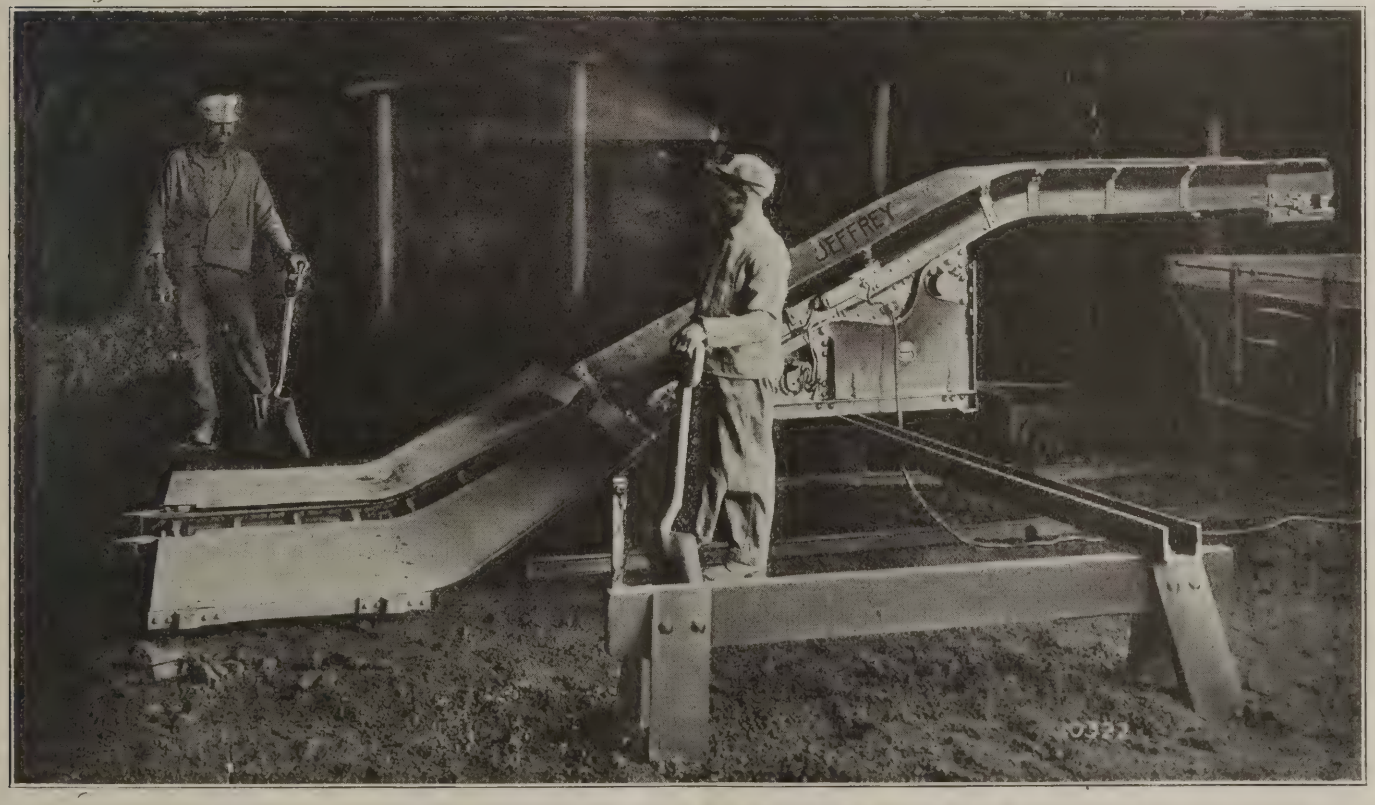


FIG. 5. TWO MEN ONLY ARE REQUIRED TO MANIPULATE THIS EASILY PORTABLE COAL-LOADING MACHINE

also be provided as permanent equipment for each room a few pipe-screw posts such as shown in Fig. 4. A post like this can be set in a fraction of a minute, whereas it often takes 15 min. or more to go and hunt up a wooden post and set it; and if the men have to go and hunt up an ax and cut the post to length, it may take half an hour.

To make a success of loading machines in a mine, every precaution must be taken to keep the machines working. If such precautions are not taken, the machines will be idle a great part of the time. If a miner is simply given a machine, he will spend more than half of the time in drilling, shooting, cleaning up, setting posts, laying track, taking up bottom and "fixing" his carbide lamp. These things should be done for him.

The last item, "fixing his carbide lamp," may seem to some as hardly worth mentioning; but if the time lost due to carbide lamps was figured up on the five loading machines, I believe it would be found to amount

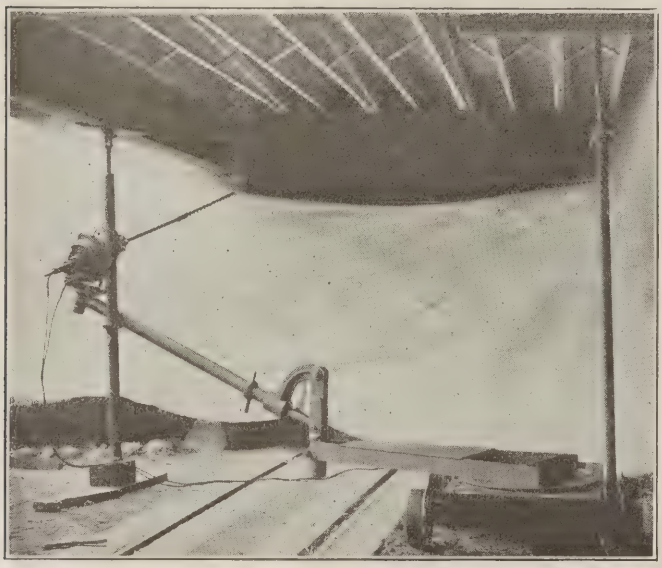


FIG. 6. SHOWING MANNER IN WHICH DRILL IS ADJUSTED FROM TRUCK

to considerable. It would, I believe, be a good idea to put in electric lights so that the men could work without their carbide lamps. There is power in the room already. Wire should be extended in the rooms from time to time so that it would not be necessary to unreel a cable and hook on in the entry three times a day, as in each day three kinds of machines are used in each room —that is, the undercutting machine, drill and loader.

Each of these ten rooms is loaded out once a shift. A 7-ft. cut in the size of room assumed will give 34 tons, or about 340 tons per shift from the ten rooms. This, it will be realized, is a good output from a small territory, and should mean a great saving in material, ventilation and upkeep of the mine.

As to the cost of the coal, this would have to be figured up for each mine, taking the conditions and labor scale into consideration. As to the number of laborers, there would be required 10 men for loading, 2 men for the shortwall machine, 1 or 2 men for the gathering locomotive and 1 man for drilling. This latter can also help lay track and assist with the timbering. In the same room with the man drilling another will probably be needed for taking up bottom and getting the room in proper shape.

Output per Underground Employee in British Coal Mines Decreases

The shortage of fuel is seriously felt throughout Great Britain, due in large part to scarcity of labor, great numbers of men having been withdrawn from mining operations during the last four years. But there is another factor of equal importance and of even greater significance which influences this matter, and that is the continual decline in output per person employed. According to R. W. Corless, in an address to the Past and Present Mining Students' Association, Wigan, and District Mining and Technical College, on Nov. 16, 1918, it does not seem that enough has been done to improve the individual output.

The accompanying table gives the returns for the years 1907 and 1917, from which comparisons may be made; the figures are arranged to show the output in tons per annum per person employed underground without taking any account of surface employees. Taking the average output, the loss of output per person in the 10 years is 47.2 tons; the number of persons employed

	Year, 1907			Year, 1917		
Section	No. of Persons Underground	Output	Output per Head	No. of Persons Underground	Output	Output per Head
Scotland.....	101,766	40,092,548	394	102,205	34,245,744	335
Northern.....	161,038	56,243,456	355	152,068	43,228,230	284
York and North Midland.....	.....	.....	.....	192,040	69,128,836	360
Lancashire and North Wales..	87,371	30,034,598	344	89,512	25,204,560	282
South Wales....	121,351	36,782,508	303	184,633	48,507,902	263
Midland and Southern.....	.....	.....	.....	90,397	28,062,201	310
	471,526	163,153,110	353.4 Average	810,855	248,377,473	306.2 Average

underground in the year 1917 is 811,510, and multiplying the total number of employees by 47.2 (the loss of output) we obtain 38,303,272 tons, or the total amount of coal lost through decreased individual tonnage.

The question—How are these figures going to be improved—has arisen. In recent years machinery has been brought more and more into use, particularly in undercutting the coal and in conveying the coal along the face, but Mr. Corless considers that they still lag a long way behind. Cases are continually met where output is sacrificed for want of power to replace manual labor. The hard seam of coal is still being undercut by hand, rock tunnels are still being driven by hand work, and the need of an auxiliary haulage system is felt to keep pace with advancing roads and to dispense with such old relics as crabs and similar devices.

Mr. Corless states there is not much doubt that, next to the actual cost of mining, the cost of transporting the coal from the face to the haulage road is one of the most expensive items in underground work; and this is perhaps one of the most laborious kinds of mining work, especially in those collieries where the gradient is fairly steep or the haulage roads are too few.

Following an explosion at a mine an experienced mechanic should at all times during the recovery work be stationed at the fan, prepared to make any necessary repairs following a breakdown. A messenger familiar with the plan of the mine should be constantly on duty to carry word into the mine in case the fan stops. If a telephone line has been installed, a man should be on duty constantly at each telephone.

Cleveland Coal Situation in 1918

By EDWIN C. BOEHRINGER
Cleveland, Ohio

SYNOPSIS — *Though supply of bituminous was never plentiful in the early part of the year, no essential war plants lost any time. Demand continued strong until Nov. 11, when the armistice was signed. Anthracite practically disappeared from the market, due to the operation of the zoning system. Pooling of coal through the Ore and Coal Exchange proved an unqualified success, and the likelihood is that the plan will be adhered to in a modified form. Opinions differ as to the outlook for the new year.*

WERE 1918 to be charted from a coal standpoint, demand would show an almost unbroken line across the 10½ months to Nov. 15, with a sharp decline downward from then to Dec. 31. Prices would show a slight decline from Jan. 1 to Apr. 1, a decided drop on that date, and remain on much the same level the remainder of the year, with a possible faint falling off from Nov. 15 to Dec. 31. Thus are revealed the principal trends of the bituminous year in Cleveland and northern Ohio.

The early months of the year strained the trade to the utmost. An unusually cold January and February, which called for greatly increased consumption, by the same token laid a heavy hand upon the railroads and cut down the supply in much the same proportion that demand rose. This situation was further complicated by the unusual requirements of the iron and steel, metal-working and rubber industries of Cleveland and northern Ohio—then very largely engaged in war work.

Doubtless the apprehension felt was heightened by the comparison of receipts then with former years. Steam-coal traveled the direct route from car to fireroom. Domestic coal was delivered in 100-lb. and 200-lb. lots instead of by the ton. But when the winter's hold was broken, it was found that no essential war plant had lost one minute's time through shortage of coal, nor did one home actually lack an immediate supply for one day. The margin, while dangerously narrow, sufficed at all times, and in fact some No. 8 coal was being dumped into Great Lakes freighters at Cleveland in March.

The winter over, efforts of the trade were concentrated on getting to the Northwest its allotment of 28,000,000 tons of bituminous. All summer long every ton of bituminous, including that from stripping and exceedingly low-grade operations, was quickly absorbed. Pressure from the United States Fuel Administration on both steam-coal and domestic consumers was applied, and not only did the Northwest get its 28,000,000 tons and more, but the entire lower lakes region was amply coaled when winter again broke.

Until Nov. 1 domestic demand continued unabated, and while new business was comparatively small, deferred orders were yet to be cared for. Retail dealers, in effect, did a winter business all summer. The unusually mild weather through October, November and December knocked the bottom entirely out of the domestic market and easily offset the more prosperous summer business. With the signing of the armistice Nov. 11, steam-coal demand fell as though it had been cut off with an ax. War work did not let up immediately, but industrials bent every effort toward depleting their war-priced, abnormal stock piles. The end of November saw overproduction just in the offing, and the first half of December found the market utterly stagnant. This was the condition when 1918 passed away, and demands for both domestic and steam coals were on rock bottom.

The beginning of 1918 saw bituminous still being delivered at contract prices. The Government maximums, strictly speaking, had little real effect here until Apr. 1, when prices dropped probably 65c. a ton on the average. Until the middle of November bituminous prices held firm at the Government maximums. Then, with standard No. 8 available, stripping coal softened, and soon was being offered at as much as 70c. off. Some stripping coal in middle December went at 90c. off. On the theory that reduced prices would not stimulate demand, the larger No. 8 operators held firm for the Government maximums. Some regular No. 8 coal was disposed of in December at about 25c. off the maximums—which for Ohio generally were $2.35 for mine run, and $2.60 for slack and prepared sizes. Domestic grades in December were bringing, delivered, $7.10 for Massillon lump, $6.60 for Coshocton, $6.35 for No. 8 Pittsburgh and $6.15 for West Virginia splint. These prices were from 50 to 75c. under the prices that ruled in the summer. The quality of domestic coal was quite poor throughout the year, and not until November were buyers given 1¼-in. lump instead of ¾-inch.

As a market factor, anthracite virtually disappeared. Operation of the zoning system kept out throughout the year about 75 per cent. of the normal supply. In December anthracite was bringing $10.35 in Cleveland, about $1 a ton higher than in the spring. Coke was pushed as a substitute, at from $11.50 to $14 a ton. It proved a poor, high-priced substitute, and the re-

COMPARATIVE MOVEMENT OF BITUMINOUS AND ANTHRACITE COAL ON GREAT LAKES

Season	Bituminous, Net Tons	Anthracite, Net Tons	Total, Net Tons
1918	28,153,317	3,948,705	32,102,022
1917	26,828,759	4,689,983	31,518,742
1916	24,369,000	4,423,800	28,792,800
1915	22,420,000	3,800,000	26,220,000
1914	22,995,000	4,285,228	27,280,228
1913	28,328,683	5,033,696	33,362,379
1912	23,335,000	4,204,741	27,539,741
1911	21,782,685	3,917,419	25,700,104
1910	22,838,700	3,639,368	26,478,068
1909	15,564,690	3,052,706	18,617,396
1908	15,750,000	3,538,098	19,288,098
1907	18,037,232	3,449,695	21,486,927
1906	14,591,910	2,681,808	17,273,718
1905	11,615,837	2,785,362	14,401,199

BITUMINOUS COAL HANDLED BY LAKE ERIE DOCKS IN SEASON OF 1918

(Vessel Fuel, Which Is Included in the Following Figures, Given in Net Tons, Amounted to 1,234,925 Tons for the Season)

City	Railroad Dock	April	May	June	July	August	September	October	November	Season
Toledo	Baltimore & Ohio	3,399	263,130	302,686	439,290	578,745	593,545	585,171	259,092	3,025,058
Toledo	Hocking Valley	74,132	533,422	603,706	788,258	883,922	820,943	885,767	545,638	5,135,788
Toledo	Toledo & Ohio Central	58,523	278,555	305,470	286,182	373,423	340,154	359,637	175,967	2,177,911
Sandusky	Pennsylvania	46,031	300,663	376,742	265,480	388,627	431,106	456,501	183,107	2,448,257
Huron	Wabash & Lake Erie	*107,861	259,106	288,568	312,320	373,703	323,730	332,390	172,049	2,169,727
Lorain	Baltimore & Ohio	*724,967	341,897	343,674	450,408	583,224	608,187	585,402	397,235	3,434,994
Cleveland	Erie	84,276	88,759	68,519	66,313	93,414	102,199	135,007	54,649	693,136
Cleveland	Pennsylvania	*118,884	307,477	352,406	464,621	436,026	449,889	438,404	272,670	2,840,377
Fairport	Baltimore & Ohio	744	4,886	8,608	62,417	56,276	50,520	91,734	42,339	317,584
Ashtabula	New York Central	34,129	270,727	272,419	300,661	460,367	361,149	304,758	161,378	2,165,588
Ashtabula	Pennsylvania	88,578	164,003	175,347	237,405	163,713	261,841	324,304	118,269	1,533,460
Conneaut	Bessemer & Lake Erie	*134,994	289,488	300,733	313,120	388,449	333,251	334,026	151,831	2,245,892
Erie	Pennsylvania West	*14,528	92,085	83,759	130,587	137,011	85,675	110,038	65,238	718,921
Erie	Pennsylvania East	.....	.....	56,715	117,243	80,030	89,009	100,748	37,804	481,549
Total		891,046	3,194,198	3,539,352	4,234,305	4,996,930	4,851,198	5,043,887	2,637,326	29,388,242

*Includes total of 22,193 tons dumped prior to beginning of season and operation of Ore and Coal Exchange.

turn of anthracite and Pocahontas will probably push it almost entirely out of the domestic market.

Pooling of cargo and coal tonnages through the Ore and Coal Exchange of Cleveland made the lake season an unqualified success. Though only August, October and November equaled or exceeded the monthly quota set by the Fuel Administration, the Northwest was given 28,153,317 tons of bituminous, while Lake Erie car dumpers handled an additional 1,234,925 tons in the way of fuel coal. The season's grand total thus was 29,388,242 tons of bituminous. The cargo coal accorded the Northwest in 1917 was 26,828,957 tons, or 1,324,360 tons less than this year. Of the 1918 tonnage the three docks at Toledo handled 10,338,757 tons—combining cargo and fuel coal—Ashtabula's two docks 3,699,048, Cleveland's two 3,533,513, and Lorain's one 3,434,994 tons.

Bituminous Trade Pessimistic At Present

At present the bituminous trade is most pessimistic. With steam coal demand away off, domestic users still stocked and the lake season over, all of the elements loom up unfavorably. The bright spots in the way of nibbling by several large steam-coal users who have pretty well eaten into their stock piles are eclipsed by the general pessimism. This depression, it is believed, will largely be dissipated by the opening of the lake season, which is only 60 days in the future. Their backs put to the wall, the larger and better-informed operators appear 100 percenters—either very optimistic or very pessimistic. There appears to be mighty little middle ground.

One view, which is not widely shared, is that bituminous will fall into the same slough as after the 1902 anthracite strike, and that with war demand for fuel over, the market has changed from a seller's to a buyer's; that it will take the industry fully ten years to recover from its present state of overproduction. This view includes a crash not later than the early spring months, with No. 8 mine-run as low as $1.50 before the upturn.

The other view, more generally held, is that the industry will encounter nothing but boom times in 1919, beginning in late February or early March. The country, these operators believe, will rush through its readjustment; export demand will be big; with the discarding of zone restrictions, No. 8 coal will find its welcome as warm as ever in Michigan; next November and December can be no worse than those months this year, from the standpoint of domestic consumption; and that the Northwest usually takes from 27,000,000 to 28,000,000 tons.

Negotiations for a new bituminous wage scale are held certain to come some time in 1919, and the belief is universal that this will result in shutdowns at the mines for 30 to 45 days at a minimum. Ten per cent. of the year's production, accordingly, will be lost this way, and from this prices will not suffer in the least. With ratification of the peace treaty and consequent opening of the wage scale before April seemingly improbable, operators expect to begin floating lake coal again at $2.80. This, too, is expected to be a factor in maintaining present prices. Many operators advance the theory that the experience of large steam-coal users in stocking with low-grade and stripping coal, and their losses through fires, will serve to bring quality into the forefront at the expense of price. It is agreed on all sides that, in any event, prices cannot go down until labor does. If the wage negotiations are begun before living costs have receded, the mine workers will succeed to another year of high wages, with prices accordingly.

Forecast of Conditions for 1919

The forecast is for a late start in the lake trade next spring, for a large part of the Great Lakes fleet is wintering at Buffalo with storage grain cargoes. About two weeks will be clipped off the start, for navigation opens at Buffalo usually a fortnight or so later than at Toledo and Cleveland. The pool is likely to be continued, though in a modified form. It is certain that the 1919 pool, if any, will not permit the mixing of coal on upper lake docks such as resulted in 1918. Losses through fires have been too severe to leave this detail unnoticed. From 27,000,000 to 28,000,000 tons again will be taken up, with the former figure nearer correct. Dock piles on the upper lakes seem certain to be much larger in the spring than they were last spring.

The lake and domestic trade sizing up as normal or virtually so for 1919, the great uncertainty lies in the steam-coal situation, and this, naturally, will be no better or no worse than general business conditions. The worst, for the local trade, seems likely to be over by the middle of March. Prices only slightly lower than in 1918, with demand 85 to 90 per cent. of what it averaged through 1918, is the by and large of the trade's views here.

Coke Industry in 1918

By WARREN S. BLAUVELT
Detroit, Michigan

THE story of the coke industry in 1918 is an interesting chapter in the history of the Great War. It is a story of the rapid development of the spirit of patriotic coöperation of coke manufacturers, coke workers, railroad men and coke consumers with the War Industries Board and Fuel Administration. With this spirit actuating the industry and those connected therewith, difficulties which appeared insurmountable were largely overcome, and the coke industry was enabled to do its part in winning the war.

Production of coke was curtailed in January, February and March over 2,000,000 tons by weather conditions which prevented regular movement of coke from beehive ovens to furnaces, and of coal to byproduct ovens. The quick improvement in railroad conditions with the advent of milder weather was made possible only by the strenuous and effective work of all the men in the railroad service.

As production increased in May, June and July stocks of coke were accumulated at furnaces remote from the coke districts. Unfortunately, the extremely hot weather early in August again curtailed the output about 100,000 tons. Fortunately for the war program, the stocks previously accumulated made it possible to keep nearly all furnaces in blast during this period. In October and November, coke production was reduced about 350,000 tons by the influenza epidemic.

In the Connellsville region in West Virginia, Virginia, Kentucky and Tennessee there was an actual shortage of labor the greater part of the year. In Alabama there were apparently enough men to man the coke plants, but chronic absenteeism, and the habit of frequently moving from place to place, reduced the available coke labor far below war requirements. Unfortunately, the campaign to correct this difficulty was not started in Alabama till the latter part of the summer and was seriously hampered by the epidemic, which was general in the district. But notwithstanding the difficulties due to the weather, the influenza and the shortage of labor, the production of metallurgical coke in 1918 was about 1,000,000 tons greater than in 1917.

The new byproduct ovens which were started in 1918 made this increase possible. In the latter part of October, for the first time in this country, more byproduct than beehive coke was being produced. The productive capacity of the byproduct ovens in the United States has been increased about 36 per cent. during the year.

The activities of the Fuel Administration in connection with the coke industry were along the following lines: (1) Establishment of maximum prices. (2) Efforts to increase production. (3) Control of distribution. (4) Efforts to improve quality.

The basis of all price-fixing orders was the price recommended to the President by the committees of the American Iron and Steel Institute and the War Industries Board, and approved by him on Sept. 24, 1917. In general, the policy of the Fuel Administration in fixing prices was to establish maximum prices as low as practicable and yet secure the production required.

A price of $1 per ton more for foundry than for furnace coke was allowed on Nov. 10, 1917. This made the price ratio between furnace and foundry coke about the same as before the war. It also had the effect of making it possible for foundries engaged in war work to secure their coke generally without Government assistance, and this relieved the Fuel Administration of a vast amount of work which otherwise would have been necessary. This greatly expedited the production of castings needed in the war industries, as there were few delays from failure to secure foundry coke.

Prices for byproduct coke were allowed which permitted the absorption of freight differentials, thus leaving the price relation between beehive and byproduct coke essentially the same as before the war. Disregarding these two price differentials, the orders affecting prices permitted advances above the base price originally established, on a merchant tonnage of only about 4,250,000 tons of coke per year, or about 7½ per cent. of the total year's production of coke.

Efforts to secure an increased production were made: (1) With the Railroad Administration, to secure a regular and adequate car supply for the movement of coke and byproduct coal. (2) With operators, to secure their maximum effort to increase output. (3) With employees, to get them to work steadily. (4) With the Employment Service Bureau and with draft boards, to increase the available labor at coke plants. (5) To secure physicians and nurses where needed on account of the epidemic of influenza. (6) With the general public in the coke regions, to establish an effective public opinion, honoring those who worked faithfully to secure the coke needed for war purposes, and shaming the slackers.

In the control of distribution the Fuel Administration was the organization for making effective the requests of the War Industries Board for the movement of coke. The general coöperation of the coke industry with the War Industries Board and the Fuel Administration is evidenced by the fact that in no one month was it necessary to issue orders or requests to coke producers for the movement of a tonnage of coke exceeding 1¼ per cent. of the total production for the month.

The constantly increasing demands for coke, irregularity in car supply and the labor shortage in many fields resulted in much off-grade coke being produced and moved to furnaces. Upon this being brought to the attention of the Fuel Administration, coke inspectors were appointed to investigate complaints and remedy conditions where possible. In some cases prices were reduced where off-grade coke was being shipped.

In the work of the Fuel Administration the effort was made to utilize the existing agencies of production and distribution, and to alter trade practices and methods only where such changes promised to mobilize the coke industry more effectively for the vigorous prosecution of the war.

Louisville Coal Trade in 1918

By A. W. WILLIAMS
Louisville, Ky.

SYNOPSIS — *Western Kentucky coal obtains a firm hold on Louisville market. Strong possibility that river trade will receive new impetus. Considerable development work throughout the state, particularly in the Elkhorn fields. Business during the new year depends largely on removal of Government restrictions.*

As a result of the zoning out of certain coals during the spring and summer season of 1918, when eastern Kentucky grades were shipped largely into Michigan, the Lake region and to gas and byproducts plants, western Kentucky coal got a better foothold on the Louisville market than at any previous time in its history. For several months western Kentucky coal came in well, and most of the summer stocking was done on this grade. A considerable amount of higher grade coal, known as Hazard coal, a slow-burning, white-ash coal produced in eastern Kentucky, also became much better known in the local market. This coal is really an excellent coal for domestic purposes and represented about the only grade of eastern Kentucky to be had on the market, as other eastern Kentucky coals were largely gas coals, which were needed for other purposes. Louisville and vicinity was largely stocked on western Kentucky domestic, however. Numerous steam consumers also purchased this coal to a greater extent than ever before.

It is believed that as a result of the heavy stocking and use of western Kentucky coal in Louisville during the past year, that it will have a much better sale here in the future, owing in part to the fact that it sells at a lower price than some of the higher grade eastern Kentucky varieties.

Louisville Able to Procure Usual Grades

Except for a few months when eastern Kentucky coal was routed to the north, Louisville was able to secure her usual grades. Louisville depends almost entirely on Kentucky production, consuming Hazard coal, western Kentucky, Harlan, Straight Creek, Jellico, Elkhorn and some little Glue Gem. The latter does not come into Louisville to any such extent as Hazard or Harlan. In addition there is some little Indiana coal, which comes in by rail to the western end of the city, over the Kentucky & Indiana Terminal. However, Indiana coal has never been used to any considerable extent here.

In addition to these Kentucky coals there was formerly a considerable tonnage of West Virginia coal, and other coal from the Pittsburgh field district. Years ago most of the coal consumed in the Ohio Valley towns came from the upper river fields by water. Later a considerable volume was handled by rail. When the war broke out the high-grade eastern coals went into the east and Pittsburgh district, where they commanded a ready market.

The demand in those districts today is not so keen as it was, and there is a strong possibility that the Monongahela company and other large river coal shippers will get back into the river game again. It is claimed that inquiries are being made all along the river for boats, barges and tow boats for river transportation of coal, and that boat builders have been asked for quotations. There is likely to be a return of the heavy movement of coal by water from the old upper Ohio and Kanawha River districts clean to the gulf. This would naturally cut in on the rail shippers materially, as rail rates are showing a 25 per cent. increase, whereas there has been no increase in water rates other than the actual increase in the cost of transportation, which in many cases is done by the jobber or producer.

Increase of River Traffic During Year

During the past year there has been somewhat of an increase in river transportation of coal by small Kentucky companies, and some large ones. The West Kentucky Coal Co., Sturgis, Ky., is interesting itself to a considerable degree in river shipping, and is collecting a fleet. The Beattyville Coal Co., on the Kentucky River, is also getting into waterway transportation, which is much cheaper if ice and other hazards do not wreck the equipment.

Kentucky production has increased greatly since the war started, due to a ready and eager demand for coal of all qualities, sizes and grades. Considerable activity has been seen in the western Kentucky field, where many new mines have been opened. The Hazard district has seen many new operations started. The Cumberland & Manchester R.R. opened up large fields in the eastern section of the state, and some big developments are promised in that region. In the Harlan districts several companies are waiting on railroad extensions and plan development when it is possible to reach market. In the Elkhorn fields, around the extreme eastern section of the coal fields of the state, a greater amount of development has been reported than from any other section. Several branch railroads are going into that district, and many new mining towns, with power-equipped mining companies, are getting ready to ship coal as soon as the lines are completed. Numerous other developments have been reported from the Harlan and Hazard fields, also from around the Straight Creek and Jellico fields.

At the present time there is little demand for coal of any grade, and mines are generally working on reduced time. The producers and jobbers are making a hard drive for business, but steam consumers are still loaded up and are operating on a smaller consumption basis themselves. Domestic consumers are well stocked, and due to the mild weather their stocks may carry them much later into the spring than had been anticipated. It had been generally believed that stocks would carry the domestic consumer until about Feb. 1, but unless cold weather is experienced

in the month of January many domestic consumers will run the season out on less than two-thirds of the coal they burned last year, and without exhausting their stocks, which in many cases were based largely on last year's consumption.

Retailers have no business to speak of. Their trucks and wagons have been put up, about one-third of their delivery equipment being kept busy. Many laid in large yard stocks of mine-run and low-grade coals, fearing a repetition of the troubles of 1917, and figuring that it would be far better to have coal of any description on hand than to be delivering direct from cars, as was the case in 1917. Prices have been weaker on all grades, and retailers have been trying to reduce stocks on hand rather than buy any additional coal, as it appears certain that prices will go no higher and high-priced low grades now on hand must be cleaned up.

Fixed Prices Stabilized Market

As a result of Government prices the market has held up in good shape. Retailers, jobbers and producers in many instances have been guilty of cutting prices slightly in order to create business. However, with a maximum Government price to work from, there has been some sort of an established market, with the result that few operators have cut more than 50c. a ton from the Government maximum prices. This has afforded the retailer a little more security than in former years. It is now a question as to when all prices and restrictions will be taken off. Restrictions have been removed in the flour-milling and other industries, and are likely to be removed from coal at any time. Many coal men adhere to the belief that in the event Government prices are relinquished the coal trade should continue to operate as close to these prices as possible and take advantage of the fact that the Government set aside the Sherman act in creating maximum prices. Such action would not represent any combine in restraint of trade, but it appears as though it will be utterly impossible to hold the trade in line.

The retailers have done better during the past two years than at any previous time in their history. Credits have been extended for only thirty to sixty days at the most, while many of the sales have been made on a cash basis. However, today retailers are so anxious to sell that they are not so particular as they were regarding cash or credit, and it is likely that conditions will eventually return to their former stage, when many consumers only paid their bills when they wanted to restock.

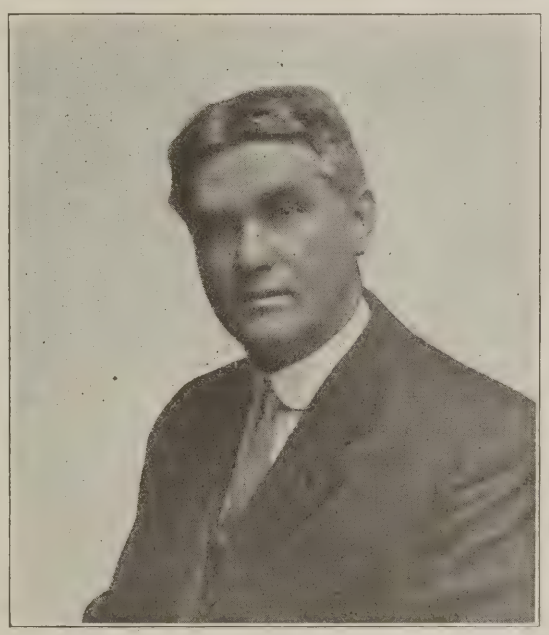
The prospects for the new year are uncertain. Rail producers cannot get away from the belief that river transportation will again be a serious factor. The zone system has lost many former connections for producers in certain sections, with the result that much rebuilding will have to be done, and at a considerable cost. Many producers have been putting their profits right back into mine improvements and additional mines, with the result that they are now tied up with the banks, and in many cases are poorer than they were insofar as ready cash is concerned. However, they have better facilities for getting out coal than they had before, and more valuable properties. They have lost far less on credits than at any previous time in their history. What the year will bring forth is any man's guess, but with the elimination of the zoning system it is believed that business as a whole will return to about the same general plane that it was on before the war.

James Scott Thompson Dies

In the death of James Scott Thompson at Salt Lake on Jan. 15 the coal industry of America loses one of its most forceful and efficient mining men of the younger generation. Mr. Thompson's death was unexpected and came as a result of heart disease.

He was born in Chicago in 1875 and graduated from the Colorado School of Mines in 1899. Physically, few men were more powerful than Mr. Thompson. During his college course he gained a wide reputation in western athletics, being recognized as one of the greatest football stars in the Rocky Mountain country.

Practically all of his business life was spent in the service of coal corporations. On leaving the School of



JAMES SCOTT THOMPSON

Mines he was first employed by the Colorado Fuel and Iron Co. Later he became assistant superintendent for the Federal Lead Co. in Missouri, but in less than a year returned to the coal fields, accepting a position as general superintendent of the Stone Canyon Consolidated Coal Co. in California. In 1909 he again entered the employ of the Colorado Fuel and Iron Co., continuing in its service until 1914, when he was appointed general superintendent of the Utah Fuel Co., which position he continued to hold until the time of his death.

Mr. Thompson is a member of the American Mining Congress and the Rocky Mountain Coal Mining Institute. His sudden death has come as a sharp blow to his host of friends throughout the country. The coal industries of Colorado and Utah, however, will continue to feel the influence and benefit of his effective service for a long time to come.

Preparation of No. 4 Buckwheat in the Cone Separator

SYNOPSIS — *With the increasing demand for and cost of anthracite, greater refinements in preparation and conservation of this valuable fuel are necessary. Among the methods used for cleaning the smaller buckwheats is the cone separator—a device long used in removing impurities from bituminous coal. Its adaptation to anthracite requirements, modifications in design and some of the results obtained, are described in this account of an interesting experiment being tried by the Lehigh Coal and Navigation Company.*

PENNSYLVANIA anthracite was likely the first coal to be washed in the United States. And probably the first extensive washing of anthracite was undertaken by the Lehigh Coal and Navigation Co. about the year 1875. This company has jigged domestic coal for many years, separating it from slate by this and other well-known methods. Until recently No. 1 buckwheat was the smallest size of anthracite cleaned of impurities. Now the Lehigh Coal and Navigation Co. improves its No. 4 buckwheat to such an extent that instead of its carrying 30 to 35 per cent. ash of ordinary breaker preparation, this size contains only 17 to 18 per cent. ash, in everyday practice; it has been cleaned down to 11 to 12 per cent. ash.

The company in question is accomplishing this result by a cone separator (shown in the accompanying illustrations), and the method is attracting much attention among anthracite operators. Bituminous coal has been cleaned by the Robinson and Howe machines for some time, but it is believed that this is the first application of these processes to anthracite preparation. The Lehigh Coal and Navigation Co. began experimenting with this separator early in 1916, adapting it to the requirements of anthracite. During this time the size and shape of the cone was changed somewhat; at present it is constructed as shown in detail in Fig. 1, and its relation to accessory parts is given in the section of that portion of a breaker equipped with this device (Fig. 2).

In the breakers equipped with the cone separator all slush water from the jigs and shakers goes to the collecting tank *A* (Fig. 2). From this tank the slush water is pumped by a 3000-gal. centrifugal pump through a 10-in. pipe to the cone separator. The pipe from the pump to the cone should be as short and have as few turns as possible, to avoid clogging up. The tank is always higher than the pump, to avoid having to prime the latter. The slush water enters the cone separator near the bottom and overflows around the circumference of the top. Entering the cone through a 10-in. pipe, the water rises and spreads out to fill a cone with a top ring measuring 7 ft. 8 in. in diameter. Thus the velocity of the water, carrying the fine coal, slate and other impurities, is considerably reduced; the slate and heavy impurities settle to the bottom and the lighter coal rises and goes over the top with the water.

A vertical shaft in the center of the cone carries three sets of horizontal arms; this stirring apparatus revolves at the rate of 12 r.p.m., keeps the contents of the cone agitated and does not permit fine material to settle on the sides of the cone. In Fig. 1 the extension of the bottom of the cone is omitted; it is shown in Fig. 2 and is marked *E*. The portion *E* is a metal cylinder equipped with two slide gates. As the slate and other refuse accumulates at the bottom of the cone, it is removed by opening these slide gates, one at a time. Thus this bottom contrivance acts as a lock and the cone water is retained while the impurities are being removed.

The top of the cone separator is surrounded by a trough by means of which the water overflowing from the cone is carried to a series of dewatering chutes *G*. These chutes have a pitch of about one in twelve and dewater the fine coal carried out of the cone with

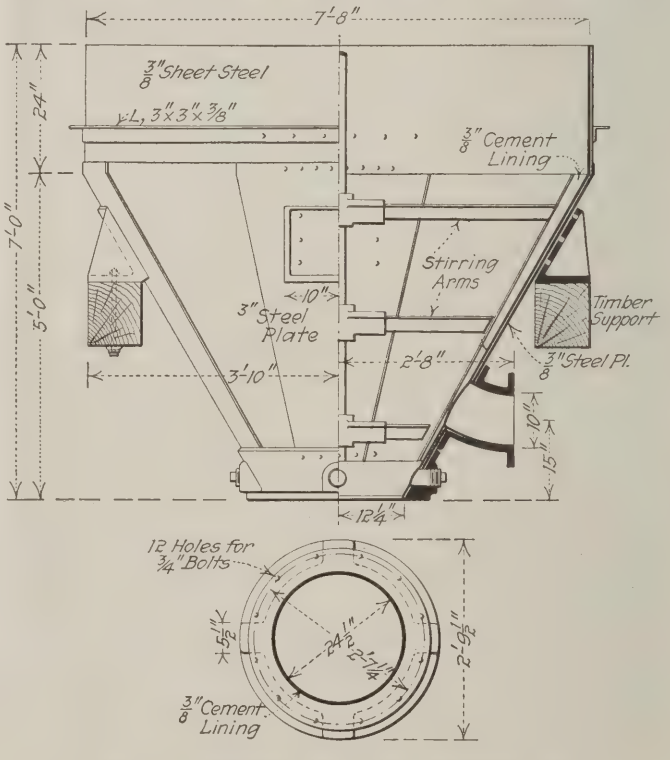


FIG. 1. DETAILS OF CONE SEPARATOR

the water. These chutes consist of a screen with $\frac{3}{16}$-in. perforations under which is a trough; water coming through the screens is collected by the troughs, from which the water is led away by the vertical boxes *H*.

Coal passing over the dewatering chutes goes to the shaking screen *J* where the dewatering process is completed. This shaker is necessary not only to carry the coal to a point where the material is entirely dewatered, but it is also useful to transport the coal to the storage

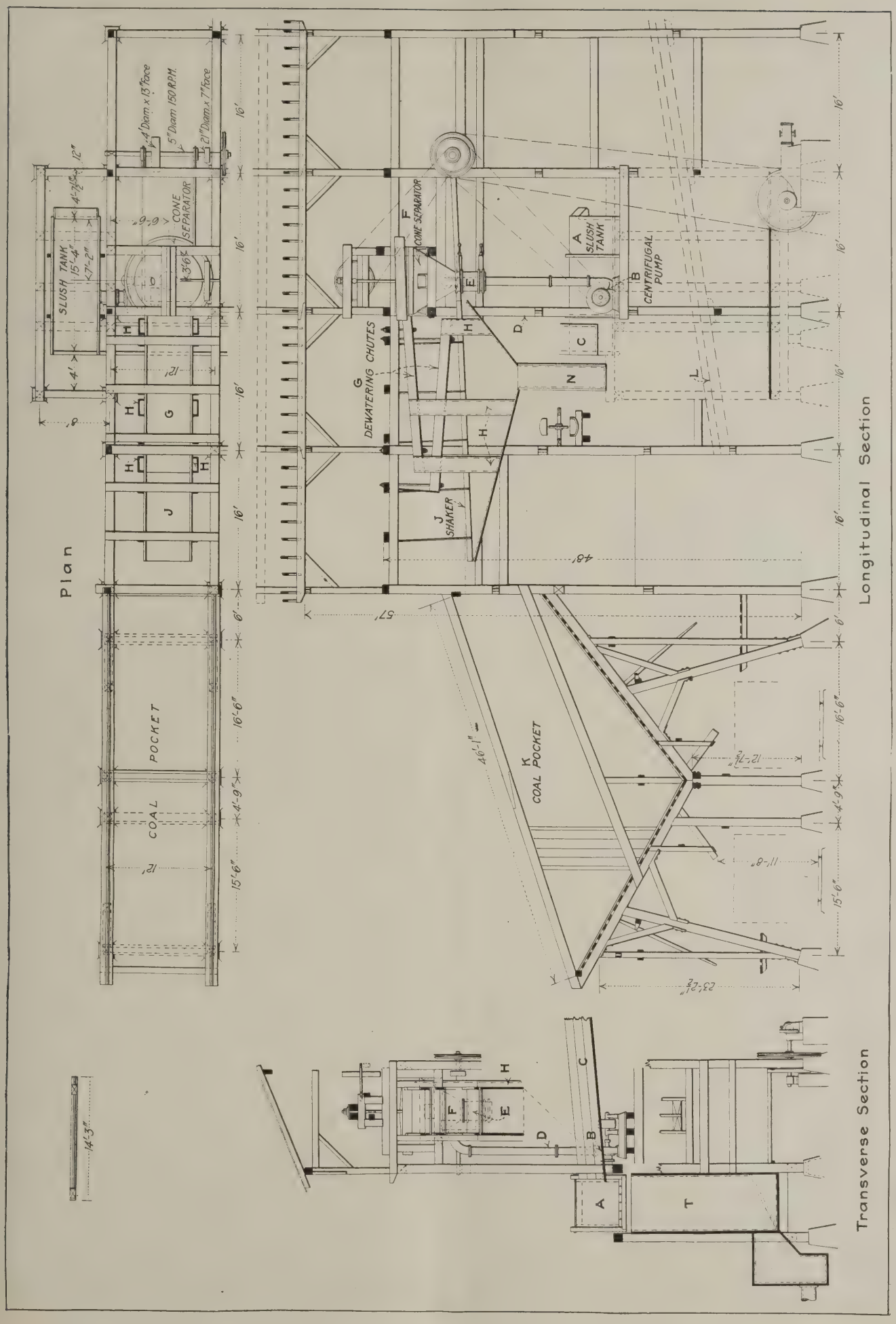


FIG. 2. INSTALLATION OF CONE SEPARATOR AND ACCESSORY PARTS IN A BREAKER OF THE LEHIGH COAL AND NAVIGATION COMPANY

pocket from which railroad cars are loaded. The shaker runs at the rate of 150 r.p.m. All water from the dewatering chutes and the shaker is collected in a hopper under the shaker; from here it is carried by a chute to the tank *T*, from which it is pumped to dams.

Special provision is made to load No. 4 buckwheat into railroad cars, as it takes longer to load it than other coal. It is loaded on tracks other than the main loading tracks for this reason. Two loading tracks are shown under the No. 4 buckwheat pocket in Fig. 2.

The Lehigh Coal and Navigation Co. has five cone separator installations at the following plants: The Nesquehoning, Lansford, Tamaqua and Coaldale breakers, and the Ashton washery. Sand, gravel and slate are removed from No. 4 buckwheat in the cone separator and coal dirt and mud in the dewatering apparatus. Each cone separator has a capacity of 150 to 250 tons per day. The total production of No. 4 buckwheat (by this process) at these five Lehigh Coal and Navigation Co. plants for the months of March to November inclusive of the year 1918 was 14,142, 12,934, 14,333, 12,025, 6818, 17,485, 12,035, 17,367 and 16,007 tons respectively. This tonnage was from freshly mined and washery coal and amounted to 123,146 tons for the nine months noted. This company can dispose of all of the No. 4 buckwheat it can produce which does not contain more than 17 to 18 per cent. of ash; the amount of refuse remaining in this size of coal after treatment by the new method is well within this limit. The Lehigh Coal and Navigation Co. uses No. 4 buckwheat with low amounts of impurities in its briquet plant and sells it as fuel, thus conserving valuable coal.

The cone separator should be serviceable in removing gravel from the small sizes of coal from strippings. Gravel frequently is washed into strippings from adjoining banks, gets mixed with the coal and generally is a nuisance in preparation. Sulphur is another impurity which it is highly desirable to remove from prepared coal. Probably certain forms of sulphur are more commonly found in the smaller sizes than in any other size of anthracite, often occurring in the form of scales. In the smaller sizes these scales generally become detached from the particles of coal and their removal should be readily effected in the cone separator.

Furthermore, in large lumps, good coal is often found attached to slate and rock. By crushing and recrushing a more or less complete separation is possible and the resulting material is in ideal shape for treatment by the cone process. There seems to be a difference of opinion as to the possibilities of this method of cleaning anthracite. But there is a tendency on the part of some of the officials of the Lehigh Coal and Navigation Co. to further investigate the matter, believing its scope is wider than its present use.

Nearly 600,000 more cars of coal were loaded during 1918 than was the case in 1917, according to figures compiled by the Railroad Administration. The loadings during the week ended Dec. 28, as compared with those of the corresponding week of 1917, are as follows:

	1918	1917
Total cars bituminous	107,350	154,883
Total cars anthracite	24,564	28,992
Total cars lignite	3,490	4,550
Grand total all cars coal	135,404	138,425

Pooling Report of the Wholesale Coal Trade Association

A conference to consider recommendations and suggestions contained in a report on matters concerning the Tidewater Coal Exchange made by the Bituminous Operators' Committee of the Wholesale Coal Trade Association of New York, of which W. A. Marshall is the chairman, was held on Jan. 15 in the New York office of the Exchange. Those in attendance were J. W. Howe, Commissioner of the Tidewater Coal Exchange; George F. Malone, Deputy Commissioner, at Baltimore; Mr. Bailey, of Norfolk; J. W. Searles, Deputy Commissioner, and his assistant, Mr. Thompson, of the New York office of the Exchange; Mr. Marshall, John W. Whitely, Charles A. Owen and Charles S. Allen, representing the Wholesale Coal Trade Association.

Mr. Marshall, in the committee's report, named three respects in which the present rules governing the Exchange should be amended. They are: (1) A more scientific classification; (2) a different method of apportioning demurrage charges and (3) a change in the method of placing embargoes.

The committee believes that with the present demurrage rules and charges it is highly important that the Exchange should be continued, and that it is certain that without the pools, the demurrage charges would be so heavy as to make it impossible for many, if not all, to ship to tide.

Present Classification of Coal Unscientific

The present classification is on so unscientific a basis, says the report, that it works a grave hardship upon the shippers of high-grade coal to a given pool, much trouble having been experienced due to the fact that inferior coals have been shipped to pools supposed to have only coals of better grades, and when sold on the latter basis have proved unsatisfactory upon delivery, resulting in complaints and in some cases loss to the shipper. Many consumers by way of protest against this unscientific classification are now demanding that their coal, whenever possible, be sent to them all-rail so as to avoid this difficulty; and this is being done even in the face of extra transportation and handling charges.

It was decided at the conference that a committee or committees will be appointed by the Executive Committee of the Tidewater Coal Exchange, probably at its next meeting, to take up and handle to a prompt conclusion this matter.

The conference then took up the matter of demurrage charges. On this matter the report states that demurrage charges should be assessed against and paid only by those shippers on whose shipments the charges have accrued and in proportion to the amount accrued against each individual; that those shippers should have the benefit of the credits earned, if any, by those handling their shipments within the free time, but that those so handling their coal should not be made to bear any part of the demurrage charges caused by others. In other words, that the credits made, if any, should go to reduce the charges against the less fortunate members of the pool, but that they and they alone should bear the penalty for lack of promptness in disposing of the coal handled for their account.

It was announced at the conference that this recommendation had been adopted by the Exchange and that it would be put into effect as soon as the necessary details were worked out.

The report stated that the present rules of the Exchange provide that when a shipper fails to furnish boats to promptly move his consignments, an embargo shall be placed against further shipments by that person. This, the committee believes, should be done in all cases; but the embargo should not be applied to every shipper through a given pool, regardless of his performance in moving his consignments.

The Exchange, it was announced following the conference, commended this recommendation, and the matter is now being handled by the Railroad Administration with a view to preventing the placing of embargoes except upon the recommendation of the Exchange. It was announced by Mr. Searles that the assent of all but one of the carriers had been obtained, though it was expected that this would be received in a short time. The committee of the association in its report suggested the following schedule for coal classification:

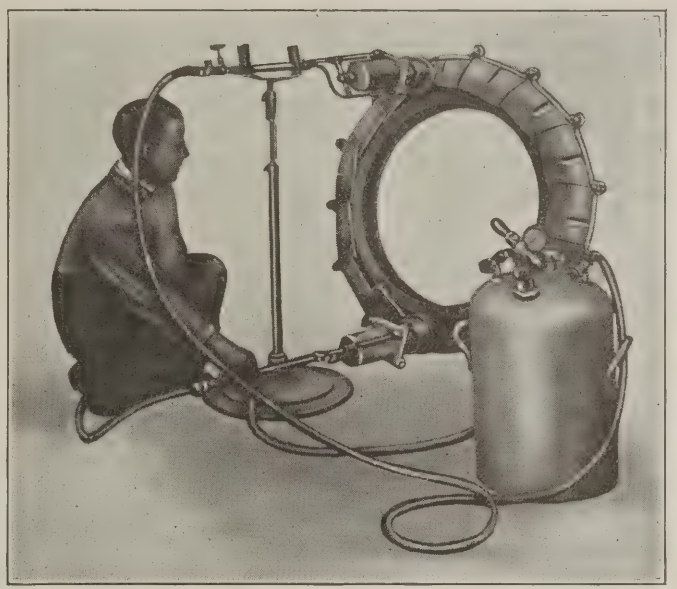
	Specifications	Description	Classification
1	Volatile under 24 Ash under 8.50 Sulphur under 1.50	Low volatile Low ash Low sulphur	Smithing
2	Volatile 24 to 32 Ash under 8.50 Sulphur under 1.50	Medium volatile Low ash Low sulphur	Byproduct and high grade gas coal
3	Volatile over 32 Ash under 8.50 Sulphur under 1.50	High volatile Low ash Low sulphur	Byproduct and high grade gas coal
4	Volatile under 24 Ash 8.50 to 12 Sulphur under 1.5	Low volatile Medium ash Low sulphur	Stoker non-clinkering
5	Volatile 24 to 32 Ash 8.50 to 12 Sulphur under 1.50	Medium volatile Medium ash Low sulphur	Stoker non-clinkering
6	Volatile over 32 Ash 8.50 to 12 Sulphur under 1.50	High volatile Medium ash Low sulphur	Railroad fuel
7	Volatile under 24 Ash under 8.50 Sulphur over 1.50	Low volatile Low ash High sulphur	High B.t.u.
8	Volatile 24 to 32 Ash under 8.50 Sulphur over 1.50	Medium volatile Low ash High sulphur	High B.t.u.
9	Volatile over 32 Ash under 8.50 Sulphur over 1.50	Low volatile Low ash High sulphur	Railroad fuel, cement plants, etc.
10	Volatile under 24 Ash 8.50 to 12 Sulphur over 1.50	Low volatile Medium ash High sulphur	Fair coal graded as to volatile
11	Volatile 24 to 32 Ash 8.50 to 12 Sulphur over 1.50	Medium volatile Medium ash High sulphur	Fair coal graded as to volatile
12	Volatile over 32 Ash 8.50 to 12 Sulphur over 1.50	High volatile Medium ash High sulphur	Fair coal graded as to volatile
13	Volatile under 24 Ash over 12 Sulphur over 1.50	Low volatile High ash High sulphur	Cheap fuel varying as to volatile or character as to smoke
14	Volatile 24 to 32 Ash over 12 Sulphur over 1.50	Medium volume High ash High sulphur	Cheap fuel varying as to volatile or character as to smoke
15	Volatile over 32 Ash over 12 Sulphur over 1.50	High volatile High ash High sulphur	Cheap fuel varying as to volatile or character as to smoke
	Rejected coals		
16	Volatile under 30 Croppy or badly prepared	Low volatile	
17	Volatile over 30 Croppy and badly prepared	High volatile	

The suggestion has been made that the use of the B.t.u. basis be substituted for the percentage of ash, and the fusing temperature be substituted for the percentage of sulphur.

New Type of Tire Expander for Use in Coal Mines

The accompanying illustration shows a new tire expander designed for coal mines and being produced by the Hauck Manufacturing Co., of Brooklyn, N. Y. It is claimed that it will expand steel in five minutes and heat to cherry red in seven minutes.

The expander consists of two special kerosene burners, a 12-gal. tank with hand pump, built inside the tank; two 12-ft. lengths of oil-resisting hose, and an adjustable sectional shield which is placed on the tire.



NEW TYPE OF TIRE HEATER FOR MINE USE

The latter is constructed in 10 in. sections and can be adjusted to fit any size tire.

Where no compressed air is available the tire heater is furnished with kerosene-vaporizing burners—which operate about three hours with one pumping. Where compressed air is available the tire heater is furnished with compressed-air burners, and it also can be furnished as a combination hand pump and compressed-air outfit. The burners when not used with the heater can be used for many special purposes where an intense heat is required, such as brazing, preheating for oxy-acetylene welding, loosening nuts, boiler repairing, straightening shafts, expanding machine parts, making shrink fits, melting out babbitt from bearings, general locomotive and car-repair work, thawing out railroad switches, thawing out empty coal cars for closing the hoppers, and for many other heating operations.

Consumers' and Dealers' Reports To Be Discontinued in Near Future

Weekly reports from industrial consumers and coal dealers, which have been required by the Fuel Administration since June, 1918, will be discontinued after Feb. 1. These reports, coming from nearly 70,000 sources, were used in determining the equitable distribution of coal. With the discontinuance of these reports, it is probable that the distribution section of the Fuel Administration will have only an advisory relation with the Fuel Administration.

Cincinnati Market Conditions in 1918

By KENNETH C. CRAIN
Cincinnati, Ohio

THE past year in Cincinnati was in many respects the most extraordinary which the coal trade has ever experienced, not only on account of the conditions common to the trade everywhere, but through some which were perhaps a trifle emphasized locally. The extremely severe winter which was experienced, with some of the worst weather in years during January and February, of course had its effect on the coal business, resulting in a heavy and continuous demand, which was filled locally only with considerable difficulty, and which in some instances in nearby towns could not be taken care of at all.

The year thus ushered in was destined to continue in a manner which promised for the trade in Cincinnati the most pleasing business conditions which could possibly be asked. In spite of the Government regulations regarding zoning, price limit, etc., the volume of business offered was such that in that important particular, at least, nothing remained to be desired; and the lesson of the severe weather did all that was necessary to a continuance of good business. With the recollection of this winter behind them, and with the united appeal of the various Fuel Administration authorities and the coal men themselves, the public, including consumers of all classes, promptly proceeded to start laying in coal for the season of 1918-19, almost before the snow of the previous winter had melted.

Not only domestic consumers, with needs limited by the consuming capacity of their furnaces, to a total of ten or twelve tons, were in the market for coal, but industrial consumers as well. Warnings were issued both by the fuel authorities and by the local gas company to the effect that consumers should not look for a supply of gas adequate to meet demands in extremely cold weather, and the experience of the previous winter amply backed up this warning. The result was something formerly unknown in the trade—a spring and summer season with a demand for coal which taxed every facility of the coal dealers and their connections to supply.

Not only was the current supply of coal inadequate to meet the demands booked by the dealers, but hauling capacity was also inadequate. In short, the state of the market more resembled that of a cold winter than the spring and summer season, proverbially dead with the coal trade. It was a common expedient with the trade, in consequence of this condition, to compile waiting lists of customers, notifying each when he could have his coal, and, in some cases, insisting that the full amount desired be taken when available, under penalty of losing his "turn"! This remarkable state of affairs, which might have been considered as totally impossible, actually lasted right up to the end of the summer, when consumers very generally had managed to secure all the coal they needed to take care of the coming season's fuel requirements.



COLLIER "TUCKAHOE" LOADING COAL AT CURTIS BAY COAL PIER, BALTIMORE & OHIO RAILROAD

Industrial storage was extraordinarily heavy, many manufacturers, by utilizing yards and other outdoor space, managing to pile up anywhere from two to six months' supply. This was the condition when the fall and winter season began, and when, on Nov. 11, the armistice was signed which caused the cessation of hos-

tilities and the immediate suspension or cancellation of war orders. And as scores of plants in and around Cincinnati were engaged on war orders, their fuel requirements showed a prompt diminution, in some cases amounting to complete cessation.

With this virtual elimination of industrial requirements, the trade has been further confronted during the winter with remarkably mild weather, such as to reduce consumption for heating purposes to a minimum. Thus, the storage supplies have been drawn upon but little, and unless the remainder of the winter sees some much more severe weather, and more of it, than the first part, many consumers, both domestic and industrial, are likely to carry over handsome balances of fuel, to an extent hardly paralleled in the past. As the first snow of the season fell on Christmas Day, and the subsequent cold snaps have been short and far from severe, this possibility has to be figured in considering the coming demand.

In attempting to forecast the state of the market, however, the question of how long it will take local industries to get back into peace harness, after being devoted for several years to war, is vital; and while it goes without saying that the resumption of peace activities will take place sooner or later, nobody knows just when it will be. In consequence, the trade at present is simply awaiting developments, fully aware that nothing can be gained by attempting to force matters, and confident that there will be an ample demand for fuel when conditions again become settled.

Good Business Outlook for 1919

R. A. Colter, secretary and treasurer of the C. G. Blake Co., and for the past year president of the Cincinnati Coal Exchange, comprising the leading members of the trade in its membership, takes this view:

"We are looking for good business when industrial concerns get around to a peace basis again," remarked Mr. Colter, speaking of prospects for 1919. "The weather, of course, has been and is against the trade, so far as demand is dependent upon consumption for heating purposes; and the disruption caused to manufacturing by the necessity of changing overnight from a war to a peace basis will take some time to repair. However, if the trade sits tight and waits for the change to take place, there will be a resumption of at least normal demand, the only question being just how long this will take. If the weather remains open for the balance of the winter, necessitating only a light consumption of fuel, there will be considerable stocks of coal carried over, as the case nearly always is when there is a mild winter, and this will tend to cut down spring business somewhat. Prospects in general, however, are good, and I see no reason for pessimism."

"We are optimistic," said J. C. Reilly, manager of the Queen City Coal Co., one of the larger domestic dealers of Cincinnati, with an especially large business in river coal. "Of course, present conditions are not such as to cause activity in the coal trade; but it will not be long before the reconstruction period is over. It will take us all, working together, to tide things over to normal conditions again, but there is no doubt that we will do it. Warm weather, coupled with the heavy storage demand which made business last spring and summer as good as it usually is in winter, is hurting domestic demand, but the industrial demand is off on account of the change from war to peace, which has affected many manufacturers seriously. Some of these manufacturers had a supply of coal stored for several months, and with the coming of peace they preferred to use this rather than save it for a reserve, as the general tendency was to cut down expenses and reduce investment.

"The spring and summer season, as I say, was remarkably good, keeping us at work fourteen hours a day taking care of the demand; and this demand was in effect that which would ordinarily wait for winter, so that there is no room for complaint on the score of the present dullness, in so far as it is caused by the extent to which people stored coal. Our supply of river coal was always good last year, on account of the use of artificial waves created by the use of the Government dams to bring coal down when the stage of the river might not otherwise have permitted it."

According to Thomas H. Richardson, manager of the Cincinnati branch of the Consolidation Coal Co., the heavy storage of coal last summer is the principal factor just now, as coal thus stored is being used to the exclusion of that offered on the market.

Consumers Have Learned a Lesson

"If these storage supplies are used up this winter, spring and summer business ought to be excellent," said Mr. Richardson. "People have learned to store their coal, and they have also learned to pay a fair price for it. The conditions of the past year, in these respects, did the trade a good service, and brought about a better appreciation in the minds of the public of the value and importance of coal than could ever have been instilled in any other way. It will not be as difficult in the future as in the past to induce customers to buy their coal in the spring and summer for the winter's requirements."

"The coal trade will be busy in 1919, as usual, but it will have to wait for business in general to get turned around, so to speak, before demand is resumed," is the way C. R. Moriarty, Western sales manager of the Cabin Creek Consolidated Coal Co., expressed his view of the situation. "The prospects for foreign business and other factors not at present clear will have to have time to develop themselves before manufacturers will feel like going ahead vigorously. Just now demand is limited, on account of reserve supplies of fuel in storage, and because concerns having coal coming on contract are of course able to get all they need under their arrangements. The railroads, which usually furnish a source of demand during the latter part of the winter, are in a similar position, so that there is hardly any quarter where one may look for business at present.

"The coming of peace, with the reduced coal requirements which result, among other things, will undoubtedly hit some small coal mines, and hit them hard. Small, high-cost operations were enabled to do business profitably under the drive for fuel which was on during the war, but this condition has now changed. With the resumption of normal conditions in the trade, including normal competition, business will seek its usual level. In the meantime, as there is no use in attempting to stimulate a demand that does not exist, the coal trade in general is showing great good sense in quietly awaiting the turn of things."

Suggestions for the Peace Conference

In Paris the representatives of the "associated" nations are trying to find a solution of the problems of the war. Here is a German suggestion taken from the Petition of the Six Associations—the League of Agriculturists (*Bund der Landwirte*), the German Peasant's League (*Deutsche Bauernbund*), the Christian German Peasant's Unions (*die christliche deutschen Bauernverein*), the Central Association of German Manufacturers (*Centralverband deutscher Industrieller*), the Manufacturers' League (*Bund der Industriellen*) and the League of Middle-Class Citizens in the German Empire (*Reichdeutscher Mittelstandsverband*). The reader will be interested to see how satisfactorily the coal fields and plants of Belgium and France are turned over to Germany. The proposal was made on Mar. 10, and May 20, 1915, the Petition being sent to the German Chancellor, Dr. Von Bethmann Hollweg, and to the Governments of the various Federated States of the German Empire.

"As a supplement to this memorandum, we must here lay special stress on the fact that the political, military and economic objects, which the German people must strive after in the interests of the security of their future, are inseparably connected with one another. . . . Hence it follows that even those demands which seem at first sight to possess a purely economic significance, must be viewed in the light of the urgent necessity for the greatest possible increase of our national strength and also from a military standpoint.

"This applies with special force to the demands, which are set forth in the memorandum, both (a) for the acquisition of territory suitable for agricultural settlement and (b) for the appropriation of the iron-ore district of the Meurthe and Moselle, of the French coaling districts in the Departements of the Nord and the Pas-de-Calais, and also of the Belgian coal fields. . . . Acquisitions, such as that of the iron-ore and coal districts mentioned above, are demanded by our military necessities and not by any means only in the interests of our manufacturing population. . . . The possession of larger supplies of coal—and, in particular, of coal rich in bitumen, which is found in great quantities in the basin of Northern France—is at least as decisive for the result of this war as the possession of iron ore.

"Belgium and North France together produce over forty million tons. Even today, as the British prohibition of coal exports (enacted on May 15) shows us, coal is one of the decisive means of political influence. The neutral manufacturing states must do the bidding of that belligerent who can guarantee a supply of coal. We cannot do this at present in a sufficient degree, and we are today already compelled to fall back upon the Belgian coal supply, in order not to let our neutral neighbors become entirely dependent upon England.

"It is quite probable that the systematic increase of the Belgian coal output, even during the present war, will prove a weighty factor in determining various neighbor states to remain neutral.

"That coal, which produces coke and gas, at the same time supplies the bases of our most important explosives, is presumably well known, as also is the importance of coal in the production of ammonia.

In benzol, moreover, it offers the only substitute for gasoline, of which we are short; and finally, it supplies coal tar, which yields (a) the oil fuel so indispensable for the Navy, (b) anthracite (anthracene) oil, the most serviceable substitute as yet obtainable at home for lubricating oil, and (c) naphthalene, the probable base of synthetic petroleum.

"It may in this connection be remarked that we should probably be unable to develop our destroyer and submarine warfare to the requisite intensity without an abundance of liquid fuel. The course of the war has so clearly proved the superiority of oil fuel over ordinary coal-firing in torpedo boats, that we should be guilty of unpardonable folly if we failed to base our future conduct on this experience.

"If our hostile neighbors secure possession of the oil wells, Germany must take care to secure for herself the necessary supplies of gas-producing and bituminous coal, and must in time of peace develop these until they constitute inexhaustible sources of oil, benzol, toluol, ammonia and naphthalene; and that, not merely in order to increase our prosperity in time of peace, but as an indispensable part of our equipment for war."

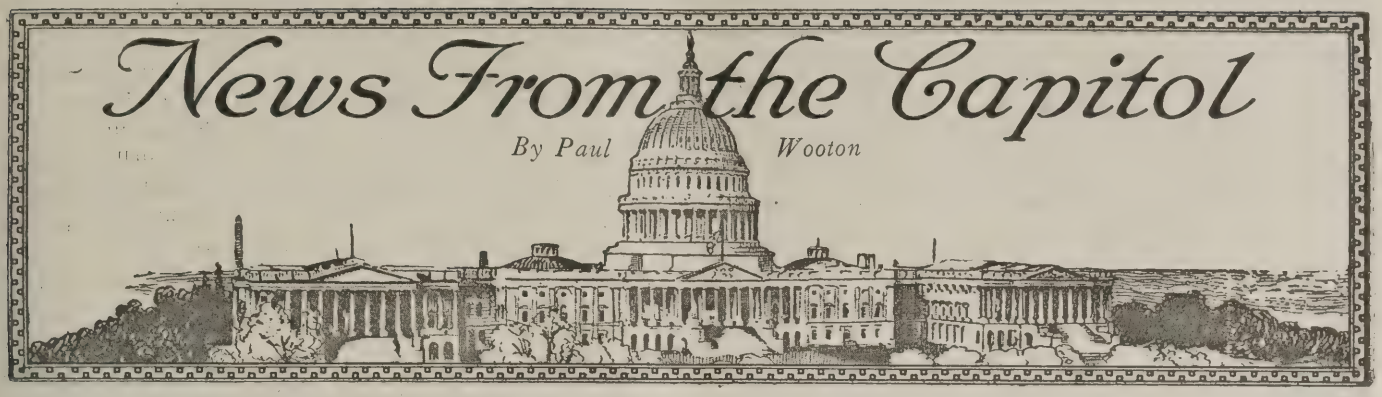
The Manifesto of the Intellectuals—German professors, diplomats and superior Government officials—dated June 20 of the same year, says less about coal but demands all (and even more than all) the territorial concessions demanded by the six associations. It, however, is quite specific as to how complete the conquest of the lands mentioned is to be:

"In order not to have conditions such as those in Alsace-Lorraine, the most important business undertakings and estates must be transferred from anti-German ownership to German hands, France taking over and compensating the former owners. Such portion of the population as is taken over by us must be allowed absolutely no influence in the Empire."

In dealing with Germany we are confronting a nation which can quote every moral phrase ever coined and appeal to every moral sentiment ever felt by humanity and then will lie, steal and murder without restraint. Germany expected to rob the world and then ask an indemnity for a war she started. Is any nation to be condemned for insisting, not on the right to rob Germany, but on the right to ask an indemnity from that Germany which started the war in the hope that it might be enabled to loot an unsuspecting world.

Local Coal Associations Would Help the Nation's Coal Industry

To carry out national plans for extending helpful service to the coal industry, the great need exists for local coal associations in several important districts. This fact became increasingly evident at the recent meeting of association secretaries, which was held in Washington. One of the principal areas which is without associations is southern West Virginia. The reason given for there being no associations in that region is because most of the operators are non-residents. The larger low-volatile operators reside in Cincinnati, while many of the high-volatile operators reside in New York.



Bituminous Price and Zone Restrictions To Be Lifted February 1

Coal prices and zones on soft coal will be abolished Feb. 1. An official announcement to this effect was made to the Fuel Administration Jan. 18. The restrictions are retained on anthracite for the present. The announcement carried with it the precaution that both prices and zones would be restored without notice if conditions should demand it. The significant feature of the announcement with regard to the Washington wage agreement reads as follows:

In the light of the so-called "Washington Wage Agreement" of October, 1917, whereby it was agreed to continue the wage scale then agreed upon during the war, but not beyond Apr. 1, 1920, the wages of mine workers should not now be reduced, and it is expected that whatever prices are asked or secured for bituminous coal between now and the promulgation of peace will be based upon the present wage scale.

Along with the zones and prices go the district representatives. The district offices in the Fuel Administration will be kept open until Feb. 15, so that records can be brought up to Feb. 1.

Denies That Railroad Administration Will Attempt To Break Down Coal Prices

Prominent among the many important announcements made recently is the statement of the Director General of Railroads outlining the policy to be pursued in the purchases of locomotive fuel. Director Hines takes occasion to deny that any effort is being made by the railroads to break down coal prices. The text of the announcement, which was issued Jan. 17, is as follows:

.The idea seems to have been suggested in some quarters that the Railroad Administration proposes to pursue a policy of so combining and using its purchasing bureau as to break down coal prices with the result of forcing a reduction in the existing rates of pay for mining labor; this is not the case.

It is the policy of the Railroad Administration to avoid at this time any undue concentration of its purchasing power of coal and to accomplish this purpose by permitting each road to purchase its own coal. It is further the policy of the Railroad Administration to require that all bids made and accepted shall be based on the existing scale of wages.

There can be no excuse, therefore, for the making of the claim that coal operators are forced to reduce wages by reason of the Railroad Administration accepting any prices which may hereafter be offered it for coal.

It is already fully understood that the railroads are not to use the car supply as a means of affecting prices. The policy on the other points above referred to is being clarified by the issuance of the following specific instructions which are being issued to make this policy clear to the purchasing agents of the roads:

"1. The railroads must not violate existing contracts or cancel contracts where the quality of coal is in accordance with specifications, without special consideration by the Central Advisory Purchasing Committee of the reasons for cancelling.

"2. The purchasing agent of each individual railroad shall buy the coal for that road under the supervision of the Regional Purchasing Committee of his region. In all requests for bids, the following paragraph should be inserted: 'It is distinctly understood that all bids are to be based on existing rates of pay for all mine labor, and the price will be subject to readjustment in event existing rates of pay are changed.'

"On contracts awarded or orders placed, the following paragraphs should be inserted: 'It is distinctly understood that the prices named herein are based on existing rates of pay for all mine labor and the prices will be subject to readjustment in event existing rates of pay are changed.'

"3. For coal which it is necessary to purchase for requirements prior to Apr. 1, 1919, the purchasing agents of each railroad should request that bids be submitted. They shall not undertake to fix the price of the seller's acceptance or make offers therefor, and shall agree only upon a price that shall be contingent upon the pay-for-mine-labor clause in paragraph 2. No negotiations for contracts for coal for delivery after Apr. 1, 1919, should be undertaken without first obtaining the approval of the Regional Purchasing Committee."

House of Representatives Passes Lignite Bill After Much Debate

By a vote of 182 to 85, the House of Representatives on Jan. 7, after acrimonious debate, passed the lignite bill. The bill already has passed the Senate and now goes to conference. The bill provides for an investigation by the Bureau of Mines to determine the commercial and economic practicability of using lignite in producing fuel oil, gasoline substitutes, ammonia, tar, solid fuels, gas for power and other purposes. It carries an appropriation of $100,000 as passed by the House. The Senate bill carries an appropriation of $150,000.

It is the intention to put up a small plant to demonstrate from a commercial standpoint that lignite can be handled on a profit-making basis. According to Mr. Norton, of North Dakota, the idea is to locate the plant either at Hebron, N. D., or at Minot, in the same state, where there is a private briquetting plant which may be utilized. Mr. Norton made one of the principal arguments in favor of the bill. In part, he said:

Let me call your attention to the immediate and tremendous importance of developing this great natural resource of our country—lignite coal. It is estimated that in the United States there is more than a trillion tons of lig-

nite coal; more than one-third of all the coal in the United States and Alaska is lignite coal. Let me particularly mention just one feature of the possibilities in the development of this low-grade coal. Investigations that have already been made show that as a byproduct from a ton of lignite coal there can be secured about 4 gal. of light oils that can be used in internal-combustion engines. This means that the light oils from lignite coal, and that can be secured from it in briquetting processes, are sufficient to meet the needs of the United States for 150 years, whereas the known or estimated amount of gasoline that can be secured from the petroleum fields of the country will only meet the demands of the United States for about the next 25 years. That is one important feature of this work that will be more fully presented to the country by the experiments and investigation to be carried on under this proposed appropriation.

Another great feature is the transportation problem. Today there is being shipped from Ohio and from other distant fields more than 7,000,000 tons of bituminous coal to the State of Minnesota.

If this lignite coal industry is developed, if the way is pointed out by the United States for private enterprise to engage in this industry, as I believe it should be, instead of transporting coal 1500 to 2000 miles into Minnesota it will be brought down there from the great coal fields of North Dakota, which are distant only a few hundred miles. That *alone* will mean a great economic saving in transportation. It will also allow of needed conservation of coal in Indiana, Ohio and Pennsylvania, where the coal fields are being rapidly exhausted. Today throughout North Dakota there can be seen fields of this coal varying in depths from 20 to 40 ft. One of the principal items in any after-war program for progressive development in this country should be the development and expansion of the use of lignite coal and its byproducts. Up in Canada they have recently appropriated $400,000 to develop the use of lignite coal there. Have we not every reason to do more to develop the use of this product in the United States?

Representative Stafford, of Wisconsin, was the principal opponent to the measure. An extract from his remarks follows:

Here we have an example of the Government going wild in Government ownership. I contend that under the authority the Bureau of Mines now possesses, similar to the authority possessed by the Bureau of Standards—of making laboratory tests to determine the practicability of these various byproducts of lignite coals—it is unwise as now proposed by this bill that the Government should go into the business of establishing a commercial plant. Originally they sought $150,000, and now $100,000 is sought by this ambitious Bureau of Mines. If it were for the purpose of merely laboratory work, I would not rise here to oppose it, but when the Government for the first time in its history is attempting to establish a commercial plant to demonstrate to the country at large whether it is economical, practical, and profitable to sell these byproducts, I say in these piping times of peace we should call a halt.

Representative Wingo, of Arkansas, who led the fight for the bill, declared that it ultimately would mean a saving of $15,000,000 to the State of Texas alone.

War Trade Board Suspends Ruling Concerning Supplementary Ship's Stores

The War Trade Board has announced the suspension of the ruling heretofore enforced, requiring all vessels when making applications for bunker licenses to furnish particulars respecting quantities of bunker fuel, port, sea and ship's stores and supplies on board vessels and those desired to be taken aboard. Hereafter the filing of Bunker Form B9-a, Bunker Form B-10, Bunker Form B-11 and Bunker Form B-12 will not be required.

Bunker licenses will be issued in the same manner as heretofore, excepting no restrictions will be placed upon the quantities of bunker fuel and ship's stores and supplies desired to be taken by vessels. A new combination application and license form will be ready for distribution in the near future, but in the meantime applicants should submit applications on the regular forms (Bunker Form B1-a, if an original license is desired, or Bunker Form B1-b, if a supplementary license is desired), and all reference to the supplementary ship's stores appearing on the applications should be deleted.

Important Ruling on the Subject of Coal Confiscated by Railroads

An important ruling has been handed down by the solicitor of the Fuel Administration to the effect that an owner of coal confiscated by a railroad between Apr. 1, and Oct. 10, 1918, is not deprived by any regulation of the Fuel Administration in effect during such period, of any legal right which he may have to recover the purchasing agent's commission which he has paid or become obligated to pay on such confiscated coal; and that the payment of such commission by a railroad on the settlement for coal confiscated during such period is not prohibited by any such regulation. This ruling, it was announced, supersedes all interpretations inconsistent therewith previously issued to individual railroads or coal companies.

Urges Formation of Statistical Branch for Each Local Coal Association

A statistical branch for each local coal association is being urged by C. E. Lesher, the geologist in charge of the coal division of the United States Geological Survey. This will be necessary, Mr. Lesher says, if the industry is to have at its disposal the most comprehensive statistics. During the war, the coal industry has had the advantage of very complete statistics made possible by the organization of district representatives. The district representatives of the Fuel Administration will discontinue their reports very shortly. This makes it necessary to get local statistics from the coal associations.

Some of the functions of the Fuel Administration probably will continue until July 1. The work of all of its district representatives, however, probably will be discontinued early in February.

Counsel Chosen for Senate Committee Investigating Hard Coal

William Wilhelm, an attorney in Pottsville, Penn., has been selected by Senator Vardaman, the chairman of the Senate Committee on Manufactures, as counsel for the committee in its anthracite investigation. Mr. Wilhelm, during the course of the present inquiry, made a number of sensational charges as to the methods being employed by anthracite operators. He is the author of drafts of legislation providing for Government tenure of percentage of anthracite coal lands; the prohibition of coal shipments when the royalty exceeds 50 cents a ton and the control of leases on undeveloped or abandoned coal lands.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

On Jan. 29, at Wilkes-Barre, Penn., a three-day convention of the insurgent organization of District No. 1 is scheduled to begin. The men in that district are in hopes that delegates will come from the two Southern anthracite districts, Nos. 7 and 9.

The Delaware & Hudson Co. has conceded the demands of its Grassy Island Colliery men, at Olyphant, Penn., and has agreed to pay for work on rock to 40 miners and 60 laborers under the agreement of November, 1916. This additional compensation will date back from the day on which the agreement was signed. A large number of consideration miners also will receive similar arrearages. The employees of the colliery voted on Jan. 12 to go back to work.

Payment for Gangways Independent of Size

The Conciliation Board in the anthracite region has been battling with the question, What is a gangway? The Delaware, Lackawanna & Western R.R. Co., Coal Department, apparently caused certain places to be driven narrower than the regular gangways, for which gangways a certain price had been established. They used these narrower places as gangways and declared that as these places are narrower the price of gangways did not apply. They argued, somewhat reasonably, that the work of the gangway driver determined the price rather than the purpose for which the place was driven.

The umpire said—somewhat testily it would seem—that "he understands fully the difference between gangways and airways, and, while he admits that the passages in the controversy were not as wide as the usual gangways, he asserts that the tunnel was used for that purpose and he refuses to read into the language of the anthracite wage agreement 'meanings that were clearly not in the minds of the parties who made and signed these contracts.' "

Gangway by Any Other Name Will Cost as Much

He also declared that coal operators cannot evade the payment of specified wage rates by calling an occupation or a place by some other name. That decision seems somewhat like a saying that another wise man recently delivered. He said that now the consumer, by careful stoking, much expenditure and skill, made 1500 lb. do the work of a ton, he should be required to pay a full ton rate for every 1500 lb. of coal received. Few of those who read that remark reacted favorably to it, nor can one react with favor toward the suggestion that the price for excavating a narrow roadway should be the same as for driving a wider place unless there were special conditions modifying this simple proposition. Frequently, it must be added, a wide place can be driven more easily than a narrow one and men are only too anxious to drive places wide, where they are paid for the coal secured. It would seem this was not true at Hallstead Colliery, or why was the price for a narrow airway made less than the price for a wide gangway? The decision of the umpire is made retroactive.

A driver at the Oneida Colliery, of the Lehigh Valley Coal Co., near Freeland, Penn., caused the death of two mules, and was discharged. The other drivers at the mine went on strike Jan. 16, alleging that the discharge of the man was not for his carelessness in taking the mules into the interior of the mine, but because he had been active in union circles. The strike lasted only one day.

President Kennedy in District No. 7 says that some soldiers and sailors in the anthracite mines have been refused their former positions. He says that they all must be reinstated and he will take the matter up with their employers.

In West Virginia Allen Bumpus, a colored miner from Republic, who claims the champion coal-loading record of the Cabin Creek field, was taken off a Kanawha and Michigan train at Charleston, W. Va., charged with ownership of a suitcase full of whiskey. He denied that he was the owner of the suitcase, but was haled before the justice on a Yost law charge.

More trouble has occurred at Drumheller, Alberta, Canada, a coal center already celebrated for production and labor trouble. The Drumheller field is second only, in Alberta, to the celebrated Crowsnest Pass field. Its production slightly exceeds that of the Lethbridge district. Consequently its labor troubles are of importance. It appears that four mines at the village of Wayne had unusually dirty coal. Commissioner Armstrong ordered the operators of these mines to pay 12c. per inch per lineal yard for the removal of this impurity and made the new rate retroactive from June 15 last. The operators declared they could not operate the mines with this handicap, and accordingly they closed them down.

The miners declare that the mines were shut down to beat the Commissioner's decision and not because coal mining under it was unprofitable. They alleged that the operators had other mines that could fill the orders of the mines at Wayne. There are 600 men idle now, and all the men in the Drumheller district are thinking of engaging in a strike if the mines are not reopened under the conditions prescribed by the Commissioner.

At Lethbridge, Alberta, a strike is threatened if two Japanese recently employed at the Galt coal mines are not discharged. At Sydney Mines, in Nova Scotia, the coal haulers are requesting an increase of 15c. per load of the miners. The Amalgamated Mine Workers of Nova Scotia has decided to let the contract for the lowest figure. It is expected that the latter organization will soon merge into the United Mine Workers of America, the men in the mines being desirous of affiliation, and the companies making no protest apparently. Formerly the corporations feared that the United Mine Workers of America might use its power to the destruction of the prosperity of the Canadian mines and to the advantage of those of the United States. They have been persuaded that the district union will have such a degree of autonomy that the dreaded result will be avoided.

About 9,500 mine workers will be affected by the change. The secretary of the Amalgamated Mine Workers is anxious to induce the legislature to amend the compensation law so that the companies will be obliged to compensate the 50 checkweigh men appointed by the men and paid by them.

Faith of Union Not To Be Impugned by Contract-Breaking Strikes

That officials of District 17, United Mine Workers of America, mean business in discouraging wild cat strikes was demonstrated recently in the Fairmont region when 300 miners employed by the Hutchinson Coal Co. at Mt. Clare, who had gone on strike without any authority from district officials, were ordered back to work. When H. E. Peters, in charge of the Fairmont office of the mine workers' organization, upon investigation found that the miners had violated their contract, he called a meeting of the strikers and informed them that they must return to work as they were violating a signed agreement. The striking miners were told that the charter of their local would be revoked unless they lived up to their agreement. Union officials are determined that there shall be no violation of contract on the part of local organizations as it casts discredit on the whole union.

EDITORIALS

Will Wages Increase in Peace Industries?

THERE is a small section of the public which says that wages must come down. It is more likely that the lower wages will rise till they get leveled up to the higher wages. As a result the average wage will increase. This will keep average prices up even though war industries may have to accept lower margins of profit.

The unionized industries have forced wages up and compelled working men, union and nonunion, to pay them; for the consumer pays the increased wage, and what are workers but consumers? During the war industries were developed by the payment of high wages, and the workers in industries that were principally of value in peace were made to stand and deliver. But a new time is at hand. The peace-worthy industries are anxious to recover the men they have lost and to secure the labor of disbanded soldiers. Unless they pay a wage equal to the war-worthy industries at points adjacent (where these are working steadily) they cannot get men.

So there will be a readjustment, still upward. Those who have a desire to buy should buy now before the price rises; for industries only suited to peace will raise prices, and the industries that are fostered by war will, like the rest, have to pay them when it buys such products. This will help sustain such war-worthy industry prices, even where margins of profit are reduced.

There Are Pleasures Even in a Strait-Jacket

THE Boston Fuel Committee on Jan. 10 removed all the restrictions that had up to that time been placed on retail distribution of coal, except the one relating to the maximum price at which coal may be sold. Even this regulation Washington has just revoked. The retail trade is therefore free. With what degree of pleasure does it greet its freedom, seeing that it has learned that there are some real benefits in strict regulation?

The retailer found in it restraint, it is true, but also support. He is now hunting around for some methods of maintaining that support. If the retailer cannot find such methods he, at least, is expecting to find some other ground for hope; for good habits have been formed, and dealers have been indoctrinated by a year of practical experience. Surely some of the supporting helps of strict regulation may still remain with the coal dealer even after he is free from Governmental control.

For free he is. The local fuel administrators admit that there is no further need for their services. It must be true, for such an admission is usually grudgingly made by bureaucrats. Those directors and tutors of the coal industry have even shown their confidence that their work is finished by presenting their resignations. Not only in Boston is this true. In ten days administrators the length and breadth of the land will be laying down their duties, meanwhile excusing the retailers from any allegiance to their behests.

Few clouds are without a silver lining. Behind all the fussy details and multiple annoyances of such careful supervision as has been placed on the coal men are disguised some real benefits which the retailer as well as the operator has not been slow to realize.

Dealers are beginning now more than ever to apprehend the entire cost of the service they have been performing for the public in all its many details. If, when competition is keen, you can only manage to close your eyes to the cost of the service you are rendering, you are quite likely to reckon it at a low figure. Now that the retailers know closely the cost of the accommodation they are affording the consumer, they are likely to have a price, a stable, inflexible price, that will not change, at least markedly, when a much-desired contract is in the balance. The expression "shading of prices" was always an unfortunate one. The consumer ever felt that a shaded price was the mark of a shady retailer. He never quite believed in the dealer who had a price which varied with the reciprocal anxiety of them both to land a contract. The consumer preferred to buy with his eyes shut and was averse to the notion that he was liable to be victimized if he did not manage to arouse a semblance of competition.

Will the dealer now stick by such a price, the sum of his items of expense plus a fair profit? During the war he had to do so and he was pleased so to do. He linked the fair and stable price with the service of his boy at the front. He coupled Government regulation with the even stricter military discipline of the army ranks. He felt it put the Stars and Stripes a little nearer the Rhine. But now it is different. He is free, and the urgency of patriotism is not so plain or so pressing. Will he now base his price on the cost of the staple, freight, wharfage and delivery plus a profit, or on what he thinks he can get his customer to pay, be it much or little?

Will he, moreover, now he is unregulated by anything other than law, reason and conscience, cease raiding his neighbor's territory and taking from him the customers his rival has secured. Will he, as before the war, haul coal to the customers of another man regardless of distance and even of loss? Aggressive business of this sort creates mutual dislike, counter raids and ill-considered reductions in price. It is shortsighted, futile and demoralizing. With the habit of keeping strictly to his own customers, and with a knowledge that the trip into his neighbor's territory will cost him so many dollars and cents, will he not, wiser now than before, avoid "head-hunting expeditions?"

And then again as to credits. Many retailers feel that they will never again have to keep so much money in "Accounts Receivable." The public has learned the art of prompt payment, and the dealer is little disposed

to let it forget what it has learned. The retailer would rather keep his money in a reasonable stock of coal than expend it in extending credits to his clients. He hopes that, in this matter also, the excellent condition of affairs will not end with the war.

These are matters directly under the retailer's control, but the attitude of the public to the retail dealer is not so closely at his command. The public is beginning to recognize, so the retailer thinks, that the charges of the retailer are based on substantial services. They do not represent merely profiteering. An outside impartial authority, a representative of the public and not of industry, stepped in and regulated the prices the retailers should charge. The authority, skeptical at first, discovers that the prices charged are fair and *have* been fair. Surely the loose accusations of the public must now cease.

These are some of the embers which the retailer hopes to save from the expiring system of fuel regulation. To let them die for want of fanning and fostering care would be the height of folly.

Inadequate Production With Six-Hour Day

BRITISH miners are exhibiting a strangely illogical point of view. Coal in Europe is in terribly short supply. There is therefore a great demand for the work of the miners. There is some doubt, however, whether all will be kept busy because there has been a lack of mine development during the war. When there were no men to fill large extensions of the mines the Government frowned on development work. Every extension demanded labor and yet added little or nothing to production. It was felt that the mine-extension problem could be well left till after the war. The consequence is that with Europe calling loudly for coal and with men to work it becoming numerous, production is halted for want of working places.

Consequently, if men are idle the fault is not in the lack of business, but in the restriction of opportunity for labor. The time when that opportunity will be available will be delayed if mine development is slow, and it will surely be slow if the hours of work are fixed at six per day. Given a six-hour day Great Britain will be hard pressed to meet the demands of business. European industry will suffer. Men will be out of work, or the population will go cold. Some will say that neither of these alternatives will happen, for the United States will supply the coal. In that event the absurdity of restricting production, from a British point of view, will be no less evident. The miner will be handing British markets over to his competitor. Such infatuation as that of the British miners well merits a hard fate. Just who will suffer most and who will gain most is not clear—but it will not be Great Britain.

At its coming Southport meeting the Miners' Federation of Great Britain is expected to ask for increases of from 30 to 50 per cent. and a six-hour day. The miners complain that prices have increased during the war 120 to 130 per cent. and wages only 75 to 83 per cent., the maximum wage now being 12 shillings and 5 pence, or about $3.02 a day.

The output of the average British mine worker is not such as to justify much more than the wage named. Perhaps it is unjust to say it, but most of them appear barely deserving of an increase to which only a larger production would entitle them. We would not, however, essay the unenviable task of determining who is mostly to blame, operators or miners, difficulties in working conditions or a meticulous desire for a No. 1 product.

So much for the wage, let us turn now to the number of hours worked per operating day. If, by working an eight-hour day, there should result an excessive coal output at any time, a few days of idleness every week would be the appropriate remedy. Why try the short-time remedy now when there is no disease? Why apply it at any time when work is plentiful. In fact, why apply the short day even in slack times? After all a whole holiday is better than several extremely short days.

There are some that are complaining that an eight-hour day at the face means a ten-hour day, bank to bank. That is extremely unfortunate. Why cannot the operator cure this undesirable condition by a man trip? In fact it seems that at every extensive mine the man trip is a necessity and an economy, if not for the operator, at least for the industry. The British miner does a short day's work. Can he feel worried about that fact when the operator who employs him views it with complacency and makes the miner oftentimes trudge farther below ground than he trudges on the surface?

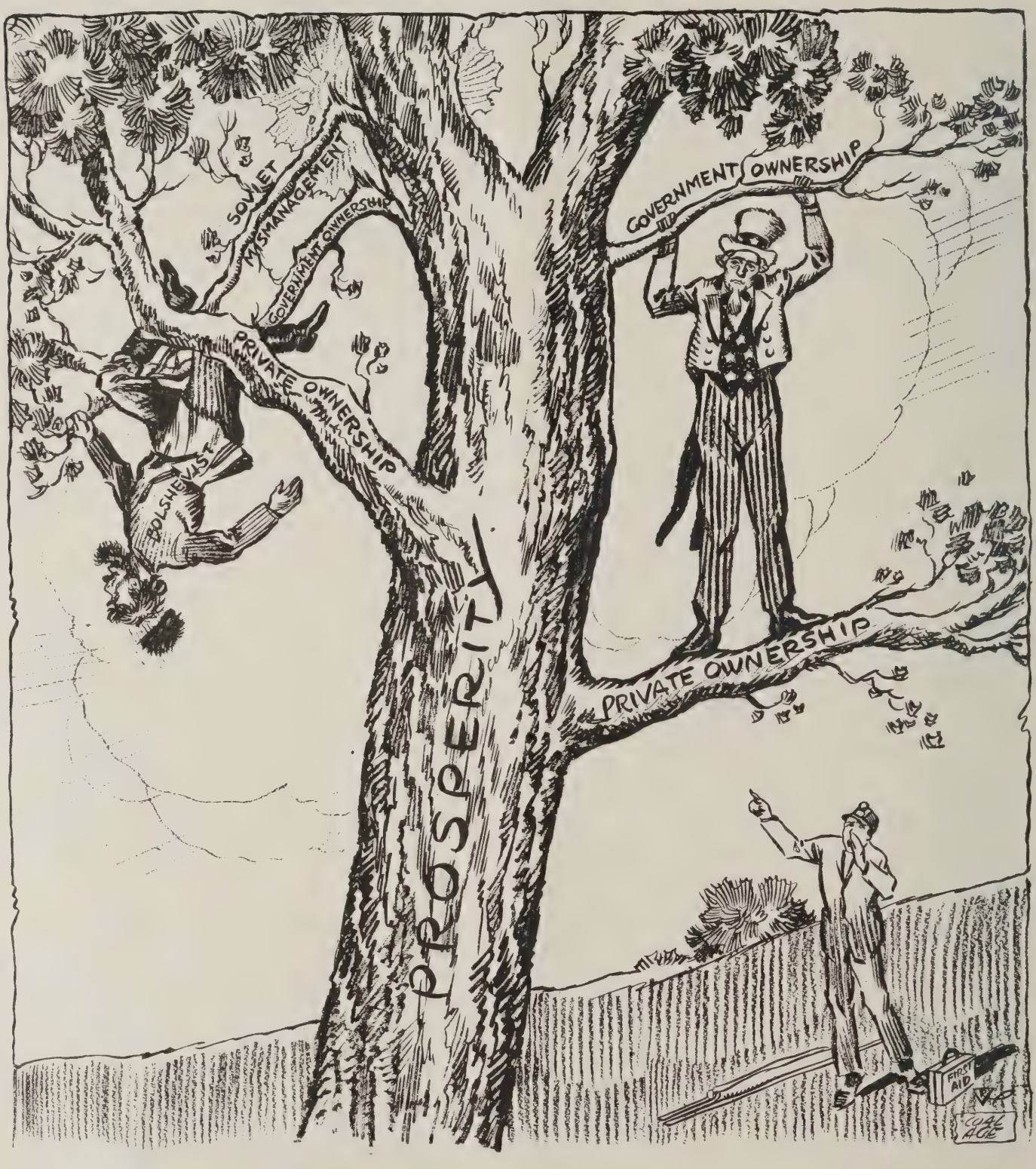
It would appear that the unreasonable attitude of the British workman, in face of a shortage at home, should furnish the American exporter with an opportunity, at least, in South America if not in Europe. A six-hour day will prevent developments as well as production. Men, who in the face of need will shorten hours, will do worse—they will render those hours of minimum productivity. The chance is now good, if ever, to put a shaft through the mail of the British export trade. With restriction in working opportunity, reduction in hours worked and deliberate loitering on the job—a trinity of handicaps—how can Great Britain continue to hold her own in the Brazils, the Argentine and the Caribbean?

Mine Workers from Enemy Countries

MANY operators have men in their employ from enemy alien countries and have found these men not lacking in willingness to do a good day's work and thus support the national cause. Nevertheless these men are troubled. They left behind in the country of their birth, a father and mother from whom they learned and inherited those qualities that have made them useful and respected. They do not know what has become of them.

The American Red Cross has a Bureau of Communications with division, state and county headquarters, and through it letters of a personal character can be sent without expense to people residing in enemy countries. If you would help any of your employees desiring to get in touch with the home folks, establish communications with the nearest Red Cross Chapter, get blanks, and have them filled out correctly. Answers can usually be expected from Europe within two or three months' time provided the persons are still alive and in the place addressed.

Better Wait Till the Limb Gets Stouter



The Russian Bolshevist reached for the Government Ownership limb thinking it would carry him. It failed. As he had left the strong support of Private Ownership, and couldn't get back to it, if he really wanted to, he tried Soviet Mismanagement instead. It snapped like a rotten limb, letting him fall to the ground.

Government Ownership is rule by one set of politicians and Soviet Rule is rule by another set. Both will be a failure till men are wise enough to run somebody else's business as well as their own and generous enough to work as hard for the public as they will for themselves.

DISCUSSION BY READERS

Zoning System of Coal Shipments

Letter No. 2—After reading the letter of Ernest B. Ligny, *Coal Age*, Dec. 19, p. 1132, I can hardly refrain from offering a few comments on the matter he has presented. While there is no doubt but that the zoning system established by the Federal Fuel Administration imposes some burdens on a few individual cases, there are two viewpoints from which the question of its benefits should be considered.

Such are the environments of the coal industry in the United States, that the business is and has been in an awkward shape. Competition is strong and the differences in the amount of capital invested by different operators and companies is so great that the successful operation of a coal mine, today, is largely a question of the survival of the fittest. By that I mean those organizations that have the greatest financial resources will overtop and eventually absorb the business of their less fortunate competitors.

Zoning System Has Restricted Unfair Dealing

It would seem that there can be no question but that the zoning system, relating to the marketing of coal, has restricted much unjust and unfair selling of coal, by certain operators, at prices below the actual cost of its production. This will apply particularly to districts lying outside of their legitimate territories.

Allow me to ask, What would be the result if the Empire Coal Mining Co., operating at Bream, W. Va., were permitted to sell its coal in Indiana. While the benefits to that company would be far less than the injustice done to Indiana coal operators, a still greater injury would be done to the coal industry at large, owing to the fact that many of the local Indiana mines would be forced to suspend operations, in order to avoid bankruptcy. The chief benefit of the zoning system is that it prevents large corporations from unloading their surplus production in an outlying territory, too often at a positive loss, in order to keep their mines running on their regular contracts. It is not assumed, however, that this applies to the company just mentioned.

Looking the situation squarely in the face, one finds that it is illegal for operators to combine in the fixing of a standard selling price for their product, which can only be done by the Government in the interest of all. Operators well know what is the average cost of production after making due allowance for overhead charges, depreciation of equipment, etc. And it goes without saying that no government desires that industrial products shall be sold at a less price than the cost of production to which a reasonable profit is added. The fact of the matter is that the root of the trouble lies in the lack of organization controlling the industry.

While many of the members, myself being among the number, who belong to the United Mine Workers of America, have suffered injustice by reason of the union, the principles of the organization, it is generally agreed, are all right. My opinion is that if coal operators were organized in a similar manner, and their activities controlled in the interests of all their operations combined, much good would result by reason of the unity thus established.

Permit me to refer, here, to the Rockefeller Foundation plan as being the only method that will insure justice to operators and employees alike. Let me urge that now is the opportune time, in this reconstruction period. Only by the adoption of some such measures can stability be assured to the coal business of the country, bankrupt methods be eliminated and the industry put on a healthy basis.

It is my impression that the British Government fixed a minimum wage for their miners about eight years ago, and I believe that there will soon be a minimum wage established in the United States. Following that, a minimum selling price will be fixed to conform with the conditions in each coal-producing district.

In my opinion, the zoning system of the shipments of coal, established by the Fuel Administration, was an effort to systematize and economize the distribution of the coal resources of the country. Let coal operators cooperate along the same line and, by organization, establish a unity of action that will develop the industry and invite the investment of much capital that at present must lie idle because of the unrestricted practices of those who have larger resources. W. H. LUXTON.

Linton, Ind.

Locating the Coal Beyond a Fault

Letter No. 8—Regarding the question of locating the coal beyond a fault, described by a correspondent in *Coal Age*, Oct. 24, p. 797, I am of the opinion that the fault mentioned is a downthrow. I also believe that the coal struck in the two boreholes sunk from the surface, beyond the fault, belonged to the X-seam.

It is true that the thickness of the coal, as shown by the results of the boring, does not correspond to that of the X-seam in the workings where the conditions were normal. But, as has already been stated by another correspondent, this reduction of the thickness of the seam has probably been caused by the great pressure incident to the disturbance when the faulting of the measures occurred. It will be noticed that the correspondent informs us that the appearance of the strata, at the face of the main heading in the fault, indicated that the formations had been subjected to a tremendous pressure, as the rock there is very much broken.

My own experience with faulted strata has been gained in the Carbonado coal fields of the State of Washington. The district is noted for its numerous slip and overthrust faults, dykes, pinches, horsebacks, etc., which are characteristic of coal fields where the strata have been contorted and twisted into numerous

anticlines and synclines such as exist in that field and, likewise, in the pitching seams of the Province of Alberta, Canada.

When a fault is encountered my policy has always been to note very minutely the nature of the hanging and footwalls to ascertain if there is any small lead that could be followed. In the absence of any such lead or stringer of carbonaceous matter, it has been my custom to secure samples of the rock at the point where the coal pinched out or the slip occurred. By studying these samples of rock carefully, it has been possible for me to correlate them as belonging to strata known to overlie or to underlie the coal, thereby showing the fault to be a downthrow in the former or an upthrow in the latter case.

Referring to the case in hand, it seems strange that, after going to the expense of drilling two boreholes, a log has not been kept showing the strata passed through. In that case, there should be no great trouble in correlating the different formations, which would have enabled them to arrive at a definite conclusion in regard to the coal struck in these holes.

It is strange, also, that when there was uncertainty in regard to the coal struck, the drilling was not continued to a depth of 50 or 60 ft. below that point, before dismantling the drill and abandoning the hole. The finding of a second seam of coal, at a depth more or less closely corresponding to the distance between the two seams in the workings, would then have given them practically definite information regarding the situation.

Cassidy, B. C., Canada. J. W. POWELL.

The Rock Arch in Mining

Letter No. 1—Interesting conditions, developing what are known locally in Utah as "bounces," are described in an article by A. C. Watts, *Coal Age*, Dec. 5, p. 1028. Mr. Watts describes certain occurrences observed during the driving of a slope in one of the mines of the Utah Fuel Co., "in virgin territory, several hundred feet away from room workings and fifteen hundred feet distant from the nearest pillar operations.

Mr. Watts attributes the excessive pressure, developing bounces and throwing the solid coal violently from the face, to the existence of two approximately parallel faults, which were passed through in driving the slope, stating that beyond the second fault the phenomena apparently ceased.

FAULTED MEASURES PRODUCE ONLY NORMAL PRESSURE

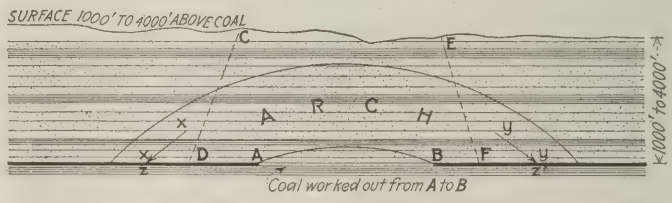
The explanation suggested by Mr. Watts does not seem to account adequately for the conditions described. The cutting loose of a block of ground by fault planes, thereby giving it freedom of movement and allowing its whole weight to rest directly on the coal bed, would hardly explain the great increase in pressure required to break the coal from the face or cause it to flow into an entry or other excavation.

In my opinion, the increase in pressure due to this cause would be limited in extent and would not be found to exist from one fault plane to the other. In other words, the pressure on the coal bed between these fault planes should theoretically be no greater than the normal pressure to which this coal is everywhere subjected by the weight of the overlying rock mass.

Some fifteen or sixteen years ago, in discussing conditions affecting mining operations in the mines of the Utah Fuel Co., I suggested to W. G. Sharp, who, if my memory serves me, was then general manager of the company, and to the late Robert Forrester, then mining geologist to the company, that severe squeezing conditions, giving evidence of very great pressure, might be encountered at considerable distances from where any pillar robbing had been done, and at distances remote from any of the workings affected by the drawing of the pillars.

An increase in pressure, in circumscribed areas remote from actual workings and in what might be termed "virgin territory," it seemed to me, might occur by the transmission of pressure, produced by the weight of the rock mass above such workings, along resultant lines of force such as develop in arched structures. That is to say, the weight of the rock mass above pillar workings will be largely sustained by transmission of the stresses due to the weight to points more or less remote from the workings, unless breaks occur in the rock mass and extend practically to the surface. If the rock mass contains thick beds of sandstone capable of sustaining great sheering stress, the weight of the rock mass will develop resultant stresses just as though it was in reality an arch. Unfortunately, it is impossible to predict the curvature or span of such arch stresses.

The accompanying sketch illustrates this principle, and is intended to represent conditions where the strata



ILLUSTRATING OVERARCHING OF STRATA

overlying a nearly horizontal coal bed are, say 2000, 3000 or 4000 ft. thick and contain thick ledges of hard sandstone, corresponding to the "Book Cliffs" district, in Utah. The sketch shows the coal bed *ZZ'*, as having been mined between *A* and *B*, the curved lines indicating an imaginary arch supporting the rock mass lying above.

Possible sheering or breakage lines are shown by dotted lines *CD* and *EF*. If the rock mass should break along these lines, there would be no transmission of stresses by arching, but the weight of the whole mass *CEFD* would then rest on the comparatively short distances of solid coal *AD* and *BF*, producing a greatly increased pressure between these points.

If, however, the rock mass does not break, the arching of the overlying strata will transmit the pressure far beyond the points *D* and *F*, as indicated by the thrust arrows *xx* and *yy*. The result will be an enormous increase in the pressure on the coal at *Z* and *Z'*. This increase in pressure cannot, of course, be determined, being modified by the pitch or dip of the formation and the possible existence of fault planes along which movement may result.

In the operation of mines in the anthracite region of Pennsylvania, it has frequently been observed that a squeeze developing in a relatively small area of mine

workings will often be quickly followed by another squeezing action, at a point so distant from the first disturbance as apparently to have no connection with it and, perhaps, separated by territory as yet unworked.

On a number of occasions, my attention has been called to occurrences of this kind, and I have no doubt that they have been caused by a transmission of pressure due to the natural arching of the strata when a break does not extend to the surface.

For this reason, it seems important that, in all mining operations in which the coal lies at a great depth below the surface, the pillars left for the protection of slopes, entries, etc., even though remote from pillar workings should be made of great width or thickness, as a precaution against the possible closure of such openings by a concentration of pressure due to arching.

In the case described by Mr. Watts, it seems possible that a thrust, due to arching above the mined territory, may have been transmitted to the block of ground between the two faults mentioned. This being unsupported on its sides and free to move, would certainly transmit a thrust, in addition to its own weight, to the coal and produce the effects described.

While the normal average pressure on a coal bed, due to the weight of the overlying rocks, is about 1 lb. per sq.in., for each foot in depth; or, say 2000 lb. per sq.in., at a depth of 2000 ft. the thrust pressure developed by mining the coal is limited only by the crushing strength of the overlying rocks, which limits their ability to transmit such pressure without crushing or actually flowing.

This limitation may be assumed as being between 6000 lb. per sq.in., for relatively soft or weak rocks, such as slates, shales and soft sandstones, up to, perhaps, 20,000 (?) lb. per sq.in., for very hard and strong rocks, such as granite or trap. If this theory of the rock stresses produced by the unsupported weight of rocks above mined-out areas is true it is entirely possible, in the vicinity of mined areas, to encounter at moderate depth rock pressures as great as would be found normally only at depths of from 6000 to 20,000 (?) feet. H. M. CHANCE.

Philadelphia, Penn.

Efficiency in Firebossing

Letter No. 2—I was interested in reading the letter of F. G. J., in regard to firebossing, *Coal Age,* Dec. 19, p. 1133, and particularly in his reference to "men who have struggled from the bottom to the top, via the fireboss route." Speaking from an experience of 20 years, in firebossing, I believe there are few men who are fortunate enough to have the opportunity of climbing the ladder by this route.

The mine foreman, from my observation, is prone to regard the fireboss as a necessary evil. That is particularly true when the foreman has never been a fireboss himself. I regret to say that there are many of this type of foreman in our mines; they have not climbed to their present eminence by the "fireboss route"; and experience leads me to conclude that more efficient ventilation would result in our mines if that had been the case.

The treatment that the fireboss receives from the average mine foreman is not encouraging. Our friend who wrote the letter to which I have just referred suggests that the mineboss should teach the fireboss all he can so that he will be able to take his place and act for him in his absence. There are, perhaps, some foremen who will do this, but the most of them prefer to keep the fireboss at his own job. They are seemingly afraid of losing their own place if there are other men who are prepared to take it.

As our friend states, conditions and laws governing mining are different in almost every state. In Indiana, the law requires that every working place where firedamp is known or supposed to exist shall be carefully examined with a safety lamp, by a competent fireboss, immediately before each shift. The fireboss must leave, at the face of each place examined, evidence of his presence there; and no person is permitted to enter a mine generating firedamp, until it has been examined by a competent fireboss and found to be safe for work.

Practice of Firebosses in Indiana Mines

It is the custom of our firebosses to enter the mines at 12 o'clock midnight. Where there is more than one fireboss each man examines his own section, which takes him from four to six hours to complete. Believe me, the work he must do is not easy. While I have never seen or heard of firebosses being compelled to dig coal in their spare time, a few years ago I had to put in my idle days in setting timbers and clearing up airways, or doing other work of a similar nature. Now, firebosses are scarce; conditions have changed and, as a rule, the men are treated better than formerly.

Speaking of promotion, however, after holding one job two and one half years, there was an opportunity for getting a better place and I went after it, only to be told that I was all right where I was. That, naturally, did not satisfy me, and my advice to the fireboss who wishes promotion and is "passed up" for some friend or relative of the management, is to look at once for another place.

I will close by saying that the greatest efficiency, in firebossing, can only be attained when the fireboss is regarded as something better than a "necessary evil." In my opinion, a man should start at firebossing, and if he can produce the goods should be advanced as the opportunity offers. FIREBOSS.

——, Ind.

Letter No. 3—It is gratifying to note that the question regarding the work of firebossing is again up for discussion in *Coal Age.* While the remarks on this subject partake largely of the nature of those made a year ago when the question was treated along somewhat different lines, my attention has been arrested by the claim set forth in one letter: namely, that the fireboss should never, under any circumstances, be called upon to do anything else than his own particular work.

Now, I have no desire to belittle the importance of the fireboss; but I want to take exception to this statement of F. G. J., *Coal Age,* Dec. 19, p. 1133. He states, further, "The fireboss should be and is, in many mines and in many respects, as important as the foreman." The duties, difficulties and responsibilities of a fireboss, cannot compare with those of his mine foreman.

In a large mine, there is usually ample work for the fireboss to perform that will occupy his whole time. But,

in a small mine, it does not require a great stretch of the imagination to see that a fireboss will often have time to busy himself looking after a pump, laying a piece of track, setting needed timbers, or other similar work that must be done.

In the case last mentioned, that of a small mine, it is my opinion that a fireboss can rightly and properly be asked to do such work. All other workers around the mine are frequently called upon to do other than their regular work, and why should not the fireboss do likewise? Is a fireboss any better than an assistant foreman, who is often called upon to perform these extra tasks? Is he any more important or deserving of more consideration than the assistant to the foreman?

Before closing, let me say, in answer to the question propounded by F. G. J., in the fifth paragraph of his letter, by saying, emphatically, yes. A foreman certainly promotes efficiency when he starts a fireboss at other work for which he has ample time without interfering with his duties as fireboss. The foreman would certainly be promoting inefficiency, in the mine, if he did not do that, or lay the fireboss off when his particular line of work is completed. The fireboss would certainly holler if that was done. EDWARD H. COXE.

Pittsburgh, Penn.

Efficiency in Mine Management

Letter No. 1—Besides being humorous and, indeed, too true, the article entitled "Need of Efficiency in Coal Mining," *Coal Age*, Nov. 28, p. 983, touches upon a vital point in coal mining and, no doubt, in other allied industries as well. Who of us has not seen all and many more of the wasteful practices mentioned in that article?

During the continuance of the war, all industries suffered alike from labor shortage. The conditions we have experienced should cause us to realize, now, the need of more concentrated effort toward efficiency; and, in no industry, is this more important than in that of coal mining. Because of inadequate or antiquated equipment, many coal operations have been forced to shut down; whereas, had they been developed on an efficiency basis, they could have survived the conditions brought about by the war. Many times have I been severely criticised by friends and clients for the constant preachment of "efficiency." Others, I believe, have had a like experience; but happy is the man who can see light breaking in darkness.

REMARKABLE TRANSFORMATION QUICKLY MADE

One incident that I recall with some pride occurred when I was called by a friend to investigate a property in which he was interested. He gave me authority to go ahead, make improvements, changes, in fact, do anything that would make the mine pay. This mine had little in its favor, except a good grade of clean coal. Transportation was difficult; material, sky high; labor, hard to get and more difficult to hold. Development was at a standstill. A trip through the mine followed by a survey of the conditions was enough. To me, it was a revelation that the crisis had not been reached long ago.

Six months later—it seemed an incredibly long time—conditions were reversed. There were new houses for the men and uptodate equipment wherever possible; but the greatest fact of all was the contentment of the men. Though labor in that district was and is yet scarce, the mine has not lost a day since taking on its new life, and is now producing a startling tonnage. More remarkable yet, this transformation took place within the period included by the months of March and August of this year. "Efficiency" was the watchword and it has proved a boon.

MISTAKEN IDEAS OF EFFICIENCY

There are those, no doubt, who can preach efficiency to the extreme. One such case that recently came to my attention was that of a property employing 130 men and keeping three bookkeepers busy in the office. The answer to my inquiry forced a smile. "Oh! We are working out a pet scheme of one of the bosses. 'Efficiency,' he calls it; and a little slip must be made out every time we turn around. Last month it was necessary to hire seven men to go about and check up the other fellows, and these two extra pen-pushers must put it down in black and white.

"The other day, the big boss came to me claiming that our overhead charges were excessive. He had a bunch of papers, stacks of figures, crooked lines and what not. Before he finished he wanted to know what was the matter in the 7-N, stating that every ton of coal from that entry cost 18c. more than from other places in the mine.

"Then he and I went up in the air and, to make a long story short, I frankly told him that if he would come down to earth and hire another tracklayer in place of the nine or ten efficiency experts, I would get coal out of the 7-N for 18c. less than any other place in the mine. Perhaps that was going some, and I expected he would fire me for being too d—— fresh."

This is by no means an extraordinary incident; it is a case of misguided energy. A level-headed analysis of working conditions and a better understanding of men would have been successful, where a wrong application of a good thing brought only failure.

Golden, Colo. F. L. SERVISS, SR.

Freezing of Shaft in Winter

Letter No. 9—Regarding the discussion of preventing the freezing of a mine shaft in winter, let me say that the mine foreman or superintendent who has not yet learned to eliminate this difficulty in his mine has yet one hard problem to overcome. Conditions differ in every mine, in this respect, and each case presents a separate problem for study.

I well remember an incident that occurred some ten years ago at a mine where I was employed as fireboss. The winter was well advanced and the air, at the working faces, had gotten so poor that it became necessary to investigate and ascertain the cause. So, after completing my examination of the working places in my section that morning, in company with another fireboss, I started out to find what was wrong with the ventilation.

Knowing it to be zero weather outside, we proceeded at once to the foot of the downcast shaft and, to our surprise, found it almost completely blocked with solid ice. The opening through which the air was passing

into the mine was, to the best of my knowledge, 2 x 2 ft., giving an area of about 4 sq.ft. It was clear to us, at once, that here was our trouble, and we lost no time in getting to the surface.

The condition of the ventilation in the mine workings and its cause, as we had discovered it, was reported promptly to the foreman and superintendent. But I do not hesitate to say that, at that time, these officials were wholly ignorant in regard to the best means to be adopted to rid the mine of such a difficulty, and prevent the further formation of ice in the downcast shaft. However, four men were quickly dispatched to the shaft, with instructions to dig out the ice and wheel it back to some place in the mine where it could be stowed away, which proved to be no easy task, as will soon appear.

The Work of Digging Out the Ice

The downcast shaft, at this mine, was divided by a partition that separated the manway from the air shaft. Descending the stairs in the manway, the men sent to perform the work of cutting away the ice were obliged to take out a few boards in this partition before they could reach the shaft bottom and begin work. The air was so keen and the current so strong, that a man could not remain in the shaft longer than three minutes at a time, and it was necessary to take a turn about until the area through which the air was passing had been enlarged sufficiently to reduce the velocity of the current. Anyone who has had experience in a similar undertaking can understand that it was no pleasing task we had in hand.

Now, regarding the best means of preventing ice trouble in a downcast shaft, in winter, let me advise extending the exhaust pipe line from the fan house to the top of the downcast shaft. Then, from this point, carry two smaller pipe lines a distance down the shaft. A valve should be placed in the main pipe, which conducts the exhaust steam to the top of the shaft, and this valve should be closed when the steam is not required in the shaft, in more moderate weather.

Advice of Scotch Miner Taken

It was not long after the occurrence of this incident that a Scotch miner told the superintendent of this plan for avoiding the ice trouble, by conducting the exhaust steam from the fan into the shaft. The superintendent acted upon the suggestion at once; and, I am glad to say that, from that time on, no further trouble was experienced with the formation of ice in the shaft at that mine.

Before closing, however, let me warn any who may adopt this method of overcoming the ice trouble in a wet shaft, that it is necessary to keep the fan running at normal speed, in cold weather when ice would be formed in the shaft. I would even suggest the speeding up of the fan at such a time. This will not only give a larger volume of exhaust steam entering the downcast shaft; but it will increase the volume of warm air ascending the hoisting shaft and keep that shaft and guides in good condition. It is important to remember that if the night fireman is allowed to let his steam get low, and the fan is run below the normal speed, trouble will be apt to follow. The slogan to adopt is: A small amount of exhaust steam in the shaft is worse than none at all, as it will only assist the formation of ice at the shaft bottom and do more harm than good.

Poston, Ohio. J. H. Taylor.

Inquiries of General Interest

Calculation of Runaway Track

On the Wheelwright division of the Elkhorn Coal Corporation's mining properties, we have what is commonly called a "runaway track." This track starts from the cutoff switch at the foot of the incline leading from the tipple to the mine slope and is constructed on such a vertical curve that it will retard and bring to rest a car that may chance to get loose and run wild into the mine. The cutoff switch is always set for the runaway track.

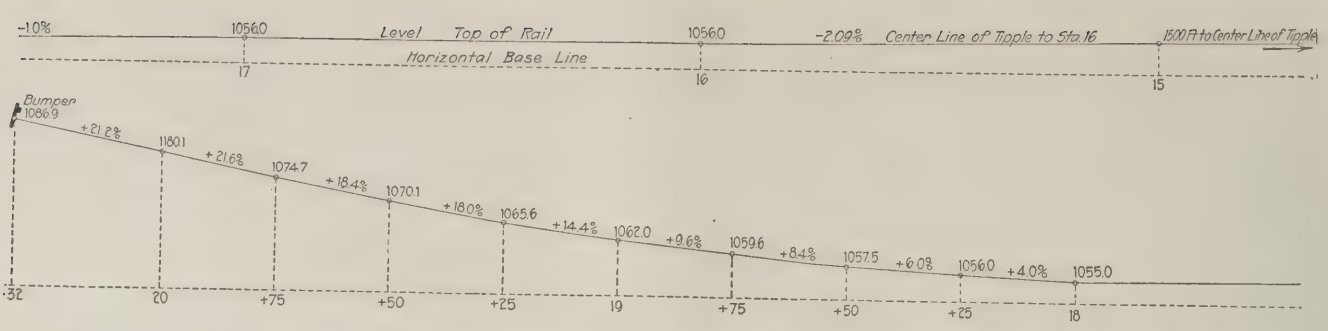
Being up against this proposition, we have made some calculations, but desire to submit our results to the Inquiry Department of *Coal Age* and ask for their revision. What we desire to know is the speed at which a wild car, getting loose on the tipple and starting from rest at Sta. 0, which is the center line of the tipple and head of the incline, would reach Sta. 18, where the upgrade of the runaway track begins. Also, at what point on the upgrade of this track would the wild car be brought to rest. Following are the data entering into this proposition and necessary for the calculations:

As shown on the accompanying profile, the incline leading from the tipple has a uniform downgrade of 2.09 per cent. or from Sta. 0 to Sta. 16, 1600 ft. Then, there is a level stretch of 100 ft. to Sta. 17, followed by a 1 per cent. downgrade to Sta. 18, where the upgrade of the runaway track begins.

The profile shows the variation of upgrade, in 25-ft. lengths, corresponding to the vertical curve of the runaway track. In this calculation, assume a straight track from the head of the incline on the tipple to the bumper at the end of the runaway track, and a good condition of track throughout. Assume, also, a 55-ton car loaded with coal, the gross weight being 66½ tons. The estimated length of the runaway track is, as shown on the profile, 232 feet. Division Engineer.

Wheelwright, Ky.

The runaway car, in this case, moves under the action of gravity, which is resisted in part by a force known, in haulage, as the "track resistance." The accuracy of the calculation will depend on the actual track



PROFILE OF TRACK FROM TIPPLE IS SHOWN ABOVE, AND BELOW IS THAT OF THE RUNAWAY TRACK

resistance, which we will assume is 20 lb. per ton of moving load. There are three phases to be considered: (1) On the downgrade, the net force producing motion is the gravity pull due to the inclination, less the track resistance. (2) On the level stretch, there is no gravity pull, and the movement of the car is retarded by the track resistance only. (3) On an ascending or upgrade, the movement is retarded by a force F, which is equal to the sum of the gravity pull due to the grade and the track resistance.

This calculation is based on the work performed by the force F, moving through a distance or space s, being equal to the amount of energy stored or given out for any given change in velocity. If the forces act to produce motion, the change of velocity is $v_2 - v_1$. On a level stretch or an ascending grade, the forces act to retard movement, and the change of velocity is then $v_1 - v_2$.

Calling the force acting to produce or retard motion F (lb.), and the mass M of the car or its weight W_t (tons) and any two velocities considered v_1, v_2 (ft. per sec.), the two basal equations employed are the following:

Downgrade,

$$Fs = \tfrac{1}{2}M(v_2^2 - v_1^2) = 2000\frac{W_t}{2g}(v_2^2 - v_1^2) \qquad (1)$$

Level or upgrade,

$$Fs = \tfrac{1}{2}M(v_1^2 - v_2^2) = 2000\frac{W_t}{2g}(v_1^2 - v_2^2) \qquad (2)$$

Now, calling the angle of inclination a, the gravity pull, in pounds, is 2000 W_t sin a; and since the track resistance is assumed as 20 lb. per ton of normal pressure, it is $20W_t$ cos a; which gives the following expressions for the force (F), acting either to produce or retard motion, in the three phases mentioned:

Downgrade, $$F = 2000W_t\left(\sin a - \frac{\cos a}{100}\right) \qquad (3)$$

Level, $$F = 20W_t \qquad (4)$$

Upgrade, $$F = 2000W_t\left(\sin a + \frac{\cos a}{100}\right) \qquad (5)$$

Then, combining Equations 1 and 3, and solving with respect to v_2, which is the velocity due to acceleration by gravity through a distance or space s, on a plane whose angle of inclination is a, we have,

Downgrade, $$v_2 = \sqrt{v_1^2 + 2gs\left(\sin a - \frac{\cos a}{100}\right)} \qquad (6)$$

Again, combining Equations 2 and 4, we obtain for the retarded velocity v_2, after passing over a level stretch or distance s,

Level, $$v_2 = \sqrt{v_1^2 - \frac{2gs}{100}} \qquad (7)$$

Finally, combining Equations 2 and 5, we have for the retarded velocity v_2, due to ascending a plane whose angle of inclination is a,

Upgrade, $$v_2 = \sqrt{v_1^2 - 2gs\left(\sin a + \frac{\cos a}{100}\right)} \qquad (8)$$

It is necessary, first, to find the value of the expression in parenthesis for the given grade, which is 2.09 per cent. from Sta. 0 to Sta. 16, and the value, in this case, is 0.011. Then, assuming the runaway car, weighing 66.5 tons, starts from rest at Sta. 0, $v_1 = 0$, and $s =$ 1600 ft. Substituting these values in Equation 6, we have for the velocity of the runaway car, at Sta. 16,

$$v_{16} = \sqrt{2 \times 32.16 \times 1600 \times 0.011} = 33.65\ ft.\ per\ sec.$$

From Sta. 16 to Sta. 17 is level; $v_1 = 33.65$ and $s =$ 100 ft.; and substituting these values in Equation 7, we find, for the velocity of the car at Sta. 17,

$$v_{17} = \sqrt{33.65^2 - 2 \times 32.16 \times 100(\tfrac{1}{100})} = 32.67\ ft.\ per\ sec.$$

From Sta. 17 to Sta. 18 is a downgrade of 1 per cent. Hence, substituting the values $v_1 = 32.67$; $s = 100$; sin $a = 0.01$; cos $a = 1$ in Equation 6, we have

$$v_{18} = \sqrt{32.67^2 + 2 \times 32.16 \times 100(0.01 - \tfrac{1}{100})}$$
$$= 32.67\ ft.\ per\ sec.$$

On this stretch, it happens that the gravity pull is equal to the resisting track resistance and there is no change in velocity. The car has now reached the foot of the upgrade, which is 4 per cent. for a distance $s = 25$ ft.; and substituting the necessary values in Equation 8, we find for the velocity of the car at Sta. 18+25,

$$v_{1825} = \sqrt{32.67^2 - 2 \times 32.16 \times 25(0.04998)}$$
$$= 31.42\ ft.\ per\ sec.$$

In like manner, the velocity is found for each 25 ft. of distance and the respective grades shown in the figure, giving the following results: $v_{1850} = 29.58$ ft. per sec.; $v_{1875} = 26.91$ ft. per sec.; $v_{19} = 23.55$ ft. per sec.; $v_{1925} = 17.60$ ft. per sec.; $v_{1950} = 2.12$ ft. per sec.

At this point it is necessary to solve Equation 8 with respect to s, which gives

$$s = \frac{v_1^2 - v_2^2}{2g\left(\sin a + \frac{\cos a}{100}\right)} \qquad (9)$$

Then, making $v_2 = 0$, we find, for the distance in which the car will be brought to rest, on this 18.4 per cent. grade, $s = 0.37$ ft., or Sta. 19 + 50.37.

EXAMINATION QUESTIONS

British Columbia Examination, Third Class, Dec. 17, 1918

(Selected Questions)

Ques.—Describe the various instruments which you, as a fireboss, would use to determine the condition of the mine atmosphere, the quantity of ventilation, and general condition in the air-courses.

Ans.—The temperature of the mine atmosphere is ascertained by means of a good thermometer, similar, in all respects, to the common house thermometer. The humidity of the mine air is calculated from the difference of readings of a wet- and dry-bulb thermometer. This instrument is called a hygrometer. The drier the atmosphere, the more rapid the evaporation of water from the wet bulb and the greater the difference of the readings of the two bulbs, which shows an increased humidity of the air.

The quantity of air in circulation is measured by an anemometer. This instrument consists of a vane having inclined blades and mounted in a suitable frame equipped with dials that mark the number of revolutions made by the vane, each revolution corresponding to 1 ft. of air-travel. A watch for determining the time the instrument is exposed and a tape for measuring the size of the air passage are necessary to calculate the volume of air in circulation.

The water gage, consisting of a U-shaped glass tube mounted on a suitable base is used to determine the difference in pressure between two airways. The greater pressure on the intake airway causes the water to fall in one arm of the tube and rise in the other, the difference in the water levels indicating the pressure producing the circulation. Each inch of the water column corresponds to 5.2 lb. per sq.ft. of pressure.

The barometer is used to determine the amount of atmospheric pressure, which indirectly affects the mine atmosphere by permitting the expansion of gases from the waste and void places in the mine. A decrease of atmospheric pressure indicated by a falling barometer gives warning of an increased gaseous condition of the mine air. The barometer consists of a glass tube closed at one end. The tube is filled with mercury and inverted, the open end being submerged in a vessel of mercury. The pressure of the atmosphere on the surface of the liquid in the basin supports the mercury column in the tube. The mercury column rises and falls as the atmospheric pressure increases or decreases.

Ques.—Describe some system of working a coal seam with which you are acquainted, giving sketches if necessary.

Ans.—The simplest and most effective way of extracting coal from a seam is the method known as the longwall system of mining, whenever this system can be applied successfully. In longwall mining, all of the coal is taken out as the working face is advanced. A solid pillar of coal may or may not be left around the shaft bottom when the work is started. The development proceeds equally in all directions and the working face is approximately a circle or an arc of a circle. As the coal is taken out, the roof settles gradually and uniformly on the waste, which is built up as solid packwalls, a short distance back from the working face. The area at the face is supported temporarily on timbers, which are drawn and reset as the face is advanced. No powder is required for blasting, but the coal after being undermined is broken down by the pressure of the roof. The success of the longwall system depends chiefly on maintaining a uniformly traveling weight on the coal.

Ques.—Describe, in detail, how you would remove a body of gas from a pair of rise headings.

Ans.—First, withdraw all the men working on the return of these headings. Then, start by increasing the quantity of air ventilating the headings and watch the effect. Use only safety lamps of approved type, and make frequent tests to observe what progress is being made in moving the gas. It may be necessary to start a brattice from the mouth of the intake on the gangway and extend it gradually up the rise, allowing the gas-charged air to return behind the brattice. By this means, the gas is gradually removed from the first heading, up to the last open crosscut. When this is reached, the return should be made to pass out through the crosscut, the main line of brattice being extended to the face of the first heading until the gas is completely removed, after which a similar method must be employed by extending a brattice from the last open crosscut to the face of the second heading, until that gas has been removed. It is frequently difficult to remove gas from the face of rise headings, if the gas is warmer and lighter than the mine air.

Ques.—Describe the various means, appliances and fixtures necessary to properly conduct the air current to the various parts of the mine.

Ans.—In conducting an air current throughout a mine, there are required doors, stoppings, air bridges, either overcasts or undercasts, and brattices. Doors mounted in substantial frames set in the airways are made to open against the air current, so that the pressure of the air will keep them closed. A door must be set with sufficient fall to prevent its standing open when not blocked. A stopping is a wall or partition built in a crosscut or passage so as to close the opening to the circulation of air. An air bridge may be either an overcast built above a roadway, or an undercast built in the floor, the purpose being to conduct an air current across the roadway without interfering with the air passing on the road. Overcasts are much preferred to undercasts, as they are less liable to be blocked by an accumulation of water or blackdamp. The term "brattice" is sometimes applied to a wooden stopping, but more commonly refers to a partition of canvas or wood extended along the rib of an airway or other passage to conduct the air to the face. At times, flexible tubes of canvas are used for this purpose.

What Happened in 1918

[Unless otherwise indicated, the bracketed figures in the text refer to pages in the last two volumes and the present volume of *Coal Age* and should the reader desire further information he can obtain it by reference to the pages indicated.]

January

Jan. 1—Mine workers of the Carterville Big Muddy Co. at Cambria, Ill., work on New Year's Day, giving their wages and the company giving its profit to the American Red Cross [XIII, 164].

Jan. 5—Judge Robert S. Lovett, Director of Priority, declares that the "tag system" of giving priority to every car tagged by a Government official, however competent, was cause of car shortage [XIII, 62].

Jan. 10—To save fuel, manufacturers of boxboard agree to close down from 7 A.M. on Saturdays till 7 A.M. on the following Monday.

Jan. 12—Alabama operators ordered to accept Fuel Administration's decision [XIII, 152]—Mine explosion at Minnie Pit of Podmore Hall Colliery, Halmerend, South Staffordshire, England, of the Midland Coal, Coke and Iron Co., Ltd., in which about 160 men lost their lives [*Colliery Guardian,* XCV, 134, 383].

Jan. 14—Francis S. Peabody, Chairman of Committee on Coal Production, testifies before Senate Investigating Committee [XIII, 146]—State Fuel Administrators are given power to divert coal and coke where such diversion is necessary for the assistance of coal-using industry [XIII, 202]—Captain of the Birchenwood Colliery No. 1 rescue team loses his life in rescue work, the reducing valve not being rightly adjusted [*Colliery Guardian,* CXV, 383].—Senate passes Walsh-Pittman coal and oil-lands leasing bill for the general leasing of coal, oil and gas, and sodium lands.

Jan. 15—United Mine Workers Biennial Convention assembles at Indianapolis, Ind. [XIII, 153].

Jan. 17—Referee in bankruptcy orders sale of 12,000 acres of land of J. V. Thompson to H. C. Frick Coke Co. for $500 an acre [XIII, 216]—Francis S. Peabody testifies before the Senate Investigating Committee urging the necessity for clean coal, the need for the zoning of the coal industry and suggesting a price for coal based on coal thickness [XIII, 201].

Jan. 18—All industries east of Mississippi closed down for workless days [XIII, 163, 200, 293, 336]—Garfield adds long list of firms exempted from the workless days order.

Jan. 21—Interstate Commerce Commission upholds the refusal, under certain conditions, of the Baltimore & Ohio R.R. to supply coal cars to wagon mines [XIII, 201]—United Mine Workers of America approve the Washington Agreement [XIII, 248]—First "workless Monday."

Jan. 23—Explosion at Allan shaft, Stellarton, Pictou County, Nova Scotia, 86 lives being lost [XIII, 252].

Jan. 24—J. D. A. Morrow appointed commissioner with the title of Manager of Apportionment and Distribution for the zoning of all fuel except petroleum [XIII, 290]—Anthracite operators pool all coal at New York City.—The Fuel Administration reduces the prices for run-of-mine coal and prepared sizes produced in the Deerfield or Palmyra fields and the Massillon and Jackson fields in Ohio, 5c. per ton. The price of screenings is raised 45c. [XIII, 251].

Jan. 25—United States Fuel Administrator announces his plan for regulating coal distribution [XIII, 250].

Jan. 26—United Mine Workers of America conclude their biennial session at Indianapolis after advocating earlier in the day that the Interstate Joint Conference be widened to include representatives of other districts than Illinois, Indiana, Ohio and western Pennsylvania [XIII, 243]—Fuel Administrator forbids all unusual hours of labor introduced to evade the law relating to workless day provisions.

Jan. 29—Alabama operators agree to comply with the terms of the agreement proposed by the Fuel Administration through Rembrandt Peale and declare they will not recognize the union but will increase wages if necessary [XIII, 294].

February

Feb. 1—General committee of anthracite operators formed to regulate anthracite industry [XIII, 283, 296].

Feb. 4—Dominion Coal Co. makes an agreement with its men [XIII, 381].

Feb. 5—Order in Council passed by Canadian cabinet suspending operation of all manufacturing plants in Canada Feb. 9-11, closing country clubs during February and March and theaters on Mondays from Feb. 18 to Mar. 25.—J. E. Roderick, chief of Pennsylvania Department of Mines, dies [XIII, 308].

Feb. 6—A. C. Campbell and Tudor Williams, fuel administrators in Luzerne and Lackawanna Counties, order the operators in the anthracite region to prepare their coal, as in former days, with breakers and washeries [XIII, 341, 383, 391, 435].

Feb. 7—Members of the mine-cave committee of the Civic Bureau of the Scranton Board of Trade meet with railroad presidents and heads of coal companies in New York City.

Feb. 8—War Department refuses request of Fuel Administration to exempt mine workers.—Fuel Administrator lifts Monday-closing order from North Carolina, Tennessee, South Carolina, Georgia, Florida, Alabama, Mississippi and Louisiana and gives power to state fuel administrators to withhold coal as well as to divert it.—Dr. H. A. Garfield, United States Fuel Administrator, refuses to Alabama the increase of 45c. per ton in the price of coal granted in other regions.

Feb. 10—Changes in demurrage rules come into effect [XIII, 293].

Feb. 11—L. A. Snead, in charge of apportionment and distribution, is appointed assistant to the United States Fuel Administrator with duties similar to those in the office he vacates.

Feb. 12—Tipple No. 5 of the Jackson Hill Coal and Coke Co. is burned in a fire believed to be incendiary [XIII, 391, 436]—Seward E. Button becomes chief of Department of Mines of the State of Pennsylvania [XIII, 342].

Feb. 13—Fuel Administration announces that as the coal situation has improved the fuel restrictions on Mondays will hereafter be removed [XIII, 336].

Feb. 14—Fuel Administrators of New England declare that under powers delegated to them by the National Fuel Administrator next Monday will continue as a holiday in New England except perhaps in New Hampshire. (New Hampshire was later included.)—Big strike commences in the Alabama field at mines of Tennessee Coal, Iron and Railroad Co., and on Feb. 15 extends to Republic Iron and Steel Co. [XIII, 308].

Feb. 15—Judge Strauss, of Luzerne County, Pennsylvania, reverses decision of Workmen's Compensation Board of that state, the judge declaring that the negligent act of an employee does not defeat his right of compensation [XIII, 391]—Smithing coal put at same price as prepared sizes of bituminous coal.

Feb. 17—Ten members of the National Board of Labor named [XIII, 424].

Feb. 18—Coke prices revised by Fuel Administration in certain coke districts of Georgia, Alabama, West Virginia and Oklahoma.—Fuel Administration orders that prices shall be the same for the same kind of coal whether sold by operator or jobber.

Feb. 18-21—New York meeting of American Institute of Mining Engineers.

Feb. 20—Texas and Montana notify the Fuel Administration that they will take care of their own fuel needs during the war. Anthracite is barred entirely in Montana.—The Fuel Administration classifies coal consumers into four groups with priority in coal delivery in accordance with their importance.

Feb. 21—Fuel Administration fixes price of diverted coal [XIII, 378]—Elias Phillips, mine inspector at DuBois, Penn., dies suddenly [XIII, 436].

Feb. 22—By an explosion of 28 cases of powder at the Royal colliery at Virden 4 men were killed [XIII, 436, 476]—Col. Reese A. Phillips, former general manager, Delaware, Lackawanna & Western R.R. Co., Coal Department, dies at Scranton, Penn. [XIII, 436]—George W. Theiss, president, Theiss-Bygate Co., coal operators of Pittsburgh, Penn., former vice-president of the Monongahela River Consolidated Coal and Coke Co., dies of a stroke [XIII, 436].

Feb. 23—Fuel Administrators of Maine, Rhode Island, New Hampshire, Vermont, Connecticut and Massachusetts have decided to suspend "heatless Monday" under the United States Fuel Administration order of Jan. 17.—A. W. Calloway, of the Davis Coal and Coke Co. and the Terminal Railroad Coal Co., is appointed Director of Bituminous Coal Distribution [XIII, 423]—Four shotfirers are killed in an explosion at the mines of the Citizens Coal Co., at Springfield [XIII, 436, 476, 565].

Feb. 26—The Fuel Administration demands greater coal conservation [XIII, 424]—Senator Reed attacks the Fuel Administration in the Senate.

Feb. 27—Frank P. Walsh chosen by American Federation of Labor to serve on the National Board of Labor.—Independent Union of Miners of America organized.

Feb. 28—Fuel Administration orders that where cannel and bituminous coal is mixed the Government price for bituminous shall govern [XIII, 462].

March

Mar. 1—Joint committee appointed by Government officials, eastern railroad representatives and mine operators of Pennsylvania, Maryland and West Virginia to apportion cars to meet the railroad-fuel demand [XIII, 461].

Mar. 2—Bill introduced by government of British Columbia for the establishment of an 8-hr. day, bank to bank.

Mar. 4—Public Service Commission holds a hearing relative to the request of A. H. Wiggin, state fuel administrator, that all private power plants in the city of New York be closed down and power requirements supplied by public-service corporations—Coroner's jury brings in verdict to the effect that Stellarton explosion of Jan. 23 was probably caused by act of an alien enemy.

Mar. 6—Priority given to coal by order of Jan. 17 is removed in all states east of the Mississippi except Pennsylvania, Maryland, West Virginia, Ohio and eastern Kentucky [XIII, 512]—Priority is given to New York Central and Hudson R.R. Co. railroad coal over all other coal contracted for.

Mar. 8—Fuel Administration makes regulations for retailing [XIII, 510].

Mar. 9—The Fuel Administration announces that the prices of anthracite will be reduced 30c. per ton from Apr. 1 to Sept. 1 instead of the usual reduction of 50c. in April, 40c. in May and so on till August when only 10c. is usually deducted from the winter circular. It also announces a system of inspection. Summer reductions in Colorado will apply only to prepared sizes on both domestic and steam coal. It shall not apply to lignite.

Mar. 10—British government announces that on Mar. 21 it will proceed to the enlistment of 50,000 miners.

Mar. 21—Several orders dating back to the order of Jan. 30, 1915, relating to the freight rates on anthracite are vacated by the Interstate Commerce Commission and an increase in rate not to exceed 15c. per long ton is added to the freight rate on anthracite [XIII, 633].

Mar. 16—Rules and regulations governing the distribution of coal and coke by persons, firms, corporations and associations subject to license are formulated by the Fuel Administration.

Mar. 20—Manufacturers of box board, who reduced their fuel consumption by running 5 days a week resume their full schedule.

Mar. 22—The Fuel Administration announces new price classification for the entire state of Illinois and for large coal fields in Ohio, Pennsylvania, Virginia and West Virginia.

Mar. 28—New prices are named for Washington, Oklahoma and Arkansas mines [XIII, 632].

Mar. 29—Companies and individuals using special means for eliminating impurities from their coal will be permitted to add 20c. to the Government price at the mine [XIII, 633].

Mar. 30—United States Fuel Administration advises the public to store coal or otherwise there will be a shortage next winter [XIII, 632].

April

Apr. 1—United States Fuel Administration zoning order comes into operation [XIII, 547]—United States Fuel Administration begins the licensing of jobbers [XIII, 546]—State of Indiana goes "bone dry."

Apr. 4—Use of domestic sizes of anthracite for steam-raising purposes condemned by the United States Fuel Administration [XIII, 698]—Price of coke raised 5 per cent. when manufactured east of the Mississippi River and sold west of the Rocky Mountains [XIII, 698]—Fuel Administration orders that the term "foundry coke" shall cover only coke selected for foundry use according to the usual practice—Charles M. Means appointed manager of inspection division, United States Fuel Administration [XIII, 699]—Judge Strauss, of Pennsylvania, rules, in the Joseph Zadwick case, that the corroboration of a second party is not needed to establish the right to workmen's compensation, when a workman dies as the result of a strain received in an isolated part of the mines [XIII, 714].

Apr. 5—R. P. Prager is lynched as an alien spy by mine workers at Collinsville, Ill., [XIII, 704, 705 and 842]—Big strike commences in the Dombrowa coal fields of eastern Russia.

Apr. 6—Central Pennsylvania mine workers decide to put off their threatened strike [XIII, 704]—Third Liberty Loan is offered for sale.

Apr. 9—Wagon mines forbidden to add cost of hauling to Government price when coal is loaded in open-top cars except where coal is bought by a railroad for its own use—Strike commences at Lethbridge, Alta. [XIII, 749]—President creates a National War Labor Board composed of the same members as composed the commission which advocated the formation of the board—Dr. Garfield demands that the price of coal paid by railroads shall be the price set by the Government as the fair and maximum price at the mines.

Apr. 10—Order of Administration requires that smokeless coal shall be delivered only to the bunkers of ships and specifies that contracts for smithing coal made before Feb. 14 will be abrogated if the coal delivered is found not to be a true smithing coal and if the coal is not used, or to be exclusively used, for smithing. [XIII, 747].

Apr. 11—Bottle manufacturers, not making food containers, agree to reduce their output 15 per cent.—The Government takes control of 63 coastwise vessels which added to the fleet owned by the railroads, which are also federally controlled, makes 111 coastwise vessels under Government control, having a rated capacity of 400,000 tons.

Apr. 12—Explosion in the Shoal Creek mine, Panama, Ill., possibly caused by alien enemies [XIII, 749].

Apr. 13—Zone system modified so as to forbid the Pennsylvania R.R. from delivering in Washington or Baltimore, coal produced on the Pennsylvania R.R., the Monongahela R.R. and the Huntington & Broad Top Mountain R. R., and their short line connections in Pennsylvania, West Virginia and Maryland [XIII, 746]—The International Board of the United Mine Workers of America protests against the frequent changes in coal prices, declaring it a large cause of the irregular work at the mines [XIII, 748].

Apr. 16—Strike commences in Georges Creek and Upper Potomac regions, laying 6000 men idle [XIII, 748 and 796]—Wage increase of 50c. per day granted by the Western Fuel Co., British Columbia, to some 1500 employees [XIII, 749]—Senate and House adopt conference report on "Sabotage Bill," which prescribes imprisonment penalties for interfering with war industry; but the punishment provided for strikers is eliminated.

Apr. 17—United States Fuel Administration announces that the Tennessee Coal, Iron and Railroad Co. will submit to the conditions of the Peale contract in Alabama [XIII, 842]—Strike in Georges Creek region comes to an end [XIII, 748 and 796].

Apr. 21—New wages scale signed for Alabama region [XIII, 797].

Apr. 22—"Lightless Night" order suspended till Sept. 1—Delegates from District No. 2 (central Pennsylvania) meet at Dubois, Penn., and decide against a strike and in favor of an investigation of wages by the United States Fuel Administration [XIII, 796].

Apr. 23—Hitchman Coal and Coke Co. decides to withdraw its action against the United Mine Workers of America which related to the enforcement of so-called "ironclad" contracts with working men in its employ [XIII, 840]—Lehigh Coal and Navigation Co. places girls as timekeepers, weigh-scale tenders, switch tenders, etc. [XIII, 841].

Apr. 24—Commercial florists and enameled ware manufacturers agree to reduce fuel consumption 50 per cent.—Joint conference held at Bridgeport, Ohio, relative to a new sale for No. 8-A seam [XIII, 840].

Apr. 25—Contract signed for No. 8-A seam [XIII, 840]—Men working at No. 11 mine of the Old Ben Coal Corporation are ordered back to work under pain of arrest under charges of conspiracy [XIII, 841].

Apr. 26—Meeting of West Virginia coal operators at Huntington to form state operators' association [XIII, 807]—Four collieries of the Nova Scotia Steel and Coal Co. are laid idle by a "holiday" of indefinite length, a holiday being taken because the mine workers are forbidden by law to strike.

Apr. 27—New zoning arrangements made in regard to shipments in box and stock cars and to the shipment of smithing coal [XIII, 835]—S. E. Button, chief of the Department of Mines of Pennsylvania, agrees to issue orders against the employment of girls in and around anthracite mines [XIII, 841]—Meeting of would-be seceders from the union [XIII, 796]—Extensive modifications are made in the zoning regulations.

Apr. 29—The United States Fuel Administration increases price of coke 60c. per short ton where the coke is for export to foreign countries or for transport to a possession or dependency of the United States. The 5 per cent. on coke shipped across the Rocky Mountains may be added to 60c. under this order [XIII, 837].

May

May 1—The 45c. allowance is conceded to the coal operators of Alabama—The Department of Mines of Pennsylvania declares its intention to enforce the law prohibiting women from doing anything but clerical labor about the mines [XIII, 841, 859, 886]—A cave-in at the White Coal Co., Pittston, Penn., destroys 20 houses and kills one man and injures another [XIII, 889]—Parrish Colliery breaker, now belonging to the Lehigh and Wilkes-Barre Coal Co., falls but without casualties [XIII, 889]—New concrete breaker is started by Delaware, Lackawanna & Western R.R., Coal Department, near Storr's breaker, Dickson City, Pennsylvania [XIII, 946].

May 2—Railroad Administration announces that it has let contracts for the construction of 100,000 freight cars—Special convention of mine workers is held at Birmingham, Ala., to consider the recent wage increase tentatively accepted by the union officials for the mine workers in that state.

May 3—Special orders providing for the diversion of coal to New England, issued during the critical period of last winter, are revoked by the Fuel Administration [XIII, 882].

May 4—First issue of "Saward's Journal," a coal trade weekly edited by Frederick W. Saward, former editor of the "Coal Trade Journal"—End of subscription period for Third Liberty Loan—Collision of cages in Loomis shaft of Delaware, Lackawanna & Western R.R., Coal Department [XIII, 898].

May 7—Order announced penalizing the New York and Philadelphia Coal and Coke Co. for providing low-grade quality of coal for the bunkering of a Belgium relief steamship.

May 8—The shipment of coke produced in the New England States to points outside is forbidden. No coke other than petroleum coke and crushed coke for domestic purposes may be shipped into the New England States from Maryland, New Jersey, New York, Pennsylvania and West Virginia [XIII, 933]—Fuel Administration makes preliminary steps in fuel conservation by appointing Thomas R. Brown, of Pittsburgh, Penn., to classify and rate plants as to their fuel efficiency [XIII, 932].

May 9—The Fuel Administrator authorizes the employment of fuel inspectors for anthracite coal—George T. Watson announces that the Consolidation Coal Co. will put in force an equivalent of the Colorado Industrial Plan [XIII, 934, 935, 976, 977]—All the mines of the Broad Top-Huntingdon field of central Pennsylvania but one are on this date found to be on strike [XIII, 934, 976, 1022].

May 14—Manager and a mine blacksmith are killed and three men injured by the explosion of a powder magazine at the Oliphant-Munson Collieries, Coal Spur, Alberta [XIII, 987].

May 15—Meeting of operators of the Central West Virginia Operators' Association with a representative of the Fuel Administration. The association agrees on behalf of its members to put the Colorado Industrial Plan into operation [XIII, 976, 977]—New scale wages goes into operation in Alabama [XIII, 797].

May 18—Decision of Judge Henry in Dauphin County court in favor of three miners who had been docked for dirty coal. Susquehanna Coal Co. directed to pay them $350 [XIII, 978].

May 20—Announcement is made that the railroads will spend about a billion dollars this year for additions, betterments and equipment, said to be approximately three times as much as in any of the last three years [XIII, 1024, 1025]—Fire at gasoline fan in the mine of the Mill Creek Cannel Coal Co., at Villa, near Charleston, W. Va., smothers 13 men and does much damage [XIII, 987, 1033, 1106].

May 21—National Retail Coal Merchants' Association holds its first annual convention at Atlantic City, N. J. [XIII, 986, 987].

May 22—James Brothers' colliery near Pottsville, Penn., is closed down for shipment of dirty coal [XIII, 1033].

May 23—The Fuel Administration requires that permission be obtained before opening a new mine and announces that it will require proof that the new mines will not secure laborers for opening and development from other mines and will not add to the difficulties of the Railroad Administration [XIII, 1021].

May 25—Price of all bituminous coal reduced 10c. per ton, it being announced that the President has ordered the railroads to pay the Government price for coal [XIII, 571, 779, 839, 885, 975, 1020, 1025].

May 27—Freight rates on coal and other shipments raised roughly 25 per cent. by order of Director of Railroads, McAdoo and the Interstate Commerce

Commission. Passenger rates are also increased to 3c. a mile. Railroad gross income should be increased $900,000,000 a year by the new schedules [XIII, 932, 1020, 1021].

May 28—National Coal Association meets for its two-day session, and before it adjourns votes for incorporation [XIII, 933]—John P. White is appointed a representative of the Fuel Administration on the Labor Policy Board [XIII, 1025].

May 29—Fuel Administration prohibits use of coal or oil fuel after June 11 for private yachts.

May 31—James M. Orr, charged with having secured an excessive price for coal, is fined $5000.

June

June 1—Regulations enforcing the production of clean coal comes into effect [XIII, 1068].

June 3—"Coal Week" (lasting till June 8) commences. All purchasers of coal are requested to place orders for all coal they will need prior to Apr. 1, 1919 [XIII, 973, 987]—Mt. Jessup colliery closed down by Fuel Administrator for shipment of dirty coal [XIII, 1083].

June 4—Meeting of mine workers' delegates in the Huntingdon and Broad Top region vote in favor of returning to work pending arbitration [XIII, 1071].

June 5—Operators' Association formed in the new Elkhorn fields, Letcher County, Kentucky, at a meeting held at Whitesburg—Fuel Administrator issues estimates of bituminous coal likely to be needed from Apr. 1, 1918, to Apr. 1, 1919, at 634,594,000 short tons, or 79,866,000 tons more than produced in 1917. This will be an increase of 14.4 per cent. over last year's production [XIII, 1116].

June 7—Production Bureau of United States Fuel Administration is inaugurated, with James B. Neale, anthracite advisor to the Fuel Administrator, as director [XIII, 1162].

June 10—New freight rates under order of May 25 come into effect—United States Fuel Administrator states that the automobile factories will only be allowed 25 per cent. of the fuel necessary to maintain their former production [XIII, 1162].

June 12—Director of Railroads amends order of May 25 by which intrastate rates are placed at the same level as interstate rates [XIII, 1161].

June 13—United States Fuel Administration gives list of precedences in coal distribution [XIII, 1161].

June 14—Fuel Administration of New Jersey removes 56 tons of coal from summer home of John F. Dryden, president of the Prudential Insurance Co. This is the first excessive stock of domestic coal reduced by Government action.

June 17—"Clean-coal" Conference at Kansas City attended by operators, labor leaders and coal inspectors of Oklahoma, Kansas, Missouri and Iowa [XIV, 23]—Cave-in kills three men at Short Mountain colliery, a Susquehanna Collieries Co. operation near Lykens, Penn. [XIV, 23].

June 19—J. P. O'Connor, doing business as the Penn Fuel Co., is deprived of his license as a coal distributor, having sold high-volatile coal as bunker fuel.

June 20—Notice is served on the Tidewater Coal Exchange to dump coal promptly as received and not hold it for foreign bunkering so as to receive the higher price provided for such coal—Short Mountain colliery closes for two days while three men are buried [XIV, 23, 24].

June 21—United States Fuel Administration declares that "Government prices" are maximum prices and that coal may be sold at lower prices to railroad and other customers at the pleasure of the operators.

June 25—James H. Hoover, of McClellandtown, Penn., is made to pay $2500 to American Red Cross for having violated the Fuel Administrator's orders in regard to the shipment of coke and having neglected to make reports as demanded by the Fuel Administration—Freight rates are increased in accord with General Order No. 28, dated May 25, 1918 [XIII, 1020, 1021]—Dr. James Douglas, of Phelps-Dodge & Co., Inc., and of the Stag Canon Fuel Co., dies at Spuyten Duyvil, N. Y. [XIII, 1217].

June 26—Henderson W. Knott appointed to take charge of engineers and inspectors investigating the power plants of the country and making recommendations relative to fuel economy—Coal operators of central Pennsylvania meet in Washington and condemn the giving of bonuses and like wage inducements [XIV, 24].

June 27—Wagon Mine Owners' Association formed at Pittsburgh.

June 28—J. M. Roan is appointed field manager of the inspection section of the United States Fuel Administration [XIV, 21].

June 29—Report of Federal Trade Commission condemning profiteering, the price of coal being quoted as an instance [XIV, 21, 22].

July

July 1—John S. Wentz, anthracite operator, dies at Philadelphia [84].

July 2—Henry F. Shoemaker, Ohio operator, dies in New York City—The Fuel Administration adds 25 inspectors to its staff to watch the preparation of bunker coal [XIV, 22].

July 3—Viscount Rhondda, coal operator, formerly David A. Thomas British Food Controller, dies [XIV, 66]—Fuel Administration prohibits the distribution of gas coal from docks on Lake Michigan or Lake Superior without permission, except to persons engaged in the manufacture of gas or in the operation of byproduct plants—The Fuel Administration reduces coal supply of breweries 50 per cent. [XIV, 67].

July 4—Jewell Ridge Coal Corporation and mine workers donate to American Red Cross all the coal mined on this day [XIV, 70]—Supply of cars to the Huntingdon and Broad Top R.R. is reduced 50 per cent.

July 5—Fuel Administration defines "modified mine run" and prescribes prices [XIV, 67]—Inquiry by Board into the operation of high-cost mines in central Pennsylvania.

July 6—Anthracite Tridistrict Board asks for a higher wage scale to meet increased cost of living [XIV, 79]—Agreement to compensate owners of undermined and wrecked buildings is made in Wilkes-Barre, Penn.—Department of Labor refuses to permit the importation of Mexican labor to mines in New Mexico [XIV, 70]—Fuel Administration orders that the coal furnished to domestic users shall not exceed quantity necessary to heat every room up to 68 deg. Fahr. [XIV, 68].

July 7—The War Labor Policies Board announces the establishment of Community Labor Boards to mobilize labor [XIV, 70, 71].

July 8—Department of Labor limits work of United States Employment Service to manufacturers of war material employing over 100 workers [XIV, 71]—Anthracite Conciliation Board directs that in case of the funeral of the victim of a mine accident the company owning the mine shall pay an additional $150 to the compensation provided by the compensation law if no men lay idle on that day [XIV, 181, 227]—Furnace Run tipple and retarding conveyor near Kittanning, Penn., burned down [XIV, 148]—Battery of 80 Koppers byproduct ovens charged for the first time by Bethlehem Steel Co., Steelton, Penn. [XIV, 193].

July 10—Thirteen men burned in an explosion of gas at the Lackawanna colliery of the Delaware and Hudson Co. [XIV, 148]—Preferential supply of coal cars to mines producing railroad fuel is discontinued—U. S. Fuel Administration announces that brewers can only count on receiving enough coal to complete the manufacture of beer from materials now in process of manufacture [XIV, 134].

July 11—A. H. Smith, Regional Director of Railroads, issues order to speed railroad coal cars [XIV, 133].

July 12—The National Coal Association with a membership producing annually 400,000 tons of bituminous coal declares in favor of immediate prohibition [XIV, 136]—James B. Neale urges coal operators at Fairmont, W. Va., to spend their time at the mines speeding up production [XIV, 229]—Organization meeting of Northern West Virginia Coal Operators' Association held at Fairmont [XIV, 147].

July 13—Fuel Administration prescribes that country clubs may use wood or peat if railroad services are not utilized [XIV, 133]—Production of bituminous coal in the week just ended reaches 13,243,000 tons, the largest weekly production thus far attained in this or any year [XIV, 180, 185, 196]—Harleigh-Brookwood coal breaker near Hazleton, Penn., is burned down [XIV, 193].

July 16—G. B. Markle Coal Co. puts its new breaker at Oakdale in operation [XIV, 193]—Fanhouse of Lehigh & Wilkes-Barre Coal Co., at Tresckow destroyed by fire [XIV, 193].

July 17—John W. Moore, of Columbus, Ohio, has his distributor's license revoked, and the Elk Coal Co., doing business illegally under his liecnse, is required to refund commissions collected by it upon transactions carried on under the license issued to J. W. Moore [XIV, 178]—Explosion of powder magazine of Black Brothers' Coal Co., Blackfield, Penn., kills one man and injures a dozen others [XIV, 194].

July 18—Coal cut off 70 coal dealers who were remiss in filing weekly reports [XIV, 68, 178].

July 19—Fuel Administration provides that in Michigan, Ohio, Indiana and Illinois, domestic anthracite should be distributed first to those communities within the state which would experience the greatest inconvenience, difficulty and suffering by a failure of the supply expected [XIV, 79]—Fuel Administration formulates orders for a reduction in outdoor lighting [XIV, 178].

July 21—German submarine sinks three coal barges and sets fire to the tug pulling them.

July 22—District draft appeal board at Scranton declares that mine clerks and stenographers are not essential workers [XIV, 239, 227].

July 23—President declares by proclamation that he will assume control of the Cape Cod canal July 25, and directs the Railroad Administration to operate it—Fuel Administration appoints a Bureau of Labor, comprising John P. White and Rembrandt Peale [XIV, 228]—Strikes at 14 mines in Michigan for an increase of 10c. per ton in the rate for coal mining [XIV, 277].

July 24—Coal for lake transportation to be given preference over all coal except railroad coal, byproduct coal and coal for illuminating gas [XIV, 226]—New "Lightless Nights" order of July 19 becomes operative [XIV, 178].

July 25—Fuel Administration sets maximum price of domestic coke [XIV, 226]—Prices are set for coal at all Nova Scotia operations by C. A. Magrath, Fuel Controller of Canada.

July 29—Order in Council in Canada gives railroads the right to file increases in tariff rates of 20 per cent. in transatlantic traffic on Aug. 1, to come into effect Aug. 12, and to remain in force to close of war—Scranton Surface Protective Association declares mine-cave agreement unacceptable—John R. Powell, pioneer "squib" manufacturer, dies at Plymouth, Penn. [XIV, 290].

August

Aug. 1—Mines of the Lehigh Valley Coal Co. at Beaver Meadow are flooded by the rising of Sulphur Creek [XIV, 289]—Increase in wage granted in Alberta coal mines to balance increase in cost of living [XIV, 407, 457].

Aug. 2—Order establishing production committees at all local mines—Fuel Administration provides price for "sized screenings" to take the place of anthracite and to be used in magazine or base-burner stoves.

Aug. 3—Announcement is made that retail coal dealers in Minnesota and South Dakota have refunded $16,000 to their local customers, or where these could not be located to the Red Cross—During the week just ended anthracite production rose to a record figure, 1,750,490 tons.

Aug. 5—United States Fuel Administrator condemns the coal operators for "bidding against each other by payment

of bonuses," threatens where bonuses are paid to assume that the coal price allowed is too high and declares that he will order a lower price in such cases—Delegates from 52 unions in northern anthracite field meet and demand a 25 per cent. increase in wages, time and a half for overtime and double time for Sundays without increase in selling price of coal [XIV, 322].

Aug. 8—Fuel consumption of cement plants restricted to 75 per cent. of average quantity of fuel used in other years.

Aug. 9—President Wilson addresses a proclamation to all engaged in coal mining, urging steady work and the duty of miners to claim and accept exemption under the selective service draft [XIV, 319]—All bars are withdrawn restricting the importation of Mexicans for work at coal mines [XIV, 378].

Aug. 16—President Hayes states that "the only logical solution (of labor conditions in the mining industry) is a substantial flat wage increase to be applied to all classifications of labor [XIV, 365]—Dominion Coal Co. announces bonus to shippers and loaders [XIV, 456].

Aug. 17—Fuel Administration provides that the price of coal delivered into the tenders of engines may be 5c. per ton more than that charged for coal loaded in cars for shipment [XIV, 364].

Aug. 21—United States Fuel Administration limits the amount of coal that may be stored by industrial plants [XIV, 405].

Aug. 22—Meeting of district presidents of United Mine Workers to discuss wage increase urged by President Hayes Aug. 16 [XIV, 365]—Interstate Commerce Commission decides that no additional charge shall be made for freight carried in privately owned cars.

Aug. 23—An order is promulgated by the Fuel Administration removing, except as to breweries, till Sept. 8 the restrictions on the purchase and use of slack and screenings west of the Mississippi River [XIV, 319, 363].

Aug. 24—Fuel Administration announces the beginning of the erection of a "Carbocoal" plant near the junction of the Carolina, Clinchfield & Ohio and the Norfolk & Western railways.

Aug. 25—Strike of men of Nova Scotia Steel and Coal Co. to compel four men to retain union membership on their advancement to position as company officials [XIV, 456, 457].

Aug. 28—Explosion at Burnett mine of Pacific Coast Coal Co., Burnett, Wash., kills 12 men [XIV, 525].

Aug. 31—War Industries Board orders West Penn Power Co. in Pittsburgh district, to give coal mines a full supply of power discriminating in favor of coal companies as against all other industries [XIV, 453].

September

Sept. 2—Flood invades Mary Lee mine of Alabama Co. at Lewisburg, Ala., and drowns two men [XIV, 525].

Sept. 3—Rocky Mountain Mining Institute holds annual meeting in conjunction with American Institute of Mining Engineers; to last till Sept. 6 [XIV, 633-641].

Sept. 4—United States Fuel Administration grants companies the right to charge reasonable switching charges for the diversion of coal wherever such diversion has been ordered by the Fuel Administration to relieve a shortage of fuel—Reclamation of breeze is prohibited by the United States Fuel Administration.

Sept. 6—William G. McAdoo declared that railroads would be able to haul all coal needed [XIV, 556]—Judge Edwin B. Parker, the priorities commissioner of the War Industries Board, formulates lists of the priority of works needing new permits or licenses [XIV, 514].

Sept. 7—Arrangement made by United States Fuel Administration by which the Consolidated Coke Co. of Pittsburgh pays $80,000 to the Steel Company of Canada, of Hamilton, Ont., and to the Thomas Iron Co., of Hokendauqua, Penn., for poor coke delivered to them [XIV, 557].

Sept. 9—National Coal Association denies William G. McAdoo's statesments relative to the ability of the railroads to handle all the coal offered to them [XIV, 556].

Sept. 10—By the fall of a cage in the Protection Island shaft at Nanaimo, B. C., 16 miners lose their lives [XIV, 617].

Sept. 11—W. J. Murray, of the Victor-American Fuel Co., dies at La Jolla, Cal. [XIV, 643].

Sept. 12—Tipple of the Ella Mine of the United Coal Corporation falls on tracks of the Pittsburgh & Lake Erie R.R., carrying down three men, who, nevertheless, escape uninjured [XIV, 618]—Logan Coal Co., of Philadelphia, Penn., is fined $25,000 and money is given to Pennsylvania chapter of the American Red Cross, for selling, as smithing coal, coal that was to be used for other purposes.

Sept. 14—Revision of the regulations governing the storage of coal by consumers of different classes [XIV, 602].

Sept. 15—Big production meeting of West Virginia operators held at White Sulphur Springs, W. Va. [XIV, 605].

Sept. 16—Big strike occurs in the southern anthracite field, the miners demanding that the United States Fuel Administration decide, at once, on the increase of wages to be provided [XIV, 607]—Annual congress of National Safety Council at St. Louis meets; to last till Sept. 20 [XIV, 502-503].

Sept. 19—Southern anthracite strike practically comes to an end [XIV, 607]—Meeting of operators, officials of insurance companies, mine inspectors and officials of the Harrisburg headquarters of the Department of Mines convenes in Harrisburg for readjustment of insurance rates particularly for anthracite mines [XIV, 662].

Sept. 21—The mine workers of District No. 1 of the anthracite region protest against the declaration that they are not patriotic [XIV, 650]—Gladstone and Michel locals vote to return to work till single shift is reëstablished—Union leaders in District 18 suggest that an arrangement be made establishing the single shift for 30 days during which time the single shift might be discussed.

Sept. 23—Explosion at the mine of the Franklin Coal and Coke Co., Royalton, Ill., kills 23 men [XIV, 714].

Sept. 24—Elbert H. Gary, chairman of the board of directors of the United States Steel Corporation, declares in favor of the 8-hour day [XIV, 650].

Sept. 25—Mine workers at Fernie declare that they will call out firemen, pumpmen and fanmen if their demand for a single shift is not conceded without reservation and a promise made to give all men work within 30 days [XIV, 748]—C. A. Magrath, fuel controller of Canada, meets Pictou County, Nova Scotia, mine workers and operators and suggests a 20c. per hour increase in wage to the former, retroactive and good till Jan. 1 [XIV, 748].

Sept. 27—Committee on mechanical labor-saving devices in mining appointed—Pictou County, Nova Scotia, strike comes to an end [XIV, 740]—W. H. Armstrong orders that the Crow's Nest Pass Coal Co. work single shift and proposes that a Royal Commission review the dangers in the mines of the company and report with recommendations [XIV, 748].

Sept. 30—Gladstone local in Fernie, B. C., turns down proposition conceding the single shift but providing for the appointment of Royal Commission to ascertain just what attitude should be taken toward the practice of running a mine more than one shift in 24 hours [XIV, 748].

October

Oct. 3—Wage meeting of Anthracite Conciliation Board with union men and representatives of the Fuel Administration is held at Washington, D. C. [XIV, 703]—Director of Education of the Fuel Administration appointed [XIV, 699].

Oct. 7—Gladstone and Michel mine workers in Calgary field, British Columbia, vote to return to work under provision, of Sept. 27, of Dominion Director of Coal Operations [XIV, 748].

Oct. 9—Conlon mines fall in and cause much damage at Plains in anthracite region of Pennsylvania.

Oct. 12—Fourth Liberty Loan drive commences [XIV, 654, 704, 750]—Announcement is made of the Anthracite Wage Agreement as proposed and accepted by the wage board but not yet made operative [XIV, 701, 703, 705, 789].

Oct. 13—Fourteen bodies are recovered from the north mine of the Franklin Coal and Coke Co., at Royalton, Ill., victims of the fatal explosion of Sept. 28 [XIV, 714, 760].

Oct. 16—United States Fuel Administration authorizes an increase in the reserve stocks of coal held by all classes of consumers except Class 1 east of the Mississippi River.

Oct. 18—Announcement is made that the United States had offered to place at the disposal of the Dutch government 100,000 tons of coal monthly till the end of the war on condition that food be not sent to Germany [XIV, 800, 827, 865].

Oct. 24—New agreement in Vancouver Island, B. C., with wages increased 75c. a day and a sliding scale to adjust wages to cost of living [XIV, 868].

Oct. 26—Dr. H. A. Garfield, United States Fuel Administrator, announces that "the Fuel Administration approaches the winter season well organized with stocks of coal on hand far in excess of the stocks of other years."

Oct. 28—United States Fuel Administration closes 13 small mines producing dirty coal [XIV, 865].

Oct. 31—New anthracite wage scale as forecast Oct. 12 is made operative by the United States Fuel Administration [XIV, 789, 867].

November

Nov. 1—New wage scale in anthracite region comes into effect, having been approved by Dr. Garfield, Oct. 31 [XIV, 789, 829, 867, 908]—Nichol Thompson, Pacific Coast representative of the Fuel Controller of Canada, raises the price of coal in British Columbia 75c. per ton to accord with the wage increase [XIV, 920]—Benjamin L. Flynn, general superintendent, Logan Mining Co., Logan, W. Va., dies of influenza [XIV, 921]—The Fuel Administration declares its intention to commence on Nov. 15 its campaign to provide coal for points in the East, including Pennsylvania, New York, New Jersey and the New England states.

Nov. 2—Fuel Administration announces that 19 more coal mines are closed because their product has been improperly prepared [XIV, 906]—Fuel Administration decides against regulation of opening and closing hours of offices, stores and other mercantile establishments and places of amusement.

Nov. 4—Tipple and boiler house of the Cross Mountain Coal Co., Briceville, Tenn., burned down [XIV, 921].

Nov. 6—New anthracite price schedule agreed upon [XIV, 905].

Nov. 7—Burton L. French introduces into the House of Representatives a bill providing for reconstruction projects [XIV, 952].

Nov. 9—New regulations made regarding "lightless nights"—Regulation made that placing coal in householders' bins shall not permit the retail coal dealer to add more than 75c. to the price.

Nov. 10—Fuel Administration announces that hereafter applications for new railroad switches for use of coal mines shall be filed with local railroad officials and not with the Fuel Administration [XIV, 949]—Fuel Administration announces that New England desires a reduction in its bituminous coal allotment from 30,000,000 tons to 27,300,000 tons [XIV, 950].

Nov. 11—United War Work Campaign Fund Drive starts [XIV, 923]—Armistice is signed by Allies and Germany—Executive Committee of National Retail Coal Merchants' Association favors 2000-lb. ton as standard [XIV, 1053].

Nov. 13—All restrictions on the use of fuel in the production of building materials including brick, cement, lime, hollow tile and lumber are removed.

Nov. 14—Fuel Administration announces that all rules and regulations in force will so remain till the promulgation of the treaty of peace unless revoked by

officers of the Administration [XIV, 949]—Restrictions on clay products and cement set at half those established in the order of Apr. 3 and Aug. 8 respectively [XIV, 950].

Nov. 15—Fuel Administration decides to restrict the operations which it has set on foot to promote the more efficient use of power at mining plants.

Nov. 16—Fuel Administration announces that it will conduct schools of instruction in the cities of Illinois, Indiana and Michigan at which will be explained how bituminous coal can be satisfactorily used as a domestic fuel.

Nov. 17—Fuel Administration rules that smaller sizes of anthracite than pea shall be sold at a price at least 50c. below that established for anthracite of pea size [XIV, 950].

Nov. 19—John P. White, joint director of the Bureau of Labor in the Fuel Administration resigns [XIV, 995]—Fuel Administration announces that certain parts of its work such as the supervision of anthracite and the maintenance of the zoning system cannot be suspended, at least at the present [XIV, 993]—Fuel Administration announces that four more mines have been closed down because of the impurity of the coal produced, making 119 in all.

Nov. 20—United States Fuel Administration announces that instructions have been issued to all camps to release anthracite mine workers [XIV, 993]—"Lightless Nights" are discontinued throughout the country though rulings may still be made by local fuel administrators if in their belief such a regulation is needed.

Nov. 22—Storage limits on bituminous coal are lifted [XIV, 994].

Nov. 25—Arrangements are announced by Fuel Administration under which Pittsburgh consumers are allowed to store their winter's fuel [XIV, 1039]—New prices and regulations made for sale of gas-house coke.

Nov. 26—Fuel Administration speeds up the "Burn Wood" campaign—Embargo of May 5 on coke consigned through New England gateways removed [XIV, 1039].

Nov. 27—Fuel Administration makes changes in consuming zones M-4, M-3, M-2, M-1 and L [XIV, 1083].

Nov. 28—Submarine attacks having ceased coal from two pools is to be permitted to be sold for bunkering purposes—Avondale washery of Delaware, Lackawanna & Western R.R., Coal Department, burns down [XIV, 1052]—Evan D. John, director of the Illinois Department of Mines and Minerals, dies after an illness of five weeks [XIV, 1052].

Nov. 30—Dr. Garfield announces that zoning and coal-price restrictions will probably be removed Dec. 15 [XIV, 1039]—Fire at boiler house of Brownsville Coal Co. does $10,000 worth of damage [XIV, 1094]—New prices made for certain Wise county, Virginia coals, operative Dec. 7—Restrictions removed on use of fuel by florists, window-glass, clay-product and cement manufacturers [XIV, 1039].

December

Dec. 1—District No. 9 (Schuylkill region) of United Mine Workers of America holds its annual convention and raises salaries of its officers 50c. a day from Dec. 1, 1917—Conference of heads of Bureau of Mines and Geological Survey with Fuel Administration at which it is arranged that Conservation Bureau and engineering program looking to development of power near to or at the coal mines shall be turned over to Bureau of Mines and Statistical Bureau shall be taken over by Geological Survey.

Dec. 2—Strike commences in Roaring Creek field of West Virginia [XIV, 1128]—Tipple and chute of Wisconsin Steel Co., Benham, Ky., destroyed by fire [XIV, 1140].

Dec. 3—Strike of 200 men of New River Coal Co. [XIV, 1128].

Dec. 4—Fuel Administration issues order prohibiting an increase of $1.05 in gashouse coke to correspond with rise in the price of anthracite by which the price of gashouse coke was recently regulated [XIV, 1083]—Retail dealers, hospitals, schools, public utilities and government agencies, federal, state and municipal, urged to make their own provision for bituminous-coal supply at once, requisitions of the Fuel Administration for industrial plants being cancelled [XIV, 1083]—Distribution of coke in each state is given to state fuel administrator who is empowered to authorize domestic consumers to use that fuel [XIV, 1083].

Dec. 5—A $50,000 fire at Richard, W. Va., plant of Elkins Coal and Coke Company.

Dec. 7—Convention meets in District No. 1, Wilkes-Barre, Penn., and declares wage scale of Oct. 30 unsatisfactory [XIV, 1127]—Fuel Administration announces that coke may now be reclaimed from coke piles and sold at $5.50 per short ton at the place of recovery—New prices are put in force for such coal mines in Knox and Whitley counties in Kentucky as are operated by members of the Tri-county Blue Gem Coal Operators' Association—New prices become effective at several Virginia mines under orders of Nov. 30 and Dec. 6—Orders of Sept. 19 relative to restrictions on shipment of coal to Canada revoked [XIV, 1083].

Dec. 10—General election of officers, United Mine Workers of America [XIV, 1040, 1127]—Case of Coronado Coal Co. et al against United Mine Workers of America is reviewed by United States Court of Appeals [XIV, 1040, 1128]—R. A. Quin, general manager of Susquehanna Collieries Co., declares it to be the company's intention to reinstate all men on their return from the service of nation [XIV, 1140].

Dec. 11—Mass meeting is held at Charleroi, Penn., at which it is decided to hold a special meeting of delegates from locals to demand a wage increase [XIV, 1127].

Dec. 13—N. S. Schroeder is appointed Director of Bureau of State organizations, vice Evans Woollen, Acting Director.

Dec. 16—Virginia coal prices are codified and coal zones F-1 and F-2 modified. Under latter, coal from all operations in eastern Kentucky along Louisville & Nashville R.R. may be shipped to all points in Indiana located on and east of the Chicago, Indianapolis & Louisville R.R., from Louisville to Michigan City for industrial purposes only, and to all points in the lower peninsula of Michigan without restriction [XIV, 1126].

Dec. 17—Agreement between Northern West Virginia Coal Operators' Association and the United Mine Workers of America, District No. 17, agree on wage scale at Fairmont, W. Va. [XIV, 1170] George B. Markle Coal Co. introduces Mexican laborers into the mines. [XIV, 1170]—Fuel Administration modifies producing zone M-2 and enlarges consuming zone M-2—Logan and Kanawha coal is permitted to go eastward in Virginia and West Virginia on the new line of the Chesapeake & Ohio R.R., including tidewater and terminal points [XIV, 1169].

Dec. 19—Premature shot kills two miners near Providence, Ky. [XIV, 1182].

Dec. 20—Fuel Administration modifies bituminous coal zone P-1 so as to permit all-rail shipment of bituminous coal on the Baltimore & Ohio, the Western Maryland and Pennsylvania to all points in New England; also modifies bituminous coal zone P-2 to permit the shipment of bituminous coal from all districts of Pennsylvania to Baltimore and vicinity, and to the District of Columbia [XV, 22].

Dec. 21—Strike for an early payday at Storrs and Diamond collieries of Delaware, Lackawanna & Western R.R. Co., Coal Department. Last till payday [XV, 24]—Explosion at the Havaco Mine of the New River Pocahontas Consolidated Coal Co., at Havaco, near Welch, W. Va., kills two men. Two rescue men are overcome by afterdamp when masks leak [XV, 35].

Dec. 22—Fuel Administration announces that zone regulations and maximum prices on coal will not be removed before Feb. 1, 1919.

Dec. 23—Wilkes-Barre Coal Co. of New York City requested by Federal Fuel Administrator of State of New York to pay $50 to American Red Cross as penalty for delivering coal without a permit to the customer of another dealer. Paid about Jan. 8, 1919.

Dec. 24—Fuel Administration announces that coal may be sold for export without a permit [XIV, 1169].

Dec. 27—Fuel Administration orders that where anthracite coal is obtainable by-product coke shall be sold at not more than the price charged under the regulations governing the sale of gas coke. This order applies solely to consumers of less than car-load loats and domestic consumers, as did also the gas-coke order.

Dec. 28—Meeting of 125 insurgent delegates in District No. 1, United Mine Workers of America, call on Lewis and Green of the international organization to explain why wage concession of Oct. 30 was not dated Oct. 1 [XV, 52].

Dec. 29—Meeting held in Belleville, Ill., field at which mine workers demand Government ownership and democratic management of the mines [XV, 62].

Successful Stoking of Brazil Coal

By pulverization, it has been possible to use with success, the impure coal of Brazil, under the locomotives of the Government-owned railroads of that country. Twelve locomotives were built and equipped, in the United States, to burn pulverized coal. They were shipped to Brazil early in 1917 and put into fast passenger service. It was the intention to burn the native Brazilian coal, a means of using which in locomotive service had not then been found. On the run of 110 miles for the round trip and several hours standby, 6 metric tons of Brazilian coal were consumed.

If the same amount of United States coal had been used, it would have cost, at $40 per ton, $240. The Brazilian coal cost half as much, and so a saving was made, for the run, of $120. After a service test of six weeks had been made on one of these locomotives, the flue sheet and tubes were found to be absolutely clean though the firebox had not been opened except for the dumping of the ash and slag.

These Brazilian coals ran high in sulphur, the percentage ranging from 4.5 to 6 per cent. However, no difficulties arose from the high sulphur percentage, nor did the sulphur have a deleterious effect on the boiler. These coals have a high percentage of moisture and ash, the proportion of the latter ranging from 22 to 30 per cent. Where possible the moisture was reduced before pulverizing to 3 per cent. and less. On several trips a low grade of Brazilian lignite was successfully burned, although the moisture ran as high as 12 per cent.

COAL AND COKE NEWS

Harrisburg, Penn.

Foreigners, permanently disabled while at work in Pennsylvania, will be paid their full compensation awards in lump sums, so that they may return to their respective countries, where they may, if possible, become self-supporting, according to a decision reached on Jan. 15 by members of the State Workmen's Compensation Board and representatives of employers. During the hearing it developed that many of the permanent disabled claimants have requested their compensation in full, so that they could go to their homes in foreign lands and buy farms or engage in some other business which would insure them a livelihood. The commission and employers decided to coöperate in paying the full awards, the initial payment being sufficient to carry the claimants and family to their foreign homes. On their arrival at their destination, the American Consul or other authorized agent will pay the remainder of the claim. It was announced that in many instances American consular agents have purchased farms for the disabled workers at the request of the latter.

Industrial concerns through the Lehigh Valley are much interested in the Delaware-Lehigh Atlantic coast inland waterway system proposed by the Morrisville (New Jersey) Chamber of Commerce to the United States Railroad Administration. The recommendations include plans for a reconstructed 1000-ton barge canal from Morrisville to Mauch Chunk and to Coalport, the northern terminus of the Lehigh Canal, a mile and half from Mauch Chunk. The total distance 708 miles, and the total lift from tidewater to the end of the Lehigh Canal, piercing the very heart of the anthracite coal region, is 563.5 feet.

Seventy-nine per cent. of the slate quarried and manufactured in the entire country comes from this region. Thirty-six per cent. of all the cement manufactured is taken from this same region, and, what is most important of all, millions of tons of anthracite coal are taken annually from the northern part of this immensely wealthy region.

Uniontown, Penn.

Removal of the fixed price on coal and coke Feb. 1, will have little or no immediate effect, operators believe, upon the local region. Virtually all coke contracts for the first half contain clauses providing for the suspension of the Government price, and demand will not then be sufficient to send the price upward. A reduction in price of spot coke for a short period would not be much of a surprise here. Explanation of the temporary backward trend of the market is found in the fact that a number of blast furnaces have blown out stacks for repairs. Within 60 or 90 days they will again be running at capacity and demanding more coke. The furnaces at present are taking all the Connellsville coke produced, but the market is not brisk. The coal market here has been inactive for two weeks, coal having sold as low as $1.90. That applies particularly to the small operators, a number having been forced out of business.

A gain of 20,000 tons in the coke output was noted in the production report for the week ended Jan. 11, which placed the aggregate output at 576,538 tons coal. Coke shipments were 270,915 tons. Coal shipments dropped off 3000 tons, being 170,415 tons. The region is still running 75,000 tons behind normal production.

Charleston, W. Va.

Market conditions at the outset of the week beginning Jan. 13 in the Kanawha district were such as to cause operators to restrict work at the larger plants to about half time, due to the fact that Western consumers are withholding orders until they are a little more certain as to what the future holds, especially in view of large reserve stocks on hand. Since Kanawha district coal for the most part goes to the West, such a condition tends to reduce the demand in that district and, therefore, Kanawha operators look for no increase in orders for at least another thirty days. A slow market is reflected in the output for the week ending Jan. 11, when 116,800 tons of coal was produced in 3163 working hours. Car shortage caused a loss of only 130 hours and labor shortage 207 hours, while "no market" was responsible for the loss of 1026 hours and mine disability for 197 hours.

Impetus was given production in the New River district during the week ending Jan. 11 and in the following week by the removal of embargoes on tidewater shipments which had been in effect for almost a month, although operators were somewhat apprehensive that there might be further embargoes. Physical conditions, however, were entirely satisfactory, cars being plentiful and the man power sufficient to mine all the coal it was possible to load. It will be fully three months, however, before there will be a return to the normal demand, in the opinion of operators.

Although train crews on the Norfolk & Western Ry. have been reduced as the result of a falling off in coal shipments, there has been an increase in the output of the Pocahontas and Tug River district, which has again reached 300,996 tons as compared with 156,000 tons, reducing the tonnage loss to 85,795 tons, labor shortage constituting the biggest loss—47,702 tons. Only 2448 tons were lost from car shortage. The loss from "no market" amounted to about 20,000 tons. The demand has been rather dull for several weeks so far as the Tug River and Pocahontas fields are concerned, but this condition, it is believed, will not last long. Zone restrictions, however, have and are working a great hardship on the mines of the district, some of which have been shut down entirely.

Market conditions, insofar as the Fairmont district is concerned, are fair and the mines have not had much occasion so far to limit their output. Cars have been unusually plentiful. The supply has run from 1400 to 2400 cars a day. The greater part of the region's product is being shipped to the East, where there appears to be a little better market than there is in the West. The operations in the district have been besieged to dispose of their coal at a sacrifice, but prices, generally speaking, are being maintained.

A slight gain was made in production in the Logan mining district during the week ending Jan. 11 as compared with the previous week, 151,499 tons being produced, the tonnage loss amounting to 135,-921 tons. By far the greatest loss was sustained through "no market", that loss reaching 96,975 tons. Car shortage also caused a considerable loss—22,074 tons.

Birmingham, Ala.

Coal production for the week ending Jan. 11 went to 339,080 tons in Alabama, compared with 250,147 for the week ending Jan. 4 and 109,179 tons for the week ending Dec. 28. Every indication points to an increase for the week ending Jan. 18. Zone and price regulations suspended Feb. 1 by the Government will have little effect here, it is said, as there is a market for every ton of coke or coal produced, and all dealers have orders for weeks ahead. Alabama producers say that they do not apprehend much change in business conditions as a result of the suspension order because all intend to live up to their contracts. The shortage here is not confined to the district, but yards within ten miles of some of the largest mines are unable to get coal in the quantities they demand.

Contracts between operators and miners will be maintained at the present scale until the end of the war, perhaps longer. Commissions for dealers, brokers and others will be taken up in plenty of time before present arrangements are abrogated.

Victoria, B. C.

The securing of an adequate supply of coal at reasonable rates for the City of Prince Rupert, B. C., has been under investigation by the Council of that community. Nicol Thompson, Fuel Controller, was interrogated as to charges, and in his reply stated that it had been arranged when he visited Prince Rupert in October, 1917, that the price of coal should be made by the dealers at their wharf or shed, cost of delivery to be arranged with the purchaser. At that time it was figured that the price would be $10.50 a ton, but since then there had been advances, making the cost at the mines as follows: All coal mines on Vancouver Island, except the Western Fuel Co., $7.20 per gross ton; Canadian Western Fuel Co., $6.45 per gross ton. Mr. Thompson further explained that under the new regulations, while the price at which a dealer might sell was not fixed, his profit was limited to 50c. per net ton over all reasonable overhead charges.

Mayor Gale, of Vancouver, wrote Prince Rupert that the retail price of coal delivered in sacks over the greater part of his city was $10.50 per ton of 2000 lb. He added that Vancouver had the privilege under charter amendments secured two years ago to operate its own coal business, and it has actually supplied all civic and semi-civic buildings at actual cost, although the city has not gone into the coal business in the ordinary way. The Prince Rupert Council finally recommended the establishment of closed coal bunkers operating on a gravity system, in order to eliminate much of the labor now wasted in distribution; that coal be purchased by consumers in bulk as far as possible to avoid the extra 50c. a ton cost for sacking; that a representative of the city be appointed to coöperate with the Provincial Fuel Controller for the regulation of supply and prices in the Northern District; and that Prince Rupert be given power under the Municipal Clauses Act to operate coal yards if it is found in the public interest that such a policy be adopted.

PENNSYLVANIA

Anthracite

Morea—The Morea Colliery of the Mill Creek Coal Co. has been completely electrified. John Creilin is chief electrician at the plant.

Cresson—The Pennsylvania Coal and Coke Corporation has contracted with the Roberts & Schaefer Co. for the installation of a tipple and washery at its Patton mine.

North Pittston—Three men employed at the No. 9 colliery of the Pennsylvania Coal Co. were seriously burned by an explosion of gas on Jan. 14. It is alleged that the men went into the working place contrary to the orders of the fireboss. Fortunately, the quantity of gas that had accumulated was small and no serious damage was done to the mine.

Wilkes-Barre—Charging that coal property is assessed 500 per cent. above its actual value while other classes of real estate in the city is 30 per cent. undervalued, Lehigh Valley Coal Co. attorneys have filed an appeal from the assessed valuation of its property in four wards of the city as fixed for the coming year by the board of revision of taxes and appeals.

Uniontown—Sale of 2225 acres of Greene County coal land, involving a price of $1,335,000, was reported here recently. The tract was purchased by the Cumberland Coal Co. for the United States Steel Corporation, which, with the new tract, now controls 17,000 acres of coal land in the county. The purchase included the holdings of the Cray, Moran and Hibbs tracts; the price paid was $600 an acre.

Uniontown—Development is to be commenced immediately of a 35-acre tract of coal located near Belle Vernon, which was purchased this week by W. H. Wilkey. The property comprises what is known as the Morgan and Beazell tracts, and includes 100 acres. Operation of the mine will be commenced Apr. 1. The coal is especially fitted for byproduct purposes. The consideration was $52,000.

VIRGINIA

Kiser—After a suspension of a few months at the instance of the Government, construction work on the big byproducts plant of the International Coal Products Corporation, at this place, has been resumed and the plant will be rushed to completion. When completed it is estimated that the plant will represent an expenditure

of $3,000,000. Byproducts of coal, much of them for Government use, will be manufactured at this plant.

WEST VIRGINIA

Meadowbrook—The Lambert Run Coal Co. is making rapid progress in the construction of a number of new miners' residences near its properties in this section.

Moundsville—S. Dorsey has recently completed negotiations for the purchase of a large tract of coal properties in the Washington and Clay Districts, near Moundsville, and plans are now in formation for early development work.

Perryville—Numerous improvements have been made by the New Export Coal Co. at its plant at this place, among the most important of such improvements being the construction of a new power house, in addition to 20 new miners' dwellings. The executive in charge of operations is W. F. Mandt.

Huntington—Huntington has been made the headquarters of the newly organized General Coal Co., which has a capital of $50,000 and which will undertake the development of coal lands in the Guyan region. The company was organized by J. L. Brooke, E. A. Spreen, R. S. Quinn, Thomas Quinn and W. J. Quinn.

Mount Hope—The East Gulf Coal Co., recently organized, is planning to commence development work at once on a tract of coal lands comprising approximately 4500 acres, near Mount Hope. It is understood that the company is arranging plans for the development of a townsite to comprise about 150 residences, the erection of tipples and necessary mining machinery for the initial development of two mines. P. M. Snyder is president; L. S. Tully is secretary-treasurer, and P. C. Thomas is manager.

Huntington—Seven thousand acres of coal land in Boone County have been acquired by the Youghiogheny and Ohio Coal Co., a Cleveland concern, from the Crane Real Estate Trust, the amount involved being, it is understood, close to $1,000,000. The property which changed hands represents some of the holdings of the late J. O. Cole and the late Clinton Crane. From what can be learned the company will not undertake the immediate development of the newly acquired land but will in time establish a large plant for the development of its new holdings, where there is much fine standing timber.

KENTUCKY

Chavies—A tipple is to be built in the near future by the Coneva Coal Corporation, which began the mining and shipping of coal recently from its No. 3 mine at this place. The company is now having estimates made on the probable cost of the new tipple.

Lynch—The United States Coal and Coke Co. is planning to commence work at an early date on the installation of a new tipple at its properties. It is understood that the company is planning for increased development operations to bring the daily output to about 400 cars.

Benham—The Wisconsin Steel Co. is considering plans for extensive improvements at its local coal properties, including the construction of new tipples and the installation of coke ovens, to provide for increased capacity. The company is a subsidiary of the International Harvester Co., Chicago, Ill.

Barbourville.—The Horse Creek Coal Co., of Manchester; and the Manchester Coal Co., of the same place, will be able to get out coal in the spring as a result of the completion of the Horse Creek branch line, built by private capital, and connecting with the Cumberland & Manchester R.R. Several other mines have been started and will be ready to ship shortly.

OHIO

Athens—Mine 254 at Jacksonville, belonging to the Collieries Co., and one of the oldest mines in continuous operation in the Hocking field, was put out of commission by a $20,000 fire which destroyed all the machinery. The cause of the fire has not been determined.

Bridgeport—A number of coal mines in the eastern Ohio district are closed down, and others are operating only on part time, according to William Roy, president of Ohio Mine Workers, District No. 2. Shutting off of lake shipments and the closing of the Government pools at Cleveland and other distributing centers are responsible, Mr Roy thinks

ILLINOIS

Toluca—The Jackson-Walker Coal Co., of Kansas City, has finished rebuilding its plant at this place. It is an old property, and the company has put in entirely modern equipment. This company's mines are located at Marceline, Mo., Pittsburg, Kan., Osage City, Kan., and at this place. The output is sold principally to the Santa Fe Ry. The company is now working five mines and controls the output of fifteen more.

Springfield—Citizens' Mine A of the Citizens Coal Co. has reopened after a shutdown of two months, giving employment to more than 200 men. The company expects to operate indefinitely.

The Springfield Consolidated Railway Co. has suspended its service to the Deveraux mine. It is expected that arrangements will be made for the running of special work cars morning and evening.

Carlinville—The Standard Oil mine at Berry, near here, will soon be ready to work, and other large developments owned by the company in this vicinity are being pushed as rapidly as possible. General Manager Maubeck and Major Douglas, chief engineer of the Chicago & Alton R.R., were in consultation recently with Assistant Manager Frank R. Fisher, with a view to facilitating the work.

MISSOURI

Kansas City—A new coal mine by the Palhattan Coal Co. has been opened in Macon County, Missouri. The operation has a capacity of 600 tons a day.

New plant No. 68, in Macon County, which the Central Coke & Coal Co., of Kansas City, is erecting at a cost of $200,000, is now being developed and is producing 100 tons of coal a day. In three months, when all the machinery is installed, it will produce 2000 tons a day. It is one of the largest mines owned by this company.

Foreign News

London, England—The Southport Miners' Federation, which demanded on Wednesday, Jan. 15 that the Government demobilize all miners in the army, also decided by a majority of more than two to one to demand an advance of 30 per cent. over present wages other than war wages.

American Headquarters in Germany—The disorders in Berlin, with the resultant interruption to railway traffic, are threatening to cut off the coal supply of the allied armies of occupation. A commission of American, British and French military officials left on Jan. 10 for the coal fields to investigate conditions. The American army alone uses 25,000 tons a month.

Victoria, B. C.—The Groundhog anthracite coal fields of British Columbia are to be developed, according to responsible mining men. These are situated north of the Hazelton district and contain eleven known commercial seams, aggregating about 68 ft. in thickness. Interest in these measures is held by Sir D. D. Mann and the Lord Rhondda Estate. While active work was suspended during the war, it is asserted that it will be resumed without loss of time.

Medicine Hat, Alta.—At a meeting of the Federation of Labor of the Province of Alberta held at Medicine Hat, Alberta, on Jan. 10, several suggestions affecting the regulation of coal mining in that province were indorsed which, if put in the form of legislation and enforced, will radically alter the present conditions. One provides for the compulsory use of electric safety lamps; another, that mine inspectors shall be elected and be subject to recall; and a third that a 6-hour day shall be granted to all underground workers.

Victoria, B. C.—Considerable interest is taken by coal mine operators of British Columbia in the announcement attributed to local officials of the Canadian Collieries (D), Ltd., that plans are being prepared by the company for the opening of new mines on the island and generally extending operations. On Jan. 6 a meeting of the directors was held at Montreal, when the resignations of Sir William Mackenzie as president and Sir Donald Mann, as a director, were received, their places being taken, respectively, by H. S. Fleming, of No. 1 Broadway, New York, and F. Perry, of Montreal.

Personals

Cary Hymere has been appointed state mine inspector of Indiana under the state industrial board. He is now a deputy state mine inspector. He succeeds Michael Scollard, who resigned a number of months ago.

Lieut. H. H. Johnson is now through with his duties in the United States Army and will resume his service with the Electric Service Supplies Co., of Philadelphia, Penn. Mr. Johnson will represent the company in the Illinois coal field.

Isaac Taylor, of Uniontown, Penn., general manager of the Snowden Coke Co., near Brownsville, Penn., was painfully injured at the Company's operation on Jan. 15, by the haulage rope flying off the sheave wheel and striking him on the leg. Mr. Taylor will be laid up for a week or more.

E. S. McCullough, of Monongahela, Penn., former vice president of the United Mine Workers of America, has been appointed commissioner of the Northern West Virginia Coal Operators' Association. The association represents a tonnage of 20,000,000 tons. Mr. McCullough will make his headquarters at Fairmont, W. Va.

Obituary

James Goldsworthy, for 15 years inside superintendent of the Honey Brook division, Lehigh and Wilkes Barre Coal Co., and for three years in a similar position in the Wyoming division, died at his home in Ashley, due to an attack of pneumonia.

James H. Small, secretary-treasurer of the Central Coal and Iron Co., Central City, Ky., dropped dead of apoplexy on Jan. 13, at the McDowell Hotel. Mr. Small was 49 years of age, and a native of Russellville, Ky. For several years he was with the Adams Express Co., as manager at Owensboro, and later at St. Louis. About ten years ago he went with the coal company, and later secured large interests in mines at Render and Beaver Dam, Kentucky.

John F. Meagher, age 37, general superintendent of coal mines for the Tennessee Coal, Iron and Railroad Co. in the Birmingham District, died at his home in Pratt City after a short illness of influenza followed by pneumonia. He was born in Maryland but moved here with his family during early boyhood. For the past seven years he had been in charge of six of the eight divisions of his company, which embrace twenty mines. He had on many occasions led his crew of helmet men in mine explosions and was loved generally by the miners.

Coming Meetings

New England Dealers' Association will hold its annual meeting March 19 and 20 at Worcester, Mass. Secretary, C. R. Elder, Boston, Mass.

American Wood Preservers' Association will hold its annual meeting Jan. 28-29, 1919, at St. Louis, Mo. Secretary, F. J. Angier, Baltimore, Md.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

National Rivers and Harbors Congress will hold its fourteenth convention Feb. 5-7 at Washington, D. C. Secretary, S. A. Thompson, Colorado Building, Washington, D. C.

Canadian Mining Institute will hold its annual meeting March 5-7 at the Windsor Hotel, Montreal, Canada. Secretary, H. Mortimer-Lamb, Drummond Building, Montreal, Canada.

American Institute of Mining Engineers will hold its 119th meeting Feb. 17-20, 1919, in the Engineering Societies' Building, New York City. Secretary, Bradley Stoughton, New York City.

American Institute of Electrical Engineers will hold its annual midwinter convention Feb. 19-21 at the Engineering Societies Building, New York City. Secretary, F. L. Hutchinson, New York City.

Recent Coal and Coke Patents

Coal Auger. M. Firl, Meyersdale, Penn., 1,280,696. Oct. 8, 1918. Filed May 28, 1918. Serial No. 239,107.

Hopper Car. A. Campbell, assignor to Enterprise Railway Equipment Co., Chicago, Ill., 1,281,286. Oct. 15, 1918. Filed May 14, 1917. Serial No. 168,401.

Smoke Consumer. P. C. Stoopes, assignor to W. N. Best Smoke Consuming Co., New York, N. Y., 1,281,694. Oct. 15, 1918. Filed Nov. 28, 1917. Serial No. 204,365.

System for Handling Coal. G. E. Titcomb, assignor to McMyler Interstate Co., Cleveland, Ohio, 1,282,144. Oct. 22, 1918. Filed Dec. 7, 1917. Serial No. 205,912.

Grate. J. S. Wilson, Scranton, Penn., 1,282,346. Oct. 22, 1918. Filed Nov. 7, 1917. Serial No. 200,764.

Dump Car. H. S. Hart, Chicago, Ill., 1,282,227. Oct. 22, 1918. Filed July 26, 1918. Serial No. 246,814.

Furnace. J. E. Bell, Brooklyn, N. Y., 1,283,047. Oct. 29, 1918. Filed Jan. 17, 1917. Serial No. 142,787.

Soot Blower for Water Tube Boilers. J. E. Bell, Brooklyn, N. Y., 1,283,048. Oct. 29, 1918. Filed Mar. 24, 1917. Serial No. 157,269.

Method of Briquetting. E. R. Stucliff, assignor to Pure Coal Briquettes Co., Cardiff, Wales, 1,283,354. Oct. 29, 1918. Filed Mar. 27, 1915. Serial No. 17,505.

Coal Digger. H. S. Webster, Canton, Ohio, 1,283,383. Oct. 29, 1918. Filed Jan. 12, 1918. Serial No. 211,595.

Mining Machine. C. E. Davis, assignor to Goodman Manufacturing Co., Chicago, Ill., 1,282,768. Oct. 29, 1918. Filed Oct. 6, 1910. Serial No. 585,549.

Mining Machine. H. C. Berkey, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,284,174. Nov. 5, 1918. Filed Sept. 16, 1913. Serial No. 790,146.

Publications Received

Third Annual Report of the Industrial Accident Board, State of Montana. For the twelve months ending June 30, 1918. Illustrated, 343 pp., 6 x 9 inches.

Arbitration and Wage-Fixing in Australia. Research Report No. 10, October, 1918. National Industrial Conference Board, Boston, Mass. Unillustrated, 52 pp., 6 x 9 inches.

Methods of Shutting Off Water in Oil and Gas Wells. By F. B. Tough. Department of the Interior, Bureau of Mines. Bulletin 163. Petroleum Technology 46. Illustrated, 122 pp., 6 x 9 inches.

Monthly Statement of Coal-Mine Fatalities in the United States, September, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, pp. 29, 6 x 9 inches.

The Environment of Camp Grant. By Rollin D. Salisbury and Harlan H. Barrows. State of Illinois Department of Registration and Education, Division of the State Geological Survey. Bulletin No. 39. Illustrated by maps, 75 pp., 6¾ x 10 inches.

Water-Gas Manufacture with Central District Bituminous Coals as Generator Fuel. By W. W. Odell, U. S. Bureau of Mines, and W. A. Dunkley, State Geological Survey Division. State of Illinois Department of the Registration and Education, Division of the State Geological Survey. Coöperative Mining Series, Bulletin 22. Illustrated, 24 pp., 6 x 9 inches.

Manufacture of Retort Coal-Gas in the Central States Using Low-Sulphur Coal from Illinois, Indiana and Western Kentucky. By W. A. Dunkley, State Geological Survey, and W. W. Odell, U. S. Bureau of Mines. State of Illinois Department of Registration and Education, Division of the State Geological Survey. Coöperative Mining Series, Bulletin 21. Illustrated, 24 pp., 6 x 9 inches.

Trade Catalogs

Copies of the catalogs, booklets and other literature listed below may be obtained free of charge by addressing the manufacturer.

Fairmont Runabout Mine Pump. Fairmont Mining Machinery Co., Fairmont, W. Va. Bulletin No. 13. Pp. 6, 6 x 9 in., illustrated. Explains the features of a portable electric mine pump.

Three-Phase Low Tension Equipment. Delta-Star Electric Co., Chicago, Ill. Bulletin No. 302. Pp. 4, 8 x 10½ in., illustrated. Deals with wiring supports, plugs and receptacles. General information is given of the application of unit type plugs and receptacles of the extra heavy type.

Steelcrete Machine Guards. Expanded Metal Engineering Co., New York, N. Y. Booklet. Pp. 40, 3½ x 6¼ in., illustrated. Describes and illustrates "Steelcrete" machine guards. The booklet will be found extremely valuable to any one who desires to install machine guards.

Sullivan Portable Mine-Car Air Compressors.—Sullivan Machinery Co., Chicago, Ill. Bulletin 75-I. Pp. 8, 6x9 in., illustrated. Describes the Sullivan class "WK-2" air compressors, mounted on a special truck. Are used chiefly in coal mines, where they are found convenient for converting electricity into air power for the operation of drills, coal pick machines in headings, post punchers, cement guns, etc.

Ladew Leather Belting. Edw. R. Ladew Co., Inc., Glen Cove, New York, N. Y. Catalog. Pp. 108, 6 x 9 in., illustrated. A beautifully printed catalog giving the history, standards, methods and policies of the company. It is in effect a treatise on the manufacture and use of leather belting. Belts for all purposes are described, as are also the many different specialties manufactured by the Ladew company. A comprehensive index is a useful feature in the catalog.

Industrial News

Buffalo, N. Y.—Reduced water pumpage in the city of Buffalo during December resulted in a saving of more than 1100 tons of coal at the pumping stations.

Wayland, Ky.—On Feb. 1 the purchasing department of the Elk Horn Coal Corporation will be transferred from this place to Wheelwright, Ky. G. S. Kinzer is purchasing agent.

Bethlehem, Penn.—The Guerber Engineering Co. has changed its title to Bethlehem Fabricators, Inc. The ownership, direction, management and policy of the company are not changed.

Virden, Ill.—The Montour Coal Co. has changed its name to the Pittsburg Coal Co. The company's mine at Virden is known at the North Mine. Arthur Neale will continue as superintendent.

Charleston, W. Va.—In line with recommendations made by Governor Cornwell, the state department of mines will ask the present session of the legislature to provide for the appointment of three additional mine inspectors and an increase of salary for inspectors of 25 per cent. The present rate is $175 per month.

Louisville, Ky.—B. F. Avery & Sons, large plow manufacturers, will be large consumers of coal in the fall, as the company has arranged to increase its plant by one third, having purchased a line of harvesting machinery from the International Harvester Co. and arranged to manufacture it at Louisville instead of Springfield, Ohio.

New York, N. Y.—William McElraevy has been appointed district manager of the Dominion Asbestos and Rubber Corporation of New York. Mr. McElraevy was formerly manager of the New York Branch power plant specialty department of the H. W. Johns-Manville Co., in which capacity he served for nine years and with a very successful record.

Pittsburgh, Penn.—The Draeger Oxygen Apparatus Co. on Jan. 7 changed its name to the "American Atmos Corporation." The charter of the company remains the same, except to the extent that it is authorized to manufacture various forms of breathing apparatus regardless of whether dependent upon oxygen or not. The officers and directors of the company remain the same.

Pittsburgh, Penn.—Members of the Pittsburgh Coal Exchange, at a meeting held on Jan. 11, elected Captain W. B. Rodgers to serve as president, this being the twenty-second consecutive year that he has held that position. Captain J. Trank Tilley was elected secretary for the twenty-eighth time. He was also made vice president, and will serve with the other men elected to that office, W. Harry Brown and A. B. Shepherd. H. O. Stang was elected assistant secretary.

Birmingham, Ala.—The Alabama Coal Operators Association has filed a petition with the Birmingham district freight traffic committee asking that a through rail and water rate from the Birmingham district to Mobile and New Orleans be published. The combination rate, it is understood, is requested in behalf of operators whose mines are contiguous to the Warrior River, and if granted will enable them to take advantage of the cheaper water transportation rates.

New York, N. Y.—The General Briquetting Co., 25 Broad St., is installing its new demonstration and custom briquetting plant at 57th St. and 12th Ave., New York City. Provisions have been made to demonstrate on a commercial scale modern methods of briquetting coal fines, coke breeze and lignite, as well as metal, ores, concentrates and flue dust. The installation includes Belgian roll coal briquetting machinery, complete with masticator for the Dutch oil process, dryers, elevator and conveyor system and power plant. It will commence operations about Feb. 1, 1919. Cost $200,000.

New York, N. Y.—With a view to putting into effect the recommendations contained in the report of the Foreign Trade Committee of the National Coal Association, that an association be formed under the Webb-Pomerene Law, to be known as the American Coal Exporters, Inc., there was a gathering of a few operators at the office of F. W. Wilshire, of the Consolidation Coal Co., of this city, on Jan. 15, at which preliminaries were discussed. Because of the small attendance, however, nothing definite was decided upon, but it is understood another meeting is to be held within a short time.

Morgantown, W. Va.—The coal producers of Morgantown received notice a few days ago that the railroads to which they had been furnishing fuel coal for some time would cancel all contracts for the present, claiming the right under the rules promulgated by the National Fuel Administration to cancel all contracts. Heretofore the railroads have been paying $2.50 a ton for coal, but have notified the dealers that they will not now consider a price above $2. This will serve completely to put the wagon mines out of business, as soon after the signing of the armistice that 75c. a ton extra allowed the wagon mines was taken off the price and the additional cut of 50c. a ton will make a difference of $1.25 a ton.

Carbondale, Ill.—George R. Sheldon, New York, financier, died at a hospital here on Jan. 14 from injuries received in the mine of the Union Fuel Co., at Dowell, 14 miles from here. He was a director of the fuel company, which is a subsidiary of the Union Electric Light and Power Co. of St. Louis, and with twelve other men was making an inspection of the mine. He became separated from the rest and was caught between a moving string of loaded coal cars and a rib of coal. He was also a director of the West Kentucky Coal Co. and was Chairman and Treasurer of the Board of Directors of the North American Co., which owns the Union Electric Light and Power Co. and the United Railways Co. of St. Louis.

Columbus, Ohio—Bids were opened Jan. 6 by the Columbus Board of Purchase for coal for the various departments as follows: 1400 tons of nut, pea and slack for the garbage and refuse departments; 2000 tons for the water-works and 3500 tons for the municipal light plant. Fletcher-Williams Coal Co., Columbus, bid $2.14 at the mines for Cambridge nut, pea and slack, with a premium of two cents for every 100 B.t.u. over 11,000. Calculating the coal to have 13,000 B.t.u., this would make the price $2.54 at the mines, which is slightly above the Government price. The West Virginia Washed Coal Co., of Covington, Ky., bid $2.40 at the mines for West Virginia nut, pea and slack, making the Columbus price $3.60. The contract may be awarded later.

Philadelphia, Penn.—The Reading Ry. is making a series of tests of various kinds of coal assigned to various engines. They comprise the freight, coal or long-trip engines, shifting and passenger engines. Tests made in Lehigh Valley engines with anthracite and bituminous mixed at the new mixing plant at Hazleton have proved satisfactory, it is said, and caused the Reading to look even more closely into the conservation question as it relates to engine fuel. The passenger engine from Pottsville to Philadelphia takes about 480 shovelfuls of coal to make the trip. The fast engines pulling the express consume less fuel and the locals more. It was figured in making the 1918-19 allotments of anthracite that the railroads would require 2,482,000 tons for all needs.

Columbus, Ohio—At the annual meeting of the Ohio organization of the United Mine Workers of America, protests were made against the U. S. Railroad Administration purchasing coal at lower than Government prices. A request was also made asking the Railroad Administration to so distribute its orders for railroad fuel as to give work to thousands of miners now employed on half time. Two hundred delegates attended the meeting, and it was stated that there were approximately 46,000 miners on the union rolls in the Buckeye State. A resolution was adopted in opposition to the creation of a state constabulary, as had been propesd, and to provide for which a bill is soon to be introduced in the Ohio General Assembly. All old officers in the Ohio organization were reëlected, with John Moore as president; Lee Hall, vice president, and G. C. Savage, secretary-treasurer.

MARKET DEPARTMENT

Weekly Review

Fuel Administration Announces That It Will Relinquish Control of Soft Coal on Feb. 1—Removal of Restrictions Should Serve to Stimulate Industry—No Shortage of Either Anthracite or Bituminous.

THE announcement made by the Fuel Administration that all restrictions on the movement and price of bituminous coal would be removed on Feb. 1 was received with commingled feelings by the coal trade. In its essence the order means that the bituminous coal industry is to be restored to its prewar status, with everything that the restoration implies. Among other things the zoning of bituminous coal will be eliminated and prices of soft coal will be governed by quality; in other words, the economic laws of supply and demand will once more prevail.

In a sense the removal of Government control of the soft coal industry should serve to act somewhat as a stimulus to production. Contracts for the coming coal year can now be entered into without fear of Federal interference, and the trade will gradually get back into its natural channels. The fear entertained in many quarters that the Railroad Administration would take advantage of the new order of things by using its collective purchasing power to force down the price of locomotive fuel has been set at rest by Walker D. Hines, Director General of Railroads, who in a recent statement denied that the railroads would attempt to make use of the power inherent in centralized control to the detriment of the coal industry.

Though it is unsafe to make any predictions, indications are many that the now almost stagnant soft coal market will see a decided movement for the better within the next two months. Consumers who have been cutting into their stock piles will again resume buying after Feb. 1; so will the railroads. The Government has released the shipping it had commandeered from private interests, and this more than anything will act as a stimulus to the expansion of our foreign trade. Inquiries are already starting to come in from other countries for our products, some of the steel interests reporting that export business is showing surprising activity. Resumption of operations in other fields means plenty of work for the mining industry.

Production of soft coal for the week ended Jan. 11 amounted to 10,287,000 net tons, making a total of 466,510,000 net tons from Apr. 1, 1918, to date. Only the high-grade soft coals are short in supply, there being ample of the other varieties to meet all demands.

There continues to be a large current demand for anthracite, and in spite of the remarkably fine weather there is reason to believe that this demand will continue throughout the winter. The Fuel Administration has not relinquished control of anthracite coal, and will continue for some little time to supervise its distribution.

During the week ended Jan. 11 there was produced 1,651,000 net tons of anthracite coal, making a total for the coal year to date of 76,870,000 net tons. The inquiries for stove and nut coal are greater than the supply, while the production of the other sizes of hard coal is sufficient to enable the accumulation of storage piles.

WEEKLY COAL PRODUCTION

Bituminous—The output of soft coal during the week ended Jan. 11 was exceedingly good, and in addition to exceeding the output of the week preceding showed an improvement over the corresponding week of 1918. Preliminary estimates place production of bituminous coal (including lignite and coal made into coke), during the week ended Jan. 11 at 10,287,000 net tons as compared with 8,428,000 net tons during the week of Jan. 4, and 10,163,000 net tons during the week of Jan. 11, 1918. The daily average during the current week is estimated at 1,715,000 net tons as against 1,896,000 net tons, the daily average for the coal year to date, and 1,757,000 net tons for the same period of last year.

Anthracite—The production of anthracite, estimated at 1,651,000 net tons, exceeds production during the week ended Jan. 4 by 262,000 net tons, or approximately 20 per cent., but fell 68,000 net tons, or approximately 4 per cent., below production of the corresponding week of 1918. The daily average during the current week is estimated at 275,000 net tons compared with 212,000 net tons for the coal year to date, and 319,000 net tons for the same period of last year. While the production of anthracite for the coal year to date is 1,600,000 net tons, or 2 per cent., below production during a similar period of 1918, it is nevertheless equivalent to demand. Figures now available for the nine months ended Dec. 31, 1918, show that the allotment originally outlined by the Anthracite Committee of the Fuel Administration on domestic sizes of anthracite (including pea), to have been practically fulfilled.

New England Shipments.—Bituminous coal to New England during the week ended Jan. 11 is estimated at 255,355 net tons, approximately 40,000 net tons, or 14 per cent., below the shipments during the week preceding. Rail receipts, as well as tidewater shipments, with the exception of the tonnage loaded at Baltimore, declined during the current week.

Tidewater Shipments.—A decrease in tidewater shipments of approximately 113,000 net tons, or 17 per cent., during the week ended Jan. 11 as compared with the week preceding, was brought about by the decline in shipments from New York and Philadelphia, which amounted to 33 per cent. Shipments from Baltimore were only slightly lower than the week preceding, while shipments from Hampton Roads exceeded those of Jan. 4 by 20,000 net tons, or 9 per cent.

Beehive Coke.—The production of beehive coke in the United States during the week ended Jan. 11 is estimated at 538,000 net tons, an increase over the week of Jan. 4 and but little less than the production in the corresponding week of 1918, when the output was 555,000 net tons. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania during the week ended Jan. 11 produced 309,416 net tons of coke, operating their plants at 72.6 per cent. of their full time as against 70.4 per cent. during the week ended Jan. 4. The same operators produced 146,000 net tons of coal.

Byproduct Coke.—Byproduct coke production during the week ended Jan. 11 is estimated at 541,600 net tons and falls but slightly below the production of the week preceding. It is, however, approximately 50 per cent. in excess of production during the corresponding week of 1918. The plants of the country were operated during the week at 83.1 per cent. of their full time as compared with 82.2 per cent. during the week of Jan. 4. The slight increase in loss of time during the current week compared with the week preceding was brought about by a shortage of byproduct coal in Pennsylvania, and repairs to plants in Maryland. Massachusetts, Ohio, Minnesota and Pennsylvania are the only states reporting losses of time due to lack of demand.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running lower than for the corresponding week of 1918. Road sales for immediate delivery were much larger, while those for future delivery were less than for the same week a year ago. Customers were in the house in increasing numbers. Collections are good.

Dry Goods Economist—Noteworthy progress was made this week in the movement toward more stable price levels. A steep cut was made on two standard brands of bleached muslins. Downward revisions were also made on other well known brands of bleached cottons. In floor coverings, following the recent recession in linoleum prices, reductions were made by one leading manufacturer of Wilton rugs.

Bradstreet's—In manufacturing the pace is unquestionably slower, especially so at iron and steel and textile centers, where the problem of unemployment, mostly of unskilled labor, is receiving more attention. The distictively new feature of the week is the apparent livening up of interest in what might be called raw materials, this more especially at large eastern centers, where dyestuffs, drugs, sole leather, raw wool at government sales, and hardwoods show more inquiry. On the Pacific coast, however, lumber is more active, fir prices having advanced. At some large western and southern centers inquiry for building materials, based on expected large spring operations, is more in evidence.

The Iron Age—With operations not quite so good as a week ago, it is to be expected that reports are numerous of plant shutdowns. A surplus of labor has already become apparent at steel works, with offers to work at lower than existing wage schedules. Concentration on export probabilities still serves to accentuate the unfavorable differences in ocean freight charges as between this country and England. American billets have been quoted at $50 per ton, f.a.s., while the British established export price is £13 10s. Thus the vessel freight rate difference needs to be within $14 per ton for the United States to participate. American steel bars have been offered at about $72.50 alongside ship, or about $20 per ton lower than the British product.

Atlantic Seaboard

BOSTON

Softening prices, but no better demand. Railroad contracts not renewed. Steamers still being tied up. Shipping Board announces that bottoms will be returned, but no assurance as to rates. Hampton Roads dumpings light. Only scattering lots placed inland from Tidewater. Rail movement continues to sag. Buyers becoming interested in differential between rail and water routes. New York piers embargoed. Long Island Sound market dead. Anthracite easier, but loading conditions unfavorable. Broken, egg and pea come forward, but range sizes hard to get. Allotments practically off. Dealers guarded about buying. "Independents" find it difficult to place the unrestricted sizes. Retail prices in Boston.

Bituminous—It is well established now that fair-grade Pennsylvania coals are being offered at considerably less than the Government price, although nothing more than scattering sales have been made. In fact, it is still taxing the ingenuity of several factors in the market here to place coal that has arrived at destination and is not accepted by the original consignee. Telegrams are frequent from operators who are pushed to find orders and all manner of quotations are heard. What was offered at $2.80 a week ago is now quoted at $2.60, and on some of the less favorably known coals $2.40 has been heard. Doubtless some of these offers are more or less irresponsible, so many selling agents are trying hard to induce buyers to take on temporary supplies, but it is very evident that sacrifices would very gladly be made by many operators to get orders for current shipment. A possibility of labor tie-ups and light output are used as arguments, but the trade is as unresponsive as at any time in its history. Most of the low-priced propositions are being made to the railroads, but this is because operators do not realize it is perhaps the most unfavorable prospect of all. One of the smaller roads, using about 250,000 tons, has now on hand nearly six months' supply, and all the New England lines have now so large an investment in fuel and general traffic is so light that it will be several months before there is any pronounced railroad buying. Most of the textile plants have goods on hand they cannot sell, and the whole prospect for coal in this territory is anything but encouraging.

As fast as certain of the long-term fuel contracts expire the railroads are allowing them to lapse, without any renewal. This is contrary to the expectation of the shippers and seems to be particularly applicable to coal coming forward by water. In view of all the conditions this policy is easily understood. No responsible buyer would today tie up for a term ahead on present marine freights as established during the height of war and in the midst of great shortage of shipping.

At Hampton Roads there continues a great surplus of coal over bottoms to load. Government requisitions are materially reduced, especially for the Navy, and embargoes are frequent against producers whose coal is not readily dumped at the piers. There is an entire absence of spot inquiry for cargo coal.

At this end, from Tidewater inland, there is only a light scattering inquiry. F.o.b. Providence and Boston present prices on Pocahontas and New River are from $8.10 @ 9, but the differential is so high that it is exceptional when more than a few cars can be placed.

Several of the pools at the New York loading piers continue to be under embargo, current dumping is so greatly diminished. Bunker and export demand has fallen off, and along the Sound the market is hopelessly dull. It is only with difficulty that contract deliveries are accepted, and in many cases plants that were unable to get shipments regularly last year through usual channels were so often forced into the open market that it is impossible for them now to take unfilled balances.

A great deal is being heard about fuel oil in this market. Some very attractive propositions are being made to large industries, and in the light of certain remarkable cases most factory managers will feel like making tests. This will make it all the more important from a coal standpoint to put marine freights on a reasonable basis.

Anthracite—The prolonged mild weather and the entire absence of any apprehension over supply the remainder of the winter leads the public to think the situation on domestic sizes in very comfortable shape. It is, however, a weather market, and given a spell of sustained cold there would develop a briskness that does not now appear. All-rail the movement continues very consistent, the average daily receipts at the gateways for the first half of January having very nearly maintained the December level. The present movement is about 330 cars.

Loading conditions at New York are still unfavorable. It is understood that strenuous efforts are being made with the Railroad Administration to induce high officials therein to permit Reading barges to resume loading at Port Richmond. The continuance of the unfortunate experiment at Port Reading cannot be too severely criticized, and it is much to be hoped that an efficient handling of the Reading fleet can once more be permitted. In spite of allotments and restrictions there might still be some serious situations in New England should we get some really cold weather, and further tampering with long-accustomed channels of supply should be given up the earliest day possible.

Broken, egg and pea are still in such surplus at practically all the piers that orders calling for these sizes are getting preference, and that means that a large number of smaller dealers who must insist upon a proportion of stove and chestnut are obliged to wait. The range sizes are still extremely hard to get.

Although anthracite allotments are not yet abolished, except with regard to broken, egg and pea, there are increasing indications that the shippers are no longer bound by them. The unrestricted sizes are being so freely offered, particularly by "independent" shippers, that retailers are buying very cautiously. Present prices do not encourage the dealer to accumulate much reserve of these sizes. It is now a regular practice of some of the retailers to use stone and coke crushers to reduce the size of their broken and egg.

The "independents" are finding it harder and harder to place their surplus sizes. During the tight period it was usual for them to exact the limit of price for coal and freight, and there are many retail distributors who are relieved to find themselves no longer dependent upon these sources.

NEW YORK

Anthracite market easy, with demand slow. Plenty of domestic sizes, and coal coming forward in good volume. Strike of boatmen not felt by dealers. Dumpings at local docks show decrease. "Independent" coals maintain prices. Bituminous traders expect little change due to removal of restrictions. Local situation inactive. Plenty of coal, but demand is slow.

Anthracite—The situation continues easy, with demand slow and plenty of coal coming forward to meet all requirements. Salesmen returning from their trips inland report better business and say that many dealers are keeping their bins well filled, notwithstanding, the belief that there might be a slump in prices for "Independent" coals.

The removal of all restrictions on the shipment of all sizes other than stove and chestnut, to any markets that can be found for them, has had no apparent result on local conditions so far, and it is possible that nothing short of a severe cold spell of several days' duration will create any sort of a demand.

None of the domestic sizes can be called scarce. Most dealers have a good supply of all coals, stove and chestnut being the shortest. Among the all-rail trade, most dealers ask for both sizes.

The strike of the boatmen had no effect upon local conditions. Dealers had their bins well stocked and were able to take care of the trade for several days, even though the weather had been much colder. There was decrease in the number of cars dumped at the local docks during the seven-day period ended July 17, 4564 cars being reported as compared with 5627 cars the previous week.

So far shippers of "Independent" coals have been able to maintain prices, but there is no telling how long this can continue unless this section of the country experiences some seasonable temperatures. Retail dealers are looking for concessions on this class of coal, and for that reason are not buying as heavily as they would if other conditions prevailed.

There is a heavy surplus of the smaller coals. Buckwheat No. 1 is a burden to some, and concessions are reported as being made. Rice and barley are not being inquired after. Quotations ranging from $3.25 to $3.40 at the mines for buckwheat have been noted, while it is also reported that some of this size has been offered as low as $6 alongside.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$7.80	$8.55
Egg	7.70	8.45
Stove	7.95	8.70
Chestnut	8.05	8.80
Pea	6.55	7.30
Buck	5.10@6.05	5.90@6.25
Rice	4.65	5.10
Barley	4.15	4.30
Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—The removal of the Government restrictions on the bituminous industry ordered for Feb. 1 is not likely to have much immediate effect upon local conditions. It is not probable that there will be much change from existing quotations for some time to come, both operator and shipper realizing that if the cost of production is to be met, returns from sales must be sufficient to meet this expense. When a change does occur it is expected prices will decrease due to the large stocks of bituminous on hand, the hesitancy of buyers and the diminished consumption which is to be looked for with the approach of spring and summer months.

The announcement from Washington had been expected for a couple of weeks and it will go a long way toward creating a feeling of certainty in the trade. Producers felt that it would be unwise to make any moves as to future operations until some definite announcement came from the Fuel Administration, and for that reason nothing has been done regarding contracts for the coal year beginning Apr. 1. Producers and distributors will now feel able to go ahead and discuss this matter.

The situation locally is inactive. There is plenty of the fair and poorer grades on hand, while the high coals are in good demand. Instead of the buyer going after the seller, conditions are just the reverse.

Buyers are willing to wait developments unless they can secure the best the market affords. There is a decided feeling that prices will drop shortly, and that even the better grades will be obtainable at figures below the present Government maximum.

The effects of the strike of harbor boatmen were noticeable in the number of cars of bituminous dumped at the local docks for the week ended Jan. 17. Reports show 4110 cars dumped as compared with 4996 cars the previous week, a decrease of 886 cars.

Quotations as to the various grades of coal varies. Coal in Pool II was quoted as low as $2.60 at the mines, and other good grades were quoted as low as $2.35 per ton. The better grades, however, were held steady at the Government maximum prices.

Receipts at the docks have been heavy, there having been 5408 cars on hand one day this week.

Current quotations, based on Government prices at the mines, net ton f.o.b. tide-water, at the lower ports, are as follows:

	Mine, Gross	F.o.b. N. Y., Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

Anthracite trade quiet. Moderate weather halts consumption. Cancellations of egg and pea orders grow. Decline in use of pea blamed on poor preparation. Only activity is in stove and nut, and some softening indicated there. Individual shipments of these sizes good. Lifting of restrictions on all sizes but stove and nut helps producers. Steam trade very dull. Little activity in buckwheat. Bituminous market does not improve. Ordinary coals off price.

Anthracite—Again weather conditions have moderated, and while the former colder conditions were not extreme they did serve to buoy up the trade for the time. As it now stands, if the weather does not soon grow cold and stay cold for several successive weeks, almost anything is likely to happen to the coal trade.

In the suburban sections of the city the dealers are fairly busy and the demand for all sizes continues quite good. This

may be accounted for by the fact that one shipping company that has heavy obligations is still behind in its consignments to these localities. A great improvement is reported by them during the past week, however, and a continuance of substantial shipments may soon alter conditions there.

In the city proper the dealers admit being alarmed at the outlook. They are booking little or no new business, and numerous customers are refusing to accept more coal on orders placed last spring. Where dealers have filled the cellars they are fearful the coal will not be consumed in time to permit them to book orders for the usual spring tonnage.

The shippers continue to receive requests to suspend shipments of the sizes in plentiful supply, until by now there is a comparatively light market for egg, and the suburban dealers are having by far the greater proportion of this size consigned to them.

The falling off in demand for pea by domestic consumers is accounted for by several dealers who say that it is not only because of the small difference in price between it and chestnut coal, but to the size of pea coal coming to market. Unquestionably there has been much inferior pea coal shipped, and there are some who strongly suspect this size is being affected by the collapse of the buckwheat coal market.

This week the Philadelphia Fuel Administrator announced through the daily papers that the regulations of the administration are still effective and will continue so until further notice. At the same time he took occasion to announce that no fairer or more general distribution of coal has ever been made in Philadelphia. He states that every one now has coal and will get more as he needs it, also that the public has been protected against exorbitant prices. He went into a full analysis of the price question, as in these times of a full supply many consumers are inclined to quibble as to price. He showed that all the price increases were legitimate and only as ordered by the Government authorities and the far greater proportion of all increases was in the form of wages to the miners.

With the removal of all restrictions, with the exception of stove and nut, in the thirty counties in the state which had been barred from receiving anthracite since last April, the market on the other sizes is expected to improve.

The steam coal business is in poor shape indeed. No shipper is able to dispose of all the buckwheat produced, and since this size is the one in greatest demand it can easily be seen that the other sizes are particularly heavy. Many complaints are also heard of the preparation of the buckwheat, the principal one being that this size contains a much greater percentage of rice coal than usual. The smaller producers are compelled to dump much of the finer sizes on the banks at their operations, while the big companies are rapidly increasing the piles in the storage yards. This also includes a good tonnage of buckwheat, a size which heretofore this season did not find its way to the yards. There is also a heavy accumulation of the small steam sizes at all the tide shipping points. Even with prices cut almost to the bone shippers are unable to move cargoes of the sizes smaller than buckwheat. On the part of the consumers there seems to be a general disposition to wait, especially since they have large quantities of all the steam sizes in stock.

The prices per gross ton f. o. b. cars at mines for line shipment and f. o. b. Port Richmond for tide are as follows:

	Line	Tide
Broken	$5.95	$7.30
Egg	5.85	7.20
Stove	6.10	7.45
Nut	6.20	7.55
Pea	4.80	6.05
Buckwheat	3.40	4.45
Rice	2.90	3.80
Boiler	2.70	3.70
Barley	2.40	3.30
Culm	1.25	2.15

The foregoing prices cover company coal. Individual shipments on sizes broken to pea inclusive are 75c. higher. Steam sizes are sold at market prices.

Bituminous—The market fails to improve and there is more coal offered than is being taken. On account of this many operations have been compelled to go on short working time. There has even been some weakening in the demand for the high-grade coals. With the ending of confiscation of engine fuel by the railroads a heavier quantity of this coal came on the market. The situation as it now stands is that only the best coals with whose name the consumer is familiar can find a ready market at the full price. The inferior grades are still selling off price, the lowest quotation we heard being $2.35 a ton. At the piers embargoes have been placed against pools carrying low grade coals of certain kinds, although Nos. 9, 10, 11 and 71 are still taking good tonnages of the better coals.

In the trade at large throughout this district it is extremely difficult to get big users to take in any but the most meager tonnages, and some of them have even held up orders for the good coals pending their reducing present stocks.

There is some inquiry for the strictly blacksmith coals which were well-known to the trade prior to the war, as the users of these coals are now anxious to get back to the proven kinds of this coal. Of course, the business in this coal is small at any time.

BALTIMORE

Coal of all kinds in oversupply. Bituminous market glutted, prices break further and many mines curtail or close. Weather continues mild.

Bituminous—The soft coal market here has broken badly. On oversupply is running from bad to excellent fuel. Even the better grades are not so readily absorbed as desired. The less coals are a true drug on the market. Embargoes are continued from time to time against the Canton and Curtis Bay piers, and also against certain line points where congestion exists. The plan of combining one poor pool with a better pool of coal at Canton to get a clean-up at that point has so far not been a pronounced success. Coal is offering freely at figures much below the Government maximum. This includes some export coal that was originally shipped to Curtis Bay to be sent out at the export figure only. Meanwhile the producing end of the business is apparently determined that no general move to keep selling coal at figures that are not profitable shall again hold the trade. Many mines are curtailing production as fast as they find that there is not a ready outlet for their production rather than keep up the old policy of running anyhow and selling at an actual loss.

Anthracite—It is officially announced by the Maryland Fuel Administration that there is now plenty of coal here for domestic use, and in fact that there is an overupply of anthracite for the time being. This fact has been growing patent to a considerable portion of the trade for some time. The continued mild weather here for the season is holding down consumption, and there is a promise that the end of the winter term will see no big rush for fuel. The local administration also announced that all restrictions on supplies of anthracite are off with the exception that permission is still required to get hard coal in car-load or barge-load lots.

Lake Markets

PITTSBURGH

Full prices maintained for standard grades. Production considerably curtailed. Elimination of zoning system will make little change.

Complete removal of coal-zoning and price regulations on bituminous coal will take effect on Feb. 1, as announced late last week by the Fuel Administration. The lifting of the zone restrictions will not greatly influence the movement of Pittsburgh district coal, as some of the limitations had previously been removed, and the trade has not been materially restricted by such zoning regulations as have lately been in force. The elimination of price control will afford two months of a free market in which buyers and sellers can get together on contracts for the new coal year. Much satisfaction is expressed in local circles over the attitude the Fuel Adminostration recently assumed with respect to the efforts of the railroads to secure special prices on coal. Producers feel that the railroads should pay the same prices as other coal consumers.

Government prices have been well maintained on Pittsburgh district coal of the better grades, and predictions are to the effect that little cut in prices will be noted after Feb. 1. Producers of standard grades have simply refused to reduce prices when under pressure and prefer to curtail production to the extent necessary. As a result, the whole Pan Handle district is operating at only 30 per cent. of capacity, and producers in that district will be content to proceed at such a rate or even a lower one until lake shipments come, only about three months hence, to swell the demand.

High-grade gas coal continues very scarce and readily brings full prices, even occasionally a brokerage in addition to the Government limit. Byproduct coal is in almost equal demand. Dealers have been quoted slight reductions, hardly enough to pay them for handling the business, and prices to consumers are the full Government limit. The great majority of the wagon mines are now closed, as well as some rail mines producing altogether indifferent grades. For standard grades of coal the market is fairly quotable firm at Government limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

BUFFALO

No active bituminous trade in sight. Anthracite demand falling off fast. Supply everywhere good. State of consumption hard to determine.

Bituminous—Members of the trade generally agree that the supply exceeds the demand quite as much now as it has done lately, and they see no reason why the surplus will not continue for an indefinite time. A few operators are holding that the present Government prices will keep up till April and then stiffen a little on the strength of the liberal contracting that is expected. It is not easy to see, though, where this view of the market is obtained, for already jobbers are showing invoices of coal at reduced prices.

The jobbers are not really so despondent as they were when the operator had no surplus to turn over to them, for they have at least some customers on their lists and they can get as much coal as they want. That gives them two chances to the one during the scarcity period. Many jobbers shipped more coal into Canada than could be sold readily, and a few lost money by having to pay heavy demurrage; but that is stopped now, though the surplus there is still large.

Anthracite—The state of the anthracite trade is shown by the report that the independent prices are weakening and that some offers are made at prices less than those made by the large companies. Steam sizes of anthracite are not any more salable than is bituminous. Jobbers report offers of buckwheat in large lots, but they refuse it. Another way of getting rid of it is to oblige jobbers to take a certain proportion of the small sizes with every order filled for pea or larger. Even this method does not appear to help matters.

Buffalo distributors say that they now have more coal than the city retailers can handle, and if the weather does not become more severe soon the market will be flat. Canada is taking more than Buffalo in proportion, but that movement is likely to weaken if the present conditions last.

CLEVELAND

Inquiry for and buying of Lake bituminous is furnishing practically the only activity now in this market. The buying of steam coal that was done the past two weeks has flickered out. Shading of Government maximums seems fast on the way to becoming the rule rather than the exception.

Bituminous—Steam coal consumers who have been feeling out the market have left it after doing some scattering buying for spot needs and have made the local market all the duller by comparison. Operators seeking to search out business have found stock piles still a great deal larger than they expected, and the demand for steam coal now seems at the lowest ebb since the armistice was signed.

The upshot is that more and more operators have been compelled to make price concessions. Especially is this true just at present of the thin-vein operators, for whom the Government maximums were 30, 40 and in some cases 50 cents higher than they would have commanded ordinarily in competition with the more standard grades. They are now letting back the spread that ordinarily existed. It is said that it would be dangerous for any steam coal consumer to offer 25 to 35 cents under the Government price for standard No. 8 coal to any operator for a sizable tonnage.

The bright spot in the market is the inquiry for 1919 lake coal. So far prices have not been discussed, though it seems pretty generally understood not much, if anything, will be clipped off of 1918 prices unless the market in the emnatime breaks badly or the wage scales or railroad rates are reduced appreciably. In several cases blocks of about 500,000 tons have been taken. In every instance, however, this inquiry and buying has been for strictly standard No. 8 coal. Buyers can now be much more particular and no such "cats and dogs" as the war forced upon them last summer will again pass muster.

The cold spell to which retail dealers looked for increased business proved short-lived, and domestic demand has fallen back into the rut it slipped into last November. Most of the larger retail dealers look for only a limited amount of buying until next fall. Domestic consumers can now buy standard grades at 25 to 40 cents less than in November. This price cutting has been especially vigorous among the smaller dealers, who seized upon offers of thin vein and stripping coal as a reinforcement for their fast waning trade.

Anthracite—The supply, though still light in comparison with regular times, continues to increase faster than demand, and there is active competition for the retail trade. This has not assumed great proportions, however, because of adverse weather conditions.

DETROIT

Inactivity continues a conspicuous feature of the Detroit market, due to large stocks, mild weather and reduced industrial activity.

Bituminous—Neither the steam plants nor the retail dealers are making as rapid progress in reducing their cumbersome stocks as had been hoped by the Detroit jobbers. The easing off in manufacturing activity following termination of war contracts has not yet given place to a normal volume of operation by manufacturing plants on a peace basis. There is consequently a material lessening of steam coal consumption.

This defers the time when jobbers and wholesalers may look for improvement in sales to the industrial plants. A large proportion of the latter are still heavily stocked with coal, much of which is of a poor quality and the use of which is proving a costly experience to its owners. Possibly this may be offset by the feeling that in having accepted the low grade coal sent to Detroit as a substitute for their usual fuel they were rendering patriotic service in yielding the better quality of coal to aid the Government in its prosecution of the war.

Anthracite—Shipments of anthracite show little increase in volume. Mild weather has encouraged conservation of the supplies on hand, as also has the opportunity afforded household consumers to stock up with coke. The requirements of baseburner owners are not yet completely filled.

COLUMBUS

Signs of strength in domestic circles are now apparent in Ohio. The steam trade is still quiet and little is expected until surplus stocks are worked up. Prices are generally firm, although some cutting is reported.

The most interesting development in the coal trade in Ohio is the increased demand shown for domestic sizes. This market has been slow on account of large retail stocks and continued warm weather. The weather has not changed materially, but nevertheless there is a better demand from many sections. Dealers are anxious to buy the fancy grades such as Pocahontas and West Virginia splints. Ohio-mined grades are also selling fairly well and, generally speaking, the domestic trade shows a better tone. Conditions are not yet normal and will not reach that point for some time because of heavy stocks which were ,stored by householders earlier in the season. Retail stocks, excepting in rural sections, are also pretty large. Retail prices are generally well maintained, although there is some cutting reported.

The steam business is generally slow. Little demand has developed from the industrial centers where reserve stocks are unusually large. This is true of the rubber plants of Akron and the iron and steel plants of northern and eastern Ohio. Thousands of tons of coal have been stocked by these concerns, and consequently they will not be in the market for some time to come. The policy is to use up surplus stocks before buying to any extent. The railroad demand is not nearly so large as formerly, as the freight movement is cut. One of the largest lines in central Ohio, which customarily uses 10,000 tons weekly, now consumes about 3500 tons per week. This indicates the reduction in the railroad fuel demand. Some cheap coal is now being purchased by railroads, but the larger producers have not cut prices to please the U. S. Railroad Administration. The plan to stop the Railroad Administration from buying fuel under the market is progressing satisfactorily.

Production has not been large in any of the producing fields of the state. This is due largely to lack of orders, and operators prefer to suspend operations entirely rather than cut prices.

CINCINNATI

Mild weather and limited industrial demand continue to make accumulated stock the chief factor in the market. Spot demand is very small.

The local market during the past week continued under the same restraining influences which have existed during nearly the entire current season. The brief period of cold weather, virtually the first of the season, around Christmas and the first of the year, has given way again to mild weather, with moderate temperatures, with the result that even consumers without supplies of coal in storage have not been brought to worry about heat. At the same time the slow recovery of industry from the necessity of readjustment from war to peace conditions continues at a rate which does not promise much stimulus to the coal business for the time being, however flattering the prospects may be for the latter part of the year.

The amount of coal in storage does not seem to have been overestimated by the trade, as dealers and wholesalers have reason to recall the extreme activity to which they were put last summer by the incessant and insistent demand from all quarters; and they have come to the natural conclusion that they must resign themselves to a situation resulting from having handled their usual winter business several months in advance, an account of the recollection then fresh in the minds of the public of the extreme severity of the preceding winter and the difficulty then experienced in getting coal. A consoling feature of the situation is that the habit of storing coal in advance of the consuming season may have become so impressed as to help the trade along hereafter.

LOUISVILLE

Light demand only for domestic coal, while screenings and steam grade are generally quiet. Many mines down, but prices being maintained.

The demand for domestic coal is so light that retailers can generally make deliveries immediately. Retailers' stocks are somewhat lighter than they were, but they are still buying lightly.

With the demand running largely to domestic, and trouble experienced in disposing of the screenings, many operators are of the opinion that domestic will jump in value the moment the Fuel Administration prices are lifted. It is claimed that it is practically impossible to dispose of screenings at this time in quantities sufficient to take care of the domestic production, as many mines screen two cars of screenings to one of domestic, and the latter is the grade that is in demand.

BIRMINGHAM

Demand good for steam coal, while domestic coal is being eagerly sought and not much found. Labor conditions improve slightly. Output around 60 to 75 per cent. normal.

There is a good general demand for steam coal in this market, the activity being due in a measure to the shortage in supply, which has been in evidence for several weeks.

The Fuel Administration is gradually restoring distribution to the peace-time agencies, the Southern Ry. and other priority consumers now handling their requirements direct with the mines holding contracts, and purchases by the several departments of the Federal Government will now be made through the channels formerly employed.

Domestic coal is extremely scarce and receipts are much lighter than the needs, both locally and throughout the state. There is a brisk demand for domestic fuel, and the yards of the city are nearly all bare of stocks.

Labor is exceedingly indifferent and slow about returning to work, and the output of coal is still from 25 to 35 per cent. below normal. Production for the week ending Jan. 4 was 250,147 net tons, a gain of about 140,000 tons over Christmas week.

Coke

CONNELLSVILLE

Slight signs of weakness. Production increasing with prospects of decreased consumption. Byproduct coke in market.

A few days before the Fuel Administration announced that coke price limits would become inoperative Feb. 1, the first definite weakness in Connellsville coke developed, some off grades of furnace coke selling at $5.50. There was no trace of standard coke selling at below Government limits, but this may possibly occur before Feb. 1, and there may be a decided break.

The situation is a simple, almost an elementary one. Production of coke is increasing, while consumption is decreasing. There has been little blowing out of blast furnaces thus far, but this process is inevitable. The most prominent Shenango Valley merchant producer has just blown out one stack, shipments of coke for this furnace from the Connellsville region having been discontinued last week.

At a generally attended gathering of merchant pig iron producers from all over the country, held in Pittsburgh last week, the sentiment expressed was unanimous, that furnaces should not pile a ton of pig iron, by reason of present high costs, but should blow out whenever they cannot slip their current make. The furnaces want to reduce costs and they also want to have it that when the general trade revival comes there will be no stocks to act as a drag on the pig iron market. The general opinion expressed at the meeting was that eventually pig iron prices will be materially lower than present quotations, although no decline in the very near future was predicted.

The byproduct producers are beginning to offer coke in the open market, and will be able to follow the coke market downward for quite a distance, on account of the value of their byproducts. The prospect for the Connellsville region, when the market does decline, is that of accepting lower and lower prices for coke down to the point where it would pay as well to ship the coal for byproduct coking as to turn it into coke in beehive ovens. The market for byproduct coal is likely to be well sustained and afford a profitable operation. The coke market is quotable fairly steady at Government limits: Furnace, $6; foundry, 72-hour selected, $7, per net ton at ovens. Screenings from old dumps are very hard to sell at $5.25, the Government limit being $5.50.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Jan. 11 at 271,366 tons, an increase of 17,386 tons, and raw coal shipments at 170,915 tons, a decrease of 2653 tons.

Buffalo—The trade follows bituminous coal pretty closely. The furnaces are well supplied again and are taking only foundry and furnace at Government prices. Off grades are hard to sell, and fuel coke is as dull as coal. Just as soon as anthracite becomes plentiful it is hard to find a market for either gas or byproduct coke, as it does not meet the needs of the domestic consumer as well. The prospect of the usual good movement of ore and pig iron in the spring is flattering, though so far as reported no sales of ore have been made for next season.

Middle Western

GENERAL REVIEW

Mild weather still has bad effect on coal market. Brief activity in high-grade domestic coals. Little demand for steam coals. Production decreasing.

The year started out with good coal weather; in other words, the mercury was hovering about zero most of the time. However, within the last few days we have been having nice spring weather, and as a result the demand for domestic coals has fallen off, along with the demand for steam sizes. It is hoped that the weather man will be a little more reasonable in the immediate future, as the coal industry has been handicapped all through this winter season by the warm sunny days.

About a week ago there was a noticeable quickening in the market for all high-grade domestic coals. It was encouraging to note the inroads made on storage piles in the yards of various dealers scattered about the territory. The number of orders placed even went so far as to stabilize the market on high-grade domestic coals to some extent. This situation was short-lived, however, as the present warm spell we are having has put back the retailer into the state of lethargy he has been accustomed to all fall. The trade believes, however, that if we had from three to six weeks of normal cold winter weather conditions would be much better, and they are all hoping that this kind of weather is in store for them.

The steam market is practically dead, as there is little demand. Every now and then some dealer tries out a car of new coal, but this desultory purchasing doesn't have any effect whatsoever on the market. Railroads are still purchasing, but it is believed that they will soon have enough to enable them to issue some orders on the requisitions they have placed with Mid-West operators.

The mines specializing on steam coal are not looking forward to any great activity in the steam market until at least the first of April. The latest reports from the Geological Survey at Washington show a sharp decrease in tonnage produced. In fact, the tonnage production is dropping like a plummet. It was stated that during the week ending Dec. 28, less coal was produced in the United States than for any like period during the last three years. It is our opinion that this decrease in tonnage will continue, as it is the only logical cure for an overproduction. Operators are becoming philosophical on this point, and are prepared to operate their mines less than half time from now on, as they see that this is the only cure for the situation.

CHICAGO

Little demand for either steam or domestic coals. Trade is concerned about future Fuel Administration activities.

Market conditions in Chicago are no different from general conditions existing throughout the Middle West today; in other words, what little demand there was a week ago for domestic coal has died off, and there is little call for steam sizes. The all-important question in the mind of the trade here today is, what the future activities of the United States Fuel Administration will be. Some say that the Administration will practically go out of existence, so far as zones, prices, etc., are concerned, on or about Feb. 1. There is some talk that the Fuel Administration will continue in office until we are well on into next summer. The State Administration maintains a discreet silence on all questions, but it is believed that they are looking forward to the abolishment of all zone restrictions under date of Feb. 1.

MILWAUKEE

Mild weather makes mid-winter coal market dull and unsatisfactory to dealers. All restrictions as to anthracite delivery removed by the fuel administration. Ample stocks on hand.

Mid-January finds the coal market at Milwaukee in a limp and pessimistic condition. Continued mild weather has operated to keep down the demand to such an extent that the inroad upon stock piles of soft coal is scarcely noticeable. It is now thought the supply of hard coal, which was short of the usual quota at the beginning of the season, will be sufficient to last till the opening of navigation in the spring.

The movement of bituminous coal to the interior is slow for the season. There has been little demand, and in some cases advance orders based upon needs in former winters have been rescinded. Should present conditions continue, there is bound to be considerable bituminous coal left on the docks when spring is reached.

Hard coal prices remain at the prices last fixed, which range from $11.05 for pea to $12.52 for chestnut, with an extra charge of 50c. for carrying in. Dealers report a disinclination on the part of consumers to pay the prices asked for hard coal, and soft coal is ordered instead.

After several weeks of parley, the county fuel administration has established the price of byproduct coke at $11.50 per ton. When this price was fixed upon in December last, the producers of byproduct coke objected strenuously. The matter was appealed to Washington, which office fixed the price at $10.40, but subsequently rescinded its action and accepted $10.50 as the price. Egg, range and chestnut sizes, which had been selling at $12.25 per ton carried in, are now offered at $11.50.

Fires in soft coal piles are still smoldering in some yards, entailing labor and expense in shifting the burning product.

ST. LOUIS

Mild weather causes local market decline. No steam demand and little domestic with an abundance of all kinds of Illinois coals. Mines idle and much unrest among the miners. Transportation and car supply good.

In the Standard fields mines have been idle for an entire week on account of the inability to move steam sizes. The domestic situation is not much better. There is a light demand in the sections that live from hand to mouth, but a big supply of coal stored last summer will more than last the consumer throughout the winter unless we have from four to six weeks of the severest kind of winter weather.

In many of the smaller places outside of St. Louis similar conditions exist; many retail companies will be doing remarkably well if conditions permit them to break even.

The recent announcement that anthracite egg will come to St. Louis was bad news to the dealer who has a supply of Arkansas, and gashouse and byproduct coke. It would have been hard to move the storage supplies of these fuels even if anthracite did not come in until after Apr. 1.

The country demand is extremely easy on both steam and domestic. What little coal is going out does so in scattered shipments.

In the Standard district the Baltimore & Ohio keep mines idle for four days on account of no cars. The Baltimore & Ohio and Louisville & Nashville seem to be stumbling blocks at this time. The Illinois Central shows some wonderful improvement, the other roads being about normal. There is a slight falling off in the showing made by the Iron Mountain in moving loads, and the Terminal seems to be slipping a few cogs in its ability to care of the business offered it.

The Standard field is in a deplorable condition. The operators in this region are unorganized, and incompatible. Some mines are unable to work on account of too much lump and egg, and a few miles away mines are idle because they cannot move the screenings though they have lots of orders for lump and egg. As long as the Standard operators continue to flounder around in this manner just so long will they continue to sell coal at below the cost of production. With mine-run costing between $1.50 and $1.60, the following prices prevail on Standard coal: 2-in. screenings, $1.25; 2-in. lump, $1.50; 6-in. lump and 2 x 6-in. egg, $1.75 up; all depending upon how much the operator can squeeze out of the buyer.

In the Mt. Olive district there is an abundance of coal and mines are idle, but everything is quiet and the operators seem to be able to handle the situation fairly well. They are maintaining their prices for the most part at $2.55.

Railroad tonnage is fairly good out of the Mt. Olive field, and the railroad tonnage in the Standard field is fair but not what it should be because the storage piles are being used up.

In the DuQuoin and Carterville fields there is at the present time an overproduction, but the railroads are helping out by buying.

There is practically no Arkansas coming in here now. Coke is a drug on the market at any price. About 100 cars of anthracite coal were ordered for St. Louis recently. This is all egg size, but none of it has arrived up to the present.

Ocean Shipping

FOREIGN FREIGHT RATES

W. W. Battie & Co.'s coal trade freight report for Jan. 20 states:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates.) On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Rangs, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net to Rio or Santos, $18.50 net to Buenos Aires and $19.50 net to Montevideo.

Export Notes

EXPORT LICENSES TO MEXICO

The War Trade Board announces that the regulations announced in W. T. B. R 320, issued Nov. 19, 1918, to the effect that applications for export licenses to Mexico should have attached thereto the order from the consignee bearing the visé of an American consul, have been withdrawn. Orders for shipments to Mexico will no longer require such Consular visé and need no longer be attached to the application for export license.

EXPORTATION OF COAL

The War Trade Board announces that applications will now be considered for licenses to export coal to all destinations in Europe and to the Argentine and Uruguay. Applications should be filed in the regular way required for the filing of applications for the exportation of other commodities to the particular country. Licenses for the exportation of coal to the Argentine and Uruguay will provide as a condition thereof that the shipment must be consigned in care of the War Trade Board representative at Buenos Aires or Montevideo, as the case may be.

HAMPTON ROADS COAL EXPORTS

NORFOLK

				Cargo	Bunkers
Lamberts Point					
1– 2–19	Amer. S.S. Ameland	Rio de Janeiro		5,299	854
1– 2–19	Amer. S.S. Quisteonck	Cristobal, C. Z		5,854	281
1– 2–19	Nor. S.S. Ottar	Havana, Cuba		1,453	158
1– 3–19	Amer. S.S. Lake Shawano	Havana, Cuba		2,440	407
1– 3–19	Amer. S.S. Lake Copley	San Juan, P. R		2,921	352
1– 4–19	Fr. Brk. Loire	Iquique, Chile		3,794	49
1– 4–19	Swed. S.S. Atland	Montevideo		6,420	1,415
1– 4–19	Br. S.S. Beltana	Montevideo		5,646	2,185
1– 3–19	Arg. S.S. Guardia Nacional	Buenos Aires		1,689	....
1– 7–19	Amer. S.S. Edward Pierce	Rio de Janeiro		5,603	1,133
1– 7–19	Am. Sch. Mabel Gale	Para, Brazil		1,193	787
1–10–19	Br. S.S. Frankinver	St. Vincent, C. V. I		6,033	1,360
1–10–19	Br. S.S. Clan Stuart	Montevideo		7,243	....
1–10–19	Br. Sc. Socony	Macoris, D. R		414	1,029
1–11–19	Nor. S.S. Hesperos	Antofagasta, Chile		7,313	....
Sewalls Point					
1– 3–19	Br. S.S. Ocean Transport	Las Palmas, G. C. I		6,191	1,320
1– 4–19	Amer. S.S. Lake Orange	Havana, Cuba		2,559	301
1– 4–19	Amer. S.S. Lake Callicoon	Havana, Cuba		2,559	....
1– 7–19	Amer. S.S. Mundelta	Havana, Cuba		6,181	....
1– 7–19	Amer. S.S. Point Bonita	Pearl Harbor, Hawaii		3,013	....
1–10–19	Jap. S.S. Ataka Maru	San Francisco, Cal		4,305	882
1–11–19	Jap. S.S. Indo Maru	San Francisco, Cal		5,748	601
1–11–19	Amer. S.S. Noord Brabant	Antofagasta, Chile		3,231	403
1–11–19	Br. S.S. War Syren	Las Palmas, G. C. I		4,933	1,169
1–11–19	Amer. S.S. Munaires	Buenos Aires, A. R		6,168	....

NEWPORT NEWS

1– 2–19	Du. S.S. Cornelis	Amsterdam, Holland		3,998	....
1– 2–19	Amer. Sc. Bayard Hopkins	Sanchez, D. R		351	....
1– 4–19	Br. S.S. Port Victor	Montevideo		6,674	2,961
1– 6–19	Dan. Bk. Thalassa	Rio de Janeiro		2,202	....
1– 7–19	Br. S.S. Adra	Las Palmas, G. C. I		6,644	862
1– 8–19	Nor. Bk. Audny	Rio de Janeiro		2,805	....
1– 9–19	Amer. S.S. Bonham	Havana, Cuba		3,677	....
1– 9–19	Swed. S.S. Hermes	Havana, Cuba		2,232	165
1– 9–19	Nor. S.S. Grove	Port of Spain, Trinidad		1,363	280
1–11–19	Dan. S.S. Henry Tegner	Nuevitas, Cuba		2,055	165

COAL AGE

Volume 15 New York, January 30, 1919 Number 5

Prices, Wages and Business

By Floyd W. Parsons

IT NOW appears that general prices of commodities will experience no sudden drop. The reasons creating this situation are the scarcity of foodstuffs and the lack of certain important raw materials. A further reason is the assurance that expanded currency and credit will contract more slowly than the volume of business. True, there is already a downward trend in the prices of most commodities that have entered largely into the manufacture of munitions; but even this adjustment shows no indications of being precipitate.

In practically all industries American corporations have been fortified against the dangers of reconstruction by the creation of substantial reserves for plant changes and the depreciation of inventories. The war's demand for quantity production brought about important changes in industrial processes and caused improvements in machinery, which has resulted in an increase in the output per unit of labor. Great benefits will come from this and the standardization of industrial methods. The war also has given us many new industries, such as shipbuilding and the manufacture of chemicals and dyes. These new businesses will afford an additional outlet for our enlarged production of raw materials.

During the period of the war this country increased its pig iron production 22 per cent., its copper production 17 per cent., and its coal production nearly 33 per cent. This immense industrial development renders it necessary that we add additional foreign markets to those America supplied in pre-war times, and contrary to the belief of many, our greatest opportunities do not lie in Great Britain, Belgium and France. Those nations will purchase from us many of the things we sold them prior to the war, but indications now plainly show that these allies will be able to take care of most of their own reconstruction work.

Belgium's fuel requirements present no insurmountable problem, for the mines of that country can be rebuilt with the same rapidity as can the Belgian industries, and as to her general needs, we must remember that Belgium has large raw-material resources in the Congo. As for France, we now know that southern France has undergone an industrial expansion almost equaling, and to a large extent counteracting, the devastation work of the Huns in northern France. When the armistice was signed France had 35,000 more people working in her various industries than were employed at the outbreak of hostilities. The nation is better able to supply its present needs than most of us imagine.

We in America should profit by the lessons in economics resulting from the Napoleonic and American Civil Wars. The situation then was saved by the returning soldiers settling on new lands; thereby developing new areas and creating new markets for industrial products. In the years immediately after our Civil War, American industries grew steadily and more than doubled in the 15-year period from 1865 to 1880. The greatest influence back of this prosperity was the growth of population in hitherto unsettled regions. The world's undeveloped area today is relatively as large as it was then, due to improvements in transportation facilities. Distance has been largely eliminated.

America has changed from a debtor nation of $5,000,000,000 to a creditor nation of $8,000,000,000. Our people have been converted into a nation of bondholders. It is only reasonable to expect that Americans will place a considerable part of their savings during the next few years into foreign bonds, and this will go a long way toward solving the problem of financing our export trade.

Unless we lose our heads, it will not be many months before the United States will enter a period of prosperity that will surprise even the most ardent optimist. The speed and success of this industrial expansion will depend on our Government accepting its present opportunity. To go ahead, the greatest need is for increased transportation facilities. We must have adequate terminal arrangements to avoid congestion of traffic, enlarged port facilities, greater development of waterways, better national highways and more irrigation projects. All of these developments are essential to national expansion and will afford employment at an opportune moment for thousands of men released from our military forces. Supplementing such action, let our legislators modify their pre-war policy toward industries, removing harmful restraints. We must, of course, prevent monopolistic practices, but we should also provide for large-scale production without the waste brought about by senseless competition.

If America in coming months meets with embarrassments in her industrial life, the fault will lie in her failure to meet the situation with courage and sense, for never in history has a nation been so well advertised and so favorably known throughout the world.

IDEAS AND SUGGESTIONS

Determining Length of Diagonal Crosscuts Between Parallel Headings

BY P. M. SHERWIN
Blue Diamond, Ky.

At many of the smaller coal mines that do not employ a resident mining engineer, considerable difficulty is experienced when, in order to pick up a lagging parallel heading or drive a haulway at other than right angles, it is desired to know just when to stop driving in order to keep the heading centers at the proper distance apart. The diagram below is to be used in connection with that

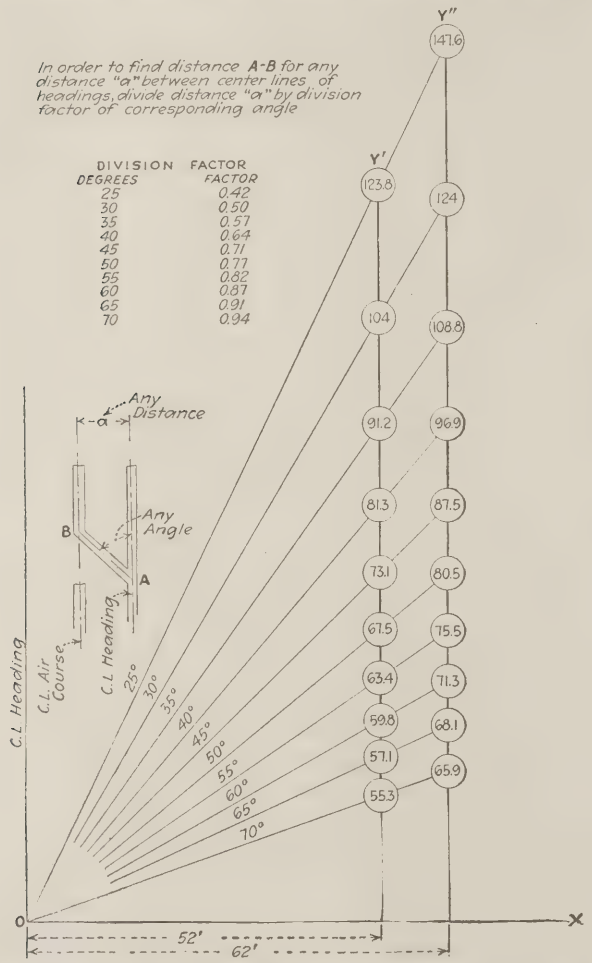


DIAGRAM GIVING DISTANCES FOR DRIVING ANGLES

shown on page 9 of the "Coal Miner's Pocketbook," 11th Edition. This latter diagram tells how to lay off certain angles without a transit, while the one shown here will give the distance that should be driven on the corresponding angle.

This particular diagram has been evolved for the use of the mine foremen of the Blue Diamond Coal Co., in the mines of which the main headings are driven on 62-ft. centers, and room headings on 52-ft. centers. In order to find the proper distance center to center, follow up the perpendicular line which corresponds to the distance between headings until the line of the angle used intersects it. The figure found there will be the distance to the center of the parallel heading. When the angle is more than 70 deg. the distance will be so nearly equal to the perpendicular distance that the latter, with a small allowance, can be used.

By using the division factors a diagram may be constructed for any distance between entry centers. The division factors are the natural sines of the angles. The distance to the right from O along OX should be laid out to scale. In the accompanying diagram a scale of 10 ft. to the inch has been used. When this work is done accurately the same scale can be used to read the required distances directly along the lines of the angles starting from O to the point of intersection with the vertical lines Y' and Y''.

This diagram was suggested by H. H. Braden, superintendent of the Blue Diamond Coal Co., and was worked out by myself.

Remelting and Using Old Metals Proves Economical in Practice

BY FRANK HUSKINSON
Trinidad, Colo.

The majority of mines simply scrap all brass and white metal bearings and bushings when they become too badly worn for further use. This is a waste of good material that can readily be converted into new bearings more cheaply than new ones can be bought. With remade bearings, also, a better fit can be secured. New bushings from the factory are always of a standard size, and a shaft generally wears more or less after being in service for some time, and in many cases has been cut down to a smaller diameter.

I have followed the practice of melting old bearings and bushings and pouring them into suitable molds, then boring and turning them to the proper size on a lathe. In melting old brasses and white metal bearings I use a good sized ladle and a forge fire.

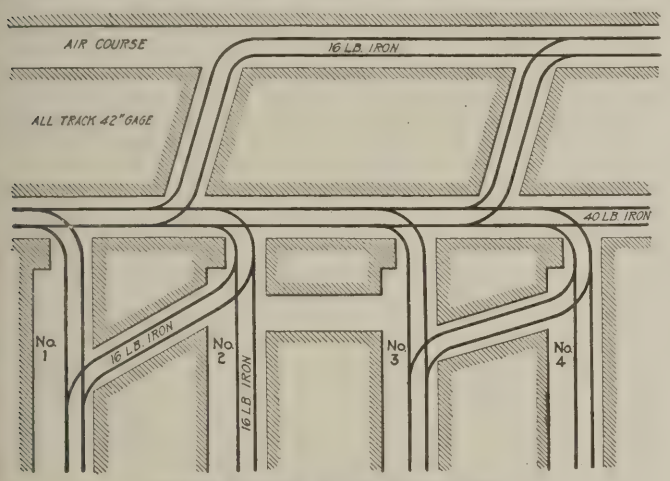
In melting white metal to be cast into molds, the heat should be brought up gradually. As soon as the metal is melted the top should be covered with powdered borax, and enough heat applied to bring the metal up to the pouring point. If the metal is melted and brought to the pouring point without covering with the borax, a portion of the alloy, such as zinc, will oxidize and be lost. The action of the borax is that it smothers the metal and prevents any of the alloys separating. When pouring into the molds the borax cover is simply held back, allowing the clean metal to be poured off.

Ordinary brass scrap can be melted in the same manner and poured into molds. Precautions should be taken, however, not to overheat any metal. Enough heat should be applied to bring it to the pouring point. Care should be taken to see that all molds are free from moisture, as molten metal and moisture do not agree.

Peculiar Arrangement of Mine Track

By Mine Foreman
Hanover City, Penn.

We are using a track arrangement in the mine where I am employed that might benefit some *Coal Age* readers. The heading in question is being driven to the rise and considerable energy is required to push a car around a room switch. Consequently, I arranged the track as shown in the accompanying illustration. When the locomotive comes in with the empty trip the motorman pushes five or six cars into rooms Nos. 2 and 4. The men can handle them from the track between the



HOW TRACK WAS ARRANGED

rooms, as may be readily seen. When a car is loaded it can be left in the roomneck and not dropped out onto the heading. This is advantageous to the cutter, as he can travel along the heading and not have to shift cars.

The arrangement shown takes considerable track work, but I believe it pays. The men are better satisfied and the cutter can get around much faster. We also use it in the air course. The motor pushes empty cars into the shoofly, or diagonal crosscut, nearest the face of the heading and the men drop the loads out of the lower shoofly, or rather keep them off the heading. Thus the heading is practically clear at all times.

Equalizing the Generator Load

By J. J. Nolan
Linton, Ind.

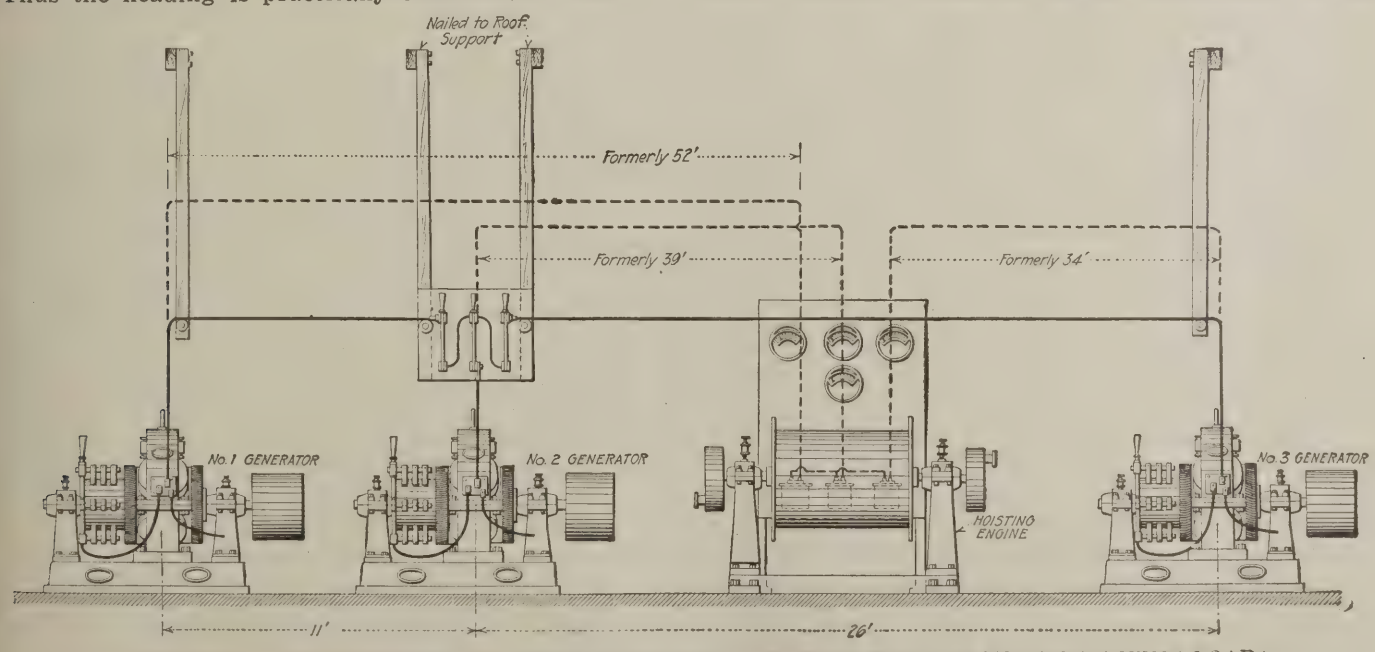
This description and the drawing shown below may interest some readers of *Coal Age* who have, in their plants, similar conditions to those here portrayed. The plant referred to, together with the mine it serves, was purchased by the company with which I am connected about three years ago. The mine is a large producer of coal.

The power plant building was intended for only two generators, but a third was added by the former owners, to take care of the increased load. As might be expected, this caused quite a difference in the length of generator lead cables.

When carrying a fair load the belts and engines put one in mind of a horse race. First one and then another had the lead. When the load was light they would motor each other, causing bad communication at times and continual moving of the rheostats throughout the day. The three generators and hoisting engine were set side by side in almost a straight line, while the switchboard was 25 ft. behind the hoist and erected on the rear of the hoisting engine-room platform without taking into consideration the efficiency of the generators.

The change, as may be noted, was not expensive and effected quite an improvement in the operation of the generators. The only extra work imposed on the engineers is the task of walking around in the morning at starting time to throw in the equalizer switches and pull them out after the day's run is over.

If only two generators are operated, the connections on single-pole switches are arranged so that any two machines can be used. The long equalizer cables going to the board were employed to increase the capacity of the positive and negative of No. 1 and No. 2 generators, these machines being farthest away. The change did away with several connections on the rear of the switchboard and equalizing bus too, giving much more room and necessitating less complicated wiring.



SHOWING ARRANGEMENT OF GENERATORS AND HOISTING ENGINES FOR EQUALIZING LOAD

Chain Making and Repairing in the Mine Blacksmith Shop

By J. T. SPRINGER
New York City

SYNOPSIS — *The average coal mine blacksmith has a wide variety of work to perform. Although most of this will be repairs, some manufacturing may well be done. Car couplings and special chains fall in this category. The manufacture and heat treatment of chains and chain links is here described.*

NATURALLY, the amount of blacksmithing done around a coal mine is considerable. One of the large items will be the forging and hardening of cutter bits. In addition to this, however, there will be miscellaneous work covering a wide range. Consequently, the mine blacksmith needs to be a good all-around man—one who can do the usual things and also one not afraid to tackle a job out of the ordinary. Much of the miscellaneous work will be repairs, but some items—for example, the chains and coupling links used in and around a mine—may well be manufactured in the mine shop. It is the purpose of this article to give practical and reliable information that, if properly utilized, will tend to make the mine its own producer as well as repairer of chain, coupling links, chain hooks, etc.

Let us begin with the chain hook. This may be made without a weld, so that the problem is one of forging. There may be, in addition, an annealing operation. Suppose that the hook desired is to be 3 in. long, is to have a $\frac{5}{8}$-in. entrance opening and a $\frac{3}{8}$-in. eye-hole. Such a hook may frequently be conveniently made from $\frac{1}{2}$-in. round stock. A short length a trifle over double the length of the finished hook is cut off. This piece will be, say, $6\frac{1}{2}$ in. long. Since it is desirable to form the eye without welding, it is necessary to upset one end in order to secure enough metal. A mark may be placed, say, $1\frac{1}{2}$ in. from the end of the blank as a reminder of the amount of stock that should go into the cruller-shaped eye.

To do the upsetting, the smith will heat the marked end to a medium forging heat and cool off the metal between the mark and the farther end of the blank by means of water. The water may be applied with a hose, by pouring, or by dipping the blank into the bath a sufficient distance. The object of cooling the major portion of the bar is to prevent movement of the metal throughout that part of the blank during the upsetting operation.

The actual upsetting may be accomplished in either of two ways: (1) The blank may be held vertical on the anvil with the hot end up and the hammer used to beat the hot metal down until the $1\frac{1}{2}$ in. has diminished to 1 in. This amount of shortening and consequent thickening will be about right for an eye $1\frac{1}{8}$ in. in diameter, with a $\frac{3}{8}$-in. hole. The ring of metal will have a thickness of about $\frac{3}{8}$ in. (2) Instead of holding the hot end up, it may be held down on the anvil, while the hammer or sledge is used against the cold end. There is, perhaps, some objection to this latter method because it tends to waste the heat. The anvil, being cold, absorbs heat from the hot end of the blank and may thus interfere with the upsetting operation. One or two men may do this work. This depends upon circumstances and the skill and strength of the smith.

After the shortening, the upset end is heated up again and the upset metal flattened out to form a circle about 1 in. across and $\frac{3}{8}$ in. thick. It is possible that there will be manifested a tendency of the eye blank to increase more in one direction than in another as the flattening proceeds. In such case the hammer may be needed to give a few upsetting blows. The eye end of the blank may be held against the edge of the anvil during this operation.

After a proper circular form $\frac{3}{8}$ in. thick has been secured and the corners rounded, the eye blank may be heated again and a $\frac{1}{4}$-in. hole punched. The punch will doubtless get warm and need an occasional dipping into water to maintain it at proper temperature. The punching of the hole may be done partly from one side and partly from the other. That is, the punch is made to

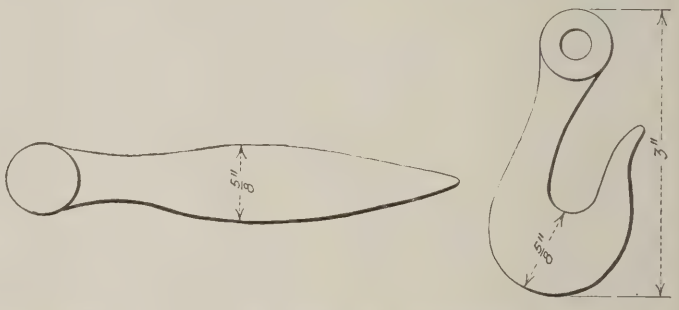


FIG. 1. HOOK BLANK AND FINISHED HOOK

penetrate about halfway from one side and the same operation repeated from the other. A small core will be formed, but this may be driven through the hardie hole or the pritchel hole of the anvil. Some blacksmiths put a small amount of coal or coke dust into the depression made when the punch has got well started. The driving of the punch will then be facilitated, because its end will not heat up so readily.

The finishing of the eye yet remains. While no substantial weld is to be made in the hook, it will be well to heat the eye to a welding heat and to beat in and together any stray fibers or filaments. The punch or a suitable mandrel should be stuck into the hole and allowed to remain there during this operation. In fact, the final shaping of the metal to form a smooth rounded surface may well be done at this time.

The punch may need attention from time to time to keep it in place. The redriving of this tool to keep it right, and perhaps other movements, will naturally result in opening up the hole a trifle beyond the $\frac{1}{4}$ in.

If a hole precisely $\frac{3}{8}$ in. in diameter is required, it may be well to finish with a $\frac{3}{8}$-in. punch. The eye should be well rounded so that it will not tend to wear on the link or bolt passing through it.

The remainder of the forging of the hook will now be rather simple. The main portion of the blank is heated and flattened to the $\frac{3}{8}$-in. thickness. It is desired to have the metal swell out at about the halfway region of this main portion or where the bend of the hook will be made. A sufficient widening may well occur during the flattening to $\frac{3}{8}$ in. If there results a swelling to $\frac{5}{8}$ in. this will probably be about right. The piece is tapered, but rather gently, between the eye and this broad section. This tapering operation will tend to lengthen the whole piece and must not be carried so far as to thin the metal below the thickness of $\frac{3}{8}$ in. On the other side of the broadened region the piece is tapered rather more decidedly to a tip at the end. The entire length of the piece should now be about $6\frac{3}{8}$ in. The corners are rounded and the hook-shaped form imparted. This latter is done on the horn of the anvil with the aid of a light hammer. All that has been said about forging, punching, bending, etc., will apply equally well to similar operations on other classes of work as well as upon hooks.

The making of chain links divides itself naturally into light and heavy work. Perhaps the most severe operation is the bending of the blank to the link form. When the size of the stock is sufficiently small to make this an easy job for one man, the whole work of forming and welding the link may well be termed light chain making. If the bending requires two men, we have heavy chain making.

The chain and links used at mines may include both classes, although the heavy chains will not run up to such enormous affairs as those used at the locks of the Panama Canal or those employed for mooring battleships. Chains have been made up to the size where the stock used was $4\frac{1}{2}$ in. in diameter. While the mine will not have any work of this description, it may possibly have chains and links made from stock heavy enough to require two men to form and weld.

Chain links are open, if the link is a simple oval. Stud links are those which have a crosspiece amidships dividing the open space into two apertures. The crosspiece is called the stud. This is welded into place and naturally stiffens the link. Undoubtedly, an open link provided with a suitable stud is stronger than it was before. But this is not the proper way to make the comparison. The real question between open and stud links is whether it is better to put additional metal into a stud or into the plain oval, thus giving the sides of the link a larger cross-section. I doubt if this question has been satisfactorily answered. Considerable chain of both varieties tends to show that a strong difference of opinion exists.

Links may be welded on the side or at the end. The end-weld link seems to be the better type, especially for large stock. Even for small stock, the objection that the side-welded link is apt to be one in which the two parallel sides under heavy stress do not yield the same has to be considered. There is a remedy, more or less adequate, in the shape of heat treatment. Unless this is to be applied, it is probably better to decide against the side-welded link.

If, however, heat treatment is to be employed, and those in charge are going to insist on sufficient experimentation to guarantee a satisfactory procedure, the side-welded type may be used and the advantage of easy bending gained; for the side-welded link is more easily bent in the region of the weld for the reason that these bends are further from the ends of the blanks and may consequently be made with the assistance of a greater leverage. The two bends near the weld of an end-welded link lie quite close to the stock ends and naturally present some degree of difficulty for that reason.

The length of stock required for a link will naturally depend on the inside length of the link, the inside breadth and the diameter of the stock. These three factors are the ones that principally govern. The precise form of the oval will also exert an influence; but, ordinarily, the foregoing items are the ones that control.

I will give an example or two by way of illustration. A well proportioned link made from $\frac{3}{8}$-in. round stock will have its inside length equal to $1\frac{5}{8}$ in. and its inside breadth to $\frac{3}{4}$ in. With these dimensions as guides, a neat form of link may be produced with straight parallel sides and circular ends. The overall length is $2\frac{3}{8}$ in. The length of stock required closely approximates $5\frac{1}{2}$ in.

This style of link may be made in various sizes by using the following formula:

$$L = 14.1 \times d$$

Where L = the length of stock in the blank and d = the diameter of the stock. Both are expressed in the same unit, such as inches or centimeters. The link produced will have an inside length of about $4.33d$. The overall length will be about $6.33d$, and the inside and overall widths, $2d$ and $4d$ respectively. The diameter of curvature is $3d$. The curvature is here reckoned as that of the axis of the stock. The curvature of the horn of the anvil where the bending may be done will be $1d$ less—that is, $2d$.

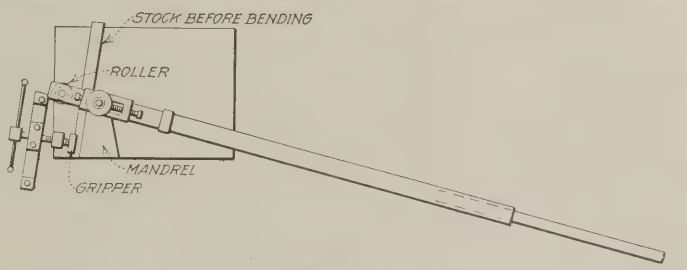


FIG. 2. JIG FOR BENDING LINK STOCK

Another type of link is the ship's cable form. Here, with 3-in. stock, the blank is made about 37 in. in length, which is decidedly shorter than would be the case with the link formed according to the formula already given. That formula would require 42.3 in. of stock. This marine link is accordingly somewhat shorter relative to its breadth. This is perhaps an advantage with big chain in preventing tangling.

In order to determine the number of links required for a given length of chain, we divide the chain length by the inside length of the individual link. The chain length is here taken as the usable length—that is, the distance from the inside of the free end of one terminal link to the inside of the free end of the other terminal link.

To make the small link described from $\frac{3}{8}$-in. stock, the

smith cuts off 5.3 in. from a stock bar. This is 14.1 times the $\frac{3}{8}$-in. diameter. The ends are cut square. The blank is now heated to a cherry red and then bent to a U-form. The curve is to be $2d$ in diameter, or in the present case, $2d = \frac{3}{4}$ in. Consequently, the bending may be done at that point on the horn of the anvil where the calipers show the diameter to be this amount. If a good many links are to be made, it may seem desirable to arrange a steel bar horizontal or vertical and to do the bending around it. The bar will naturally be of $\frac{3}{4}$-in. round stock or be forged to this size. The advantage over the anvil would be the elimination of the necessity of continually noting at just what point on the horn of the anvil the bending is being done.

The scarfing of the ends may be done by the following method, which is the one recommended by T. F. Googerty. The U-shaped piece is held on the left-hand corner of the anvil at the base of the horn with the legs of the U making an angle of about 45 deg. with the edges of the anvil. Both legs are held with their ends on the anvil top, the right-hand leg having but a small amount of bearing while the left-hand leg has perhaps a third or more of its length overlapping. The smith then strikes a blow with his hand hammer on the hot U-shaped piece. Before striking again, the piece is shifted a little. That is to say, the end of the right-hand leg is held to its original position and the

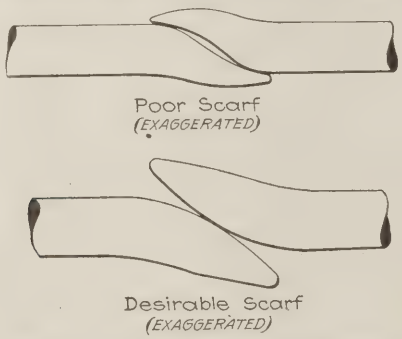


FIG. 3. GOOD AND BAD SCARFS

other leg withdrawn a trifle from the anvil top. In a sense, the one end rotates (in a horizontal plane) about the other end. By striking and shifting, striking and shifting, in the way described, a bevel may be produced. "The scarf consists of a series of slanting notches."

In scarfing it is desirable—not to say necessary—to produce two convex surfaces, to oppose each other at the moment of welding, rather than two concave surfaces. That is to say, when the ends that have been scarfed are overlapped for the purpose of welding, convexity should oppose convexity. Doubtless this requirement is more important with big links than with small ones. It will be best, however, to observe this rule, regardless of the diameter of the material.

It is not considered good practice in chain making to make two links and then thread the intermediate one into them and weld it shut. When one link is made, the next is threaded into it and welded; then the third link is threaded into the second and welded; and so on. In this way the chain grows link by link.

Let us return now to our small link. The U-piece has had its ends properly scarfed. It is now necessary to bend them toward each other, thus forming the end of the link by overlapping. Naturally, the smith will use the horn of his anvil and bear in mind the curvature he ought to produce; otherwise he will use some substitute for the horn, such as the rod of uniform curvature already suggested.

After proper shaping, the link may be heated and welded. The threading onto the chain already made may well be done after shaping and heating for the weld. This gives opportunity to do all the heating without the nuisance of the interference of the chain already made.

Naturally, the sizes of chain used about a mine will not involve the handling of excessively heavy links. At the same time, the smith may be called upon to handle sizes where he will need assistance in the bending and other operations. The blank at first is straight and the ends are cut off square. The whole piece is heated, but the center is given more heat than the ends. If the size of the blank permits, the heating may be done without reversing the piece. Should this be necessary, however, it may be done; but, if possible, the smith will aim to do the heating without such reversal.

Bending the Link

The bending of the blank is accomplished either on the anvil or by means of a suitable jig. The weight and stiffness of the blank will naturally guide the smith as to what he should prepare for. At any rate, a bending device is readily made and will be quite useful if the smith has much heavy work to do in making coupling links or the like. For this purpose a slab of metal is provided for the base of the device. On this slab, near one corner, a mandrel is firmly secured. This is a block of metal having a form suited to guide the bending of the blank. Naturally, the mandrel will present the outline of a U or of a V with rounded point. The edges of the mandrel against which the blank is bent may be grooved. This is probably unnecessary with links of moderate size. The blank is, at the time of bending, placed close up against one side of the mandrel and securely held there. The portion not in contact is then forced around the mandrel block.

The bending is done with a lever or sweep, pivoted on the nose of the mandrel and arranged to rotate in a horizontal plane. At the short end of the sweep, a roller is arranged to bear against the blank as it lies against the mandrel. By swinging the sweep in the proper direction, the roller forces the blank to conform to the shape of the mandrel. In the work occurring in and around a mine, it will hardly be necessary to provide anything more than some suitable holes in the slab and some plugs or studs to fit into them. A plug may be set in place to hold the blank. An ordinary swage block may often be used for this purpose.

Whatever the desirability of using a special device may be, the smith will probably find that he can, at a pinch, do some pretty heavy bending on the anvil, especially with the aid of a helper.

With the same heat that was used for bending heavy stock the turning in of the ends may be accomplished in part. With small chain, including possibly all sizes wanted at a coal mine, it may seem better not to attempt any end-bending immediately after the bending of the blank at its center. With moderate and small sizes it may be much more convenient to do the scarfing while the U- or the rounded V-shape is maintained. It appears to be good practice with big chain to do the

scarfing after the ends are started upon the inward bend but before the full operation is completed. A difference thus exists in handling big and little work. The smith's own judgment will determine where the dividing line is to be drawn.

I have already pointed out that the convex form of scarf is to be preferred to the concave. This is an important matter, as good scarfs tend to produce good welds and poor scarfs tend to produce poor welds. The reason appears to be this: With concave scarfs, there is a tendency to include dirt or foreign material of some kind between the surfaces to be welded. Convex scarfs tend to crowd such material out of the weld, particularly if the hammering begins in the center of the welded region. Material included between the surfaces in a weld means an area of no union of metal. A further point about scarfs is concerned with the character of the edges. There should be no sharp and thin edges or other parts because when the high heat necessary for welding is applied such parts are liable to damage by oxidation. Consequently, it will be well to round all edges and terminal portions.

Where the scarf surfaces will not get dirty from the fire when the welding heat is imparted, it may prove useful to roughen or score them with the edge of the hammer. But if dirt may be gathered by such indentations, it may be better to provide thoroughly smooth surfaces. Where dies are employed in scarfing, scores in the upper die seem to be of service in producing better welds.

The Proper Length of Scarf

The length of a scarf is also a matter of some importance. A tendency exists with some to make the scarfs too long. It is recommended that they be somewhat longer—say, 50 per cent.—than the thickness of the stock. "If the scarfs are too long, they will overlap one another too far and can not be welded down quickly enough. If too short, they hammer down too quickly to make a good job, and the weld will be thin. If the scarfs are the right length and about the same size, which is important, the weld will finish down in good shape and make a smooth job, providing the ends are clean. When the pieces being heated look as though they are covered with grease, you may be sure the fire is dirty, or is too new." "The fire must be a clean one. A well burned fire is best. A new fire is not a good one to raise the welding heat in, as there is too much smoke and green coal that comes in contact with the metal."

In both forging and welding much depends upon the character of the fire. Ordinary soft coal is unsuitable, because of its sulphur content. There are some special seams or beds of soft coal which are more or less free from sulphur. Such fuel is, perhaps, permissible, but wood charcoal is more suitable. Coke contains less sulphur than the coal from which it is made. Anthracite is also a usable fuel. Fuel oil is suitable, provided the furnace arrangements are such that the metal is not close enough to the burner to encounter the gases before combustion is complete.

The welding heat is about 1900 to 2000 deg. F. It probably varies with the carbon content of the steel. At any rate, the metal will not only be yellow, but will be around a white heat when it is in proper welding condition. At first, the blast is operated slowly. When a yellow color appears, it may be increased. The ends should be managed so that both are heated alike. It may be necessary to keep a pretty close watch in order to cover this point. Attention may be given also to the edges and thinner portions of the scarfs to see that they do not heat up too rapidly as compared with the rest of the scarf. "It is a good plan sometimes, when the pieces are about a yellow heat, to shut off the wind for a moment and let the pieces and fire even up, and give the heat a chance to soak through them. As the pieces become nearly white, the blast is increased."

The length of time between taking the work out of the fire and actually beginning the welding operation is important. A striking illustration of this was afforded by the case of five doublets (two links) tested to breakage. All were made of heavy stock and with oil heating. The first doublet, however, was made with the regular man in charge of the crane, which transported the work from fire to anvil; the others were made with an inexperienced man in charge of the crane, who was able to manage only one movement at a time and so secured slow transportation. The first doublet broke at a stress of 568,100 lb.; the remaining four at an average of 489,410 lb. This was a loss of 14 per cent. in strength.

Necessarily the steel or iron used in making chain is damaged by the very process of manufacture. This damage may, however, be confined mostly to the welding. The heats really needed to effect the bendings and the scarfing do not involve much injury to the quality of the metal, but this is by no means the case with the welding heat. As steel is heated from medium cherry red, its structure undergoes changes while the chemical constitution remains unaltered. It is the structure that has varied its condition. That is to say, steel is made up of grains or crystals which may or may not have an intervening film between them. These grains begin to grow as the temperature rises above medium cherry red. Apparently, there is no stopping point until the metal is about to melt or does melt.

If the heat is stopped at any point above the medium cherry red, the grains will cease to grow. But unfortunately, they will not return to their original and normal size. I say "unfortunately," because large grains are an accompaniment of deteriorated quality. Enlarged grains mean reduced strength. If we want the original quality and strength, we must force or coax the grains to go back to normal size.

Fortunately, there are methods of doing this. One process depends upon working the metal. The forging hammer, the rolling mill, the draw bench, etc., are means which are more or less successful in breaking up big grains and inducing them to remain small. The second method accomplishes its results with less outward violence. It consists in heating up the metal again, beginning at a point below medium cherry red and proceeding to a point that varies with the character of the steel. The result is that the big grains break up and a re-formation takes place. The new size of grain will tend to approximate the size which corresponds to the temperature at which the heating is now stopped.

Both methods are good. However, in actual practice it is not always possible to make the blows of the hammer or other means of working the steel reach everywhere. Every part of the weld and the adjoining metal

that was highly heated will be damaged steel. To restore the quality with the hammer, the effects of the blows must reach all, and not merely some, of the damaged spots, inside and outside. There are parts of the weld where the hammering will generally be sufficient; but there are interior portions and regions distant from the weld where the smith may neglect or be unable to hammer.

If it is proposed to restore by hammering the quality of the metal in a link after it has been heated at the joint to 1900 or 2000 deg. F., let the smith bear in mind two things: (1) The restoration is not to be expected everywhere unless he hammers everywhere. The interior will not be restored unless the force of his blows penetrates to the interior. (2) The benefit will in large part be determined, probably, by the temperature at which he stops working the metal. For example, if he works the steel without let up from the incandescent welding heat down to, say, a full orange, the benefit will correspond to the grain size belonging to full orange or to a shade somewhat brighter.

In view of these two principles, the smith must work all over the region where there was high heat and make his blows penetrate; and he must keep all this going, down to a point near full cherry red. The reheating method is undoubtedly better, if for no other reason than that it is easy to make the restorative effects penetrate thoroughly. In fact, the thing to do is to deal with the chain as a whole and not with the individual links.

Proper Heating of Completed Chain

The chain when absolutely cold—or at least not hotter then, say, a black heat—is put into a heating compartment and heated up to the point appropriate to the particular steel in hand. It will be excellent practice to do the latter part of the heating slowly. The object is to get the heat to penetrate to the interior without raising the outside to too high a point.

After the proper temperature has been obtained, and the heat held steady for a time, the work may be left in the furnace and the whole allowed to cool off slowly together. If it is necessary or desirable to take the chain out, or if the weight and bulk of the furnace are not such as to guarantee the chain a slow cooling, the work may be withdrawn and heavily packed in some nonconductor of heat like slaked lime, dry ashes, dry sand, asbestos fiber or the like.

Perhaps the most difficult operation, if the steel happens to be a very soft metal, is to determine when to stop the rise of heat in the reheating procedure. It is not difficult, if the steel contains 0.40 or 0.50 per cent. carbon or some higher percentage, as in such a case the common horseshoe magnet may be used. But chains are often, not to say usually, made of steel containing less than 0.40 or 0.50 per cent. of carbon.

The proper stopping point for these steels is higher than that at which the magnet loses its grip. The less the carbon content, the higher is the stopping point. For steel having zero carbon, the terminal temperature has been given as somewhat above 1652 deg. F. (full orange). This is over 252 deg. above the magnetic point for such steel. For steel having about 0.50 per cent. carbon, the stopping point is somewhat above 1400 deg. (full cherry tending to light red). This is just above the magnetic point. Consequently, we have the rule: For steels varying from 0 to 0.50 per cent. carbon, the temperature which should be attained varies from 1652 to 1400 deg.; intermediate steels have proportionate temperatures just above which the heat should be halted.

As the total variation in temperature is 252 deg. and the total variation in carbon content is 0.50 per cent., for every 0.01 per cent. of carbon less than 0.50 per cent. we add 5 deg. of temperature to 1400 deg. Thus, for 0.20 per cent. carbon steel we have to deal with a carbon content 0.30 per cent. less than 0.50 per cent. As we are to allow 5 deg. of temperature for each 0.01 per cent. carbon less than 0.50, the total temperature change is $30 \times 5 = 150$ deg. The stopping point, accordingly, for 0.20 per cent. carbon steel is in excess of 1550 deg. (light red.) Seger cones or some equivalent may be used to determine the temperatures.

The warning must be given that for low carbon steels it will be best to use the foregoing figures as rough guides. Experimentation with the exact steel you have to work with may be necessary in order to get the best results. Commercial steels vary too much in respect to impurities to permit a total disregard of all experimentation.

Carbonization and Distillation of Peat

The value of peat lies in its distillation rather than its combustion, and on these lines it could supersede wood in the production of acetic acid, methylated spirits of ammonia and tar; the latter being the basis of so many dyes.

In the process of distillation, as peat is a light, bulky material, it requires larger retorts than coal, and of a design which facilitates the transmission of heat from the surface toward the center. Experiments have shown that revolving retorts produce the best results. The apparatus devised and here described is on the principle of the roasting appliances used for coffee, chicory, and so on, but of course with the addition of a receiver for collecting the distilled vapor; the great object being to provide apparatus complete in itself for continuous operation.

This apparatus consists of six cylindrical retorts, each mounted on its own axis and capable of uniform rotation; the individual rotating cylinders are arranged radially about a central pivot, so that the retorts charged with peat can be successively introduced into and withdrawn from a stationary semicircular furnace.

When the apparatus is in operation there are always three retorts in which peat is being distilled in the furnace; the other three being outside—one condensing, another emptying and the third recharging. The distillation takes on an average about 40 min. for retorts holding a ton of peat and making six revolutions per minute.

To enable the gas arising from the carbonized peat to pass out of the retorts, the hollow shaft of each is perforated so as to provide a passage from the inside of the retort to a collecting chamber in the axis of the pivot and thence to the stills for fractional distillation.

The rotary movement of the retorts insures rapid transmission of heat from the furnace to the retorts, and as this heat acts on a large surface, the peat is uniformly carbonized in a short time and at a relatively low temperature.

Coastwise Shipping Conditions in 1918

By G. G. WOLKINS
Boston, Mass.

SYNOPSIS — *Serious shortage of colliers followed by embarrassing surplus. A notable record. Difficulty of keeping ships manned. Problems for 1919. Rates on barge and sail tonnage.*

THE prominent feature of the first half year of 1918 in shipping was the great effort made to provide cargo space to meet New England's coal requirements. For the two months ended Jan. 19, 1918, an average of only 89,600 gross tons per week was loaded at Hampton Roads for New England, and the first three weeks in January it dropped to only 70,000 tons weekly. In the judgment of the trade the need was imperative for not less than 200,000 tons weekly from Hampton Roads and 25,000 tons weekly from Baltimore. The answer was—more ships. Clearly it was the lack of shipping, sold, taken in Government service, or abroad on atractive charters, that was the largest factor in the tense fuel situation that prevailed in January and February.

In March it was agreed by representatives of the Shipping Board and of the Fuel Administration that at that time, in addition to barge transportation, there were steamers available amounting in tons to 238,000 D. W. capacity. To these there was promised an addition in March of 32,575 D. W. tons, making the total 270,575 tons. But beyond this there would be required additional steamer tonnage of 170,500 to move the coal, figuring 27 trips from April to December, at that time estimated as necessary to keep New England going.

By June a lot of progress had been made. Not only were the "Achilles" and the "Ulysses," 12,500-ton Panama Railroad colliers, diverted for the emergency, but new Lake-built steamers of around 3000 tons capacity were added as fast as they could be brought around. Through March, April, May and June the situation had improved to such extent that twenty ships, aggregating 89,700 tons, were withdrawn. Most of them were old-type general cargo boats of neutral registry and were only put into the coastwise coal trade to meet the unusual situation.

During the week ended June 21, eight steamers, amounting to 26,544 tons, were added, so that at that time the steamers in operation, 78 in number, totaled 320,602 tons, to which should be added 16 steamers, or 68,910 tons, then repairing, to make up the aggregate of 389,512 tons in service—94 steamers in all.

The deficit in coal-carrying capacity was therefore being rapidly made up. In July, the week of the 13th, the highest number was reached. Besides twenty steamers, or 55,900 tons, on a contract basis, there were 132 steamers, or 342,000 tons, chartered trip by trip by the Shipping Board to carry coal to New England. To show the extent to which this tonnage was later reduced, because New England was getting jammed with coal, 38 steam colliers were withdrawn between Nov. 27 and Dec. 7. On the latter date but 16 ships, or 44,800 tons, were left that were not operating on a contract basis plus the twenty that were, or but 100,700 tons in all in service. At the end of the year there were steamers tied up in Portland and in Boston because no charters were offering. In one week in September colliers amounting to 90,000 tons were withdrawn for General Pershing's bridge of ships. It all forms a notable record of ebb and flow in tonnage available.

As to rates, there was the same uniformity on steamers taken over and operated by the Shipping Board as in 1917, when colliers above 2500 tons D. W. were commandeered. The rates named in December, 1917—$3 from Hampton Roads and $3.25 from Baltimore—to Boston was in effect until the week ended Apr. 13, when in each case there was an advance of 25c. This remained in force throughout the rest of the year.

The complete story of how the increased cargo space was obtained would make interesting reading, but it is practically inseparable from the same efforts to get coal. Coal and ships were bound up together the first half year, as indeed they were the second, although the process was reversed. The wooden steamers so much talked about early in 1918 had no chance to materialize in the coal trade. By the time any of them could be put into commission it was foreseen the emergency would be over.

Few Losses Due to U-Boat Activities

It was in May the statement was authorized that from then on there would be a steady flow of completed vessels from Lake yards. At one time there were 34 en route from lakes to seaboard. It was to avoid waste of transportation that several of these loaded Provincial coal at Sydney, C. B., a tonnage that was readily absorbed.

Submarine activities slowed up movement for short intervals, but naval intelligence service was good and very little tonnage was lost on that account. Had it not been for the delay in manning and keeping manned the new ships that came, the surplus in August would have been much more pronounced. The loss in efficiency was said to be at least 25 per cent. for this one reason. Steamers that had been counted on for 34 trips were at that time making barely one in three to four weeks. Time was when certain of the colliers made 47 trips a year. The problem of securing crews and keeping them aboard was a serious one all through 1918.

For 1919 there are many kindred problems. What is to be done with the surplus of high-cost ships? It is not possible to compete with foreign shipping under our existing laws. Conferences have been held, but as yet no real progress has been made. Steamship owners feel that shipping should be under private ownership. Are foreign nations to be induced to scale

up wages and other conditions to a level with ours? These are questions for 1919 to answer.

Barge rates to Long Island Sound, New York loading, during the second half year were fairly constant at the rates suggested by the Shipping Board—$1.90 to Providence, $2 to Fall River, $2.15 to New Bedford and $2.50 to Boston, in each case the rate applying only to anchorage.

On July 25 the Cape Cod Canal was taken over by the Railroad Administration under presidential proclamation. The proposal was to deepen to 25 ft. to make the canal available for barges and steamers of the type most in use.

Outside barge freights, Hampton Roads to Boston, for practically the entire year, were 25c. higher than steamer freights. A sailing vessel was chartered in the same trade at $4 in April. The rate on bituminous in Reading barges the second half year was $2.05 from Port Reading, N. J., to Boston points and $2.40 from Philadelphia. The range of freights from New York to eastern Maine points was $4@5. Seldom was there any surplus, so few in number are the craft that 25 years ago used to carry the great bulk of the coal to Maine ports.

Coal Dumpings at Hampton Roads Piers in 1918

Notwithstanding the fact that coal movement was seriously hampered during the past winter by reason of extremely unfavorable weather conditions for the operation of coal piers and harbor craft, the movement of coal for the year 1918—reaching as it did in round figures over seventeen million tons—exceeded the quantity of coal moved during any previous similar period.

The demand for coal of all kinds has been heavy, especially so until the signing of the armistice. The lull which naturally occurred since that time is already changing into greater activity of coal movement. The outlook for Tidewater coal movement is encouraging—especially export business—and the coming year, 1919, should develop a still greater flow of coal through this Tidewater harbor.

COAL HANDLED AT HAMPTON ROADS PIERS DURING 1918

	N. & W. City Pier	N. & W. Lamberts Point	C. & O. Newport News	Virginian
January	20,488	338,842	283,790	235,736
February	25,407	533,876	436,971	329,369
March	23,818	628,737	500,870	379,641
April	25,140	650,511	501,056	365,781
May	26,036	751,486	457,902	422,810
June	23,882	680,670	438,160	392,763
July	25,009	810,891	493,402	402,029
August	19,784	796,743	461,709	377,383
September	20,076	679,342	442,692	403,350
October	24,311	663,177	383,120	316,851
November	20,973	545,696	302,637	323,974
December	.....	396,154	259,728	238,952
Totals	254,894	7,526,165	4,962,037	4,188,664
Grand total 1917				15,828,139
Grand total 1918				17,201,760

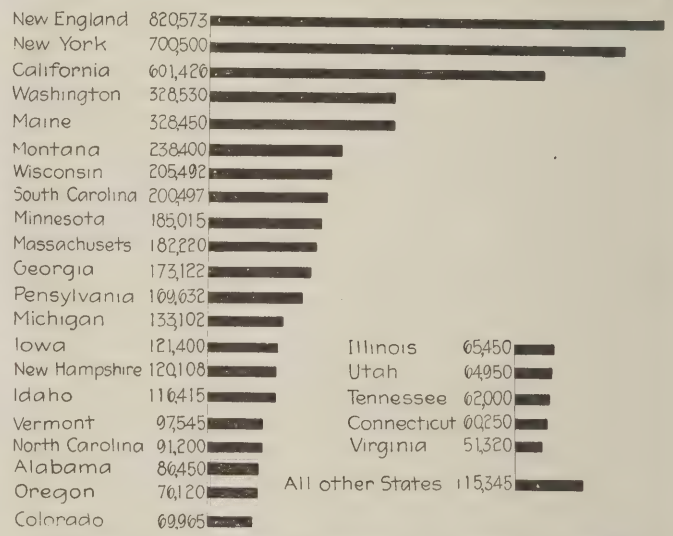
The figure 17,201,760 tons, reached in 1918, sets a high mark for the Hampton Roads piers, being 2,418,819 tons greater than last year and about two millions greater than 1916, which was the banner year for coal handling at the Norfolk and Newport News coal docks.

While it may be true that the great records made during the past year and the two preceding years were a result of war conditions, it is also true that the activity in the coal trade that has been created is obviously bound to remain. With the coming of peace and the renewal of unrestricted trading by merchantmen steamers, the coming year may see an even greater record hung up than during the year 1918.

France, Italy and the other nations of Europe have been for four years suffering keenly from a lack of coal, and before operations can be fully resumed in the mines of Europe all the coal that can be mined and shipped in from the United States will find a market.

Great Increase in Water-Power Development Where Coal Is High in Price

The accompanying chart shows the water-power development of this country up to 1914. Small plants or those generating less than 1000 hp. each are not included. It will be noticed at once that the greatest development has taken place in the Northeast and the extreme western portions of the country; or, in other words, in the regions where coal is necessarily high in price on account of long freight hauls.



WATER-POWER DEVELOPMENT IN UNITED STATES

Many sources of water-power are still undeveloped. The next decade will doubtless see much activity in this direction. The overhead charges on water-power plants are high, and as a rule considerable time is required to build one. When power is wanted quickly, therefore, a steam plant may be constructed with much more dispatch than a hydro-power plant. War time has therefore been unfavorable to the development of water-power. Peace, with its decreased industrial stress and its anticipated lower costs of labor and materials, should tend to stimulate such development.

Campbell states in a report of the United States Geological Survey that the coal reserves of the world, in short tons, are as follows:

Americas, 5,627,823,500,000; Asia, 1,410,487,600,000; Europe, 864,412,600,000; Oceania, 187,842,900,000; Africa, 63,755,900,000; a total of 8,154,322,500,000 net tons. The United States has 4,205,154,000,000 net tons, or over half the total of the world reserves.

High Lights in the Coal Trade During the War Period

By ALEX MOSS
Editorial Staff, *Coal Age*

TO FAITHFULLY chronicle the happenings in the coal industry during the war period would be a task of no mean proportions, and it is not the intention of the writer to enter into the subject *ad exhaustum*. To do so would result in a volume that would compare favorably in size with "Webster's Unabridged." The milestones, as it were, that marked the road traveled by the coal industry while the nation was at war will be indicated, though the vast extent of ground lying beween, must, in the interests of space and the reader's patience, be left untouched for some more earnest and conscientious historian.

ON APR. 6, 1917, the United States entered the world war. Soon after we shelved the Monroe Doctrine and war industries began to get under way, a shortage of bituminous coal made itself evident. Anthracite was already scarce, though a true knowledge of the importance of this situation was confined to the trade. In spite of the fact, however, that stocks of soft coal in the hands of dealers and consumers were not large, there was little attempt being made at this time to accumulate reserves. The trade situation was somewhat confusing, there being a decided tendency of both buyers and sellers to await developments. Everybody was marking time and expecting some more definite assurance as to the future.

In official Washington it was early recognized that fuel was the very heart of the nation's life; and that in order to meet the greatly augmented domestic and industrial requirements, and to avoid the pitfalls into which France and Great Britain had fallen soon after the outbreak of the war, it was necessary to utilize or to create some force that would exert a sort of centralized control over the coal industry. This belief that the regulation of production and distribution of coal would serve as an excellent war measure found outcome in the formation in May, 1917, of a Fuel Board, with Francis S. Peabody as chairman. Mr. Peabody was a practical coal man and had gained recognition as an able organizer.

Fuel Board Settles Down to Business

Soon after the formation of the board a number of plans were set afoot looking toward the stabilizing of coal prices, the collecting of production statistics, and the efficient transporting and distributing of coal. The Fuel Board acted as a sort of clearing house, the members of the board being kept busy digesting and collating the vast mass of information needed to successfully work out the tremendous problems of the fuel situation. In June, 1917, labor was given representation on the board, and the way was thereby smoothed for more efficient coöperation between that body and the mine workers of the country.

Keenly desirous of efficiently handling the coal situation, the Federal Trade Commission, through the Fuel Board, made several rather startling recommendations—startling because no such drastic prescriptions were expected. In essence, the most important of these recommendations were as follows:

First, a pooling arrangement, which was to be placed in the hands of a Government agency, to control the production and distribution of coal and coke. The producers of the various grades of fuel were to be paid their full cost of production plus a uniform profit per ton (with due allowance for quality of product and efficiency of service).

Second, the transportation agencies of the United States, both rail and water, were to be similarly pooled and operated on Government account, under direction of the President, and all such means were to be operated as a unit. The owning corporations were to be paid a just and fair compensation, which would cover normal net profit, upkeep and betterments.

Reduced Current Prices of Soft Coal

In the latter part of June, 1917, after conferences had been held with the operators, the Fuel Board (now known as the Committee on Coal Production) made sweeping reductions in the current prices of bituminous coal. This was a revolutionary procedure, and, like other measures meant for the public good, it was received with much abuse.

Early in the conferences referred to above, it was realized that a national organization of coal operators would be necessary to make the price-fixing and other plans of the Government readily operable. To this end was formed a tentative organization composed of the twenty-five secretaries of coal-trade associations who were present at the sessions. C. P. White, of Cleveland, was chosen chairman and C. E. Lesher, of the U. S. Geological Survey, was made secretary. The association was to work in conjunction with Mr. Peabody's committee and was to be supported by an assessment, not to exceed ¼ mill per ton, to be levied on all operating coal companies in the United States.

In the meantime, the consumption of fuel was expanding to unprecedented proportions. Anthracite was still short (this condition proved chronic), though recourse to the culm banks resulted in quite large tonnages being sent to market.

Aug. 1, 1917, saw the tidewater pooling arrangement, suggested by the Committee on Coal Production, in full operation. All shippers of tidewater bituminous coal had agreed to pool their output at the ports of New York, Philadelphia, Baltimore and Hampton Roads, and time has proved that the benefits expected to be derived from this arrangement have been more than realized. This plan, too, came in for a bit of healthy criticism, many in the industry pointing out that there were obstacles that could not be surmounted, such as proper classification, just remuneration for carefully prepared coal, and matters of a kindred nature.

The maximum prices that had been announced by the Committee on Coal Production brought forth some acrid remarks from Secretary of War Baker, who characterized the new figures as "exorbitant, unjust and oppressive." But in spite of the disagreement between Government officials, the prices fixed were closely observed by the operators. True, all the available output was covered by contract, or some form of tentative agreement, but there was only a minimum business being negotiated under the Government's figures.

However, the prices of the Committee on Coal Production were short-lived, for on Aug. 21, 1917, President Wilson took the matter of price-fixing into his own hands and prescribed provisional prices to cover all the coal-producing districts in the country. The new figures were one-third lower than those agreed upon voluntarily by the operators with Mr. Peabody. The statement announcing the new prices divulged the information that they were based upon the actual cost of production and were deemed to be not only fair and just, but liberal as well. Provision was made for a reconsideration "when the whole method of administering the fuel supplies of the country shall have been satisfactorily organized and put into operation."

The market reacted to this new phase of the coal situation by "playing 'possum." All the coal operators in the United States were called upon by the Board of Directors of the National Association of Coal Operators to meet Aug. 29 at Pittsburgh, to discuss the latest pronunciamento.

Following upon the heels of the President's announcement fixing bituminous prices, came the setting of prices for anthracite, the specification of jobbers' margins—and the naming of a coal administrator. In a brief fifty-word statement the President made public the fact that in accordance with an act of Congress approved Aug. 10, 1917, he had appointed Harry A. Garfield, president of Williams College, as his fully empowered representative to carry out the provisions with regard to the control of fuel.

Relief Felt at Dr. Garfield's Appointment

For some days previous to the issuance of this pronouncement, it had been known in official circles that the President had declined to name a board of three to exercise control over the coal industry, and that a dictator was to be named. The name of the man most likely to be selected for the post was well guarded by the President, although Mr. Garfield's name did enter into the speculation a few days prior to his appointment. It may be said with all truthfulness that great relief was felt when Dr. Garfield's appointment was announced, as some had feared the selection of a man with less balance and more radical tendencies.

The new schedule of prices had no effect whatever on anthracite, though it threw the bituminous market into chaos. Practically all soft coal disappeared from the market, and delegations from all parts of the country rushed to Washington in an endeavor to get the prices on bituminous coal increased. Dealers who had purchased stocks of coal at prices considerably above the latest Government figures were in a quandary, for to dispose of their supply at the new prices would mean that many of them would suffer a considerable financial loss.

On Sept. 8, 1917, Dr. Garfield made public his plans for controlling retail prices by the formation of local fuel administrators in every coal-consuming section of the country. Shortly after this, intimations came from Washington that the President's provisional prices for bituminous coal would be increased, as in effect the original schedule had tended to decrease production.

In the fall of 1917 the publicity department of the Fuel Administration began to warm up to its work, and soon every man, woman and child who could read the newspapers knew that there was going to be a fuel shortage. Economy was preached to both domestic and industrial consumers, and industries that were not essential to the winning of the war began to get apprehensive as to their coal supply.

On Sept. 30, 1917, Dr. Garfield issued an order describing the method by which retail coal and coke dealers were to fix their maximum margin of profit. The order became effective the next day and authorized retail dealers to charge 30 per cent. above their 1915 margins.

Demands for Coal Exceeded Supply

All through the fall the demand for both anthracite and bituminous coal kept considerably ahead of the supply, and many sections of the country were in dire straits for want of soft coal. The price of bituminous had been increased 45c. on Oct. 27, the advance being made to cover the increases in the miners' wage scale that had gone into effect.

By December, 1917, it was palpably evident to those in the coal industry that the Fuel Administration would brook no interference with its plans. The personnel of the administration had been growing since its inception, and some of the best executive brains in the country had responded to Dr. Garfield's call and were giving a million dollars' worth of service for a dollar a year.

With the arrival of cold weather and the unprecedented temperatures that prevailed during the winter of 1917-18, came more urgent demands for coal from all classes of consumers. New England in particular was in a sorry plight, and large cities such as New York could get no hard coal to warm the homes. The tremendous amount of tonnage which the railroads were called upon to handle congested the yards and terminals, and overtaxed the motive power facilities so that it became impossible for the roads to handle expeditiously the most vital necessities. Embargo followed embargo, and preferential shipment orders for this and that helped to further muddle the transportation situation.

It can readily be perceived that the railroad congestion did not help fuel matters any. In fact, Dr. Garfield went on record as saying that the question of an adequate or inadequate coal production depended in large measure upon how soon the transportation difficulties were overcome. Every operation reported a shortage of cars, and though the clamor for relief was loud and long, no one seemed to know just what steps to take to ameliorate this condition.

So the fuel problem was tackled from another angle—that of conservation. Estimates made by the fuel authorities had determined that the country was be-

hind over fifty million net tons of bituminous coal. As there seemed to be little likelihood of output ever catching up with demand, reliance was placed in securing less waste of coal in large plants and in cutting down unnecessary uses of power. What the conservation department of the Fuel Administration accomplished in the next few months proved a revelation. And, if the country gained nothing else during Dr. Garfield's regime, it could still point with pride and profit to the lessons learned by industry in the elimination of waste brought about by improper firing methods, faulty boiler-room installations and other chronic fuel-wasting conditions.

As a climax to Dr. Garfield's statement that the railroads were chiefly responsible for the deplorable coal situation came the news that the Government had taken over the railroads. This astounding information was announced by the President in a proclamation issued on the night of Dec. 26, 1917.

The ushering in of 1918 found the country in the grip of an intense cold. The production and distribution of coal were proceeding as rapidly as transportation facilities would permit, though not anywhere near fast enough to satisfy the demand. The various local fuel administrations, boards and committees were perfecting their organizations, and the efforts to relieve congestion on the railroads were beginning to bear fruit in the shape of a slight improvement in the car supply at the mines.

"Workless Monday" Order in Effect

On Jan. 16, 1918, came the now famous Garfield order shutting down business for five days and closing up industries on every Monday until Mar. 25. The storm aroused by this latest announcement was far more tempestuous than any that had greeted other revolutionary edicts of the Fuel Administrator. Nobody had received any advance notice of the order, and following its publication the Senate of the United States permitted itself to reach a degree of excitement that could show few precedents. The political side of the situation received a thorough ventilation on the floor of the Senate, and only 19 votes were cast against a resolution introduced by Senator Hitchcock requesting a five-day suspension of the order to allow those opposing it to be heard. Nevertheless the order was obeyed with a promptness that clearly portrayed the temper of the American people.

February, 1918, brought a cold wave that greatly interfered with railroad transportation and served to negative much of the good work that had been accomplish up to that time. Throughout the New England States the fuel situation was still acute, both as regards domestic and industrial consumers. From many sections came reports of plants that were forced to shut down for lack of fuel, while many other concerns were enabled to keep running on a hand-to-mouth basis through special shipments of fuel by the local fuel administrators.

On Feb. 13 the order providing for heatless and workless Mondays was suspended. Though it was admitted that little coal had been saved by the order, it was generally acknowledged that it helped considerably to relieve the freight congestion.

Warmer weather during February brought a generally better feeling, which was reflected in a let-up in the urgent demand for domestic fuel. There was still a great scarcity of steam grades, and cities in the interior of the country were in a bad way for coal, principally anthracite.

Along in March the country began to stop worrying about its immediate coal needs and started to lay plans for future requirements. Even the situation in New England showed signs of improvement. Much of the freight congestion had been cleared away by this time, though the bituminous operators still complained bitterly of a car shortage that hampered their efforts at increasing production.

With the drawing near of the new coal year, operators, jobbers, dealers and the consuming public relaxed from the tension of a nerve-racking winter and turned their eyes toward Washington, whence had come whisperings of new plans for prices, zoning, car supply, diversion of shipments and so forth.

Anthracite Coal Situation Unimproved

The demand for coal continued to exceed the supply in virtually all grades. A slight betterment was evident in the production of bituminous coal, owing to an improvement in the placing of cars at the mines. Anthracite, however, continued to be scarce, and there was no reason for believing that this condition would change.

After months of work, the Fuel Administrator on Mar. 22 announced a zoning plan for the distribution of coal. This was to go into effect Apr. 1. Every state in the Union was more or less affected by the plan. The basic idea underlying the new move was to confine Eastern coal to Eastern markets and make it compulsory for the Middle West, as well as other sections, to use coal produced in near-by mines. The announcement was received by the industry with commingled feelings. Many operators and shippers who had been years in building up trade connections suddenly found their customers taken from them. Consumers who had been accustomed to burning certain qualities or grades of coal were forced to use fuels with which they were less familiar. *Mais, c'est la guerre,* and producers and consumers alike readjusted their old methods of doing business to conform to the new order of things.

The trade was still further convinced that the Fuel Administration had control of the entire coal output, from the time it left the mines till it reached the consumer's bin, and even the furnace, when Dr. Garfield on Apr. 1 announced that all coal jobbers would have to procure a license in order to continue in business. Many abuses had crept into existence which the Government desired to eliminate, and the licensing plan, stated Dr. Garfield, would be fair to the operator, fair to the bona fide jobber, and fair to the consumer. The new system was somewhat of an innovation, for it enabled the retailer, for the first time, to buy at his option of the producer or the jobber.

By the beginning of the new coal year the Fuel Administration had made rapid progress in the task of clearing the path for a quick movement of coal from mine to consumer. New prices had been announced, the local fuel administrations had perfected their organization to take care of distribution—but there was no coal. No improvement could be reported from the

bituminous mines. In many producing districts the car supply was still below normal, and not sufficient motive power was available on the railroads to clear the yards promptly enough to insure the regular movement of cars. The trade at this time was somewhat uncertain, owing to the fact that the making of contracts for the new year was confounded by Government commandeering and preferential shipment orders.

During April the output of hard coal began to increase, though the operators had to contend with a shortage of labor that grew more serious as the months went by. Bituminous coal output, on the contrary (it always is "on the contrary" when hard and soft coal conditions are compared), continued to be disappointing. The railroads had shown no improvement in the manner in which empty coal cars were allotted, and John Skelton Williams, who was in charge of purchases for the railroads, insisted on the right of the roads to distribute cars where and how they pleased. There was an ulterior motive behind this attitude, which was to use such control of shipping facilities as the railroads possessed for the purpose of forcing price concessions from the coal producers. Thus was the public confronted by the amazing spectacle of one branch of the Government setting at naught the edicts and rulings of another Government body. This action on the part of the Railroad Administration served as did nothing else to bring to the support of Dr. Garfield many of the operators who had hitherto been inimical to him.

Better Feeling with Warm Weather

With the sunny skies and warmer weather of May came a feeling of optimism. Recognizing the truism that the public is prone to forget what it had suffered in the past, the fuel authorities began to urge consumers to lay in their coal supply during the summer months, and not to wait until winter was again upon them. The production of both anthracite and bituminous coal was steadily increasing in the meantime, though inadequate car supply still hampered a maximum output of the latter.

A reduction of 10c. per ton in the mine price of bituminous coal on May 25, and an order that all consumers were to pay the same price for fuel, settled the long-standing controversy between the fuel and railroad administrations. Immediately following this order the railroads began to take a large tonnage of coal.

Industries deemed unessential to the winning of the war were being denied the use of any kind of coal when June arrived, while dealers in anthracite were unable to fill even the two-thirds requirements of all their domestic customers.

Gradually the truth was borne in upon interested parties that the coal industry was being organized as it never was organized before. Many there were who believed that the production and distribution of the nation's entire coal output could not be systematized, but the Fuel Administration staff, under Dr. Garfield, was accomplishing the seemingly impossible. Weekly reports made to the Fuel Administrator kept him conversant with the actual output and consumption of coal in each zone, and in this way a watch was maintained on the needs of each section. In many instances where the occasion manifested itself, coal was shifted in transit to take care of emergency cases. Quotas had been fixed for those cities that were permitted to burn anthracite, and none of this grade of fuel was to be sent west of the Mississippi or south of the Potomac or Ohio rivers.

During all the foregoing period bituminous coal had been in such urgent demand that much of it got to market as it never got to market before. Some of the fuel was good, far too great a quantity was bad, and a whole lot of it was indifferent. To correct this evil, and to insure that the consumer who paid for coal would get what he paid for, Dr. Garfield on June 1 made public new regulations that imposed heavy penalties on operators who persisted in shipping dirty coal. To enforce these regulations inspectors were appointed for the different bituminous-producing sections.

Attempt Made to Speed Up Production

It became evident at about this time that one of the things essential to a solution of the bituminous coal problem was to speed up production. Having established this fact, Dr. Garfield formed a new section of the Fuel Administration, to be known as the Production Bureau, and placed the difficult task of stimulating the soft-coal miners to greater endeavors in the hands of James B. Neale, who had been acting as his advisor.

July found the coal industry hard and fast in the grip of Governmental regulation and administration. The competitive features that had distinguished the coal market in previous years were conspicuous by their absence, and one said it all, in referring to trade conditions, when he stated that "Demands for all kinds of coal are urgent, with stocks inadequate." The railroads and the fuel authorities were working together shoulder to shoulder, and the bituminous mines were producing record tonnages. Many of the larger operators at this time were shipping their entire output to the lakes, but because of the late opening of navigation shipments to the Northwest were behind schedule.

During the month of July record outputs of soft coal were made in many districts. But so rapidly did demands increase, that the manner in which industry was literally swallowing the nation's production of bituminous coal was being viewed with consternation by the Federal Fuel Administration. Every week that passed brought a new or additional requirement that had not been foreseen, and therefore not included in preceding estimates. For instance, a call for coal to be used in France and another to take care of an English obligation in Chile were typical of the latest types of demand of which no previous calculation had been made.

Naturally, the production and conservation divisions of the Fuel Administration were exerting their utmost efforts to help stem the overwhelming tide of demands. Car supply at the mines was good, in some few cases equaling or even exceeding requirements, and a shortage of labor began to manifest itself in the soft-coal regions.

In August the Department of Labor classified coal mining as war work, and efforts were made to keep the mining forces from leaving their tasks for other war industries such as munitions plants and shipyards, where higher wages prevailed than in the mining districts. Throughout the West and Middle West produc-

tion was well up to the demand, and reports began to circulate that certain grades and sizes of Indiana and Illinois coal were being sold below the Government maximum. In the East, however, particularly along the Atlantic seaboard, demand for all grades of coal was strong and dealers were unable to accumulate any stocks, except of the smaller sizes of anthracite. The movement of coal to the lakes was heavy, though receipts at the upper lake docks were still behind the schedule. Every effort was being made to keep shipments to the Northwest by water at a maximum, as only in this way could that region be taken care of by the close of navigation.

The intense heat during the middle of August exerted an influence more or less potent upon the production and distribution of coal. Reports at this time, however, failed to reveal any shortage of coal for immediate needs. Some regions had been able to accumulate surplus stocks in fair volume, while others were unable to build up any reserves whatever.

The condition of the country, so far as concerns coal, on Aug. 20 was about as follows: That portion of the country lying roughly between the Rocky and Allegheny Mountains appeared to be fairly well supplied with fuel, though Michigan was complaining of a shortage of domestic coal. A scarcity of coal seemed to be most pronounced along either coast. New England, while admitting that coal was coming forward in adequate volume for immediate needs, nevertheless was still apprehensive as to the future. On the Pacific Coast industries were somewhat short of coal; and although little anxiety was felt, it was anticipated that wood and other fuels would have to be used during the winter.

Opinion Divided as to Future

By the middle of September conjectures as to the outcome of the fuel situation were many, but only one gifted with infiinite knowledge could prophesy at that time, with any degree of accuracy, how the country would fare during the approaching winter. Optimists pointed out that the storage rules prescribing the quantity of coal that could be kept in reserve by industries in certain sections, the modifications of zone restrictions, the large stocks in the hands of consumers, and the improved car supply at the mines were all happy auguries. Pessimists shook their heads sadly as they compared the weekly tonnage figures with the estimated requirements, and heaved a heartfelt sigh at the news of labor troubles at the mines. They argued that the consistent preaching and enforcing of conservation measures were certain indications of a stressful winter.

A strike in the anthracite region during September caused quite a drop in output. The hard-coal miners, after maintaining an enviable record for patriotism and production, struck for higher wages in the face of an existing contract and the country's needs, and many collieries were forced to suspend. In many towns hundreds and thousands of orders for hard coal were on the dealers' files, and it was believed that there would be a duplication of the suffering of the preceding winter if cold weather were experienced.

In the meantime every red-blooded American was being thrilled with the accounts of the heroic exploits of our boys across the sea. The Fuel Administration had placed the question of whether the miners would back up the achievements of our forces with an increased production of coal squarely up to the workers themselves; it was either plenty of American coal or the loss of American lives.

The coming of colder weather in October witnessed an urgent demand for fuel from household consumers, an influenza epidemic from which the country was suffering causing the starting of fires in homes much earlier than usual. The stove and chestnut sizes of anthracite were in strong demand, though an outstanding feature of the market at this time was the collapse in the demand for the steam sizes of hard coal, several collieries being reported as about to close down for lack of orders.

Fuel Administration Justifies Itself

By the middle of October even the most carping critic was forced to admit that the Fuel Administration had amply justified its reason for being. In control of all production and distribution facilities, the administration had brought to fruition the many plans which it had formulated early in the year for safeguarding the nation's fuel supply. In the face of apparently insurmountable obstacles and scathing sarcasm from many quarters Dr. Garfield and his assistant had labored steadily until chaos had given way to order. New England and a number of other important industrial centers had ample reserve stocks of fuel against the uncertainties of winter mining and shipping conditions, the exact reverse of what was true in the fall of 1917. The Northwest, too, had been amply taken care of, and it was a foregone conclusion that the lake shipments would meet the schedule.

And then came peace talk and influenza to trouble the coal-mining industry. Premature reports of the surrender of Germany led many mine workers, among millions of others, to throw down their tools and enter into an orgy of celebration, with the result that the coal output was reduced. More serious, however, during the latter part of October was the havoc being wrought by the influenza epidemic, particularly in the hard-coal regions.

The belief was strong in late October that there would be no serious shortage of bituminous coal during the winter of 1918-19. The needs of essential industries were being supplied as they became evident, and even nonessential industries were being permitted to accumulate reserve stocks under a new order issued by the Fuel Administration. Anthracite coal still continued to present a problem, though the prevalence of warm weather kept consumption down. Furthermore, there was every reason for believing that the bins of domestic consumers were stocked with coal as never before.

With the urgent need for quantity production of soft coal now somewhat ameliorated, the Fuel Administration again began to turn its attention to quality. During the week ended Oct. 28 orders were issued to a number of soft-coal mines prohibiting them from mining or shipping their product, as it was of an inferior quality. This made a total of 99 mines closed since the Fuel Administration inaugurated its campaign for clean coal.

Early in November a surplus of soft coal was reported from practically all mines west of Pittsburgh, this

unusual condition being attributable largely to the possibility of an early sure-enough peace, and partly to the exceptionally mild weather prevailing throughout the country. Developments in the war situation changed with such rapidity that manufacturers of war goods stopped buying coal, as it was evident that if Germany accepted the terms of the Allies' armistice, war work would cease.

Then the expected happened, though much sooner than had been looked for. On Nov. 11, 1918, about 19 months after our entry into the conflict, the world war came to an end. Demand for soft coal was cut off as with a knife. Immediately consumers discovered that they had a large oversupply of coal on hand, and mines that only a short time before were hard put to it to meet their production quota found that they were unable to dispose of their output. Bituminous coal of the lower grades became a drug on the market, and bituminous operators one after the other were forced to a realization that for the present their days of prosperity were over. What the story would be in the future, when the country readjusted itself to a peace basis, was open to conjecture. But one thing was evident. Until industry again began to go full steam, the bituminous mines would have to mark time.

Efficient Storage of Explosives

By C. Atwood
Tamaqua, Penn.

The watchword of "efficiency" has taken a sweeping hold on the people of the country during the past two years. Greater efficiency was planned for manufacturing plants, was put into play on the farms, entered the homes of our people and found its way into the mines. As a result enormous amounts of coal were poured forth from the shafts each day. There was, however, a place in some mines where efficiency was neglected, and that was where the high explosives were stored.

Moist storage conditions work a great deal of damage to powder and for this reason the best of drainage possible about a magazine should prevail at all times—everything should be done to keep excessive moisture from the magazine. Some magazines are so poorly arranged in regard to drainage that after a rainstorm great pools of water can be seen standing on the floor about the cases of dynamite. Even though the water does not come in contact with the boxes of explosives (though oftentimes it does), the water evaporates and makes the air humid. When repeated two or three times the humidity becomes so excessive as to cause the powder to become soft and mushy in the cartridges. Where the cases of dynamite stand in puddles of water for any length of time, some of the ingredients may possibly be dissolved out. While dynamite in any of the above-mentioned conditions may shoot, it is almost certain that it has lost some of its efficiency and may cause misfires. Misfires are expensive and also dangerous, and should be carefully guarded against wherever possible; even if the dynamite detonates, it is quite possible that it may have lost some of its strength by the dissolving out of some of its ingredients. It may also give off obnoxious fumes for the same reason.

Excessively hot storage may also cause trouble with powder. Of course not many mines are afflicted with this fault, but yet there are some which are, and it is just as much a fault as a damp magazine. Continued heat in time has a tendency to make a powder unstable and it also causes it to leak and get soft and mushy, as when it is stored in damp places. It is well known that permissible powders contain enough moisture in them in some form or another to cool the flame and thereby make the powder safe in dusty or gaseous mines. A hot magazine tends to dry out this moisture, and this may reduce the safety of the explosives if they are kept in heated storage for a long time. Some types of dynamite after being kept in a hot magazine get very hard when they are taken out to a place where the temperature is cooler, so hard in some cases that it is difficult to insert a cap in them. Should this difficulty appear, it can be easily overcome by rolling the cartridge by hand on a flat wooden surface until the powder becomes soft. After this the cap can be inserted easily.

One of the worst types of magazine is the one that is damp, hot and has poor ventilation. Here we have a heated, humid atmosphere, and with poor ventilation there is no means of changing the air. This warm, moist air, held in contact with the powder for days at a time, readily dissolves out ingredients from the dynamite due to the increased solubility of salts with an increase of temperature. With this condition we have a damaged powder whose properties are not the same as when it was received at the mines. In other words, we have a powder which has been lowered in efficiency and will not do the work that it would have done when it first reached the mine.

One of the common faults of magazines is cold storage. It is difficult to say whether this is a worse fault than a damp or hot magazine. But it certainly is a serious one, and one that it would pay to remedy. Of course, an extremely cold magazine means frozen dynamite, and frozen dynamite is treacherous. Before it can be used it has to be thawed, and because of careless methods used by some miners thawing is dangerous; the liability to accidents is great. At times, when a miner is in a hurry, the stick may be only partly thawed and still have frozen spots in it. Frozen powder is more sensitive than unfrozen, and frozen spots throughout a partly thawed stick may cause trouble. It may be set off by friction on the side of the hole or by a metal tamper; friction caused by breaking the powder in the place where it is frozen may be enough to start a detonation. Partly thawed powder may cause a misfire or only a partial detonation. All of the above-mentioned results from a partly thawed cartridge are serious and should be watched carefully. A powder that is much chilled and yet not frozen is cut down in efficiency; it lowers the sensitiveness of the explosive and it also lowers its brisance; that is, it cuts down its shattering power.

It can easily be seen that efficient storage is a matter that should be observed much more carefully around mines. Better powder, greater production and more safety for the miner are obtained. In order to procure this, magazines should be kept dry and at a normal temperature (between 60 or 70 deg. F.), and in this manner a greater good will come to all, miners and mine owners alike.

Modern Tipple Equipped with a Simple Balanced Horizontal Screen

By FRANK J. SCHRAEDER
Chicago, Ill.

SYNOPSIS—*A small wooden tipple of large capacity is here described. The screens are double-decked, horizontal, with opposed and balanced movement. This balancing permits the supporting frame to be of comparatively light and inexpensive construction.*

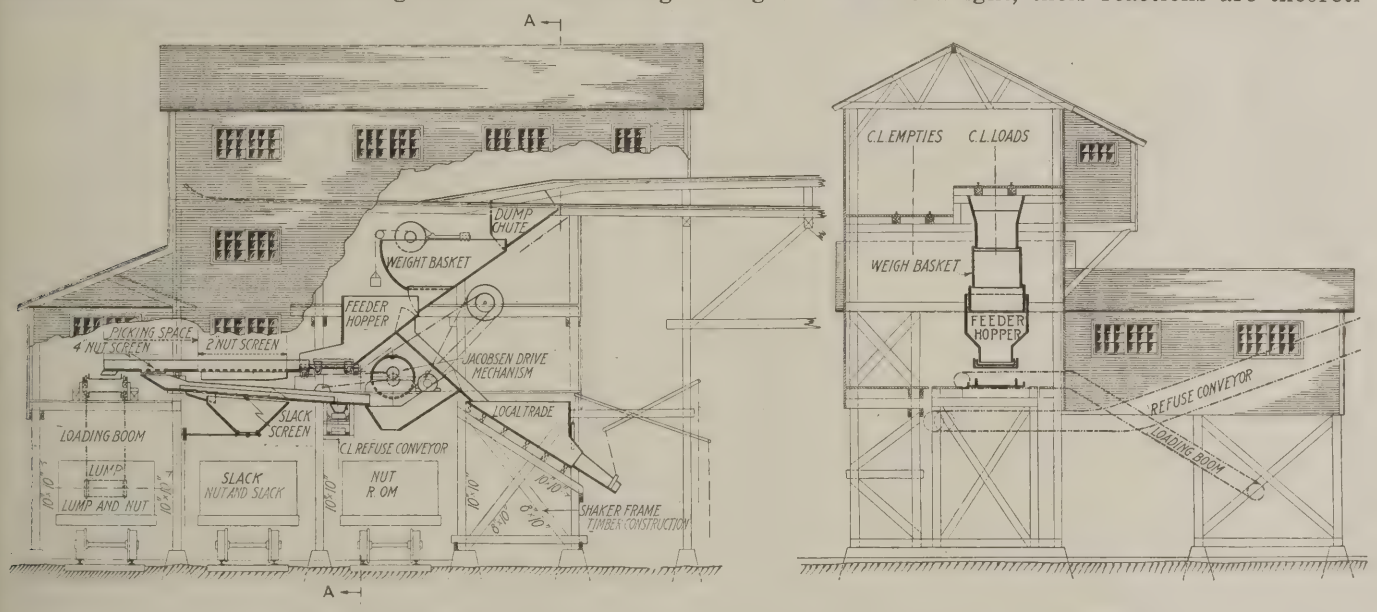
DURING the last two years almost anything that was black sold as coal, and under the emergency there was a ready market for it. However, almost immediately upon acceptance by Germany of the armistice terms, the demand for clean, well-sized coal increased, so that today many operators are interested in and planning for the installation of a simple equipment for the preparation of their output.

Some operators foresaw this and equipped their mines to meet the new conditions arising after the war. Among these, the Van Kirk-Carroll Coal Co. has recently put into operation a new tipple for its mine at Dellroy, Ohio. The equipment there installed is considered the simplest modern tipple machinery for screening, picking and loading coal.

The equipment and its arrangement are indeed remarkably simple. There is comparatively little machinery and less equipment than has heretofore been required for the work and results afforded. Nothing has been sacrificed in the way of advantages, but instead the efficiency in screening has increased and the number of mechanical units has been decreased. For illustration, a single drive with a single motor actuates the self-cleaning reciprocating feeder, the combined screen and picking table, and refuse conveyor.

In the Dellroy tipple shown in the accompanying illustrations, coal is brought to the tipple in trips of 10 to 15 cars each. These are passed over a Phillips crossover dump and discharged into a weigh basket especially designed to receive the coal without breakage. After weighing, the coal is carefully passed from the weigh basket into the feeder hopper. Both basket and hopper are large enough to hold two mine cars full of coal, in order to facilitate quick dumping. From the feeder hopper the coal is conveyed at a uniform rate of 100 to 150 tons per hour to a pair of Jacobsen balanced horizontal shaker screens, which are 4 ft. wide, and arranged for loading on three tracks.

The screens consist of one upper deck, adapted to convey the coal forward toward the lump track, and a lower deck, adapted to convey the coal and refuse pickings in the opposite direction. The two screens travel in opposite directions at identical speeds, and being of the same weight, their reactions are theoretically completely counteracted, thereby eliminating the necessity of heavy, reinforced concrete supports or any heavy structure. In this particular case only a simple wooden frame was employed to support the drive.

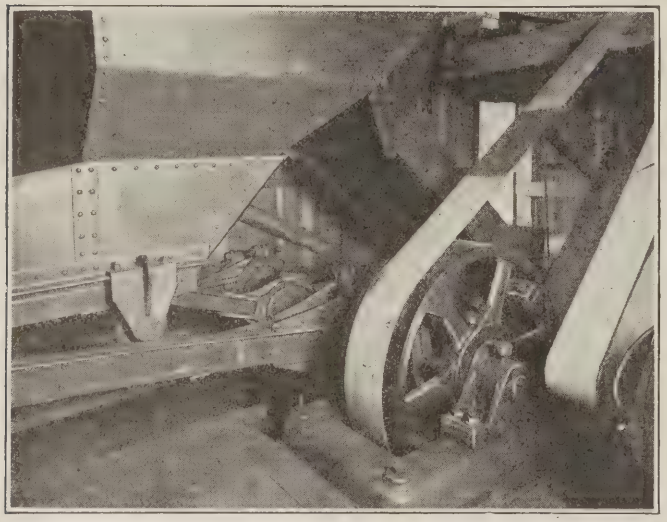


SECTIONAL ELEVATION SECTION A-A

SECTIONAL ELEVATIONS OF THE DELLROY TIPPLE OF THE VAN KIRK-CARROLL COAL CO.

The upper screen is provided at the receiving end with 8 ft. of 2-in. circular perforations and at the delivery end with a short section of 4-in. perforations; the intermediate part of the trough is provided with blank plates over which the 2-in. lump, which has been relieved of slack after passing over the 2-in. perforations, is conveyed in a thin, uniform layer. This makes each piece of refuse clearly visible, so that picking may be performed directly on this upper screen without the installation of a separate picking table. The coal, after having been picked, passes over the 4-in. perforations,

the over-size being conveyed over the end of the screen and delivered without breakage to an apron type of loading boom. The 2-in. to 4-in. nut passing through the 4-in. perforations to the lower screen joins with the 2-in. slack and passes over 10 ft. of lip screen. The slack passing through the lip screen is delivered to a gate-



DRIVING MECHANISM FOR DOUBLE DECKED SCREEN

controlled hopper, whence it is discharged to the railroad car, while the nut coal is conveyed further and discharged over a chute to the nut track.

The refuse and pickings are deposited into two narrow troughs, there being one on each side of the lower deck. These refuse troughs are fastened direct to the lower screen and therefore receive the same conveying action without any additional machinery. Thus the refuse is separately conveyed in these side troughs and delivered to a scraper conveyor which carries it to a 50-ton refuse bin, where the sulphur and refuse are separated and from which they are loaded by gravity into railroad cars for shipment. This simple arrangement for conveying refuse on the side troughs of the lower screen will be appreciated, since this arrangement eliminates a refuse conveyor and its driving machinery.

The lump loading boom is 42 in. wide, of the apron conveyor type, driven by a 7½-hp. motor, and arranged for lowering and raising by means of a worm-driven winch operated directly by the drive machinery of the boom. Clutches are provided for raising and lowering the hinged section and for stopping the boom independently. These clutches are operated and controlled by rope from the trimmer's platform.

The driving head for imparting the reciprocating motion to the screens is known as the No. 4 Jacobsen driving mechanism and consists of one continuous drive shaft on which are oppositely mounted two pairs of ordinary eccentrics, each pair operating one section of the screen. A uniformly rotating power-driven differential flywheel pulley imparts to the shaft a motion which is slow at first and then gradually accelerated toward the end of the forward stroke, then quickly reversed and retarded toward the end of the return stroke. This motion insures a continuous uniform travel of the coal at a suitable speed for screening and picking. A separate eccentric centrally mounted on the same drive shaft operates the reciprocating feeder and imparts to it the same irregular reciprocatory conveying motion which makes the feeder self-cleaning. Thus the cost, installation and maintenance of an independent feeder drive shaft with its bearings, supports and pulley is saved. This arrangement has the advantages afforded both by the apron type feeder and the old-style reciprocating feeder, while it possesses none of their inherent disadvantages.

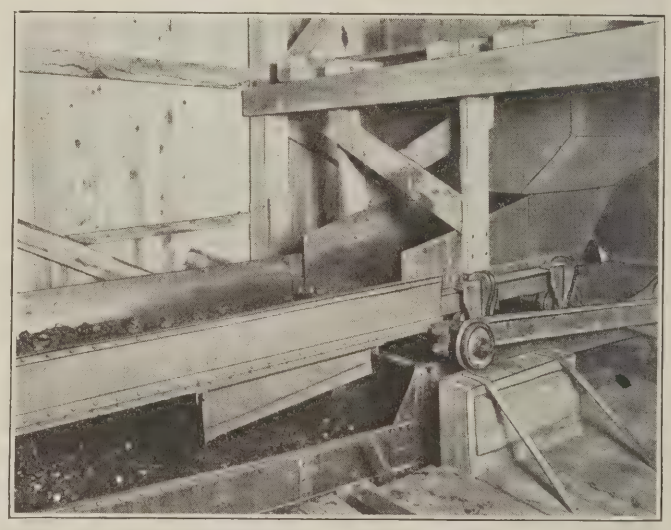
A 25-hp. motor is employed for driving the screens which grade the coal and convey the refuse. The power actually consumed runs from 10 to 20 hp., varying with the load on the screens.

The feeder hopper is provided with a gate for by-passing run-of-mine coal directly to the railroad car without having to operate any of the shaker screen equipment. The coal may also be by-passed directly into the local-trade bin, which is arranged with gates and hinged chutes for loading wagons on the public road that passes under the tipple.

Picked run-of-mine may also be loaded by opening a gate near the discharge end of the upper screen and by-passing the material to the lower screen, where it may unite with the nut and slack and be loaded through a gate in the lip screen into a car on the slack track. By manipulating gates in the screen, any combination of sizes may readily be had on the three tracks.

Briefly summed up, the advantages of this type of equipment are: The balanced horizontal screen maintains its horizontal position at all periods in its cycle of operation, and conveys the coal over the screen at a speed such that picking facilities are afforded directly on the screen itself without the installation and maintenance of any separate picking tables and structure for them.

This is a balanced screen and requires no unusual supports or heavy concrete pier for foundation; the upper deck counteracts the reaction of the lower deck, both being driven from the same mechanism and from oppositely disposed eccentrics cast in one piece, so that,



VIEW OF BOTH DECKS OF THE SCREEN

theoretically, the reactions are neutralized within the castings without even passing to the shaft.

The reciprocating feeder is actuated from the screen-driving mechanism shaft and requires no separate drive shaft, bearings, transmission machinery or supports. In addition, this reciprocating feeder has the same peculiar conveying action as that of the screens, and is therefore self-cleaning.

All of the machinery and equipment is kept near the ground; thus the dumping point is lower. This means a lower structure and in shaft tipples a shorter hoist and an increased tonnage.

The tipple structure is simple and therefore costs less money than would be required for any other type of tipple equipment for the same purpose.

Provision is made for conveying refuse pickings either forward on a trough above the upper screen or backward on side troughs integral with the lower screen, which has a backward or reverse conveying action from that of the upper screen.

The reverse conveying of the lower screen permits wide flexibility in combining the various sizes; picked lump can be taken back for combination and loading with other sizes.

The cost of the machinery and equipment is comparatively low and the simplicity affords ready installation in existing or new structures.

The complete tipple equipment described in the foregoing was designed and installed by Jacobsen & Schraeder, Inc., engineers, Marquette Building, Chicago, Ill. The Van Kirk-Carroll Coal Co. is now installing similar equipment at its other mines.

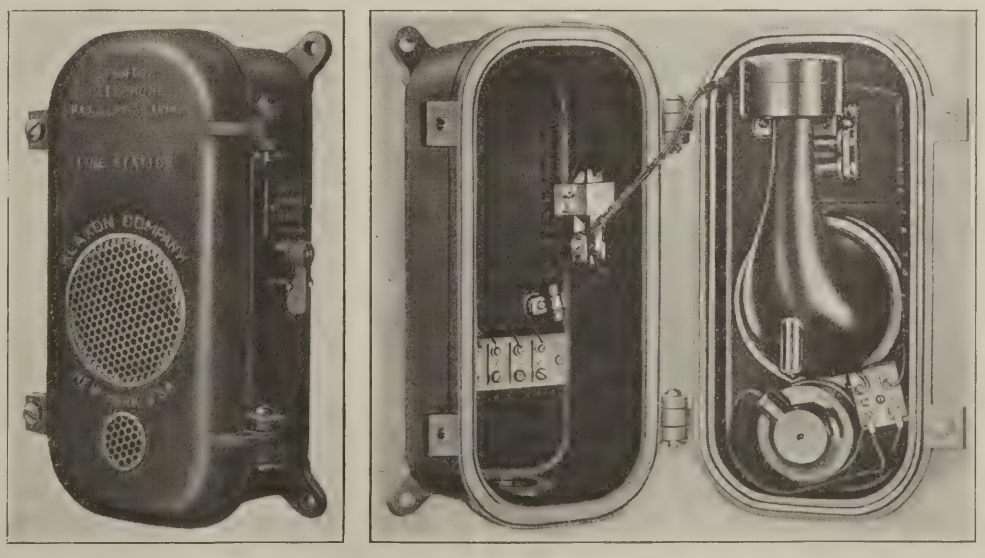
New Telephone Admirably Adapted for Use in Mines

The Klaxon Co., of New York, will shortly place upon the mine market what it calls its Stentor telephone. This instrument has been developed primarily for use on battleships, where conditions of service are decidedly severe and the intercommunication system must be equal to any and all emergencies. Thus developed, the instrument is admirably adapted to use in mines.

The Stentor instrument differs radically in construction and results from the ordinary telephone even of mine type. As may be seen in the accompanying illustration, it is entirely devoid of both external receiver and transmitter. While these elements are of course present, they are attached to the inner surface of the box cover and might thus be rightly termed internal, in contradistinction to the external parts of the ordinary instrument. The distinguishing characteristic of this device, however, lies in the volume and distinctness of the sound transmitted. The diaphragm of this instrument is mounted between rubber cushions, or gaskets, with the result that the sound transmitted is extremely distinct and penetrating. Under favorable conditions a person may stand 5 to 20 ft. away from the instrument and yet hear and be heard with ease.

The construction of this instrument is heavy and rugged. The case is of a special brass or bronze composition, which is of course rust and corrosion resisting. The hinged cover bears upon a rubber gasket and is fastened to the instrument box by means of cap screws. The working parts are thus effectually sealed weather, water and gas tight. All exposed parts are either of bronze composition or are copper plated. So thorough is this protection from injury by the elements that the instrument may be entirely immersed without deterioration. What this may mean in case of a mine flood will be readily appreciated.

These instruments may be connected to each other or to a central station in the same manner as the ordinary telephone. Its small size, reliability, ease of operation (the lever at the side is merely pressed in order to call central or signal another station) and loud, distinct tone are factors that should be decidedly in its favor for mine installation.



VIEWS OF THE STENTOR TELEPHONE, SHOWING MECHANICAL DETAILS

Nitro-Starch as an Explosive

Nitro-starch, which in some of its properties is superior to nitro-cellulose (guncotton) and nitroglycerine, seemed at one time likely to establish itself as a useful explosive, but, as formerly manufactured, it was wanting in stability. Perhaps its constitution was not fully understood. War requirements directed attention to this compound, and a safe explosive was produced from tapioca-starch. Tapioca-starch has long been used in large quantities by the Post Office Department for the gum of postage stamps. The need for this substance in the form of an explosive led to a search for a substitute. This was soon discovered and after rapid but intense research it was found that nitro-starch possessing the required stability can be made from corn-starch, the product being better in quality and cheaper than that obtained from tapioca.—*Chemical and Metallurgical Engineering.*

Coal Age Index for Last Half of 1918 Ready in February

An index to *Coal Age* for the last half of 1918 will be ready for distribution some time in February, and will be sent free to anyone addressing a request to the subscription department of *Coal Age*, New York City.



Statistical Program of Fuel Administration May Be Abridged

Apparently the Secretary of the Interior is not convinced that the coal industry is entitled to a continuance of the broad statistical program being conducted by the Fuel Administration. If Secretary Lane so desires, this statistical work can be continued in his department until July 1 on money already appropriated to the Fuel Administration. If the program is continued after July 1, it will be necessary to secure an additional appropriation.

Congress, however, is inclined to view with favor the expenditure of money for statistics, because it supplies consumers and the smaller operators and dealers with most valuable trade information which they would not be able to collect for themselves. On the other hand, the more highly organized concerns have an advantage in the absence of Government statistics, from the fact that they are able to support statistical divisions of their own and are enabled thereby to have more insight into the general situation. This argument, as a rule, is effective with the appropriations committees.

The statistics, which are being gathered by the Fuel Administration, cover the details of production, distribution, consumption and stocks.

Improvement of Ohio and Mississippi Rivers Will Benefit Kentucky Coal Industry

That the improvement of the Ohio and the Mississippi Rivers is of importance to the Kentucky coal industry is indicated by the statements made by C. F. Richardson, the president of the West Kentucky Coal Co., in a letter to Representative Barkley. The letter reads:

You no doubt are familiar with the recent rivers and harbors bill, there not being any appropriation made for the improvement of the Ohio River other than the unexpended appropriations which have been tied up under contract for the Ohio River improvement.

The improvements on the Ohio River are of vital importance to all of the people who live on the Ohio and adjacent to it, and inasmuch as about one-sixth of the population of the whole United States live in the Ohio and Mississippi Valleys it seems to me that the benefits that these citizens can derive from having the Ohio and Mississippi Rivers made navigable continuously during the year are such that our representatives in Congress should not overlook the importance of making the necessary appropriations to complete the great work that has already been begun in order that the public may have the benefit of these great waterways.

The West Kentucky Coal Co. is especially interested in the improvement of the lower Ohio as well as the Mississippi River, but more especially in the lower Ohio. Under ordinary conditions we transport half a million tons of coal down the Ohio River from our mines located near Caseyville, Ky., and on account of the present river condition we are only permitted to operate approximately seven months in the year, and these operating months are contingent on the flood stages of the water. With the proper improvements we could have continuous operation and could transport one and a half million tons of coal with the same equipment that we now have, and I am sadly disappointed that no appropriation was made in this session of Congress to take care of the necessary improvements on the lower Ohio.

With the present high labor cost on railroads, as well as the congestion of the railroads at various periods of the year, it makes it more necessary that improved river transportation should receive the necessary attention. In periods of car shortage, as well as other transportation facilities, if the Ohio and Mississippi Rivers were put in the condition in which they can be put at a nominal cost, then the citizens living along these two great rivers could be served not only with coal but with various other commodities which have been most difficult for them to get transported to the towns and cities bordering these two rivers; and with these increased transportation facilities better car supply, as well as motive power, could be diverted to other localities where they would be needed.

I earnestly request that you use every effort in your power to see that something is done at the next session of Congress, and if possible at the present session, to have the necessary appropriations made for a continuance of the improvements of the lower Ohio River and not have it delayed for two or three generations to come. This country is in need of this improvement, and it should be given immediate attention; and if the necessary appropriations are made, it would help solve the great question of what are we going to do to find work for the returning soldiers.

Coal and Coke Fuel Administration Cancels Requisition Orders

All orders for the requisition of coal or coke, whether they are now outstanding or issued prior to the present time, have been cancelled and annulled, to take effect on Jan. 31, it was announced Jan. 23 by the United States Fuel Administration.

Permits Required for Certain Smokeless Coal Shipments

To correct a slight misconception of its order of Jan. 16, regarding the removal of restrictions on shipments of bituminous coal and smokeless coal by way of the docks on Lake Michigan and Lake Superior, the United States Fuel Administration pointed out on Jan.

21 that this order still keeps in effect a provision that: "Low-volatile smokeless coal shall not be sold or shipped from docks on Lake Michigan and Lake Superior for use by domestic consumers unless a permit for such sale or shipment shall first have been obtained from the District Representative of the United States Fuel Administration in charge of said docks."

The order also declared valid all permits heretofore or hereafter obtained from the District Representative in charge of said docks, under the proviso of the order of Jan. 2, 1919, although granted without the approval of the Federal Fuel Administrator.

Record Custodian for United States Fuel Administration

Harold B. Harris was appointed on Jan. 21 Custodian of Records of the United States Fuel Administration. Mr. Harris has been a member of the Bureau of State Organizations of the Fuel Administration and has had charge of retail prices. By the terms of the order, issued on Jan. 21, he has "authority to make such arrangements as shall be necessary and proper for the custody, safe-keeping and disposition of all records and documents of the United States Fuel Administration."

Question of Railroad Fuel Interesting the Coal Industry

Railroad fuel has furnished the matter of liveliest interest in Washington during the past week. The statement of policy with regard to the purchase of railroad fuel, made recently by the Director General of Railroads, is highly satisfactory to such representatives of the coal industry as are in Washington, but it is felt that the statement does not go far enough. If the employment situation is kept secure, it is realized that railroad fuel purchases must be made in such a manner as to make fairly equitable distribution of contracts within the various fields. If the tonnage is not spread out well between the different districts and within each district, irregularities in employment are certain to arise.

In such negotiations as have been had with Director General Hines, he has shown an unmistakable disposition to be fair and broadminded, his callers testify unanimously. They have hoped that he will make a definite trial of some systematic distribution of orders.

The plan of the Railroad Administration to ask for bids on coal is a departure from past methods which is being watched with interest. Some operators have suggested to the Railroad Administration that there be a fixed price established for Government coal. The industrial situation is such that it is practically certain that the Government, as a large purchaser of raw materials, will take that situation into account.

In order to protect themselves from an influx of high-grade coal, when the zones are abandoned, retailers in certain cities where there are stocks of low-grade fuel still on hand are entering into an agreement not to bring in any high-grade coal until the surplus of low-grade coal is disposed of.

Mining Institute To Hold Joint Meeting with Canadian and Electrical Institutes

The American Institute of Mining Engineers will meet on Feb. 17 to 20 with headquarters at the Engineering Societies Building, 29 West 39th St., New York City. Joint sessions will be held with the Canadian Mining Institute and the American Institute of Electrical Engineers. The program is as follows:

Monday, Feb. 17—Registration at Institute Headquarters, 9 a.m. to 9 p.m.; Simultaneous Sessions of "Institute of Metals Division" and "Industrial Organization," 10 a.m.; Luncheon at Headquarters, 12:30 p.m.; Simultaneous Sessions of "Institute of Metals Division" and "Industrial Organization," 2 a.m. to 5 p.m.; Visit to Morgan Galleries, 3 p.m.; Evening entertainment, 8:30 p.m.

Tuesday, Feb. 18, Canadian Mining Institute Day—Annual Business Meeting, 9:30 a.m.; Simultaneous Sessions on "Principles of Taxation" and on "Iron and Steel," 10 a.m.; Meeting of the Women's Auxiliary, 11 a.m.; Meeting of Boards of Directors, 12 m.; Luncheon at Headquarters, 12:30 p.m.; Discussion of International Coöperation in Mining in North America; Improved Relations of Capital and Labor; Uniform Mining Law for North America, 2:30 p.m. to 5 p.m.; Visit to Metropolitan Museum of Art and Senator Clark's galleries, 3 p.m.; Smoker, 8:30 p.m.

Wednesday, Feb. 19—Session of National Council, 10 a.m.; Session on Mining, Milling and Geology, 10 a.m.; Meeting of Women's Auxiliary, 11 a.m.; Luncheon at Headquarters, 12:30 p.m.; Matinee for Ladies, 2:30 p.m.; Joint Session with American Institute of Electrical Engineers on Electric Welding, 2:30 p.m. to 5 p.m.; President's Reception, 6:30 p.m.; Annual Banquet followed by Dancing, 7:30 p.m.

Thursday, Feb. 20—All-day trip to Newark Bay to visit Federal Shipyard, where the first electrically welded ship is being built. A ship launching will add to the interest.

The Coal and Coke Committee will present the following papers: "Anthracite Mine Costs," by R. V. Norris; "Work of National Production Committee, United States Fuel Administration," by J. B. Neale, and "Distribution of Coal under United States Fuel Administration," by J. D. A. Morrow.

The Industrial Organization Committee will conduct discussions on housing and Americanization. It lists the following addresses: "Prevention of Illness Among Employees in Mines," by A. V. Lanza; "Professional Section—United States Employment Service," by I. W. Litchfield. "Use of Cripples in Industry," by J. P. Monroe; "Need for Vocational Schools in Mining Communities," by J. C. Wright; "Employment of Mine Labor," by H. M. Wilson; "Psychology Tests," by R. M. Yerkes; "Mental Factors in Industrial Organization," by T. T. Read.

Giving Credit Where Credit Is Due

In some unaccountable manner the Wyoming Coal Co., in Wyoming District No. 2 (see *Coal Age*, Jan. 16, page 96) was credited with a coal production of 430,099 tons. The tonnage is correct, but the coal was produced by the Monarch Coal Mining Co. instead of the Wyoming Coal Company.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

It has been recently announced, to be exact the date was Jan. 22, that the general disbandment of the United States Fuel Administration would not affect the Bureau of Labor which works under the Administration. It will continue its labors till the end of the war. Under an agreement published July 23, 1918, all labor questions pertaining to the coal-mining industry were placed definitely under the jurisdiction of the Fuel Administrator, this arrangement having the sanction of the Secretary of Labor and of the United Mine Workers of America. The agreement included the provision that any dispute failing of settlement between the parties at interest must be submitted to the Fuel Administration for final disposition without stoppage of work.

All Must Get at Least Present Average Wage

In the anthracite region a strike has broken out at the Heidelberg No. 1 and No. 2 Collieries of the Lehigh Valley Coal Co., at Dupont. The men went on strike Jan. 18 and on Jan. 24 were reported as still out. About 500 men are involved. A meeting has been held at which representatives of both the men and the company were present. The controversy arises from a desire to fix a minimum day's wage to average $6.63 per day. The company will not agree to it, of course. Dupont has always been a center of trouble and contract breaking.

It is interesting to compare the wages of anthracite mine workers with those of skilled workers in the city who have far higher living costs than the mine workers and where especially rent and coal are much higher than in the mining regions. According to the figures of the Fuel Administration the contract miner receives $6.63 daily or $39.78 a week. That is what the Heidelberg miners would make the minimum wage. The following is a list of the wages received by other workers, by the day and by the week:

	Daily	Weekly
Consideration miner...	$5.50	$33.00
Contract laborer	$3.70- 5.16	$22.20- 30.96
Company miner	4.56- 4.80	27.36- 28.80
Inside laborer	4.08- 4.32	24.48- 25.92
Common laborer	3.36- 3.68	20.16- 22.08
Shaft engineer	4.88- 5.20	29.28- 31.20
Fireman	3.84- 4.24	22.24- 25.44
Blacksmith	4.56- 4.80	27.36- 28.80
Carpenter	4.56- 4.80	27.36- 28.80
Machinery repairer....	4.40- 4.56	26.40- 27.36

Thus Does Scranton "Put It Over" Chicago

The United States Department of Labor issues the following statistics for full-time wages in Chicago, May 15, 1918. These, understand, are union scales:

Bricklayers, cement finishers, elevator constructors, marble setters, painters, stone masons, tile layers, granite cutters and iron molders, $33 weekly; asbestos workers, carpenters, sheet metal workers, structural iron workers and finishers, each $31.20 weekly; slate and tile roofers, $31.90 weekly; all-around machinists, $31.20 weekly; metal polishers, $26.88 weekly; building laborers, cement laborers, elevator helpers, hod-carriers, $22 weekly; machinery helpers, $18.24 weekly.

When it is considered that living costs are considerably higher in metropolitan cities, the mine-workers living in communities of smaller populations have more leeway for the worth of a dollar, as its purchasing powers go further.

The coal miners of the Nesquehoning region are declaring defiantly that if the country goes dry they will not mine coal. They allege that stimulants are absolutely necessary if they are to do such heavy work, and they say that if they are deprived of the beer, on which their strength depends, they will seek employment less hazardous and more conducive to health. Where they will find an employment more conducive to health cannot be imagined. Lots of work, it is true, is less hazardous, but the work on which they are engaged will become decreasingly hazardous when their nerves and their judgments are not unsteadied by alcohol. The story that beer is necessary for the hard worker is one of the prize fables of the brewery storyteller.

In central Pennsylvania much friction has arisen at the Winber plants of the Berwind White Coal Mining Co. and as a result the Winber Citizens' Association has been formed, the merchants of the town forming the background of the body created to attack the policies of the company. The Winber citizens, who are all either employees of the corporation or derive their whole trade and living from those who are the company's employees, allege that their meetings are watched, and the employees of the corporation who attend the meetings are "fired" the next day.

The mine workers complain that the company has been quite active in municipal politics and has been discharging all men whom they believe have voted against such officials of the company as were seeking municipal preferment. They claim not only that the company discharges those actively opposing it but also blacklists them when they seek employment elsewhere. An appeal has been made to the United States Secretary of Labor for an investigation of the conditions alleged by the mine workers.

Illinois Miners Want More Compensation

Illinois miners think that workmen's compensation legislation should be changed from time to time in keeping with fluctuations in wages and increases in the cost of living. Local No. 304, United Mine Workers, of Belleville, Ill., has adopted a resolution asking the Illinois legislature, now in session, to increase the rate of compensation to injured persons. They say that the rates now in effect are based on wages and the cost of living prior to 1916 and therefore do not meet the exigencies of the present situation. The same resolution is to be adopted by miners' locals all over the State and forwarded to Springfield to be presented to the legislature.

Walter Nesbit of Belleville, secretary-treasurer of the Illinois mine workers, has made an appeal to the legislature for the relief of the suffering existing among the miners of the state as a result of the influenza epidemic. He states that 740 miners died from influenza or pneumonia, leaving dependent families and parents, and that a majority of these families have been left without support.

Operators Want Present Wage Scale Upheld Till Cost of Living Drops

The Winding Gulf Operators' Association at its last meeting passed resolutions favoring the establishment of a miners' state hospital in the Winding Gulf region, calling for certain changes in the compensation law (*Coal Age*, Vol. XV, p. 152), advocating an increase in the salaries of the chief of the Department of Mines and the district inspectors, and urging a continuance of the present scale of wages:

"Resolved, That it is the sense of this meeting of the Winding Gulf Operators' Association that our field has reached a state of development and attained a population which makes it very desirable and necessary that a state hospital be established, and that this hospital should be so located as to be convenient to the greater number of operations in the field, and that a committee be appointed by the chairman to see that this matter is properly presented to the Legislature at this session by our local representatives.

"Resolved, That there are some changes necessary in the present Compensation Law in order to enable the Commissioner of Compensation to make a more liberal distribution of the funds at his disposal; that this association is in favor of these changes being made; and, it is the sense of this meeting that any changes contemplated in the present Compensation Law should include a provision requiring the State Compensation Commissioner to make a complete detailed quarterly financial report to be published in the newspapers throughout the state.

"Resolved, That the chief of the Department of Mines and the district mine inspectors fill positions which carry responsibilities for which they should be more adequately compensated. That we are in favor of the chief of the Department of Mines receiving a salary of $5000 per annum, plus expenses, and the district mine inspectors receiving salaries of $3600 per annum, plus expenses, and that the appropriations for paying these salaries be made as heretofore has been done.

"Resolved, That in view of the continued high cost of living the Winding Gulf Operators' Association is in favor of the present scale of wages and desires to maintain same as long as market conditions permit."

New Wage Scale in West Virginia

The operators and mine workers of West Virginia will meet in the next few weeks to open their conferences relative to the wage scale for the year beginning Apr. 1, for at that time the present scale agreement expires. The conference will find many miners in West Virginia, not out of work exactly but not suffered to work regularly because of the curtailed demand. However, if a resolution of the Winding Gulf Operators' Association may be accepted as showing the attitude of operators, they will not seize upon the shortage of orders as a reason for forcing down wages. Until an agreement is reached as to next year's scale of wages, labor conditions will be more or less unsettled.

It seems as if the West Virginia operators were proposing to do their duty by operators in other states, for they are not seeking a wage reduction though it would be somewhat profitable as they, if successful, would secure it first. It would be unfortunate if the West Virginia district were to attempt to attain such a temporary advantage. Reductions in wages would be peculiarly regrettable at this time, for all such revisions downward would suggest other changes in the same direction but in greater measure. As a result business would begin to doubt whether it was resting on rock bottom or on a snow ledge over a fathomless abyss.

A scale convention for the Winding Gulf field met at Beckley on Jan. 23 for the purpose of formulating the miners' demands for the new scale year.

While mines are being operated irregularly, there does not appear to be much shifting about from plant to plant, even though some companies are more in need of men than others. This is regarded as a healthy sign.

Let Who Will Make Laws for the Operator Mine Workers Will Make Their Own

For several months the coal miners of the Crowsnest field have been working single-shift. This concession was granted during the strike of last September. All the parties concerned arrived at an understanding under which a Royal Commission was to be appointed immediately, which commission was to make inquiry into charges that the mines of the district were unsafe to life while operated on the basis of two shifts in 24 hours.

It now appears that the men, satisfied with present conditions, do not propose appointing a representative to the commission, a course which, it was understood, they were to take, the personnel to be completed by appointees of the Crow's Nest Pass Coal Co. and of the Minister of Mines. What course will be adopted as a result of this announcement is difficult to say, but it seems certain that the company will not be content to allow the situation to remain unchanged, for the officials of the corporation feel that the working of two shifts does not reduce the safety of the workings and that the continuance of the single shaft materially lowers the output and lessens the returns to be derived from the operation of the property.

The following resolution was adopted at a recent meeting of the Gladstone local union of Fernie, B. C.:

"Order 26 decreed that the miners at Coal Creek and Michel resume work on single-shift for an indefinite period pending the report of a Royal Commission. As we have been actuated in taking our position solely from our desire for the greater safety of the mines, we have viewed with great concern the probabilities that such a commission, composed as it will be of men of lesser efficiency or repute in the mining world, would take ill-advised action.

"We, the members of the Gladstone local union, protest that we did not seek or request, either individually or collectively, that the expert judgment of G. S. Rice, of the United States Bureau of Mines, be sought in this matter, though we recognize that he is the authority of highest repute on the American continent. The evidence on which he based his report was furnished exclusively by the Crow's Nest Pass Coal Co. and the Department of Mines. We complain that we were not informed of the conditions at the No. 3 mine which led to the disastrous explosion at that colliery. Yet the Department of Mines had already on file G. S. Rice's report regarding those conditions, which report clearly shows that the flash point should be reduced from 5.5 to 2.5 in those mines.

"Since the above-mentioned disaster men have been withdrawn from their places in the mine when the cap on the lamp is ¾ in. high or higher, whereas before that time withdrawal was required only when a ½ in. or higher cap was exhibited. This shows that the Department of Mines must have some faith in the Rice report on which we based our argument.

"All commissions that have been appointed to settle disputes between capital and labor have invariably been unsatisfactory to labor. For these several reasons we, the members of Gladstone Local Union, No. 2314, United Mine Workers of America, absolutely refuse to take any part whatever in the aforementioned commission."

Ohio Miners Couple Steady Work with Government Ownership

That part of the United Mine Workers centered in Ohio, at the annual convention held in Columbus recently, adopted resolutions favoring Government ownership and the steady operation of all coal mines. The delegates voiced the opinion that only under Government ownership could the miners get full justice as to wage and working conditions. A resolution was also adopted asking for legislation increasing the maximum weekly compensation for injury and disability. The convention urged that pay be made weekly.

The housing and the sanitary conditions of the various coal-mining villages was given as the cause of the high percentage of fatalities occurring during the recent influenza epidemic. The Ohio legislature was asked to remedy that condition by the enactment of more stringent sanitary regulations.

It was forecast that a special "international" meeting of miners would be called immediately after the signing of peace, when the entire question of a new wage scale will be discussed. Under the agreement with the Federal Government the present scale is to continue during the war. It is believed that higher wages and better working conditions will be demanded.

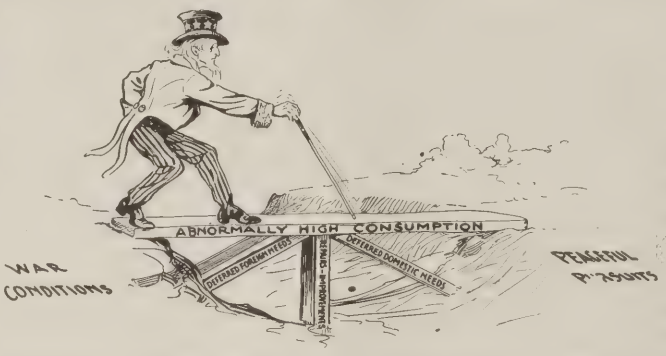
The working mine employees in the Yorkshire mines, England, numbering some 150,000 men, on Jan. 22, decided to quit work in order to enforce an extra 20-min. lunch time, 40,000 men having already been locked out for attempting to put the new lunch hour into effective operation. Sir Guy Calthorp, the Coal Controller, conceded the "snap" demanded and work continued. The mine workers were even threatening to bring out all enginemen, firemen and boilermen. A desire to reduce output and compel the employment of both returned soldiers and the persons who replaced them during the war was probably the cause for the demand.

EDITORIALS

The Dangers Are All in Our Fears

FOR THE nonce Uncle Sam is like a man who steps out on a plank bridge and wonders if it is likely to break, and how far it would be if he fell. There won't be much work done for a while if he continues to suspect the strong plank under him, though it is a safe wager that it would hold up a dozen such men as he.

There are big prospects ahead here and some abroad. To begin with, the United States furnishes enough work for all its citizens whenever those citizens go briskly about their business relying on the prosperity of the country. When they go feeling around in doubt and fear, there is not enough work here or in any country. Whenever there are silly people busily assuring their neighbors that profits and wages must both be largely curtailed, of course no one will buy. These men are the enemies of the country, perhaps greater enemies than the pacifists and pro-Germans. They create the idleness that breaks the cohesion and morale of the nation. They proclaim when they preach lower prices or lower wages that there must be a revolution against the employing class or the working class, or both.



If it were true that a great modification in prices is at hand, it would be hard for any of us to refrain from prophesying it; and if it has to come, we might wish it to come early. But it does not have to come. If we don't sit up, wait for it and fuss over it, it won't come. There is nothing particularly disconcerting about the present high wages, if indeed we can call them high wages, for in most cases they do not represent an excess of purchasing power.

Since the Middle Ages (when an English two-cent penny a day was a good day's hire in England) to the present day (when 250 of those same pennies is considered hardly enough to keep an average family in health) there has been a steady rise in the actual and nominal wage of employees. The actual wage has risen partly because machinery, efficiency and steady employment have increased production and partly because the decline of flunkeyism and the cessation of certain kinds of waste have prevented the drain on capital which reduced the quantity of available production.

The nominal wage has increased even more, and that specious change in the rate of pay has come from industrial exigencies and from the importunity of labor unions. Some unions have been actuated by the vain and foolish hope that wage increases could be conceded without causing an equivalent rise in the cost of living. Others, better weighing economic causes and effects, have been animated by the immoral expectation that by getting wage rises first the other wage earners who did not get an increase in wage would be obliged to pay tribute to those who did.

But the point to be made clear is that in, say, 500 or 600 years wages have multiplied, in part nominally and in part actually, 250 times, mostly during wars. What reason is there to believe that a doubling of wage during the present struggle is a tide which must have a regression. History shows that the wage increase during a war is inevitable, and that the readjustment after the war does not bring the scale back to its original level. History also records that the high wage does nobody any harm except the gold-mine corporations, the holders of bonds, the hoarders of money, insured and pensioned persons. With all due respect to these people, we wish to see everything move along regardless of them and their wishes. None of them would gain by such a restriction of business as would readjust the face values of wages and profits to their former level. Such a setting back in wage would involve a cataclysm of such magnitude that it would render their securities of little value.

The world can go on working with the higher wages as well as it did with the lower wages. If wages were again doubled, no great harm would be done to most of us, and there would be no appreciable benefit to any one but the borrowers of money and the payers of pensions and industrial compensation. Unfortunately, everybody assumes that the condition of high wages is so irretrievably bad that it must be corrected sooner or later—and why wait till later? The situation is not bad at all, only our reaction to it. Let us see the matter in the right way and there will be an end to the seriousness of the problem.

Conditions are favorable to more than normal prosperity. Before the war people were being fast educated to desire more commodities than ever before. Automobiles, plumbing fixtures, good homes, artistic house furnishings, traveling facilities—all were in unusually large demand before we entered the conflict.

Patriotic people, despite the growth of the desire for the good things of life, suddenly cut off the purchasing of all articles for which there was no great necessity. For some months, if not for some years, they endured hard conditions so that the war might be won. Their tastes have not been changed; their ambitions are not reduced; they are ready to buy again in large volume. Now that the war is over they are free to express their desires in purchases. Business is sure to be brisk, and being brisk, it will be profitable.

As for export business it must be good—for a while at least. Europe wants so much of what we can supply. For a few years Europe will be willing to borrow and we to lend, and so long as that condition lasts exports will be fair. Of that there is no doubt. Even if there is not much coal in what is sent to Europe, what matter? A man at Kokomo, Ind., is just as desirable a customer as one at St. Etienne, France. Why worry? This country is big, and its demands are large. Whether only a ton, ten million or one hundred million tons of coal a year go to Europe is no matter so long as our market here is good. And good it will be as soon as Uncle Sam quits looking at his plank, throws his head up and jauntily swings across the gully.

Great Britain says: "I can produce more than my people can consume. I must export my surplus." France puts the same into Parisian, with a shrug, and the Italian repeats the sentiment in his language with an appropriate gesture. We are all saying the same thing. We are all going to export a surplus. That surplus is the yellow dog that all must shoo from the door. There is no place for him unless it be an international dog pound, and the pound has not yet been established. For the most part we, in the United States, must look to our own people to take our staples. There is a good steady market abroad for our mechanical devices and our machinery, but some staples which have been home stayers in the past may have to be truly patriotic and stay in the U. S. A., and be at home to welcome other staples that Europe will send to pay for our manufactured articles, our copper and our loans. But there is an endless demand if the old gentleman will quit feeling about so tremulously with his cane. The bridge is strong. Reconstruction is not needed. All we need is resumption and, as we learned years ago, the way to resumption is to resume.

Opportunity for Export of American Coal

ENGLAND is short of coal. Her needs, so far as fuel is concerned, are as great now as at any period during the war. No reserve stocks of coal have been accumulated, and until these reserves have been built up for transport, domestic, industrial and public utility purposes, Britain must resort to rationing.

In the South Wales district coal production has decreased to an abnormal extent. Furthermore, the South Wales Miners Federation is making a determined effort to secure a six-hour work day. If the miners succeed in carrying the measure through, the annual coal output of the United Kingdom will as a result decline several millions of tons.

Italy is so urgently in need of coal that she is seeking to control its purchase and distribution so that fuel may be more plentiful and more equitably apportioned. For this reason, the Italian government desires a complete monopoly in the sale of coal within her own borders. France and Belgium, unable to procure enough coal from their ally, Great Britain, are looking to Germany for their necessary supply, and expect to set off its purchase price against the indemnities and compensations demanded of the German people.

All this is of particular significance to the American producer of bituminous coal. The soft-coal mines, owing to pressure of war demands during the war period, demonstrated their ability to produce millions of tons of coal above normal requirements. Having expanded their capacity to such an unprecedented extent, these mines must now either curtail production or find an outlet for the surplus tonnage. The former plan is a most unsatisfactory solution of the problem; the latter plan can be adopted if certain changes are brought about in American shipping conditions.

Right now is the psychological moment for the building up of a large South American export trade in United States coal. England, for some time to come, will be unable to take care of her European fuel obligations let alone look after her South American business. Given enough cheap bottoms to compete with vessels from South Wales and Australia, which have been supplying the bulk of South America's coal needs, there is no reason why the United States could not capture the Latin American markets.

To further the interests of coal operators who are desirous of entering foreign markets, *Coal Age* with this issue has inaugurated a new department to be headed "Foreign Markets and Export News." Under this head will appear items and information having a direct bearing on the subject of coal export, such as foreign market conditions, ocean shipping rates, opportunities in outside markets, coal-export statistics and so on. *Coal Age* would like to see this department grow and become of real value to the industry. To this end the coöperation of its readers is solicited. Correspondence is invited on the subject of coal exports, which promises to become one of ever-increasing importance to American coal producers.

Hunt a Culprit to Excuse Themselves

THE mine workers in Ohio are trying to blame the coal operators for the disastrous plague of influenza. An epidemic occurs and carries off a million or so of people, and the Ohio mine workers try to put the burden of the offense, as far as it concerns themselves, on insanitary housing and unhygienic conditions.

Most of the towns in the mining districts of Ohio are old. The greater part of them doubtless reflect the ideas of the close of the century just passed. They are probably none too sanitary. A commission of examination might conceivably do no harm. Typhoid and malaria are only too common in many mining towns, and it is quite likely that the Ohio coal towns have their share of the first, at least.

But influenza is spread solely by disregard of certain conventions, and so far as we know not at all by lack of sanitation, using that word in a broad community sense. The disease of influenza can best be kept from spreading by personal isolation. Every person should have his own washing and eating utensils. In fact the precautions that should be taken are almost innumerable. A careful man, who has learned to dread contact with other persons, will take them instinctively. A careless man will oppose them all—and will blame the landlord for the results.

It is said that a campaign for sanitation is proposed by the unions. Well and good, but let them remember that as Jerusalem was kept clean by every man sweeping his own doorstep, so will the mining towns be sanitary if every householder tries to abate his own nuisances.

Peace How The Miner Is The Good Friend Of His Fellow Workman Both In Peace And In War

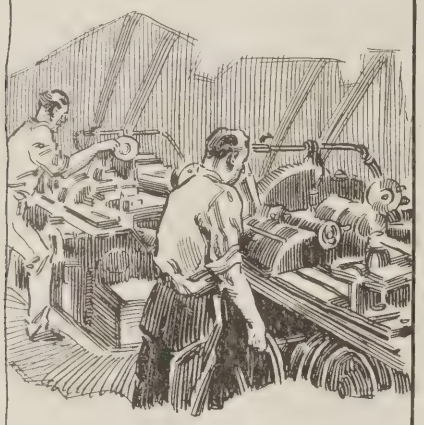


FURNISHES THE WORKMAN WITH FUEL FOR HIS STOVE

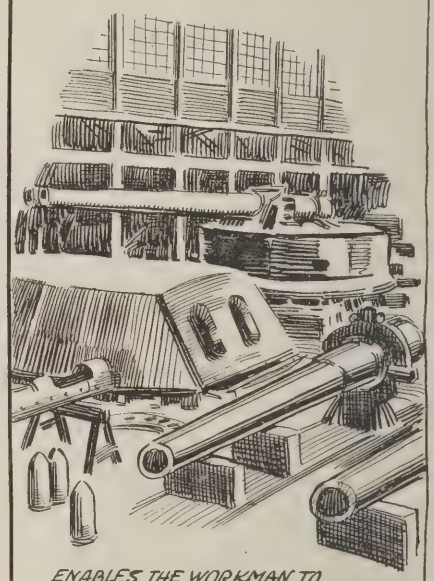


FUELS THE TRANSPORTS TO CARRY THE BOYS ACROSS THE SEA

FRIENDSHIP is not a mere sentiment. Patriotism is not a mere sentiment. It is based upon a principle, upon the principle that leads a man to give more than he demands. Similarly, friendship is based not merely upon affection, but upon common service. The man is not your friend who is not willing to serve you and you are not his friend unless you are willing to serve him. And out of that impulse of common interest and desire of common service arises that noble feeling which we consecrate as friendship.

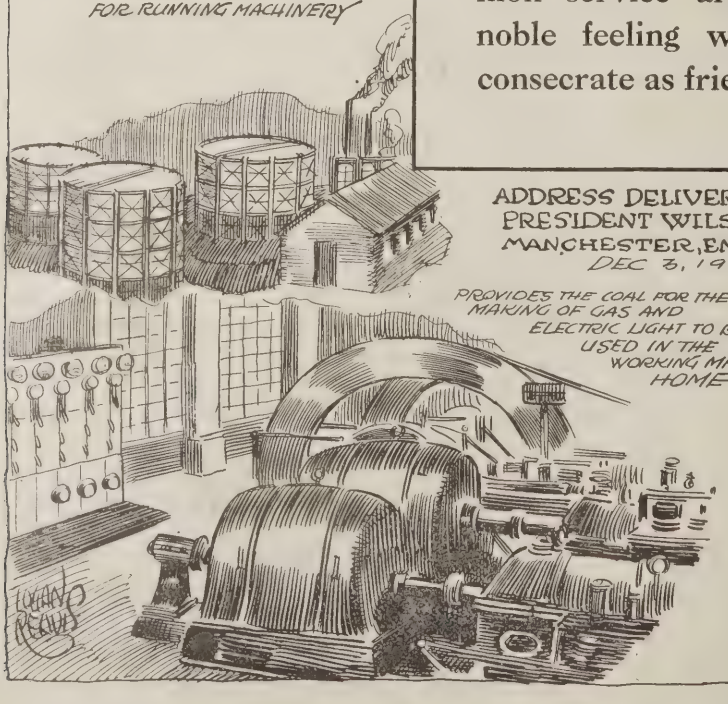


SUPPLIES POWER FOR RUNNING MACHINERY

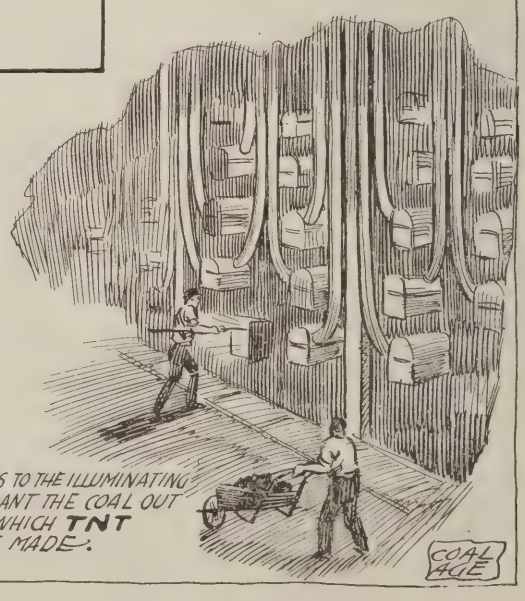


ENABLES THE WORKMAN TO MAKE SHELLS, TANKS AND GUNS FOR HIS DEFENSE.

ADDRESS DELIVERED BY PRESIDENT WILSON AT MANCHESTER, ENGLAND DEC 3, 1918



PROVIDES THE COAL FOR THE MAKING OF GAS AND ELECTRIC LIGHT TO BE USED IN THE WORKING MAN'S HOME



DELIVERS TO THE ILLUMINATING GAS PLANT THE COAL OUT OF WHICH TNT IS MADE.

COAL AGE

DISCUSSION BY READERS

Traffic with Germany

Letter No. 1—The editorial that appeared in *Coal Age*, Nov. 14, p. 910, entitled "Shall We Traffic with Germany?" was read with much thought and deep interest. The article draws attention to the fact that, in order to enable Germany to pay her great debt that she has incurred in the prosecution of the war, we must both accept of her labor and buy the products of that labor. This is the only sane way of looking the situation in the face. It is the only means open to the Germany of the future for liquidating her debt.

I am but expressing the views of the average American in stating that we longed to see the Huns driven back to Berlin, and to have had the conquering hosts of the allies occupy that country and set up a provisional government therein, until such time as they were satisfied that the German people were fit to govern themselves.

The Situation Regarding Germany, Defeated But Not Conquered

It must be admitted, however, that Germany is defeated but not conquered. In view of the atrocities she has committed and the laws she has violated, Germany is in no condition to be treated with, at present. There is, as yet, no government in that territory capable of negotiating peace. History for 200 years back furnishes no precedent to guide the peace commissioners in the work set before them. The task is stupendous. It should be done at once and done right, if there is to be formed a "League of Nations" that will insure a lasting peace.

But, to return to the question, "Shall we traffic with Germany?" Why not? Let me suggest that the position of Germany, today, is very much like the man whose wife has overdrawn his pay at the company store. The foreman of the mine knows that he must keep the man at work and make it possible for him to earn good wages so that he will be able to square himself at the store.

The Delinquent in the Mine, an Analogy

The situation presents one of the greatest impositions on a mine foreman who wants to deal fairly and justly with all his men. It is one that does violence to a foreman's ideas of justice and equity. While it is well for a management to assist its worthy men all they can, and there are always a number of these at every mine, it is an injustice to the other workers to keep one man in a good place where he can earn big money, and compel others to work in poorer places, because this one or that one is behind in his account with the company. A continuance of such a policy is sure to dissatisfy many good men who are thrifty and pay their accounts promptly. It is, indeed, far from dealing fairly and justly by men who want to do right.

The case I have cited presents a strong analogy to the position of Germany, following the war. She is in debt, with no available assets with which to pay. To boycott German goods and labor would take from her the only means that she has to free herself from indebtedness. At the same time, trade with Germany should not be allowed to impair our traffic with other countries. Goods and prices should be such as to insure equal justice to all.

American Ideals and Standards

Considered from an ethical standpoint, American standards and ideals would be lowered by adopting a policy that would not enable the German people to retrieve themselves and establish a higher and better form of government than the autocracy that has ruled them in the past. Let us not lower the estimate that our boys "over there" have created by the unselfish service they have given in the cause of democracy.

The attitude of Germany when our aircraft began to do damage over their border was that of a cringing cur. Forgetting the devastation created by her armies and airplanes, in Belgium, France and England, she at once set up a howl and threw up her hands when the war threatened her own country. The allies realized, however, that Germany, in her present condition, is a greater asset than a country devastated by war.

It was this consideration that led to the willingness of the allies to negotiate a peace and desist from the subjugation of the enemy. But, it will be necessary to establish a solid and stable government in that country, even if the boys have to march into Berlin to accomplish their purpose.

S. D. HAINLEY.

Osceola Mills, Penn.

Fighting Publicity with Publicity

Letter No. 1—Not long ago, there appeared in *Coal Age* a very timely editorial entitled "Fighting Publicity with Publicity" [Nov. 21, p. 953]. Attention was then drawn to the exaggerated accounts, wrong statements and misrepresentations that are often made in the public press, by men and women who denounce the coal industry boldly, over their own signatures, which leads the public to believe in the truth of what is said. The suggestion was made that it would be far better if men, in the industry, would announce themselves with the same boldness and not permit the public to be misled by their silence.

The following incident will serve to show the reason why many men, holding inferior positions in large companies, but who are eminently able to treat subjects of interest connected with their calling, hesitate to have their names appear in print. The reason for this is to be found in the attitude of the management, in most large concerns. It is owing to this that many valuable discussions in *Coal Age* are signed only by some ficti-

tious or pen-name. An instance of this came to my notice recently.

Some years ago, a particular friend of mine frequently wrote articles that were published in *Coal Age* over his own name. A little later, he received a gentle hint that the company would rather not have its employees discuss matters pertaining to the industry, for publication. That this attitude is quite general among the larger coal companies is obvious, from the fact that the names of the employees of those companies seldom appear attached to the articles they write. However, it must be equally obvious to an intelligent management that much good has resulted to the coal industry through the publication of many of these nom-de-plume letters. How much greater good would have resulted had the same letters appeared over the names of their writers?

Practical Advantage Gained in Publicity

The chief and, perhaps, the only objection a management would have to its men voicing their opinions publicly is that matters would occasionally appear that were not intended for publication. The danger of this is slight, however, where the policy of a company is well understood by its men who know, moreover, that such a procedure would endanger their position in the company. Since the episode just cited occurred, my friend's name has not appeared in print.

A practical application of the principle of *fighting publicity with publicity* is illustrated in the growing discontent of large classes of miners, growing out of the statements being continually made by agitators that the men are not receiving a fair wage, in proportion to the selling price of the coal they mine.

Were these statements permitted to go unchallenged, they would soon be accepted as true; whereas, superintendents and foremen, did they feel free to do so, would soon show the falsity of such a claim. It is these men whose familiarity with the situation would make their statements accepted and prevent the injustice otherwise done to the industry. JUSTICE.

Birmingham, Ala.

Perils in Reconstruction

Letter No. 1—I was deeply interested in reading the Foreword that appeared in *Coal Age*, Nov. 14, entitled "The War is Won, Now Let Us Win the Peace." The article furnishes the sober-minded person with plenty of food for reflection. It emphasizes the fact that one's patriotism and duties as a citizen, which have been so stimulated during the period of the war, must not cease now that peace is in sight.

As stated in the Foreword, "Peace has its problems not less acute than war." The coal-mining industry of this country is going to play a large part in the reconstruction of Europe, and the scenes that are now transpiring on the Continent suggest that the coming period of reconstruction will be fraught with all the perils of the French Revolution.

From present reports, it appears that Germany and Austria are passing through the same experiences that have torn Russia apart. Bolshevism is on a rampage that threatens to menace the civilization of all Europe, unless the Allies secure and maintain a firm hold on the irresponsible elements now asserting themselves.

In order to realize the objects for which we have fought and establish a democracy that is safe to live in, it will be necessary to arrest the acts of murder, pillage and destruction that are now rife in those countries; and, with infinite patience, bring about a readjustment of affairs that will permit some stable form of self-government.

The industrial life of this country must play an unselfish part in the task of redeeming civilization. The condition of Russia today proves that Bolshevism is a failure. For over a year, now, affairs in that devoted country have furnished another hideous example of what anarchy will do for a nation, and have recalled the scenes of the French Revolution, from which, at great cost, has arisen a noble republic. Bolshevism is synonymous to the lowest type of socialism.

The effect of this peril in our own country, in time to come, remains to be seen. One is loath to believe that this counterpart of socialism will ever find a fertile soil for its growth in America, notwithstanding the clamoring for so-called "justice and equity" that is heard from time to time. The freedom of the press, which is the pride of the American people, affords the socialist element the desired opportunity to give expression to their opinion that there is nothing reprehensible in the wholesale murder and depredations now being committed, in Russia, in the name of the Bolsheviki.

Make Every Foreigner an American Citizen

There are foreigners working in the mines, in this country, who may sympathize with their countrymen in what they believe to be a struggle against oppression. The foreigner's training has led him to regard as oppressors everybody except the working man himself, but many of those of average intelligence, who are naturalized citizens of the United States, have become enlightened, and no longer harbor these thoughts of oppression. Such have affiliated themselves with their new surroundings and are striving to build up an enduring democracy that regards all men as equal.

The foreigner who has thus assimilated himself and become an American citizen is not impressed with the sayings of socialism and the doctrines of the I. W. W. To him, these both mean anarchy and the ultimate destruction of all the principles of equitable government. In order to avoid the perils that confront us, it is our duty to encourage literacy and the naturalization of the foreigner, so that he will cultivate American ideals.

Thomas, W. Va. PATRIOT.

Expediting Locomotive Haulage

Letter No. 1—Recent letters of writers in *Coal Age* have mentioned the difficulty experienced by mine operators in getting motor-runners who will take the necessary care of the expensive machines they operate. Complaint has been made of much time lost at the motor-repair pits, and the frequency of replacing burned out armatures due to "plugging" the motor. Mention has been made of the cost of repairing strained storage batteries and other high maintenance costs occasioned by the careless way in which the average motorman handles his machine.

It occurred to me that it might be of interest to readers of *Coal Age* to hear of a plan that we have

tried, on a small scale, at one of our mines, where we instituted a system of paying the motormen and the snappers a per-diem wage, lower than the usual wage, for a certain minimum tonnage of coal hauled daily. In addition, these men were paid a bonus for the tonnage hauled in excess of this amount, which gave all a chance to make more than was possible on the former per-diem basis.

What was the result? Where the locomotive crews formerly made from $5 to $6 a day, under the new system they have averaged from $7 to $8 a day. In the same 8-hr. shift, however, they hauled 30 per cent. more coal, owing to the increased interest taken to make good money.

The men were not slow to learn that all time lost at the motor-repair pit meant a direct loss to them in the bonus earned. On this account, they were anxious to learn the best methods of taking care of their locomotives, in order to reduce the time required to keep the machine in repair. They realized that all such work was unproductive labor on their part. There was, noticeably, a rapid increase in the number of burned out armatures, sulphated batteries, which showed a decreased cost of production per ton of coal hauled.

A remarkable fact, in this same connection, was that the old complaint of loaders and miners that they could not get cars to load was unheard, now, as the crews kept every miner well supplied with cars. Each motorman saw to it that his snapper lost no time in throwing switches and that he used extra care in coupling and uncoupling cars, which has been frequently the cause of much delay and accident.

Enterprising Motorman Gains Advantage by Monopolizing the Roller-Bearing Cars

About a week after the new system was started, an interesting outcome developed. At that time, about one-half of the cars in the mine were equipped with plain bearings and the other half with roller bearings. It soon appeared that one enterprising motorman, knowing how much easier it was to haul cars with roller bearings, had stolen a march on his fellows and had adroitly cornered most of the roller-bearing cars in his section of the mine. This enabled him to handle a greater number of cars in a trip and resulted in a good increase in his bonus for the time. There was also less delay in loading those cars, in that section, because of the ease with which the roller-bearing cars are handled in the rooms.

It did not take long, however, for the other crews to size up the situation; and it became necessary to instruct the men on the tipple to distribute the roller-bearing cars equally among the crews. As quickly as possible, all the cars used in the mine were changed to roller bearings and the situation greatly improved.

The principle underlying this system is not new. It is based on the fact that men will take better care of their own property, or what is producing revenue to them, than they will of the property of their company. Also, repairs to machinery formerly meant, to them, time for loafing; but under the new system, it meant a lower paycheck.

It is my belief that a similar bonus system could be used to advantage, in paying motormen in many mines, while, no doubt, in some mines, a straight tonnage-payment basis would be better. In either case, there would be an inducement for each motorman to haul the largest possible tonnage in a day.

Washington, D. C. Maverette Ashley.

Centrifugal Mine Pumps

Letter No. 2—Speaking of centrifugal pumps, permit me to give my experience with the same. About 15 months ago we changed our mine pumps, replacing seven steam pumps with four centrifugal pumps driven by electricity. Of the discarded steam pumps, three had a capacity of 2000 gal. per min.; two, 600 gal. per min.; and the remaining two, each, 1000 gal. per min.

Each of the centrifugal pumps installed has an estimated capacity of 2200 gal. per min. On a recent test, these pumps handled 2240 gal. per min., at a speed of 1760 r.p.m. The pumps consumed a current of 28.5 amp., at 2200 volts. Three of the centrifugals have handled the water at all times, thus far, without trouble; although, last spring, the flow of water in the mine was as great as at any time in six years.

Discharge and Suction Pipes Larger Than Their Respective Openings in Casing

Referring to the statements of William H. Grady, in his letter, *Coal Age*, Jan. 9, p. 66, regarding the relative size of discharge and suction pipes in centrifugal pumps, and their respective openings in the pump casing, let me say that I regard it as an advantage to have the discharge and suction lines of a pump larger than their respective openings in the pump casing. At least, that is my experience.

Our centrifugal pumps have 8-in. openings in the casing, and these are connected with 14-in. discharge and suction lines. Both the discharge and suction pipes are lined with wood. There is a foot valve at the bottom of the column pipe, while the suction pipe has no valve, but is equipped with a water-jet primer.

Since the installation of the centrifugal pumps we have had no trouble at all, and practically no expense for maintenance or repairs. We are also operating a small centrifugal pump to drain a large swag or dip in the entry. This pump has a 3-in. opening connected with a 5-in. wood lined pipe, at both the suction and discharge ends. A foot valve is provided on the suction of this pump and a gate valve on the discharge line. The pump has given the most excellent results since its installation 18 months ago. David Fulton.

Greensburg, Penn.

Efficiency in Firebossing

Letter No. 4—Referring to the question of securing the greatest efficiency in the work of firebossing, brought out in the excellent letter of F. G. J., *Coal Age*, Dec. 19, p. 1133, permit me to say that it is my belief that the fireboss should be employed and controlled by the state, in order to attain the highest efficiency in respect to his work.

When one reflects that the fireboss must often work under an inefficient foreman, obey his orders and frequently do things that he knows do not comply with the requirements of the state law and, perhaps, will jeopardize the lives of those working in the mine, it is clear

that he is placed in an awkward position. His refusal to obey the orders of his foreman would result, sooner or later, in his discharge.

Under these conditions, a man with a large family must think twice before undertaking the responsibilities of this position. I know of firebosses who would do anything they are told, without regard to whether their acts are lawful or dangerous to the men working in the mine. While some fear the consequences of refusing to comply with an order they consider unsafe or unlawful, others are controlled by a desire to stand in with the boss. Neither of these give a thought in regard to their individual responsibility to the state. They are unprincipled and a disgrace to their more conscientious fellows who are guided by their own judgment. The average fireboss, in my opinion, is a man that can be trusted, in every respect, by his fellow workers whose lives are in his charge daily.

It has often occurred to me that if the firebosses and mine foremen, in this state, would come together at regular meetings and discuss ways and means of overcoming the difficulties of their work, they would not only better their capabilities but assist the management by which they are employed. In this way, also, they would come to be recognized by their companies and by the general public, as the men who are chiefly responsible for the safety and welfare of all employed in the mines.

It is true that the superintendents, mine foremen and firebosses of the larger coal companies hold monthly meetings in their several camps; but I can safely say that the majority of firebosses go to those meetings with the firm conviction that the only safe policy for them to pursue is to say nothing in regard to the one feature of their work that is most discouraging and 0armful; namely, the lack of freedom to use their own judgment in the performance of their duties.

Rains, Utah. FRED TURNER.

Efficiency in Mine Management

Letter No. 2—It was with keen appreciation that I read the article entitled "Need of Efficiency in Coal Mining," *Coal Age,* Nov. 28, p. 983. Methinks that the author of that article was a dyed-in-the-wool sufferer from the inefficiency he has so aptly described. Satire is crude, except when handled by an artist; but this writer has described with the touch of a master the reasons why some men never become more than the bosses of antiquated "holes in the ground."

The description in that article, of the lubrication of the grandfather type of mine-car wheels, familiarly known as "self-oiling" or "ring-oiling" car wheels, took me back several years, in memory. Once again I stood upon the tipple of a mine, a few miles from Birmingham, Ala. Before me was an oiler with his gun in hand, and every time a car came on the tipple he would shoot, shall I say, a quart of oil at each wheel. His aim was not that of a marksman, and a constant stream of oil was dripping through the tipple floor beneath which was a great mound of "blackstrap," as they called the oil, and dirt, mute evidence of the waste.

Again, my thoughts reverted to a visit I made, some months ago, to a mine in West Virginia, said to be an "uptodate mine," where 3000 self-oiling car wheels are purchased every year to replace the wheels worn out in the service of a few hundred cars. Conditions underground were the average conditions found in coal mines. The waste, in this case, was due to the use of the wrong kind of equipment. Judging from the appearance of the superintendent of that mine, no one could tell him anything. His father and his grandfather before him had worried along with the same kind of equipment and why should he use anything else?

I was in the mood for revery, and a third time my thoughts wandered to a visit made to one of the largest mines in southern Illinois. Here, a huge pile of scrapped equipment was mute evidence of the lack of definite knowledge of the demands to be made upon it in the operation of the mine. The man in charge was one of the "know-it-all" type, and the company had paid for his exalted opinion of himself, many times over in a year.

My thoughts still wandered and, in imagination, I pictured to myself the man who thinks that he cannot use brakes on his mine cars, because his conditions are different from those of the mine just across the field. He does not realize that all of the time he is ruining good wheels by the practice of spragging his cars instead of employing a suitable brake.

Conditions Described Are Universal

Someone may think I am citing exceptional cases. My answer is, Go into almost any section of the country and observe the same inefficiency wherever you go. There is told the story of a mine in western Pennsylvania that has a haul of several miles. As the story goes, all of the four wheels on the rear car are spragged so as to hold the trip stretched to its full length. Sparks flew from each of the spragged wheels, and it is easy to imagine the four wheels ruined in each trip made in that mine.

Let us suppose each wheel weighs 100 lb. At a cost of 4c. per lb., the value of four wheels is $16. And, while we are at it, let us say that 100 tons of coal is hauled per trip. Then each ton of coal is taxed 16c. to pay for the ruined wheels. Fortunately, this undue expense is compensated for by the good results of other mines operated by the same company; but that does not excuse the waste mentioned.

Managing a Mine Not an Office Job

Speaking of efficiency, there are a large number of mines that are conducted along the right lines, though I fear many of these fail to use the right system of accounting, particularly in respect to mine haulage. I have in mind, at present, a mine in southern Illinois. The mine is in charge of a thorough-going conscientious man who, though not the owner, is a stockholder in the company.

This man learned long ago that, to achieve the greatest success, his job is not an office job. He makes daily inspections of all the mine equipment, including locomotives, coal cutters, mine cars, etc. When he observes a plank giving way, he sends the car at once to the shop for repairs. He gives particular attention to the running gear and takes up all wear by thrust washers, besides seeing that the wheels are lubricated, not oiled, at stated periods. The track is always in good condition.

One feature that, to my mind, is the solution of the whole question of waste is that the superintendent just mentioned finds time to become acquainted with his drivers, loaders and machine runners. He knows their habits and practices, and the results he has achieved prove that a coal mine cannot be managed from a swivel chair.

In coal mining, there are more avenues for leaks than in most other industries. A manufacturer knows the cost of his raw material and the labor put upon it, which, added to his overhead charges, gives him a real basis of computation. In contrast to this, a coal mine is operating a property bought or leased, perhaps a decade or more ago. It is often the case that this and other capital charges are ignored; and, as long as the selling price of the coal mined is kept a little above the cost of its production, the mine is supposed to be making money.

Efficiency in management calls for accurate accounting and only those managers who have the best system, keep their cars in the best shape, their motors in good condition and buy the best equipment obtainable are making the most on their investments. OBSERVER.

Philadelphia, Penn.

Perplexities of Mine Foremen

Letter No. 7—A short time ago, I was reading the letter of "Mine Foreman," *Coal Age*, Oct. 24, p. 793, regarding a dispute between a miner and his foreman, in respect to some bottom coal that a machine runner had left in the miner's room.

It appears that the foreman offered to pay the miner for the extra work of cutting out the bottom coal; but the miner said he would have to first see the committeeman working in the next room before he could go ahead and cut out the coal. I failed to see how this matter should perplex the foreman. He should not worry because the miner was willing to lose a little time. A car of coal more or less would not seriously affect the day's output of the mine.

The Pit Committee of a coal mine controlled by the miners' union sometimes oversteps its authority, and a miner is always willing to listen to the committee when it decides in his favor. However, no one committeeman has any right to act alone or to tell a miner what he should be paid. Such action can only be taken by the committee as a whole, whose duty it is to take the matter up with the foreman and make an agreement with him that would seem to be right in the matter.

While the miners' union have accomplished a lot of good, there are instances where they have led miners to believe that the miner cannot secure a square deal from a foreman, unless he works through the union and depends upon their activities to secure to him his rights. So often has it happened that a Pit Committee has made trouble for a mine foreman, that coal operators have absolutely refused to recognize the union, in order to protect their foremen from trouble arising from that source.

A few years ago, when I was working in the Diamond shaft, at Springfield, Ill., the drivers had a habit of taking off a large block of coal from the corner of a loaded car, so as to make a seat for themselves on the car. In cleaning up this coal, it was credited to the company to offset the expense of gathering it up. The miners demanded an average weight for the coal to be credited to themselves, but their demand was refused by the superintendent.

By vote of the miners, for three days afterward, the men loaded their cars only "bedded," which amounted to a loss of 1500 tons. The difficulty was then settled by the superintendent agreeing to make an allowance of 4 tons of coal a day to 150 miners. But, what may surprise some, the affair did not seem to worry the foreman in the least, as he had often been called to face greater difficulties than that.

A Superintendent's Lack of Wisdom

Another instance I recall where a good foreman was busy "on top," ordering much needed supplies of props, rails and ties that were to be sent down at once into the mine. The superintendent appeared and ordered the foreman to get into the mine himself and get out the coal, or get off the job at once.

On that occasion the foreman replied, telling the superintendent to go down the mine himself and get out the coal, and then quit. Had he chose to do so, the law would have upheld the foreman in going down and ordering every man whose place was in need of material to get out of the mine, until the material could be furnished.

There are perplexities for which mine foremen are themselves to blame. One writer has referred to miners roaming about the mine "looking for the boss." That will seldom happen when the boss performs his duty by the men. Most mining states have a law requiring the foreman to visit every man's working place at least once a day, while the man is at work. When the foreman does this there will be no necessity for miners roaming about looking for the boss.

Foreman's Work Not Done When He Goes Home

The real perplexities of a mine foreman come when he goes home and is kept busy away into the night, thinking out his plans for the next day. After putting in 10 hours of hard work in the mine, he has his cost-sheet to make up and a list of supplies to be given to the outside foreman, telling what is needed in the mine. Other lists for the cager, rope rider, stable boss, timbermen and trackmen, must be made out, and, after a good smoke, the foreman goes tired to bed.

Think of a good practical foreman carrying these responsibilities for which he is paid $6 a day when the poor devils he must watch to see that they do not get killed load their 12 tons of coal, at 83c. a ton, which brings them practically $10 a day, and we are face to face with some of the few perplexities of foremen.

Organized as a Foremen's Protective League, under the Federation of Labor, it might be possible for mine foremen to secure consideration for themselves; but, until that can be done, my advice is, Stay on the job and run your mine in compliance with the law. Keep a keen eye on the old and abandoned workings; allow no accumulation of gas, and do your duty by the men in your charge. As President Wilson has said, "*Be willing, no matter what your personal fortunes may be, to play for the verdict of mankind.*" It is an immortal saying and worthy of our following.

Farr, Colo. ROBERT A. MARSHALL.

INQUIRIES OF GENERAL INTEREST

Correct Accounting

During the past two years, much attention has been given to the proper method to pursue in estimating the cost of producing a ton of coal. But, yet, there seems to be quite a variance of opinion as to whether such items as mine cars, steel rails and ties, copper wire and wire hangers should be entered in the equipment account or charged direct to the operating account as supplies. I have held the opinion that these and similar items should be charged to the stock account as equipment, and the operating account should be charged, each year, with an amount showing the depreciation, as all such items have a life of several years and are available as assets until they are no longer fit for use. The same question has, no doubt, puzzled many other operators and accountants, and I would like to have their opinions and know their practice. ACCOUNTANT.

Matewan, W. Va.

The proper accounting of mine supplies and equipment is truly an important matter. For lack of a proper charging of the numerous items that enter into the operation of a large coal mine, it has happened that the end of the year has more than once brought disappointment to the interested stockholder.

This correspondent is quite right in assuming that all supplies, machinery or other form of equipment that goes to form an integral part of the mine should be charged to the equipment account and a suitable amount for depreciation be entered each year as a charge to operating expense (profit and loss) and credited to equipment.

Wiring systems for telephoning, signaling or the transmission of power, ropes, piping, steel rails, steel ties or steel timbers are equipment, as they form part of the permanent fixtures necessary for the operation of the mine. They are chargeable to the equipment account, which should be credited with their depreciation. Repair supplies are chargeable to operating expense.

Lead Rail of a Mine Switch

Tracklayers, in coal mines, do not commonly have the training that enables them always to gain an intelligent idea of the meaning a textbook intends to convey. An instance of this is found in the description of a mine switch given in a leading mining textbook. I refer to Vol. 86 of the International Library of Technology, Sec. 48, p. 34.

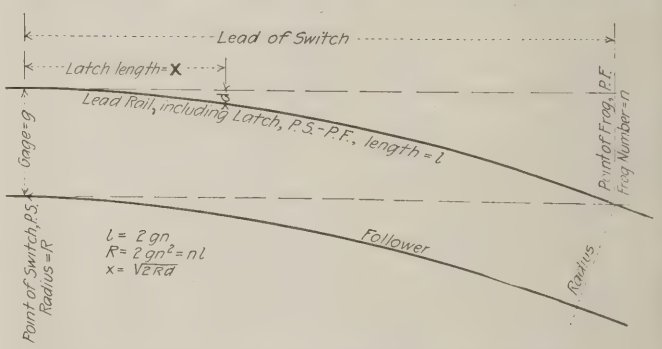
In naming the different parts of the switch, the text reads, "The lead of a switch, or frog distance, is the distance measured on the main line from the point of switch to the point of frog." This would seem to mean that the straight rail of a switch is the lead rail. However, on the same page, the very next paragraph reads, "The lead rail of an ordinary mine switch is the turnout rail, lying between the rails of the main track, which refers, apparently, to the curved rail, reaching from the point of switch to the point of frog.

The reading of these two references leaves the impression that the same term, "lead rail," is differently applied in different switches, one being described as an "ordinary switch," while the other is, perhaps, a special form of switch. Speaking of this text, I overheard a good tracklayer remark, recently, "my work is to lay the switch down, and the book should use names that I know what they are talking about."

My own impression and understanding is that the term "lead rail" refers to the curved rail extending from the point of switch to the point of frog, or what I would call the "transfer rail." In mine practice, however, I always avoid the use of the term *lead rail*, preferring to speak of the *curved rail* or the *straight rail* of the switch, which causes no confusion. Will *Coal Age* kindly explain the true meaning of "lead rail."

———, W. Va. INSPECTOR.

Had our correspondent read more carefully the text of the volume from which his quotations are taken, he would have noticed that the first sentence he quotes is



ILLUSTRATING THE COMMON MINE SWITCH

speaking of the *lead of the switch*, or what is commonly called the "frog distance," or the distance the frog is ahead of the switch, as measured on the straight rail. This has nothing to do with the "lead rail" of the switch, to which the second quotation refers and which is the curved rail reaching from the point of switch to the point of frog.

The length of the lead rail is always greater than the lead of the switch, which is measured on the straight rail of the main track, from the point of switch to the point of frog, as clearly indicated in the accompanying figure.

In every switch, there are two curved rails and, in the main track, two straight rails. For this reason, the terms "curved rail," and "straight rail" are indefinite. There is only one lead rail in a switch. The other curved rail is often called the "follower rail." To understand correctly, one must read the text closely, or there is bound to be confusion.

EXAMINATION QUESTIONS

British Columbia Examination, Third Class, Dec. 17, 1918

(Selected Questions)

Ques.—Describe the precautions necessary in general shotfiring and name some of the conditions under which you would refuse to fire a shot or shots.

Ans.—In blasting coal, the charge of powder should be free to perform its work in breaking down the coal. The hole should not be drilled too deep and the shot should be properly mined or sidecut, and any projecting tops or bottoms should be removed before the shot is fired. The charge of powder should be no more or less than is required to perform its work, and this should be pushed to the back of the hole and thoroughly tamped with clay or road dust.

It is very important that coal slack or other combustible material should not be used for tamping. In firing with fuse, extra care is needed when tamping the hole, to avoid injuring the fuse, which might result in a misfire. In firing with squibs, the match should not be broken off or soaked in oil, or otherwise treated to hasten its burning. Care must be taken in removing the needle from the hole so as to leave a free passage for the squib back to the powder. Before firing, all accumulations of fine coal and slack should be removed and the place tested for gas. In a dusty mine, it is necessary to sprinkle the place before a shot is fired in that place or one adjoining.

A shotfirer should refuse to fire any shot that, in his judgment, is unsafe, or that he has reason to believe contains an overcharge of powder or is improperly tamped. Also, no shots should be fired where there is an accumulation of gas or dust in the place.

Ques.—Name and describe the various gases found in coal mines, stating where they are found and how detected and giving their specific gravities.

Ans.—The names and specific gravities of the common mine gases are the following: Methane, or marsh gas (CH_4), specific gravity, 0.559; carbon dioxide (CO_2), 1.529; carbon monoxide (CO), 0.967; hydrogen sulphide, or sulphureted hydrogen (H_2S), 1.192. Olefiant gas (C_2H_4), 0.978, is associated with methane in mines. The nitrogen of the air, specific gravity, 0.9713, is frequently the chief constituent of the blackdamp found in mines.

Methane is found where generated at the face or accumulated in pockets of the roof or at the face of rise workings and is detected by observing the cap formed on the flame of a safety lamp when this gas is present.

Carbon dioxide is mostly found in poorly ventilated or abandoned or other void places in the mine, or where it has accumulated in swags or at the face of dip workings in the mine.

Carbon monoxide is to be found in the products of slow combustion or gob fires existing in poorly ventilated places. It also is a constituent of afterdamp resulting from an explosion of gas or dust in a limited supply of air. Carbon dioxide is detected by observing its effect of dimming or extinguishing a lamp. Its presence is also made known by producing headache or nausea. Carbon monoxide can only be safely detected by observing its effect on small animals, as birds, or mice confined in a cage and exposed to the mine air where this gas is suspected.

Hydrogen sulphide is a dangerous gas which, though less common in mines, may be found in low damp workings where sulphur, in the form of pyrites, is present in the coal or adjoining strata. The gas is detected by its smell, which resembles that of rotten eggs.

Ques.—What are the principles involved in the safety lamp and what are the requirements for a good lamp for general use?

Ans.—The principle of the safety lamp is the isolation of the flame from the outside atmosphere, by means of a wire gauze chimney, all openings being protected with the same wire gauze. As long as the gauze remains cool, the gas-charged air passes through its mesh, and the gas is burned within the lamp. The flame of the burning gas is prevented from passing out of the lamp, by the cool metal. In passing out through the mesh, the gas is divided into streamlets and its temperature reduced below the point of ignition, which causes the extinction of the flame.

The requirements of a good lamp for general use are the following: The lamp must give a good light projected upward for inspection of the roof and downward on the floor. Its construction must be simple and consist of few parts that are easily and correctly assembled. The lamp must be strong for service and rough usage and not be too sensitive to gas so as to cause flaming in the lamp when little gas is present. It must be light and portable. A working lamp must be provided with a form of lock or fastening that will reveal any attempt to tamper with the same.

Ques.—At the commencement of your shift as a fireboss, you find the barometer unusually low and the water gage unusually high. What conditions in the mine are thus indicated, and how would you proceed under these conditions?

Ans.—The unusually low barometer points to a possible outflow of gas into the mine workings from abandoned areas and other void places in the mine and suggests a careful inspection of all the working places, wherever gas may be expected to accumulate, particularly the rise workings.

The unusually high water gage, assuming the speed of the fan is normal, would indicate some unusual obstruction in the air-courses, which hinders the flow of air and increases the resistance of the mine. Under these conditions, the fireboss must use extra precaution to discover the cause and take steps for the immediate removal of any obstruction or other cause he may find.

FOREIGN MARKETS AND EXPORT NEWS

Azores Islands Offers Chance for American Coal

The districts of St. Michael's and Fayal (Azores) showed a notable gain in imports during the year 1917 over those of 1916, in consequence of the increase of coal shipments to the ports of Ponta Delgada and Horta. The imports of coal at Ponta Delgada in 1917 amounted to 3,032,253 escudos (normal exchange value of the escudo is $1.0805), compared with 854,549 escudos in 1916; at Horta, 1,104,512 escudos in 1917, against 401,712 escudos in 1916; and at Angra, 10,638 escudos in 1916, but none in 1917. There was consequently a gain of 2,869,866 escudos in coal imports in 1917 over 1916. Practically all the coal was used for bunkers in supplying the demands of the largest number of ships that ever visited these island ports in a single year. The Azores, which are owned by Portugal, exports among other commodities alcohol, beans, pineapples, tobacco, sugar, tea, wine and mineral waters. Increased banking facilities have been offered to merchants to do business in American markets. If satisfactory shipping facilities are established, there ought to be a marked increase in commerce between the United States and the Azores. Though the market is small, there is no reason why American coal should not find a ready sale in the Azores, as it is a port of call for ships sailing to the Mediterranean.

Coal Scarcity in Greece

During the recent war the importance of an adequate supply of coal to Greece from outside sources was strikingly brought out on several occasions. It seems, from U. S. Consular reports, that there are lignite beds of good quality in the southern Peloponnesus. Permits for lignite mining have been granted by the Greek Government to various companies, but up to the present time mining operations are understood to have been conducted at a loss. This state of affairs seems to be due to lack of proper machinery and information as to the best methods of production, transportation, and so on; the cost of lignite became so high in the markets as to discourage its use, while a lower figure for the product would have involved the mine owners in even more serious loss. For these reasons all the mines except that at the city of Kardamyli have stopped operations, and this plant has an insignificant output. There is great demand for fuel by the railroads and other industries of Greece which at present consume quantities of wood either alone or with lignite. The Consular reports emphasize the demand for fuel and note the favorable opportunity for capital to invest in lignite mining. However, due emphasis is laid on the necessity of approaching the problems of mining, preparation and transportation on up-to-date lines in order to reduce the cost of lignite to a minimum.

Canada's Coal Supply

The coal consumption in Canada for the calendar year 1917 amounted to 5,319,688 net tons of anthracite and 29,497,375 net tons of bituminous—a total of 34,817,063 net tons. The anthracite coal is practically all utilized for domestic purposes. Only one mine in Canada produces a near-anthracite coal, and the tonnage from that seldom exceeds 150,000 tons per year. It is apparent, therefore, that Canada depends upon the United States almost entirely for anthracite coal.

The bituminous coal is used largely for industrial purposes. Out of the 29,497,375 tons of total consumption Nova Scotia produces 6,324,684 tons; New Brunswick 188,660 tons; Saskatchewan 355,304 tons; Alberta 4,723,139 tons; British Columbia 2,418,920 tons. This makes a total of 14,010,707 net tons, which leaves Canada indebted to the United States for the balance (after deducting 1,733,156 tons of coal exported from Canadian coal mines) of 17,219,824 tons of bituminous coal, or a total importation of 22,539,512 tons of the annual coal consumption of 34,817,063 net tons.

In an effort to relieve the fuel shortage Great Britain is releasing former workers in the coal mines of the Kingdom at a rate approaching 5000 a day. The coal shortage affects not only England's industrial reconstruction and the comfort of her householders, but that of several European states which have always looked to England for coal. Unlike conditions in the United States, which is rationed closer on anthracite than on soft coal, in London and elsewhere one may have two tons of anthracite in place of one of soft coal.

Market in South America for United States Coal

If the coal operators of the United States can compete with the British facilities in shipping by securing cheap bottoms, there is no reason why this country cannot obtain the coal trade of South America. Most of the coal used in South America comes from Cardiff, Wales, and points in Australia. There is a big demand for coal in Buenos Aires, Argentina, and in Montevideo, Uruguay, for bituminous coal for domestic and industrial purposes. A better effort will have to be made by American coal operators in the manner in which they handle their coal for shipment, as the cargoes from America in the past appear to be pulverized by the time they reach their destination.

Peru imports all of its coal for railroad purposes, and also for gas plants and other industries. Argentina consumes much coal on its extensive railroad system, as does Central Brazil.

Coal destined to points north of Valparaiso, Chile, is generally shipped through the Panama Canal, but for shipments south of that point it pays to ship around the Straits of Magellan, unless time is a consideration.

Coal Shortage in Germany

The coal situation in Germany appears to be causing some alarm. Owing to sickness among mine laborers and the sudden departure of the many prisoners who were working in the mines, the production in all districts has fallen far below normal. One report recently received from Essen is to the effect that the output of the mines in that vicinity is only about half the normal figure. A report from the same district, in the Norddeutsche Allgemeine Zeitung of Nov. 25, states that about 20,000 prisoners and other foreigners employed in the mines there have left since the signing of the armistice; and there has not yet been time to fill their places with demobilized troops. To a certain extent railway traffic also is disorganized. These conditions have caused such an acute shortage of coal in Berlin, for instance, that special measures are being taken to keep the consumption as low as possible.

Exports of Anthracite and Bituminous Coal and Coke, by Customs Districts and Countries—November, 1918

(Compiled by Bureau of Foreign and Domestic Commerce)

From Customs District	To	Anthracite, Tons	Bituminous, Tons	Coke, Tons
Maine and New Hampshire	Canada	1,770	1	.....
Vermont	Canada	1,614	3,107	206
Massachusetts	Newfoundland	31	....	.....
Massachusetts	Canada	....	2	.....
St. Lawrence	Canada	92,308	207,685	3,617
Rochester	Canada	46,434	80,584	655
Buffalo	Canada	264,122	280,079	47,966
New York	Canada	8,542	192	.....
New York	Guatemala	....	....	3
New York	Panama	....	....	295
New York	Newfoundland	515	....	.....
New York	Barbados	25	....	.....
New York	Jamaica	....	....	2
New York	Cuba	....	....	26
New York	Haiti	....	1	.....
New York	Santo Domingo	100	28	3
New York	Argentina	....	....	125
New York	Brazil	....	....	4
New York	Chile	....	....	33
New York	Venezuela	....	....	3
Philadelphia	Canada	100	....	.....
Philadelphia	Uruguay	100	1,642	.....
Maryland	Mexico	....	2	.....
Maryland	Cuba	....	3,097	.....
Maryland	Argentina	....	....	1,639
Maryland	Chile	....	....	12,006
Maryland	Colombia	....	905	.....
Maryland	Peru	....	....	3,000
Maryland	Uruguay	....	4,442	.....
Virginia	Bermuda	....	2,030	.....
Virginia	Panama	....	3,188	.....
Virginia	Barbados	....	9,394	.....
Virginia	British West Indies	....	4,622	.....
Virginia	Cuba	....	90,870	1,803
Virginia	Virgin Islands	....	2,989	.....
Virginia	French West Indies	....	2,247	.....
Virginia	Dominican Republic	....	1,747	.....
Virginia	Argentina	....	1,168	.....
Virginia	Brazil	....	55,623	.....
Virginia	Chile	....	22,143	68
Virginia	Uruguay	....	4,237	.....
South Carolina	Brazil	....	3,624	.....
Georgia	Cuba	....	1,059	.....
Florida	Cuba	....	3,453	.....
Mobile	Cuba	....	200	.....
New Orleans	Guatemala	....	....	2
New Orleans	Honduras	....	170	5
New Orleans	Nicaragua	....	217	.....
New Orleans	Cuba	....	1,000	.....
San Antonio	Mexico	821	514	8,015
El Paso	Mexico	248	5,896	5,813
Arizona	Mexico	192	3,056	14,391
So. California	Mexico	1	7	.....
San Francisco	Salvador	....	4	12
Washington	Canada	104	140	98
Washington	Chile	....	3,192	.....
Dakota	Canada	77	1,366	42
Duluth and Superior	Canada	....	1,471	154
Michigan	Canada	6,008	147,112	25,940
Ohio	Canada	7,357	662,408	20,721
Totals		430,369	1,616,914	146,647

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
1-13-19	Jap. S.S. Seiyo Maru	San Francisco	6,648	.....
1-13-19	Am. Sc. Maria	San Juan, P. R.	502	.....
1-13-19	Am. Sc. Kenwood	Para, Brazil	1,312	.....
1-13-19	Nor. S.S. Christian Bors	Rio de Janeiro	5,355	1,377
1-14-19	Nor. S.S. Nepos	St. Lucia, B. W. I.	3,994	442
1-16-19	Br. S.S. Breynton	St. Vincent, C. V. I.	5,894	504
1-16-19	Am. Sc. Salem	Para, Brazil	1,208	.....
1-16-19	Ital. Bk. Wallacetown	Puerto Ferrajo, Italy	2,194	.....
1-16-19	Jap. S.S. Ide Maru	San Francisco, Cal.	4,940	922
1-16-19	Am. S.S. Polar Star	Santa Anna, Brazil	4,165	316
1-18-19	Lake Gradan	Barbados, B. W. I.	3,400	350
1-18-19	Oaklands Grange	Montevideo, Uruguay	6,308	1,291
1-18-19	Nor. S.S. Belita	Havana, Cuba.....Coke	497	267
Sewalls Point				
1-14-19	Am. S.S. Crawl Keys	Havana, Cuba	2,721	220
1-14-19	Am. S.S. Shawmut	Havana, Cuba	1,651	283
1-17-19	Lake Gratis	Havana, Cuba	3,349	286
1-18-19	Eurymachus	Montevideo, Uruguay	5,158	1,884
		NEWPORT NEWS		
1-11-19	Am. S.S. Lake Fondulac	Cienfuegos, Cuba	3,041	365
1-14-19	Am. S.S. Pollux	Havana, Cuba	3,331	543
1-14-19	Am. Sc. Mount Ranier	Santos, Brazil	2,960	.....
1-15-19	Am. S.S. Crathorne	Antilla, Cuba	2,581	371
1-15-19	Br. S.S. Teenkai	Montevideo, Uruguay	4,000	2,082
1-16-19	Am. S.S. Zuiderijk	Callao, Peru	5,992	549
1-16-19	Du. S.S. Andijk	Rotterdam, Holland	7,566	1,496
1-17-19	Br. S.S. Clan Macbrayne	Buenos Aires, A. R.	5,643	1,228
1-18-19	Am. Sc. Alla G. Turner	San Juan, P. R.	750	.....
1-18-19	Am. Sc. Pusey Jones No. 4	Puerto Plata, S. D.	488	.....
1-18-19	Am. S.S. Dorothy	Havana, Cuba	2,930	271
1-18-19	Am. S.S. Flirt	Humacao, P. R.	1,637	350

American Shipping Rates Cut

The U. S. Shipping Board on Jan. 27 announced a reduction in transatlantic freight rates to meet a cut made by the British Government. To Marseilles, Cette, Genoa and Naples the new rate is $1.60 per 100 lb., or 85c. per cu.ft. against the old rate of $75 per ton, rates based on weight or measurement at ship's option. The new rate to the United Kingdom is $1 per 100 lb. or 50c. a cu.ft., against the old rate of $66 a ton. The rate to Havre, Bordeaux, Antwerp and Rotterdam is $1.25 per 100 lb., or 65c. per cu.ft., against the old charge of $65 a ton.

Consular Invoices

The War Trade Board announces that the regulations contained in W. T. B. R. 409, issued Dec. 18, 1918, have been amended and that consuls have been instructed to certify invoices covering all unrestricted commodities without requiring evidence of the issuance of an import license and of the number thereof. In announcing this simplified procedure, the War Trade Board desires to impress upon importers that, for their own protection and to avoid the possibility that shipments may be made for whose importation license may be refused by reason of noncompliance with enemy trade regulations or for other reasons, they should secure import licenses before shipments are made.

COAL AND COKE NEWS

Harrisburg, Penn.

Particular attention was given by the United States subcommittee on manufactures, which is investigating the high price of anthracite coal and the alleged shortage of domestic sizes, to royalties paid by producing companies and to the cost of production.

Estimates by witnesses as to the cost of production ranged from $3.50 to $4.64 a ton, while the amount of royalties paid was said to be from 40c. to $1.30 a ton. It was testified that royalties, especially those paid to the Stephen Girard estate of Philadelphia, had steadily increased in the last five years.

A. C. Dodson, head of the Dodson Coal Co., testified that the royalties constituted about 23 per cent. of the selling price. On an investment of $2,000,000, he said his company had paid the Girard estate, since 1914, royalties of $1,873,000 on coal from 390 acres. He said the Girard estate was the barometer in determining royalties and that other owners, before leasing virgin coal lands or before making a new scale of royalties, invariably gaged their prices on what was charged by the Girard estate.

"Every time wages are increased or any other factor aids in boosting the price of coal, the Girard estate collects on it," commented Senator Jones.

Mr. Dodson estimated roughly the cost of producing a ton of coal at $3.50, while the estimate of Charles Dorrance, operating head of the Hudson Coal Co., was $4.64. A. B. Jessup, general manager of the G. B. Markle Co., told the committee the average cost at his mines in the Hazleton region was $3.80 a ton with a reduction of 30c. paid in royalties. Of this cost, he said, 30 per cent. represented the labor charge.

Mr. Jessup said the rate of royalties was regulated the same as for any other commodity, by the highest price the coal land owner could get for the lease on his lands.

T. Ellsworth Davies, a Scranton coal mine expert, estimated that there are about 23,000,000,000 tons of unmined anthracite in the Schuylkill County fields. At the present rate of mining, he testified, this coal will not be exhausted for 900 years.

Uniontown, Penn.

The Regional Fuel Administration, the agency which directed the mobilization and regulation of the Connellsville coke region for the part it played in the war, will be discontinued on Feb. 1 when price restrictions and the zone system of distribution are removed. With the closing of the regional fuel office the industry is returned to a normal basis, and operators and producers generally are prepared for the occasion.

Since May, 1918, when statistical reports of production were first compiled, the output of the Connellsville region has totaled 11,660,368 tons of coke and 6,812,027 tons of coal, or an aggregate production of 24,302,579 tons. Removal of fixed prices is expected to create a steady market, and operators are planning a curtailed production for a few weeks until conditions become more settled in order that an oversupply will not be secured to beat down the market.

Production of coal and coke in the Connellsville region for the week ending Jan. 17 reached its highest figure since the ending of the war. Figures issued at the office of the Regional Fuel Administration show an aggregate output of 631,099 tons, an increase of 64,561 tons over that of the preceding week. Coke was 290,465 tons, an increase of 19,550 tons, and coal shipments were 195,391 tons, a gain of 24,976.

During the present period of uncertainty repairs will be made to ovens and plants in preparation for the spring rush. Coal has been "off color" in the market since the first of the year; but the removal of prices finds the demand for coke active, although some "spot" was sold this week for $5.25.

Charleston, W. Va.

The removal of zone restrictions and the freedom from tidewater embargoes is conducive to operations on a larger scale in the New River district. Vessel space appears to be more plentiful, and consequently congestion at tidewater points has been relieved. A large tonnage of New River coal is now being absorbed by the Navy. With the Western markets now open to them, New River mines will begin within a week or so to ship coal to the West, zone restrictions having prevented that heretofore. In view of the fact that miners and operators are getting ready for the wage conferences for the coming year, labor conditions are somewhat unsettled.

"No market," and a labor and car shortage, was responsible for a decrease in production in the New River and Pocahontas district. The total production was 335,931 tons, this being a gain of about 35,000 tons over the previous report. Even though the market for Pocahontas coal has been somewhat limited, partly attributed to zone regulations, prices have been maintained and it has been found difficult to secure enough men to man some of the larger operations.

Impetus will be given operations and consequently production, to some extent at least, in the Kanawha district following the removal of the ban on shipments into certain zones, and more coal will move westward in the future. The full effect of the Fuel Administration's latest order will not be felt, however, for a time, owing to the fact that there is plenty of coal on hand in the West; but there will undoubtedly be, in the opinion of Kanawha operators, some stimulation of trade in the Kanawha region. Production during the week ending Jan. 18 reached 107,785 tons.

It continues to be a peculiarity of conditions in the Fairmont region that although there is no longer any imperative demand for coal, yet transportation facilities have been better in the region than at any time in the last twelve months. There was furnished to the mines of the district during the weekly period ending Jan. 18 with clock-like regularity, not less than 2300 cars on any one day, more than the mines of the district succeeded in loading. There was, during the same period, a healthy demand for the product of the Fairmont district, the bulk of the coal mined being shipped eastward. Prices are being maintained even with a somewhat diminished demand.

Once again loss of production is larger than actual production in the Logan mining district, as the production report for the week ending Jan. 18 shows. The total output only reached 149,829 tons, while the production loss was 172,384. By far the largest part of the loss was due to no market, such a loss amounting to 139,776 tons, other losses outside of that from car shortage being comparatively small.

New York, N. Y.

Wilbur A. Marshall was elected president of the Wholesale Coal Trade Association of New York by the Board of Directors of the organization on Jan. 21. Mr. Marshall succeeds George M. Dexter, of Carpenter & Dexter, who declined reëlection.

At the annual meeting of the association, which was held in the Whitehall Club, reports read by Charles S. Allen, the secretary, and by C. C. Harris, the treasurer, showed the organization to be in a flourishing condition.

Addresses were made by E. A. de Lima, president of the Battery Park National

Bank, who spoke on trade acceptances from a banker's standpoint; by George H. Cushing, managing director of the American Wholesale Association; and by Major W. R. Coyle, a member of the Board of Directors of the Association, who had just returned from France where he served with Uncle Sam's forces.

The election of directors resulted in the following being chosen: W. S. Alden, W. R. Coyle, George M. Dexter, E. Kelly Downey, C. C. Harris, J. M. Leonard, W. A. Marshall, Howard C. Matlack, Charles A. Owen, Gardener Pattison and LeBaron S. Willard.

Besides M. Marshall, as president, the Board of Directors elected the following officers: Vice President, Charles A. Owen, to fill the vacancy caused by the resignation of Mr. Willard; treasurer, C. C. Harris. Mr. Allen will continue as secretary.

Mr. Marshall, the newly elected president, is a well known member of the coal trade. He is president of W. A. Marshall & Co., the Lincoln Coal Co. and the Wolf Den Coal Co.

It is understood that the change in assessing demurrage charges as recommended by the Bituminous Operators' Committee of the Association ["Coal Age," Vol. 15, No. 4, page 186] will be put into effect on Feb. 1, and that the Tidewater Coal Exchange will take up the matter of coal classification schedules at its meeting on Jan. 31.

PENNSYLVANIA

Anthracite

Williamstown—The dead body of Charles Barry, fireboss at the Susquehanna Coal Co.'s colliery, who was buried in a rush of coal, was found several days later by rescuing parties that had been working since the time of the accident. Charles J. Price, state mine inspector, of Lykens, was badly bruised in a fall while aiding in the search.

Mauch Chunk—The Anthracite Forest Fire Protective Association, which is composed mainly of coal corporations and large woodland owners, both private and corporate, is undertaking to protect 70,383 acres of forest land from destruction by forest fires. This land is almost entirely located in Carbon, Schuylkill and Luzerne Counties.

Summit Hill—Many old-time and practical miners are predicting that the present method of digging coal underground will soon be superseded altogether by stripping. The Lehigh Coal and Navigation Co. is at present placing another large steam shovel at a point about 500 ft. up the mountain here, where a large stripping operation will be started.

Wilkes-Barre—The Lehigh Valley, Traders', Central, Wilkes-Barre and Hudson companies have been indicted on the first indictment of its kind for damage to surface property and must stand jury trial for injury wrought by mine caves in Plains township. The action against the companies was brought by the Township commissioners after several streets had been damaged by caves.

Shenandoah—The cage in the Hammond Colliery shaft jumped the guides on the morning of Jan. 21, tore and crushed the shaft timbers out of place for many yards and hurled the large timbers to the bottom. Considerable damage was caused and the colliery was forced to suspend, throwing 1200 men and boys idle. Only the fact that coal was being hoisted at the time the accident occurred accounts for no loss of lives.

Wilkes-Barre—The Lehigh & Wilkes-Barre Coal Co. has given notice that every man who left the service of the company to take up arms for the country will be given his old position. C. F. Huber, the president and general manager, announced that returning soldiers and sailors have only to inform the mine foremen under whom they worked of their desire to return. There are 24,000 jobs open for mine workers in the anthracite fields. Ten hundred and seventeen men formerly employed in the anthracite region are scheduled for early release from military camps.

Hazleton—J. S. Wentz & Co. are arranging preliminary plans in connection with the large tract of coal properties recently acquired at Raven Run. It is understood that the present operating company holds a lease for about another year, but the Wentz company will perfect its plans to take over the tract as soon as available. In connection with the proposed work, a new breaker will be erected, with other structures, the mines to be electrically operated throughout. It is also understood that the company is considering the development of a new townsite at the operation

Glen Lyon—Thomas M. Cooper and Morgan Thomas received burns in an explosion of gas in No. 2 shaft of the Alden Coal Co., on Jan. 18, which resulted in their deaths at the Nanticoke State Hospital.

Pottsville—For the first time since the beginning of the world war, coal is now accumulating in the anthracite region. The Philadelphia & Reading Coal and Iron Co. has begun filling up the bins in the big storage yards at Landingville, and three of the big "pockets" which extend down the moutain side are already filled with coal. The only coal being stored, however, is of the steam sizes, and if this coal continues to accumulate a number of coal washeries will be closed down, as they produce steam sizes of coal almost exclusively.

Carbondale—Under the terms of a settlement reached by counsel at the opening of court Thomas Calacuis, who was injured while at work in a Hudson Coal Co. colliery, is to receive $2800 damages from the company, while his father is to get $450. Attorneys representing the boy contended that he was under fourteen years of age at the time of the accident, and that he should not have been employed.

North Scranton—Recently the New York courts awarded the heirs of the Rockwell and Gilbert families, owners of coal underlying a considerable portion of the city, back royalties in the sum of $429,000, the heirs having charged that the Delaware & Hudson Co. had failed to pay for small sizes mined. At the time the suit was instituted the plaintiffs asked for forfeiture of the lease, and also won on this point. Although the Delaware & Hudson promptly appealed from the decision, it has since opened negotiations with the Rockwell and Gilbert heirs for a settlement of the case. It is understood that the company would like to either renew the lease or execute a new one, and others, notably the Scranton Coal Co., it is reported, would like to secure the lease. The tract of land being mined comprises 325 acres and is said to be rich in coal, being mined through the Leggitt's Creek shaft.

Mount Carmel—Plans for the electrification of all the anthracite mining operations owned by the Susquehanna Collieries Co. in the Mount Carmel-Shamokin coal fields, the power to be generated at one central plant, are about completed and the work of construction will begin shortly. The big plant, which will cost several millions of dollars, will be located at Green Ridge, near the Pennsylvania colliery, engineers having recently laid out the site of the building. The ground is already cleared. From the power plant high tension wires will be strung to the Richards, Pennsylvania, Scott, Hickory Ridge, Hickory Swamp, Luke Fidler and Cameron collieries. At all these operations electrically driven machinery will supplant that now used in the operation of slopes, shafts, planes and breaker machinery, and the steam plants now in operation will be done away with.

Larksville—No. 5 breaker of the Delaware & Hudson Coal Co. was totally destroyed by fire on Jan. 21 and 2500 men and boys are temporarily idle. The monetary loss is difficult to estimate, but company officials are of the opinion that the breaker can be replaced in about six months at an expenditure of $500,000. The work of rebuilding will begin immediately, according to instructions received from heads of the company in New York. The destruction of the breaker, which handled the daily output of 4000 tons of coal from five west side mines, has necessitated the shipment of this huge amount of coal to the Baltimore colliery at Wilkes-Barre, and Coal Brook and Powderly breakers near Carbondale, which work, it is believed, will be started within ten days. The fire originated in the preparing room about 7:45 a.m., and was caused by sparks from an overheated motor igniting the woodwork.

Wilkes-Barre—"We are beginning to read the handwriting on the wall and are investigating possibilities and probabilities," said F. M. Chase, general manager of the Lehigh Valley Coal Co., recently, when asked if the Lehigh Valley is considering shutting down some of its collieries, because of the slackness in the demand for anthracite. It is reported that at a recent meeting of company executives the question of shutting down several collieries in each district where the production cost is highest was discussed, with a view to adopting this expedient if the market should become so dull as to warrant it.

Bituminous

Johnstown—Thomas Currie, of Nanty-Glo has purchased for $50,000 the Finesome coal mine at Confluence, Somerset County, the deal including tipple, buildings and a lease on 200 acres of mineral. The property was formerly a part of the holdings of Cosgrove & Co., of Johnstown.

Uniontown—The four miners entombed on Jan. 20, in the Mt. Braddock mine of the W. J. Rainey Coal Co., are alive. On Jan. 22 they were rescued by teams from the H. C. Frick Coke Co. and the Central Connellsville Coke Co., led by State Mine Inspectors Richard Maize, E. E. Girod and William Langan, who had been in the mine day and night to reach them. The miners killed on Jan. 20 died from asphyxiation in an attempt to release the entombed men, who had been cogging in the affected section of the mine. About 4 a.m. on Monday, Jan. 20, a large rock and refuse bank which was afire dropped into the mine, due to a cave-in, and set fire to a portion of the workings.

WEST VIRGINIA

Glen White—Construction work will be begun on a large tipple for the E. E. White Coal Co. within the next few months, engineers having virtually completed surveys and other preliminary work in connection with the erection of the structure, which will be most completely equipped.

Bluefield—Fire completely destroyed the Norfolk & Ungle tipple of the Pocahontas Fuel Co. at Switchback on Friday, Jan. 17, but while the fire resulted in a total loss, the company was protected by insurance even covering loss of profits, cost of operation, etc. The destroyed tipple, one of the largest in the Pocahontas coal fields, will be replaced by a steel structure.

Logan—The general store building as well as several dwellings owned by the Standard Island Creek Coal Co. were completely destroyed by fire at Taplin, W. Va., on Thursday, Jan. 16.

Morgantown—Operations at the Bertha mines of the Quality Cement Coal Co. in Monongalia County, one of the largest operations on the west side of the Monongahela, were suspended at the last p
It is not known when the company will resume the mining of coal. Nearly all o
the mines in that section, except the North American, have shut down, and miners in the community are idle. Conditions are similar along the Morgantown & Kingw
R.R., and in other coal mining sections of the county.

OHIO

Carrington—The Sunday Creek Coal Co. and allied interests are erecting a new tipple at Mine No. 9 at this place. This is one of the largest mines of the company and is located on the Zanesville & Western R.R. The Ohio Collieries Co., operated by the George M. Jones Co., of Toledo, is also making many improvements.

INDIANA

Terre Haute—The Indiana Bituminous Coal Operators' Association, with headquarters here, has advertised a reward of $1000 for information leading to the conviction of persons responsible for surface mine fires, most of which were believed to have been of incendiary origin the past year. There were a number of serious surface mine fires the past twelve months.

ILLINOIS

Herrin—The Pond Creek Coal Co.'s mine has been sold to D. E. McMillan, Chicago, and James C. McElvarn, of Springfield, for $250,000. The property consists of 1000 acres, with an output of 1500 tons a day. It employs 250 men.

Pekin—The Tazewell Coal Co. has filed an appeal in the Illinois Supreme Court against the Illinois industrial commission and Mrs. Matina Lipnick, administratrix of the estate of her deceased husband, Andrew Lipnick, who was killed in the mine of the Tazewell Coal Co., to review the judgment of the Tazewell County circuit court, which gave Mrs. Lipnick damages for the death of her husband.

Springfield—The Peabody Coal Co. has in the past year completed two holes, each 426 feet deep, and 18,546 tons of coal have been hoisted at a rate of 300 tons daily. There are now 125 men employed in the mine. Eventually there will be 4500 tons of coal hoisted daily and 750 men will be on the pay rolls.

Bloomington—The Chicago & Alton R.R. has begun the storage of 50,000 tons of coal at various points. This is done in anticipation of a possible shutdown of Illinois mines Apr. 1. Reserve supplies of coal are being stored at Chicago, Bloomington, Springfield, Roodhouse and other points.

Belleville—The temporary injunction obtained in the Circuit Court recently by the Missouri-Illinois Coal Co. against the White-Sergent Coal Co., restraining it from abandoning the mine at Rentchler Station which it has been operating under a lease from the Missouri-Illinois company, has

been dissolved. The injunction was obtained on the representation that the White-Sergent company had violated the agreement to operate the mine continuously and that accumulating water was destroying the equipment. The dissolution was granted when it was shown that the White-Sergent company had given notice of intention to discontinue operation in December, and that when the injunction was obtained it had men pumping the water out of the mine.

KENTUCKY

Earlington—The St. Bernard Coal Co. is erecting a large power house at its plant here.

KANSAS

Cherokee—Fire at the plant of the Hamilton Coal Co., Shaft No. 6, recently destroyed a portion of the tipple and the chutes. The total loss is estimated at approximately $50,000.

Foreign News

Quebec—Never in the history of navigation on the St. Lawrence has a steamer left Quebec for the open sea so late in the season as the Canadian "Voyager," which departed on Jan. 22 for Halifax and then overseas. The St. Lawrence is ordinarily ice locked here at this time of year.

Victoria, B. C.—The Rocky Hard Coal Co., which has large interests in what is known as the Alberta Coal Branch of the Grand Trunk Pacific, are actively operating on a large hill of coal which extends 60 ft. above the level of the railway tracks, coal being taken from a facing of about 400 ft. The field is located near Coalspurstation, 47 miles south of the town of Edson. The coal is of good quality and is being shipped as far east as Winnipeg. Its accessibility is indicated by the fact that steam shovels are being used in loading the coal directly from the coal beds into the cars.

Nanaimo, B. C.—A verdict has been given by the Coroner's jury before which an inquest was held into the cause of the death of 16 coal miners at Nanaimo, B. C., on September 10 last. It reads as follows: "We, your Coroner's jury, empanelled to inquire into the death of Robert Kelly and 15 others in Protection Shaft, of the Canadian Western Fuel Co., Sept. 10, 1918, find that the said men came to their death by descending on a defective cable, which broke, owing entirely to the oxidizing of the wires, chiefly caused by apparent absolute lack of any internal lubrication, leaving the wires thus exposed to the action of a more than normally corrosive water and a humid atmosphere. In view of the evident general unreliability of exterior lubrication measures, which from the evidence adduced failed to preserve to any very appreciable extent the life of said cable or preclude against deterioration, we suggest that the Department of Mines recommend the appointment of an expert inspector of hoisting ropes, cages, safety catches and all appurtenances generally, and that legislation be enacted whereby under such abnormal conditions as obtained in said shaft no new hoisting cable be retained in service longer than some reasonable time to be determined by the Department of Mines, as otherwise there would appear to be no practicable process which can be adopted and absolutely relied upon looking to the absolute dependability of such hoisting cables against defect or breakage under all present governing conditions."

Personals

R. G. Rees, formerly in the coal business in Lima, Ohio, has been made sales manager of the Maple Hill Coal Co., of Columbus, Ohio.

J. A. Cameron, recently returned from service in France, has accepted the position of superintendent of the Ellsworth Collieries Co., Ellsworth, Penn.

M. L. Carriger has been succeeded as superintendent of the Midland Coal Co., of Barbour County, by **E. S. Walfesberger.** Mr. Carriger will return to the Pocahontas fields, where he previously held an executive position.

Clarence H. Robbins, general inside superintendent of the West End Coal Co., has resigned his position to take effect Feb. 1. Mr. Robbins has been connected with the West End interests for more than forty years, and has had charge of the inside workings for over thirty years.

Thomas J. Davis has been named sales manager of the Producers' Coke Co., the largest brokerage concern in the Connellsville coke region, to succeed Wiley L. Byers. During the war Mr. Davis, in the capacity of assistant to Mr. Byers, had virtual charge of the sales department of the Producers' Coke Co., while his superior was



THOMAS J. DAVIS

engaged in Fuel Administration activities. He is a practical coke man of several years' experience and is also familiar with the railroad end of the business, having been chief clerk in the coal and coke office of the Pennsylvania R.R. at Uniontown, Penn., for a number of years prior to his employment by the Producers. The Producers is the selling agency for many independent operators and does an annual business of from $6,000,000 to $8,000,000.

R. E. Butler, superintendent and engineer for the Benoit Coal Mining Co., has resigned his position and opened an office in Jasper, Ala., as consulting and mining engineer. Mr. Butler, before joining the Benoit company, was for seven years chief engineer for the Republic Iron and Steel Co. in Alabama.

C. B. Stewart has been appointed general superintendent of the Coal Bell Coal Co. operations at Bentree, W. Va. Mr. Stewart has been identified with the coal-mining industry in the Kanawha and New River districts for several years, and has a broad general knowledge of electrical and mechanical coal mining.

Thomas W. Davis, commissioner of the Michigan Coal Operators Association, has resigned his position, to become effective Mar. 1. Mr. Davis, who has been commissioner since 1901, with the exception of one year spent in the West, was from 1887 to 1899 in various positions of responsibility with the mine workers' organization.

William T. Grier has resigned as secretary of the Anthracite Committee of the United States Fuel Administration effective Feb. 1. The work of the Anthracite Committee has become greatly lessened since it became possible to permit free distribution of all sizes of anthracite other than stove and nut. Prior to becoming secretary of the committee Mr. Grier was connected with the Lehigh Valley Railroad Co. in New York City.

Industrial News

New York, N. Y.—The incorporation of William Farrell Sons, Inc., of this city, was announced in Albany on Tuesday, Jan. 28. The corporation, which will deal in coal, wood and ice, is capitalized at $12,000,000, and will have $4,000,000 eight per cent. cumulative preferred stock, par value $100.

Pittsburgh, Penn.—The Beckwith Machinery Co. has opened a Cleveland office at 1227 West 9th St., in charge of E. G. Stoner, assisted by C. Z. Dally, of the Pittsburgh office. The Beckwith company handles hoisting engines, concrete mixers, engines and boilers, and expects to carry a complete stock of such equipment in Cleveland, as well as in Pittsburgh.

Brownsville, Penn.—At the annual meeting of Snowden Coke Co. in Pittsburgh, Penn., on Jan. 16, Charles Snowden, of this place, resigned as president of the company, and Isaac Taylor, of Uniontown, general manager, was elected president. The operations of the company are near Brownsville on the Redstone branch of the Pennsylvania R.R., and consist of a large mine and 300 Mitchell rectangular coke ovens.

Washington, D. C.—The second offering of unsold portions of the coal and asphalt segregated deposits in the Choctaw and Chickasaw Nations will be made between Sept. 15 and Nov. 15 of this year in place of December and January, 1920, under terms of the Indian appropriation bill ordered reported to the House on Jan. 14. Only one-tenth of the tracts were taken at the first sale. It is provided that at the second sale the deposits must bring the appraised value, as in the first sale.

Columbus, Ohio—E. E. Learned, who was in charge of the office of the Hisylvania Coal Co. and allied interests during the absence of Secretary E. W. Blower, has been made sales manager and purchasing agent of the concern. The company has moved its offices from the twelfth to the sixteenth floor of No. 8 East Broad St., which give additional space. The former offices of the company have been occupied by the Consolidated Mining Co., which moves from the Columbus Savings and Trust Building.

Jefferson City, Mo.—The Workmen's Compensation bill to be introduced in the House for the State Federation of Labor has been modified to meet objections of employers. Under the modification it will provide a "waiting period" of three days before compensation shall be paid for any accident. The employers have also prepared a bill to be introduced, but sponsors for the Federation bill hope to make it so nearly acceptable to the employers that they will not push their own bill vigorously.

Louisville, Ky.—The rapid motorization of large retail coal company delivery equipments was shown a few days ago when the Byrne & Speed Coal Co., of Louisville, advertised the following items: "For Sale—14 coal wagons and carts; seven double sets of harness (almost new); 14 head of mules." This company is using Federal trucks in delivery. The Atlas Coal Co. went exclusively to motors, was unable to find a market for the carts, and burned them in its yards, realizing more for the metal before peace was declared than it could for the carts.

Charleston, W. Va.—Deaths in the coal mining industry of the State of West Virginia in December totaled 34, all except four of such deaths being inside mines. Deaths from falling roof and coal continue to lead all other causes, there being 13 during December. Seven deaths were caused by mine cars and five by motors. One casualty was caused by a premature explosion and four by a local gas explosion at Havaco. Outside the mines one fatality was caused by a mine car, two by motors. The largest number of deaths was in McDowell County. Of those killed, 21 were Americans and 13 were foreigners.

New York, N. Y.—Cosgrove & Wynkoop, Ltd., which recently opened offices in the Singer Building, is developing a large export trade. This firm was organized early this year. Mr. Wynkoop, the president is well known in the coal trade, having been connected with Watkins & Co.; while the other member of the firm is John C. Cosgrove, the Johnstown operator. He is the treasurer of the firm. Other officers are H. J. Meehan, vice president; A. Kemmerer Cosgrove, manager of the Philadelphia office of Cosgrove & Co., is the secretary. The firm has an export loading capacity of 2000 tons per day and is the sole export agent of the Lenox Coal Co., Homer City Coal Co., Ernest Coal Co. and Thermal Smokeless Coal Co. It also handles New River and Pocahontas coals and anthracite.

Fairmont, W. Va.—Under a reorganization of the Fairmont and Cleveland Coal Co E. A. Russell has been elected secretary of the company to succeed J. F. Straight who resigned. The new secretary has for several years been the manager of the Twin Mountain Orchard Ry., and prior to that was connected with the Consolidation Coal Co. The officers of the company as now constituted, are W. E. Watson, of Fairmont, president; E. F. Hartley, of Fairmont, first vice president and attorney; Friend Cox, of Wheeling, second vice president; John W. Poling, Fairmont, third vice president; Glenn F. Barnes, treasurer. The Rosebud Fuel Co., which was operated as a sales company for the Fairmont & Cleveland Co., will be dissolved and hereafter the company will handle all sales matters. The Fairmont & Cleveland Co. operates on Parkers Run, Marion County.

MARKET DEPARTMENT

Weekly Review

What Market Conditions Will Be With Elimination of Government Control Open to Conjecture —Some Price Cutting on Medium Grades of Soft Coal—Practically No Demand for Anthracite.

WITHIN the next few days the bituminous coal industry will find itself functioning as it did in pre-war times, for on Feb. 1 all the handicaps and restrictions imposed by Federal control during the past two years will have been removed. Market conditions in the near future will as a result be determined solely by the manner in which the producer and consumer of soft coal react to the new-found freedom.

It is impossible to conceive of the coal industry returning again to price-cutting and cutthroat competition; and large purchasers who purposely kept out of the market in recent months, in the belief that when Government control ceased they could name their own price for fuel, will find that the old order has passed, never to return.

The elaborate system of reports required by the Federal Fuel Administration during the war period has taught many operators their true cost of production, a knowledge that was woefully lacking before the Government took hold of the industry. With wages as high as they are at present, and the cost of material and equipment still "in the clouds," coal will hardly be cheaper. If the consuming public will not pay a price for coal that will enable the operator to make a legitimate profit, the coal will not be mined. Already a great number of operations have shut down rather than work at a loss, and instead of paring down prices to meet the figures set by purchasing agents many mine owners have signified their intention of doing likewise.

It cannot be overlooked, however, that at the present moment fair-to-poor grades of bituminous coal are being offered here and there at prices considerably lower than the Government maximums. The overstocked condition of the market, the closing down or restricted operation of many factories and the phenomenally mild weather are factors that tend to work counter to the best interests of the coal mining industry. High-grade bituminous coals continue to maintain their price levels, with a strong probability that they will go higher with the elimination of Federal price control.

Retail demand for anthracite is practically nil, for reasons that are obvious. The one-third withheld from consumers by the fuel authorities early in the year in most cases is now not wanted. In the majority of instances original applications were padded, the two-thirds delivered representing virtually the entire season's requirements.

WEEKLY COAL PRODUCTION

Bituminous—The production of bituminous coal in the week ended Jan. 18 is estimated at 9,943,000 tons, a decrease of 423,000 tons compared with the week of Jan. 11, but an increase over the same period of 1918. The daily average in the week of Jan. 18, 1919, is estimated at 1,657,000 tons, compared with 1,422,000 tons the same week of 1918 and 1,738,000 tons in 1917. Production in January, 1917, was not hampered by storms such as were encountered in January, 1918, nor by lack of market as this year, as many consumers are using coal from storage accumulated last summer, and production is probably less than current consumption.

The estimated production of bituminous coal from Apr. 1, 1918, to date is 476,563,000 net tons, an increase of nearly 36,000,000 tons over the corresponding period of 1917-18.

Anthracite—Estimates of the production of Pennsylvania anthracite show continued improvement in the output which, for the week of Jan. 18, 1919, is 1,786,000 net tons compared with 1,651,000 tons the corresponding week of 1918. Although production during the coal year to date is more than 1,500,000 tons less than corresponding period of 1917-18, the current needs of the country for anthracite are apparently being fully met, because of the careful distribution of domestic sizes by the Fuel Administration and the warmer weather this winter compared with last winter.

New England Shipments—Shipments of coal to New England in the week ended Jan. 18, both by all-rail and tidewater, increased over the week ended Jan. 11. Baltimore was the only port to show a decrease. Shipments through rail gateways were nearly 116,000 net tons, compared with 106,000 tons the week of Jan. 11 and 195,689 tons average weekly Apr. 1, 1918, to Jan. 18, 1919. Tidewater shipments were 195,000 tons, compared with 149,400 the week of Jan. 11 and 321,565 tons average for the coal year to date.

Tidewater Shipments—Bituminous coal dumped at North Atlantic ports in the week ended Jan. 18 was 706,000 net tons, an increase compared with 561,565 tons the week of Jan. 11 of 144,500 tons. Baltimore recorded a decrease, but both New York and Philadelphia and Hampton Roads had substantial gains.

Beehive Coke—The production of beehive coke in the week of Jan. 18 is estimated at 557,000 tons, the third successive increase over the low record of Christmas week. Operators in the Connellsville, Greensburg and Latrobe districts reported operation at 76 per cent. of railroad rated capacity, an increase of 72.6 per cent. over the previous week. Production of beehive coke in these regions is reported as 334,431 net tons and shipments of 160,950 tons of coal.

Byproduct Coke—The production of byduct coke in the week ended Jan. 18 was 553,610 tons, an increase over the week of Jan. 11 of nearly 26,000 tons. This increase was due, in part, to increased capacity and better demand for coke, and repaired plants. Increases in capacity were reported from Pennsylvania, where additional ovens were operated at the new Clairton plant, and in Colorado and at Youngstown, Ohio. The percentage of capacity reached in the week of Jan. 18 was 83.9, compared with 81.0 per cent. the previous week. Various reasons were assigned for the increase from 4.5 per cent. to 7.7 per cent. in capacity lost for other causes, among others delay occasioned through transportation difficulty in getting empty cars placed for loading.

BUSINESS OPINIONS

Dry Goods Economist—Readjustment of selling basis of cotton fabrics continues. Prices of well known lines of bleached cottons, wide sheetings, pillow tubings, tickings, outing flannels, ginghams, madras and chambrays have been cut by mills and their selling agents. The attitude of labor in textile plants and in the cutting-up industry is becoming a source of grave concern. Demands for decreased hours of labor are heard on all sides.

Bradstreet's—The trade situation, though slack, is not without redeeming features, and there is enough sunlight to prevent an unrelievedly gloomy picture being painted. Perhaps the most encouraging feature from the standpoint of the long-suffering consumer is the continuance of the declining tendency shown in food prices. While this tendency is most manifest in butter, cheese and eggs—dairy products, in short,—and mild weather and cancellations of our own and Allied government orders may be chief reasons therefor, there is little disposition to question the cause in view of the agreeable effect.

Iron Trade Review—In Pittsburgh, steel works are operating at an average of 70 per cent. capacity. About thirty blast furnaces have been blown out in the East, and South Buffalo furnaces are again becoming a powerful factor in the New York pig iron market, owing to the fact that the freight rate from Buffalo to the metropolitan territory is lower than the rate from Pittsburgh. Inquiries for 5000 tons of foundry iron for delivery during the first half are now pending in New York. Moderate export activity continues. Japan, which is actively pushing its shipbuilding program, has placed 35,000 tons of plates in the Chicago district and ordered 10,000 tons of pig iron.

The Iron Age—With new bookings less than half of current production, the industry is measurably nearer the moment of total deflation from the war basis. In many lines of finished steel there is not much over a month's work ahead. The encouraging feature from the buyer's standpoint is that labor now idle shows a disposition to resume at reduced wage rates and firm offers for steel at below present levels are now the more likely to lead to successful negotiation. January pig iron production will be considerably below that of December. A downward revision of coke prices, seeing that Federal control will be relinquished Feb. 1, and that capacity is now much greater than demand, is a factor in the readjustment.

Marshall Field & Co.—Current wholesale distribution of dry goods is in excess of the same week of 1918. The total of road sales for immediate delivery also was greater compared with a year ago. Fall lines have not yet been opened. Retailers are stimulating their sales most effectively and are rapidly reducing their heavy stocks. They are buying from hand to mouth to replace sold out merchandise and are not making any heavy purchases as during the past seasons. The radical reduction in the prices of staple cottons together with the revision downward in gingham prices has given more confidence to the trade generally. More customers were in the house, compared with the same week of 1918. Collections continue good.

American Wool and Cotton Reporter—Reductions in wool prices have already taken place, but discussion has created an impression among buyers that great concessions can still be made. It is natural for prices to decline when the demand is relatively small, but since the Government has established the new low prices for raw material, it would seem unwise to expect quotations for cloth to be figured upon any lower raw material basis. Buyers of cotton goods are not satisfied that the low market levels have been reached, since cotton has not declined in a way to compare with the decline which has occurred on goods. The attitude in regard to guaranteed prices shows that buyers are uncertain as to the course of the market.

Dun's—For nine weeks running, recessions have outnumbered advances in a representative list of wholesale quotations, and in retail channels, where accumulations of merchandise have resulted partly from unseasonable temperature over a wide area, some offerings are being made at material concessions. But while certain markets have been lately turning downward, and though efforts to stimulate demand are increasing, the price reaction apparently has not yet gone far enough to promote the anticipated business revival, and the prevailing situation, in the broader sense, remains one of diminishing consumption and production. This condition finds plain reflection in the decided halting of industrial activities, especially in the leading Eastern centres, and current reports of idle machinery and growing unemployment contrast sharply with the recent great manufacturing pressure and universal complaint of labor scarcity.

Atlantic Seaboard

BOSTON

Prices continue anything but firm. Only scattered sales, although movement all-rail shows notable increase. Tidewater situation about the worst ever known. Sellers have great difficulty placing coal. Hampton Roads dumpings for New England continue extremely light. Industrial activity slows down to marked degree. No inquiry for loading over New York piers. Trade interested in possible moves for next season. Shipping Board gives no sign of change in policy. Anthracite gets rapidly easier. All-rail receipts show increase. Lack of orders for broken, egg and pea. Middle houses actively solicit business. Retail demand very light.

Bituminous—The operating interests are laying siege to this market in their efforts to get orders for prompt shipment. Through Boston houses and by their own representatives quotations are being freely made all the way down to $2.40 for fair coals in the central Pennsylvania district. Indeed no buyer is left without the impression that any reasonable offer would be accepted for the sake of keeping certain mines in operation. All this activity results in little more than a feeling that the coal market is badly demoralized and that $1.25 @ 1.50 coal is a possibility for April and May. Certainly there will be no broad market by that time; there are opinions here that buying will not begin before July, so well stocked is this entire territory in every branch of industry and public service.

There have been some scattered sales the past fortnight, but for the most part salesmen are not able to get much response. Even small consumers whose storage is limited are cautious about buying, so little faith is there in present prices. Every buyer, large or small, is being hounded today to supply consignments, and no such thorough canvassing has been carried out in years as that now in progress throughout New England.

The tidewater situation could hardly be worse than it is at this writing. Extraordinary expedients are resorted to in order to place water-borne coal. There have been instances where cargoes have been consigned to a neutral point like Newport, R. I., "for orders," and there have been cases where cargo balances of 300 to 400 tons have been set out into the stream after the major portion of the cargo had been discharged and the barge allowed to wait until the balance could be placed. Shippers who have Emergency Fleet Corporation steamers under charter are at their wits end to know what to do with these bottoms the balance of the charter term. Eighteen steamers are now tied out in Boston Harbor awaiting business and the number will be augmented almost daily. Consignees who were counted upon to take monthly quotas to Apr. 1 are now confessing their utter inability to do so. All such calculations were based upon something like normal business, and no such condition as now prevails was foreseen.

Steam grades at the New York piers seem to be more and more a drug on the market. Inquiry is almost nil, and except for bunker use and for railroad fuel in railroad-owned barges, there is almost no coal being dumped. The relatively low rates on company barges to points east of Boston makes it an inducement for a limited tonnage to be moved in this way, rather than in steamers at the Shipping Board rate from Hampton Roads.

Under the conditions it is quite natural that the Hampton Roads shippers should take counsel together over the outlook for next season. Some conferences have been held, and as a result it is rumored there is some idea of selling on the basis of $3 f.o.b. mines for Pocahontas and New River. This means in excess of $5 f.o.b. loading port, a price level that today seems impossible to realize for coastwise business, so long as marine freights are unchanged. To try to maintain any such price the coming season looks much like inviting the same situation that followed a similar attempt in 1903, after the big strike. The price mark established that year in the spring was $3.35 f.o.b. Hampton Roads, only to drop by June 15 to $2.40 and $2.50. New England certainly cannot be relied upon to support an increased price program from the West Virginia fields, while Pennsylvania grades are so accessible and at a differential never so great in their favor.

Meanwhile the Shipping Board gives no sign of any change in policy as to coastwise freights; $3.25 continues the rate from Hampton Roads and $3.50 from Baltimore, leaving shippers to hold coal at the piers or at the mines and tie up the steamers they have under charter. More and more the much-talked-of export market fails to meet expectations and output in most of the Southern fields shows a steady decline.

Anthracite—Receipts of domestic sizes show further gains from week to week. The six days ended on Jan. 23 showed a daily average of 439 cars passing the New England gateways as compared with 330 cars for the first half of the month. Everything that looks like an order for broken, egg and pea is now being shipped, and many dealers who forgot to cancel their requisitions in season are now wincing at the proportion of these sizes they are called upon to accept. The fact is that more than a few retailers who went to the Fuel Administration for assistance got their full share of egg size through that channel.

The Philadelphia and New York city markets are of course limiting their current requirements to stove and chestnut, the only sizes that an increasing number of New England distributors are in position to take, and the result is a great effort on the part of all the shippers to move the less desirable sizes. A few cargoes are still coming forward either all egg, or with a large proportion of egg, and perhaps a single hatch of chestnut or pea, but another fortnight will probably see practically nothing coming forward but stove and chestnut, the majority of retailers are so loaded up with other sizes.

Boston and New York houses who normally represent "independent" operators are once more actively in the business and soliciting orders. By water current freights are to their disadvantage, but there is enough softening in prices, especially on egg, to put them on an even basis with the companies. All-rail they are still making sales in some volume.

NEW YORK

Demand for anthracite slow and trade is cancelling orders. Situation resolves itself into a "waiting game," and only several days of low temperatures will create a demand. Dealers look for concessions on Independent coals. Concessions made to move the anthracite steam sizes. Bituminous market quiet. Mines are working about half time and buying is slow. Bunker coals maintain full prices.

Anthracite—The trade is inactive, and instead of booking new orders dealers are receiving cancellations. This latter plan is affecting "independent" coals more than "company" coals, with the result that shippers of the former find it almost impossible to obtain the 75c. differential for their product.

The restrictions against stove and chestnut coals remain in force, but there appears to be plenty of these sizes to take care of all requirements.

Shippers of "independent" coals have about reached the point where they may have to suspend shipments from the mines, which will, of course, result in a slowing down of production. This action, it is understood, has already been taken by some small producers.

The outlook for better business here is not good. With spring not many weeks distant, neither dealer nor consumer is anxious to fill his bin with high priced coal when there is a possibility of the usual spring reduction. Reports from the coal fields are not so bright as they might be. There are occasional labor troubles, and the hope held out that as soon as they were discharged from their country's service the men would return to their former places in the mines has not come true altogether. Many of the men, according to information received here, are looking about for positions in other industries, many of them anxious for clerical places. The authorities, however, hope they may be able to induce most of the men to return to the mines for the winter, at least, in order to help the present labor situation.

Conditions along the line are much better than at Tidewater. "Independent" operators are able to dispose of most of their product to the inland trade, but are not always able to secure their full price.

Whatever may be said as to the lack of demand, the report of the Regional Director of Railroads shows that for the seven-day period ended Jan. 24 there were 6558 cars of anthracite dumped at the local docks. This was the largest week's dumpings reported since Sept. 27, when for the previous seven days 6727 cars were dumped. During the week ended Jan. 17 there were 4564 cars dumped.

The movement of the steam sizes may prove to be serious unless there is a decided increase in the demand for the domestic coals. These coals are almost a drug on the market, and operators are said to be stocking considerable. Quotations vary according to the grades. Buckwheat No. 1 was quoted as low as $3.15 at the mines, according to quality; rice from $2.25 to $2.50, and barley as low as $1 at the mines.

The retail trade has requested that the state fuel administration retain its supervision of the industry until Mar. 15 at least.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$7.80	$8.55
Egg	7.70	8.45
Stove	7.95	8.70
Chestnut	8.05	8.80
Pea	6.55	7.30
Buck	5.10@6.05	5.90@6.25
Rice	4.65	5.10
Barley	4.15	4.30
Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—The concessions from the Government maximum prices at which various grade of bituminous coal can be purchased here offer no incentive for buying. There is a heavy surplus of all grades at this market, and apparently the only qualities holding their prices are the best bunker coals.

Movement is slow and inducements fail to create any demand. Operators are not reckless, however, about cutting prices, realizing that the selling figure must be sufficient to cover the cost of mining. Some producers have found it necessary to slow up mining, and in various sections of central Pennsylvania and nearby districts many of the mines are working about half time. In the Fairmont region it was said that on one day last week nearly 400 openings were idle because of the lack of orders.

The trade fails to see any light ahead unless there is a cold spell of several days' duration. Many manufacturers who laid in large stocks of coal last summer and fall are said to be disposing of much of their surplus to other consumers not so fortunate, or are transferring the coal to other of their factories. It was also reported that some railroads are refusing further shipments because of oversupplies.

Various shippers see no encouragement in the immediate future. With the present stocks on hand some believe there will be no activity until about June 1.

Several of the local loading piers were affected by embargoes during the week just ended. Reports received here indicate a further slowing down in consumption due to the closing of many factories. During the week ended Jan. 24 there were 6103 cars of bituminous dumped at the local piers, as compared with 4110 cars during the previous week, an increase of 1993 cars.

Current quotations, based on Government prices at the mines, per net ton f.o.b. tidewater, at the lower ports, are as follows:

	Mine, Gross	F.o.b. N. Y., Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3 08	5.23
Prepared	3 36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher

PHILADELPHIA

Anthracite men becoming worried over outlook. Individuals finding it difficult to maintain prices and move production. Talk of restricting mining unless weather conditions change. Egg and pea draggy. Poor market for steam sizes, and prices being cut. No sale for barley or culm.

Anthracite—The market is rapidly approaching a critical stage. The shippers and the retail men both say something drastic must soon happen, unless there is a marked change in weather conditions. The retail men, especially, claim that nothing but severe and continual cold weather will keep equipment moving.

The trade appears surprised that the prices of the individuals have not broken. We have made repeated inquiries and cannot find that their 75c. differential has been cut into. They must be finding other markets for their product, especially on egg and pea sizes, for their trade is not only stocked with these two sizes, but it is not being moved. We do hear of their offering stove and chestnut for prompt shipment, if an equal proportion of egg and pea accompany the order. As last week, the suburban dealers appear busier than their competitors in the city proper, but even they say the end is in sight.

It must not be understood that the big companies are soliciting business, or are short of orders; that is, for prepared sizes. They are still shipping on orders entered as of Apr. 1, based on their 1916-17 business. They appear quite hopeful of conditions soon changing for the better, and before it is necessary for them to look for places to put their coal, at least before the end of the month. Naturally, their orders, with the lower prices, will be the last to be held. With a few exceptions, none of their salesmen are on the street, but next month, we have reason to believe, will see most of them looking over the ground. With the light demand for coal, the representative dealers are becoming quite apprehensive of how their numerous competitors will manage their business in the future. They claim it took a war to teach them how the business in the city should be conducted. Never before have the several hundred retailers located here worked in harmony. Price cutting and long-time credits have been entirely eliminated, and older and wiser heads are most anxious to maintain those high standards.

The dealers generally are not as yet informed of the new railroad ruling, prohibiting the loading of hopper coal cars of less than 75,000 lb. capacity. This will make quite a difference, especially to many small dealers located on Philadelphia & Reading tracks, whose yards are small, and who, before the present railroad administration, preferred the small Philadelphia & Reading cars, averaging 25 tons.

The individual operators are visibly worried over the outlook, and claim that while the present wage agreement with the miners is operative, they will lose money if they cut prices. We believe there is a movement on hand to restrict production by shutting down the collieries rather than equalize their rates with those of the big companies.

There is much speculation as to what the April price will be, and there are some in the trade who actually pretend to believe that the present company circular will be the basis of spring, with an increase of 10c. per ton for five months. The rumor, if such it may be called, has it that the individuals would adjust their prices to these figures. While we are much inclined to believe "the wish is father of the thought" with the small operators, we do know that they are seriously discussing this plan. Also do we know that they have never been satisfied with the increase in price of $1.05 per ton ordered by Dr. Garfield, on Nov. 1, 1918, to cover advance in miners' wages. They have all along claimed this was insufficient. On the other hand, it must be borne in mind that it is not new for the individual operators to want the big companies to advance their circular rates. The higher they are the better they like it. It places them in such a favorable position to undersell them, especially during dull periods, which, for years, has been the habit of some, and still receive a good price for their product. Just now, the "little fellows" are up a tree and are doing a lot of thinking.

There are no signs of steam trade improving. Buckwheat is away off, and has been offered at $3.10—perhaps 10c. lower. Some operators would be glad for offers of $2.40, for rice; barley and culm are practically out of the market; and it is said that no reasonable offer would be refused.

Bituminous—Operators report that a number of mines producing low-grade coal have closed down, and more are expected to follow suit. Prices for coal from these operations have been below those named by the Government. The majority of mines producing the higher grades are working, and it is proposed to close down rather than cut. Heavy tonnages consigned to piers lack boats in which to move the coal. This coal, in many instances, was sold at off prices, in order to release equipment, and now demurrage will accrue.

Numerous inquiries for export business are not being considered, because it is impossible to secure bottoms in which to ship.

BALTIMORE

More than enough coal to meet demands. Some consumers with big stocks of "war-coal" apparently dissatisfied now that better fuel is offering. Jobbers resuming old relations. Trade generally optimistic. Hard coal supply liberal in face of mild weather.

Bituminous—The situation here remains largely unchanged, for the trade has more soft coal than it can handle for the moment, despite the fact that numerous mines that usually supply this territory are closed or have shut down in part. There is practically no market here for less desirable fuels, even though many are offering at prices considerably off the fast-dying Government maximum. Some better coals are holding fairly well in price, but there is little real demand even for this class of fuel.

Some consumers in this territory, who during the war were most urgent to have purchasing agents secure fuel for storage over this winter, and who stocked up heavily on the kind of war-coal that was going to non-preferred industries, are now showing signs of dissatisfaction when better coals are offering at the prices paid for the inferior grades. The City of Baltimore, with some 40,000 tons on hand, is one of those making complaint, but the trade realizes that a mayoralty election is coming shortly and makes allowances.

With many mines anxiously seeking to get outlets for their fuels now that war contracts have come to an end, the jobbers here and elsewhere are in a position to get back into old lines of endeavor. The thing for the jobbers to do just now is to hustle around and find customers or to connect with old consuming interests.

Despite the present overstock of coal here, and the many cuts in prices, the trade as a whole is optimistic. With the dropping of Government regulation Feb. 1 it is believed it will only be necessary for business to clean up a bit on back stocks of poor coal before a healthy market at fair rates results.

Anthracite—Mild weather continues to cut down hard coal consumption here, and the supply of anthracite in this district is more than liberal. There can no longer be a doubt that many consumers will be able to get through the winter on the two-thirds delivered on orders early in the winter, unless February should be unusually cold.

Dealers here are already wondering whether there is to be a cut of even 30 to 50 cents in the spring. With prices as they now are, and with the threat of shortage of coal due to war work over, few handlers of coal here believe that the public will come in heavily in the spring for coal unless there is some inducement offered. Dealers say that there will not be any big stocking up by retailers on prospects in days when the mines require a cash trading. Not a few dealers see a big piling up of both wholesale and retail trading toward fall unless some attractive feature for early buying is worked out.

Lake Markets

PITTSBURGH

Market very quiet. Best grades nominally at Government limit. Steel industry's consumption decreasing.

There is practically no activity in the local coal market, and little progress has been made toward the development of prices that may be regarded as regular market rates. Producers of the best grades of coal regard the market as at the full Government limit and assert that they would not entertain bids at less. Lower grades could doubtless be bought at discounts, but there is no demand for them; indeed, there is little demand for any coal except high-grade gas coal, which appears to command the full price without difficulty.

Production of coal is confined almost entirely to the filling of contracts, and consumers as a rule find their contract shipments fully up to requirements, if not in excess. Negotiations against contracts for the new coal year will probably be taken up slowly, as neither buyers nor sellers have any definite idea as to what prices will eventually rule.

The steel industry, the biggest single consumer of Pittsburgh district coal, with the possible exception of the railroads, is running slacker and slacker each week. The mills are not only consuming less coal but are more indisposed to carry stocks. The winter, if it is a winter at all, is passing, and there is no prospect of great steel mill activity for months to come.

The market for the best grades of coal remains quotable nominally at Government limits, which are to come off at the end of January: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

TORONTO

Market continues quiet. Dealers well stocked with all grades. Industrial reconstruction proceeds slowly. Demand for bituminous light.

The coal market is quiet and dealers report but few orders. Owing to exceptionally mild weather, which has prevailed for some time, the domestic demand is light and mainly confined to the poorer class of consumers. The yards are well stocked with all grades and shipments from the mines are coming forward promptly. The readjustment of the industrial plants lately engaged in munition work to normal lines of production is slower than was anticipated, many alterations being deferred in the expectation of a drop in prices of material; consequently there is little movement of bituminous. Prices are as a rule well maintained, but occasional reductions have been made in order to effect sales.

BUFFALO

Too much coal. No relief in sight. Weather as mild as fall. Question as to the future of the bituminous trade. Will it break. Anthracite plenty also.

Bituminous—The reports of more coal than the consumer will buy continue. It now looks as if it would be a hard matter to hold the trade, though there are some who say the operators will shut down rather than allow prices to drop too low. At the same time the surplus appears to accumulate everywhere. It was supposed that the Montreal district was too far away from the source of supply to become overloaded as other districts were, but members agree that it is piled full of coal and will not buy any more freely than other sections.

There is nothing for the coal jobber to do but to pick up here and there the sale of a car or two and wait until the market comes back. It is agreed that there is surplus enough in consumers' hands to make any sort of activity impossible for a long time.

In view of the bituminous stagnation and the coming end of arbitrary prices the quotation must be made with caution, but still most of the coal sells at former prices or thereabouts, $4.65 for thin-vein Allegheny Valley, all sizes, $4.45 for Pittsburgh and No. 8 lump, $4.20 for sale mine-run or slack, $5.65 for smithing or smokeless, $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—Distributors of hard coal in the city are now sending out notices to customers who gave anxious orders last summer, but who are not saying anything about the coal now, asking them if they want it and adding that they are prepared to deliver the full amount. The two-thirds rule that was made then looks decidedly odd now. Not a single consumer goes near the Government fuel office now. Many of them will not ask for more than the partial delivery promised them last summer.

It is said that the city will not begin to use up its allotment, though the fuel administrator was making anxious trips to New York all through the fall, asking for more. It is mainly the weather that has created the conditions. With such weather last winter the situation would have been easy and no fuel office would have been easy. It has scarcely been down to freezing temperature in a fortnight.

CLEVELAND

Official lifting of all Government restrictions in this district is not expected to bring any startling market changes. Upper lake dock operators face a serious situation from the order that permits Illinois coal to come by rail into the Northwest cheaper than coal can be shipped off upper lake docks. Steam coal is slightly more in demand, while prices are somewhat firmer.

Bituminous—The local coal market just now presents a rather anomalous situation. Unemployment is more widespread and labor is offering itself at greatly reduced prices—both indicative of decreased operations and lessened coal consumption—while at the same time the mines are working better, more steam coal is moving into northern Ohio and talk of shading of Government maximums is much more repressed. One operator points to the fact that out of 2967 cars of standard No. 8 coal shipped from his mines last week only seven brought less than the Government price. Operators not well situated as regards contracts, however, are not spurning offers of 25 to 35c. below prices that prevailed prior to Nov. 11, while the supply of stripping and thin vein coal that is obtainable at a concession seems inexhaustible.

Attention of the bituminous world here now is centered on the lake situation. The Northwest, like the more southerly portions of the Middle West, has suffered—from the coal man's viewpoint—from extremely mild weather and the unexpected end of the war. Coal has moved off the upper lake docks in at a rate far under expectations. Not only that, but Illinois coal now can be shipped by rail into most of the Northwest cheaper than lake coal can be moved off the docks. Consequently, the opening of the 1919 lake season is likely to see 2,000,000 tons or more left on the docks, whereas 1918 and 1917 saw the docks pretty well cleaned up. In pre-war seasons a dock balance of 750,000 to 1,000,000 tons in the spring caused comment.

Retail demand for bituminous has remained stagnant, with weather conditions such as to demand a minimum use of coal for domestic heating. Massillon lump is now bringing $7.10, West Virginia splint $7.15, and No. 8 Pittsburgh $6.35. These prices are little changed from those of the past 60 days.

Anthracite—Receipts are heavy enough now to stisfy the light demand, and dealers continue to compete for business. Egg is selling for from $10.50 to $10.90, delivered.

Lake Trade—With the upper lake docks well stocked with coal and lower lake docks with piles of iron ore several million tons above the average, the 1919 lake season is not expected to be opened much before May 1. This, coupled with the fact that most of the larger lake carriers are holding grain cargoes at Buffalo—where the ice goes out two weeks or more later than at Cleveland and Toledo—is looked to cut the 1919 movement to as low as 25,000,000 tons. So far only one 1919 coal cargo has been floated, and it is unlikely that much lake coal will move toward the docks before the latter part of March.

DETROIT

Lack of buying demand both in the steam trade and among retail dealers, owing to large stocks in possession of each, creates a dull market for bituminous in Detroit.

Bituminous—With large stocks of bituminous still held by many of the industrial consumers and a large proportion of the retail dealers, jobbers and wholesalers find business light. Several causes have retarded cutting down the large supplies that were accumulated in accordance with admonitions of the Fuel Administration a few months ago, and which include a considerable quantity of coal of an inferior quality that was bought because nothing better was then available.

Cancellations of numerous contracts for products for war use having been made, manufacturing plants are now in a period of unsettledness, which is emphasized by the policy of the Government in holding back settlements on contracts and claims of the contractors. The diminished industrial activity curtails consumption of steam coal and tends to prolong the time during which the large reserve will be a check on new buying.

Continuance of temperature conditions unfavorable to stimulation of buying by domestic consumers is one of the reasons why retailers' stocks are still an impediment. Another reason is found in the poor quality of much of the coal and its unsuitableness for domestic heating plants of the type generally used in Detroit. The increased supply of coke, which many householders, accustomed to the use of anthracite, prefer to burn in place of bituminous, also holds back distribution of retailers' stocks.

The prospective ending of zone regulations on Feb. 1, is unlikely to cause much change in market conditions in Detroit, until the stocks now here are cleared away.

Anthracite—Owing to the mild weather consumption of anthracite has not been so large as in previous years. Shipments continue small in volume, but a moderate supply is in the hands of dealers. Low temperatures continuing for a few days would be likely to bring a rush of orders. The coke supply has done much to relieve the situation and help out anthracite users who were unable to obtain a sufficient supply of coal to meet their entire winter fuel needs. Few of the retailers are in position to buy anthracite freely because of their heavy stocks of bituminous.

COLUMBUS

The coal trade in Ohio remains quiet to the extreme. The weather conditions are still unfavorable for domestic demand. Large reserve stocks of steam grades are reported in all localities. The market is now purely a weather proposition.

The domestic trade remains quiet, as the thermometer is still ranging around the summer heat mark. Retail stocks are still large, and dealers are not in the market for any large tonnage. There is a fairly good demand for the fancy grades, such as Pocahontas and West Virginia splints. Retail prices continue firm at the levels which have prevailed for some time. Hocking grades are also selling to a small extent. Some cutting is reported, but not sufficient to cause any flurry in the trade.

Steam business is slow in every locality. This is due to the large reserve stocks on hand and also to the fact that business is rather slow in becoming adjusted to peace conditions. Michigan and northern Ohio are well stocked up, and the same is true of every locality to which Ohio-mined coal is shipped. It is believed that little steam business will develop before April, and producers are looking around to ascertain the prospects for the lake trade. Reports show that there is a large tonnage at the head of the lakes, and unless something happens to hasten consumption prospects for the coming lake season are not bright. There is some shading of prices for steam grades, especially mine-run, but the larger operators are not sharing in the price cutting and are generally holding up fairly well.

Production has not been good during the past week. In fact it is said that the output has reached the lowest ebb in years. Reports show that the output in the Hocking Valley field is about 35 per cent. of normal, and other fields are producing only a little more. Eastern Ohio, which has been favored by large steam contracts, is producing not more than 40 per cent. of normal. Little hope is expressed for an increase in production under existing conditions.

CINCINNATI

Remarkably mild weather continues, and demand is at a low level on account of limited consumption. Vigorous selling efforts are planned.

With a continuance of the same extraordinarily mild weather which has been experienced during nearly the entire winter, the hopes of the coal trade for a stimulation to business through more seasonable temperatures are gradually giving way to the conviction that there will be a heavy surplus of stored coal carried over after the winter has passed. It is of course possible that February and March will bring some severe weather, and force not only increased consumption of coal in the hands of consumers, but an additional demand for fuel; but as the season advances, with spring-like temperatures prevailing, and a corresponding lack of necessity for fuel, this possibility becomes increasingly vague as a definite factor in the situation.

The lack of a market for the present production of the mines, together with the certainty of large holdover stocks, furnishes the necessity for selling efforts during the coming months of an intensity hardly heretofore paralleled in the coal trade; and such efforts will accordingly be made, judging by plans which are being discussed by jobbers' and operators' representatives. The removal of the Government restrictions which have operated to limit distribution will of course make it possible to enter into efforts of this sort much more freely than was possible with those restrictions in effect, and members of the trade in this section will therefore go after the business which they formerly handled all through the Middle West and the North.

LOUISVILLE

General demand for all grades quiet, with no immediate signs of improvement. Operators busy lining up prospects for spring shipping to the lake region. Prices weak, but effort being made to hold steady.

There has been little demand for any grade of coal for the past few weeks, and conditions are not improving as weather conditions continue mild and consumption in a domestic way is far below normal. Steam consumers in many instances are reported to be carrying stocks sufficient to run them for weeks and months, while industrial demand is generally quiet.

Little river coal is coming in, and prospects for movement are not so good as they were, due to the market being stocked. However, some coal is expected in February and March. West Virginia is making a bid to get back in the market with the lifting of the zones, both by rail and water, principally rail.

The lifting of zone regulations is expected to improve conditions materially for a number of producers who have been shut off from their best customers for months past, and many expect to pick up where they left off.

Some price cutting is being done by mines which are long on production. Prices of 50c. and 75c. a ton under maximum Government prices have been quoted by long distance to local consumers of steam coal during the past week, these prices being for immediate delivery only, not on contract basis. Retailers are holding prices fairly well.

Eastern Kentucky and western Kentucky are both having trouble in marketing coal, western Kentucky probably having more trouble than eastern, except on some river business moving south, as there is very little demand for high grades and less for low grades.

Many mines are closed, and wagon mines and small mining companies are at a standstill. Labor is showing a surplus in many mining districts, and there is no shortage. Sidings are full of cars, although there is not much coal on cars waiting a market from the mines or at mines.

BIRMINGHAM

Conditions in steam trade easy, but requirements practically absorb the output. Domestic fuel short and market strong. Production making satisfactory gains.

There is an easy tone to the steam market here, and while there is a demand sufficient to practically take up the output of the mines, inquiries are not of an overinsistent character. The passing of Government control of prices, distribution, etc., is apparently causing little concern to either the producer or the consumer. There appears to be little likelihood of a lowering of prices as a whole, as the continuation of the present wage schedules will maintain a high cost. Such reductions and increases as will probably materialize with the return of the trade to normal conditions will be brought about by the adjustments based on quality. With a normal demand upon the district, which practically absorbs the output of the commercial mines, prices of the better grades of steam coals will more than likely advance, while no material reduction is looked for in the Big Seam and other cheaper grades.

Owing to the pronounced shortage of domestic coals in this district, which condition has existed since Apr. 1, 1918, there will more than likely be an advance by domestic producers. Dealers throughout the district and state are unable to get anything like the tonnage desired.

District Representative Holmes, of the Fuel Administration, has notified producers and jobbers that all requisitions made for coal and coke through any of the Fuel Administration agencies are cancelled, effective Jan. 31. Coal production for the week of Jan. 11 showed a gain of about 26 per cent. over the previous week, the output being 339,080 net tons.

Coke

CONNELLSVILLE

Coke market declining. Furnace coke becomes heater coke. Byproduct coke offered. Production increased.

The coke market lost no time in exhibiting decided signs of weakness upon the Fuel Administration's announcement that its price control would end with the month of January. At the beginning of last week fair grades of furnace coke were offered at $5.75, against the Government limit of $6, while indifferent grades found no sale at all to blast furnaces and had to be sold for heating purposes, bringing lower

and lower prices until by the end of the week $5 or less was the price.

While producers now attempt to explain that prices for "heater coke" have nothing to do with the regular coke market, blast furnaces point out that during the war equally poor coke was shipped to blast furnaces and invoiced at the full Government price, while furnaces were afraid to complain of quality for fear shipments would be shut off. There has been a limited demand for coke by blast furnaces, which as a rule do not bid over $5.50, and at this price they secure some coke of fair grade.

In foundry coke there has been an equal divergence on account of quality. Makers of the best brands still adhere to $7, the Government limit, but foundry coke of fair grade can be had at $6.50. The market is quotable at $5.50@5.75 for furnace coke and $6.50@7 for foundry coke, per net ton at ovens.

Producers of byproduct coke have been offering surplus lots to contiguous blast furnaces, and some sales have probably been made; but this coke does not get into the open market as it is always sold to nearby furnaces.

Nearly all the blast furnaces have contracts for coke, either for the half year or the whole year. Some of the contracts provide that in the event of the Government price control being taken off, the parties shall negiotiate to determine a fair settling basis week by week or month by month, while the others provide that "last Government price" shall rule. Several furnaces having such contracts have already notified coke operators that they desire to discuss this matter, evidently with a view to asking a price reduction. Their argument would be that otherwise they will have to go out of blast, and as the contracts are "requirement contracts," this would constitute quite an argument.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Jan. 18 at 291,332 tons, an increase of 19,966 tons, and shipments of raw coal at 195,693 tons, an increase of 24,778 tons.

Buffalo—The situation continues to ease off along with soft coal, and it is not now expected that any further shortage will occur for some time, if again this winter. The furnaces are getting most of their supply from the local byproduct ovens and prices range so as to compete with the Connellsville prices, which are $7 and $6 for the foundry and furnace grades. The freight here is $2.60 net. Fuel coke is as dull as bituminous coal. Dealers in it find that it does not compete closely with any coal and have to cut the prices to find a sale.

Middle Western

GENERAL REVIEW

News of removal of soft coal restrictions causes uncertainty. No market on any grade of coal.

The news of the lifting of all bituminous zone and price restrictions came as a surprise to the majority of the coal trade in the Middle West. It was generally known that restrictions were to be removed, but it was not expected that this would take place before Apr. 1, at least. These radical changes, which are to be effective on Feb. 1, have infused into the market an element of uncertainty and hesitancy which is anything but welcome at this time.

So far as the zone question itself is concerned, the effect of the new order is of far more importance to the retailer than to the manufacturer. Generally speaking, the retailer uses a substantial tonnage of Eastern coal, heretofore zoned out, while the manufacturer is only interested in short rate fuels, usually mined fairly near his plant. The average retailer in the Middle West is loaded to the guards with Mid-West coal. His trade, now that higher grade products from the East are available, will want better coal, and he will have to supply it. As a result, he will have to place orders for more coal, even if his bins are filled to overflowing with the Western product. It is a bad problem to be worked out, and it is going to be watched with interest. The operators will be as much affected as the dealers by the changes. Large tonnages of Illinois and Indiana coal replaced during the past year Eastern fuels. It will develop within the next few weeks whether or not Mid-West operators will be able to hold their ground against the inroads of Eastern coal. In the event that Eastern coal wins back its old position with the Mid-West trade, it will mean that another burden is added to the Illinois and Indiana operators.

The present market on all coals is hard to describe, chiefly because there is no market. Practically no purchases are being made, as all buyers are waiting to see what is going to happen, and by this waiting process it is believed they hope to break the market down to figures considerably below the coal prices, as set by the United States Fuel Administration. This is equally true of the railroads, as well as the general buying public. It may be said, in behalf of the manufacturer, however, that he has better grounds for keeping out of the market than the railroads have. In the first place, the manufacturer was loaded up to the maximum by the Fuel Administration, and in the second place, the end of the war made so many changes that he is justified in going easy for a while. The railroads, however, are about as busy as ever.

The question of railroad coal, by the way, is causing considerable comment unfavorable to the Railroad Administration. The opinion is that the railroads have no right to a price better than that given the general public. Furthermore, it is stated that the railroads are faced with the problem of reducing their operating expenses. There are, roughly speaking, two means by which they may accomplish this. The first, reduce wages; the second, purchase coal at a reduction. For many obvious and politic reasons, they will not reduce wages, as they do not want the responsibility of such a grave step. They have left to them, therefore, the remaining plan of buying their coal at a reduction. If they are able to do this, it will mean the operators will be forced to close their mines or reduce wages.

CHICAGO

Both steam and domestic demand practically dead. Plenty of anthracite coal to be had.

The weather in Chicago, and in fact the whole Middle West, has been very soft and springlike for the last week or ten days. As a result, much less coal is being burned than is normally consumed at this time of the year. The steam users are taking advantage of the present situation to reduce the large stocks they accumulated during the summer months at the order of the Fuel Administration, and consequently are not in the market at this time.

The domestic situation is practically dead at this writing. As soon as the news came that Eastern coal was to be allowed in this territory, the retail dealers naturally stopped buying Illinois and Indiana coal, in order to make room for Eastern coal, to be moved in after February 1. There has always been a certain demand for Eastern coal, and the retailer is reducing his stocks so that he will have a place to put his high-grade Eastern product.

It is stated that one company, operating mines in the Pocahontas district, and having a sales office in Chicago, received orders for 65 cars in less than two hours. This will give an idea as to what coal is being purchased now for domestic uses.

The anthracite situation is very easy. All restrictions, so far as the retail distribution is concerned, have been removed, and the householder may now obtain all the anthracite he wishes. According to information picked up from various dealers in and about Chicago, they are receiving all the hard coal they desire.

MILWAUKEE

Coal market one of the poorest on record. Decline in price of bituminous predicted. Hard coal unaffected by conditions. Movement of fuel slow all around.

The coal market at Milwaukee continues extremely dull, the season's business thus far being characterized as one of the poorest in the history of the trade. There is little demand locally, and the movement to the interior is simply nominal. Last year at this time hard coal was being dealt out gingerly in ton lots, and the problem of delivery was complicated by snow and ice. There were also restrictions on orders of soft coal. Up to the present time this season there have been only a few days of real cold weather, and the consumption of fuel has been abnormally light.

There is an overabundance of soft coal on the market, and a decline in prices of this character of coal is looked for by Fuel Administrator Fitzgerald about Feb. 1 because of the discontinuance of maximum prices at the mines and the elimination of the zone system of distribution. The maximum prices at the mines now range from $2.35 to $4.95 per ton.

Hard coal remains unaffected by the unseasonable conditions. Maximum prices on anthracite will remain in force. Customers are now being solicited and advertised for at the following prices: Egg, $12.20; stove, $12.40; pea, $11.05; buckwheat, $10.60. An added charge of 50c. per ton is made when coal is carried in.

Solvay coke is advertised at $11.50 and gas coke at $11. The coke schedule includes carrying-in charges.

The state and county fuel administration offices will be closed on Feb. 1.

ST. LOUIS

Mild weather continues to demoralize the market. No local or country call for steam or domestic. Steam sizes heavy. Trade much depressed and miners restless.

Continued mild weather has brought the market to an absolute standstill. This has even gone so far as to affect the Williamson and Franklin County fields. It is impossible to move steam sizes at almost any price, and the result is that mines all over the southern Illinois field are idle because they cannot dispose their screenings.

There is practically no country call for steam coal. This is a blessing in disguise, for steam coal could not be furnished on account of the surplus stock that the screening size would produce.

There is practically no domestic business excepting in small quantities, and retail firms with from ten to twenty delivery teams and trucks have use for about one. The supply of coal put in by the consumers last summer will in most instances last until the first of April.

This condition is prevalent all over this territory.

In the Standard field some mines work one day a week and some have been down for over a week. The miners in these districts are dissatisfied and figure that when they do work they will have to get more money in order to exist.

There is a small railroad tonnage going out, but nothing to speak of and the operators are fighting for this.

The question of getting a price that will pay for the cost of production seems to be somewhat vague, and there is no chance in the world for any kind of a contention on the part of the Government that these operators are in any kind of a combine to hold up prices. If they need any control at all it should be under the supervision of the Federal Trade Commission, which is generally supposed to advise corporations how to keep away from the bankruptcy courts.

In the Standard field the screenings are down to $1.25 for 2-in. lump, to $1.50; 6-in. lump from $1.75 up; mine-run at $1.55 to $1.65.

In the Mt. Olive field conditions are bad, but the operators are holding their prices with one or two exceptions. There is some railroad coal moving out of this field, and the greater tonnage of domestic moves north and west.

In the Williamson and Franklin County fields they are beginning to feel the effect of the mild winter for the first time. Several mines are idle on account of their failure to move screenings, and others have not enough lump and egg orders if they did want to work. The nut sizes are also slow in moving, some mines having to suspend work because they could not move the nut. The car supply everywhere is abundant and transportation shows some improvement, except on the Iron Mountain lines.

There is an effort being made by the larger operators in St. Louis to create selling agencies for all the mines on each line of railroad; for instance, all the mines on the Illinois Central, from Pickneyville to Belleville, will be handled by one company on a commission basis and another company would handle the sales from the Louisville & Nashville mines and another from the Baltimore & Ohio mines, etc. This would be an admirable plan if carried out without any malice, but the petty jealousies that exist in these fields prevent this from being carried out by local management. It can be successfully done if an outside, disinterested party were to take supervision of the work. The operators distrust their own leaders, and while that condition exists no hope can be held out for a just price on coal from the so-called Standard field.

About 100 cars of anthracite egg are now in transit to St. Louis, a few cars having arrived, and a few cars of West Virginia smokeless. Arkansas is practically out of the market on account of its high price. Coke is heavy with little call and nothing to be expected. Colder weather is the only thing that will save what is left. At the present time there are about 65,000 to 70,000 tons of storage coal in St. Louis held by the larger dealers. Anthracite egg is scheduled to retail at $12.35.

COAL AGE

Volume 15 New York, February 6, 1919 *Number* 6

Perpetuating the Thrift Habit

By Floyd W. Parsons

IT IS probably true that of all the serious problems confronting the American people today none is of greater moment than the question of how to encourage and continue the saving habit that has been developed in the United States during the war. The mine manager who believes that the matter of individual thrift on the part of his employees is no concern of his is perpetrating a serious folly.

One investigator found that in two great corporations the labor turnover amounted to 187 per cent., which when analyzed developed the significant fact that of this amount the proportion of married home owners was but 4 per cent., and that of married renters only 11 per cent. Nothing could prove more conclusively the benefits that accrue to a company from the development of thrift among its employees. It is unnecessary to stop to prove that permanency and stability on the part of employees breed efficiency and create profits.

When this country entered the war, we had in the United States only 300,000 investors. It is estimated that today 25,000,000 Americans are bondholders. This means that practically every family in the country, mostly through patriotic motives, has practiced thrift. Shall we view this change in habit with indifference and permit the Nation to slide back into the uneconomical customs that prevailed before the war? Or, shall we profit by the lesson we have learned and build in every community still greater organizations designed to perpetuate habits of economy?

Throughout the world, restless dissatisfied people under the guise of Bolshevism, or some other "ism," are holding forth destructive ideas which they submit as a panacea for all political and social ills. Such campaigns fall flat when an effort is made to proselyte a community of property owners. The man who owns his home and who has invested his earnings in the bonds of his government, and in the stock of the company he serves, is not easily converted to a faith that teaches turmoil and destruction.

An extension among coal miners of the habit of saving would undoubtedly improve their living conditions; but it would do more, for such thrift would not only benefit the fuel industries but it would increase the volume of capital, thereby stabilizing the Nation's financial and political habits. It is for this reason that the great business leaders of the country are urging that employers should use such methods of distributing the forthcoming bonds of the Fifth Liberty Loan as can be continued permanently thereafter. In this way the thrift momentum will not be lost, and the habit of saving in America will be placed on an established basis.

The United States is splendidly equipped to maintain its present position as the most powerful nation on earth. Great Britain and Germany each has contracted an indebtedness of $40,000,000,000; France owes $30,000,000,000, while the indebtedness of the United States is only $21,000,000,000. Our position has changed from that of a borrowing country to that of an investing country—like England and France were before the war. Our people must be taught to understand the necessity of investing abroad, and that by so doing they protect themselves.

High wages can only be maintained by the workers putting back their earnings into money-making enterprises. Saving must be made as attractive and as easy as spending. Heretofore it has been a difficult and gloomy practice. We must put joy into it. It will be necessary also to introduce the business of saving to every individual. Last year the working people in this country bought $3,000,000,000 of Government securities, or nearly as much as the total average savings placed annually in all the savings banks in America. And this $3,000,000,000 was on top of the usual savings placed in those banks.

Right now is the opportune moment for each and every coal company to perform a real national service in fostering the habit of thrift among the miners of America. Incidentally, such action would be a marvelous stroke of good business.

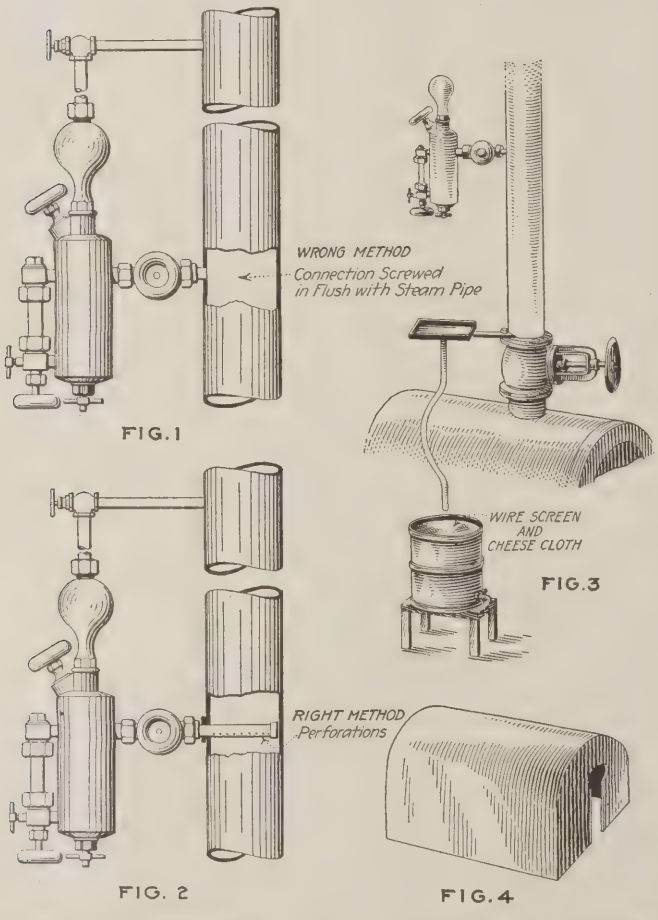
IDEAS AND SUGGESTIONS

Attachment and Care of Lubricators to Insure Efficient Engine Operation

BY JACK L. BALL
Amsterdam, Ohio

For the smooth and economical operation of a steam engine or pump, a lubricator of some kind is needed to feed the oil in such manner that the cylinder walls and valves may be lubricated. As the sight feed or hydrostatic lubricator is the one most commonly used around the mines, I shall confine my notes to this type exclusively.

When connecting a hydrostatic lubricator to the steam line, the idea is, or should be, to so make the connection



FIGS. 1 TO 4. SUGGESTIONS FOR ATTACHMENT AND CARE OF LUBRICATORS

that the oil will mingle freely with the steam, insuring complete atomization and causing a better distribution of the oil to the valves and walls of the cylinder.

Fig. 1 shows a fault commonly met with. The connection is screwed in flush with the inside of the steam line, allowing the oil to run down and adhere to the side of the pipe. This method is wrong and uneconomical. The connection shown in Fig. 2 has been proved by experiment to be a much better method of attachment. It will be readily seen that with the latter connection the oil has a chance to mingle freely with the steam and is more completely atomized.

Lubricators should be cleaned quite often. This is easily done by blowing out with steam. A common difficulty encountered is that of the sight feed glass becoming dirty. This is caused by the oil not feeding in drops, but running out and sticking to the side of the glass, or arises from the drops being too large. If the drops are too large the permanent remedy is to make the feed nozzle smaller. If the oil feeds in a stream or the drops are too large, a temporary cure is to put a small piece of soap inside the sight feed glass.

It sometimes happens that a lubricator is in a place where it is exposed to cold. This, of course, congeals the oil so that it will not feed properly. A common way to remedy this is to wrap a piece of brattice or other cloth around the lubricator and the steam line. This will then keep the lubricator warm.

It is a common practice among engineers, firemen and pumpers when filling a lubricator to use a pair of combination pliers or a 10-in. pipe wrench to open or close the drain and filling plugs. This is wrong. These plugs are so made that they can be closed with a slight pressure of the fingers and be perfectly tight. They will remain so for years if this precaution is taken.

Probably few power-house men have taken the time or trouble to save the oil that is wasted from lubricators. This may be but a few drops a day or, again, it may be considerably more. At one mine where there are several lubricators used the device shown in Fig. 3 has been installed to save the waste oil. The engineers were much surprised to learn that enough cylinder oil was being wasted to lubricate, after proper filtration, a large steam-driven pump in the mine. Fig. 4 is a piece of roofing iron so formed that it will set in the tray shown in Fig. 3 and keep the lubricator warm in cold weather

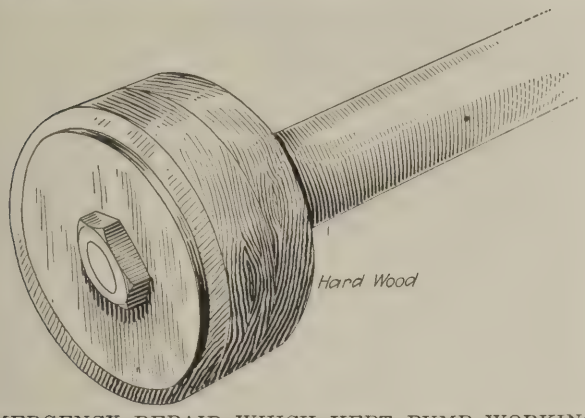
Novel Emergency Pump Repair Saved Both Time and Money

In coal mining, as in other phases of mineral production, output is an important factor in economical operation. When the output decreases the costs usually increase. Consequently, no reasonable diligence is spared in order to keep the mine product moving steadily. To accomplish this many expedients and makeshifts, usually of a temporary nature, are resorted to. Thus in one sense the most successful mine mechanic is the man who with small resources can temporarily accomplish the biggest results.

The accompanying illustration shows an emergency pump repair, or one that can be used in case of necessity. Should no packing be available for the regular pump piston, or should the piston head be broken, two or more pieces of hardwood plank may be drilled to fit

the bore of the piston rod and turned up around the circumference to fit the bore of the pump barrel. This fit should be a loose one, since all wood swells somewhat when it absorbs water.

To replace a regular pump piston head with two thin

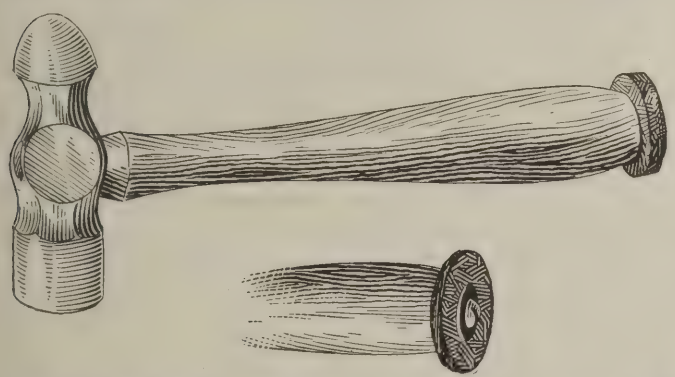


EMERGENCY REPAIR WHICH KEPT PUMP WORKING

follower plates and two circular pieces of plank can by no stretch of the imagination be considered as being a workmanlike job. In times of necessity, however, such makeshifts are entirely justifiable.

Preventing the Hammer from Slipping

Often a hammer will slip out of the hand of a workman who is engaged in repairing greasy machine parts. The accompanying photograph shows an accident of this kind, in which the flying hammer struck a coworkman,





HAMMER SLIPPED AND INJURED WORKMAN—THE GUARD SHOWN PREVENTS TOOL FROM SLIPPING

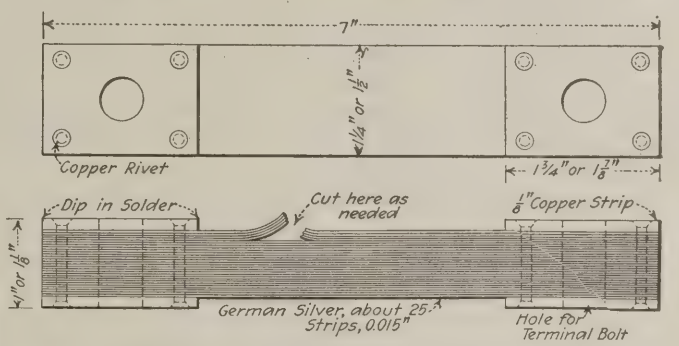
injuring him seriously. To prevent accidents of this character, hammers that are used when repairing oily machine parts should be provided with a leather washer fastened to the hammer handle as shown in the drawing.

Generator Cable Resistance That Will Last Long Time If Properly Installed

By J. J. Nolan
Linton, Ind.

The accompanying illustration shows resistance that has been in use in two separate power plants where two or more direct-current generators are operated in parallel. Quite often little attention is paid to the load when it is not equalized between two or more generators working in parallel, and it is a common occurrence to see one generator taking more than its share of the load unless the attendant keeps moving the rheostat throughout the day. Around coal-mining plants the load is highly variable and when switches are pulled after closing down at the end of the day's run a difference of 10 to 25 volts might be found on the voltmeters of different generators.

On looking closely several pounds of german silver might possibly be found connected across the extreme ends of the series field of the generator that is inclined to take more than its share of the load. This is an old practice, but seldom has it been found to do any good. The cables leading from the machines to the board



RESISTANCE FOR GENERATOR CABLE

should be of the same cross-section and length if the generators are of the same capacity. If cables leading from one generator are longer than those from the other, a suitable resistance should be connected into one of the shorter cables. This resistance should be of suitable strength and of such nature that the rise in temperature necessarily resulting from its use will not carry into the terminals of the cable or to the stud where it is connecting and injure the connection, melt the solder or pit the joint, later offering too much resistance at times and perhaps causing an "open" in the line or a serious burnout on heavy load that would result in a shutdown.

The resistance here illustrated will last indefinitely if installed properly with a clean snug joint, bolted up firmly. The ammeters should be watched carefully when a fair load is on, and if the generator which formerly took the largest share of the load continues to do so, one or two strips should be cut and results noted. Also, the resistance piece should be felt during the load so as to determine if it is offering enough resistance; if not, more strips should be cut and bent back until the desired results are obtained.

The man who does not get a certain satisfaction out of his work is losing the best part of his pay.

Safety Gate Protection at Mine Shaft

By R. P. HINES
Fairmont, W. Va.

SYNOPSIS — *A combination of devices is here described that will permit the shaft gates to be opened only when the proper cage is in place at the landing. The cage then can not be lowered until the shaft gate is again closed and locked. A few special pieces were required, but most of the material used was of standard design.*

IT IS the purpose of this article to describe the method used by a large operating company to obtain protection for the gate at the man, or surface, landing of one of its mining properties in the Pennsylvania bituminous district. In order, however, that the exact relation of the protective system and devices to the other parts of the equipment may be more fully understood, a general description of the hoisting system will first be necessary.

The mining plant includes a double-compartment shaft, the two compartments being of 6 ft. 10 in. by 11 ft., and 7 x 11 ft. on 7 ft. 4 in. centers. Through these the coal is hoisted from a depth of 345 ft. by an electrically driven hoist, also used for hoisting and lowering men.

The hoist is a double, conical, grooved-drum machine, each drum being 6 ft. 6 in. diameter at the small end and 8 ft. 6 in. in diameter at the large end, and of sufficient face to coil 500 ft. of 1¼-in. wire rope, allowing three extra turns for fastening. One of the drums is tight on the shaft, the other being loose and driven by a heavy toothed internal clutch wheel with machined teeth, for taking up slack and for the adjustment of the length of rope should it be desired at some future time to hoist coal from a lower level. Two band brakes are provided, these being of the weighted type, operated by air cylinders.

The hoist is operated with the cages and cars in balance, self-dumping cages being used. It is driven by a 250-hp. three-phase, 60-cycle, 450-r.p.m. synchronous-speed, 2200-volt, variable speed, slip-ring induction motor. This is attached to the pinion shaft by a flexible coupling, single reduction herringbone gearing being used.

A master-type drum controller is mounted on the hoist operator's platform, being used in connection with a 2200-volt, air-break, two-pole reversing contactor for reversing the direction of rotation of the hoist motor, and also a low-voltage contactor equipment for varying the speed of the motor, by varying the resistance in the rotor circuit.

A bank of three 85-kva., single-phase, 60-cycle, outdoor type, oil-insulated, self-cooled transformers are mounted on a steel framework outside the hoisthouse. These reduce the voltage from 11,000, at which the power is received from the transmission line, to 2200 volts, at which it is delivered to the hoist motor.

The electrical equipment furnished included the usual standard type of limit switches to be installed on the guides to prevent overtravel of the cage. There was also included a motor-driven air compressor to furnish compressed air for the operation of the brakes of the hoist.

There was later added to this equipment a device for the prevention of overwinding and overspeeding, including special man-landing protection. The electrical control devices are so arranged that when hoisting men it is impossible to run the hoist in excess of 900 ft. per minute, rope speed.

This device for the prevention of overwinding and overspeeding is of Vulcan Iron Works manufacture, and together with the scheme for automatically stopping the hoist at the man landing is protected by letters patent.

Fig. 1 accompanying this article gives a good idea of the device, as it shows it with the cover removed. A horizontal shaft, or spindle, bearing a square thread is carried in bearings at each end of the box-like supporting structure. One end of this spindle carries a

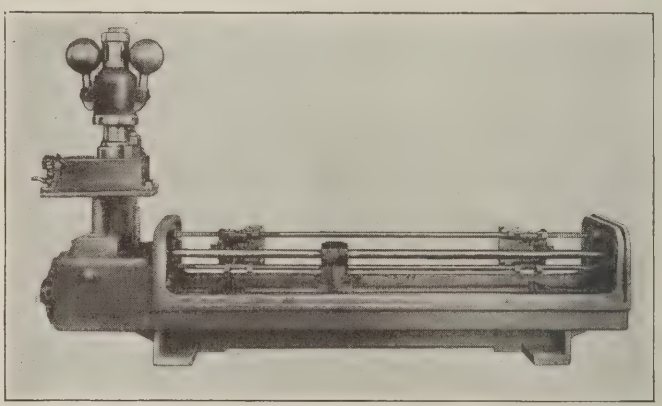


FIG. 1. VULCAN IRON WORKS FLYBALL GOVERNOR OVERSPEED DEVICE, COVER REMOVED

sprocket wheel, which is chain-driven from another sprocket rigidly fastened to the mainshaft of the hoist. This main horizontal spindle is also arranged to drive by means of bevel gears, the vertical spindle carrying the flyball governor.

The threaded spindle works through a rider, sliding over a round rod, as indicated, and this rider moves backward or forward, depending upon the direction of rotation of the hoist. Two sets of controlling contactor fingers are provided, and these are adjustable in their position and are actuated by the rider. Two of these contactor devices are used for protection in the normal operation of hoisting coal and are set so that the rider will travel from one to the other while the cage is traveling from the bottom of the shaft to the dump.

The other pair of contactor devices are for landing protection, and are set so that the rider will make contact with one of them as each cage reaches the man, or surface, landing. These contactor devices are wired in the circuit, so that when they are actuated by the rider in its travel they will open the control circuit of the hoist motor and equipment, which automatically shuts power off the motor by tripping the main oil circuit breaker and also applies the air brake.

The flyball governor, which is driven at a speed proportional to that of the hoist, is arranged to open a contactor wired in the control circuit and shut off power and apply the air brake, should the speed of the hoist reach 10 per cent. above the normal operating speed. A retardation feature is also provided and operated from the flyball governor, which accomplishes

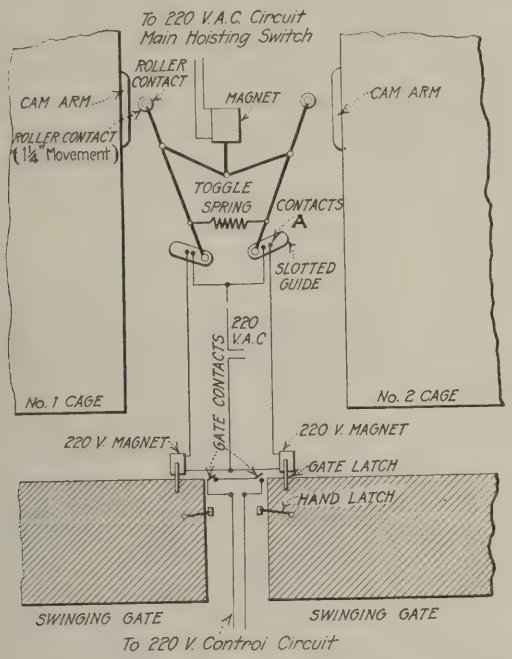


FIG. 2. AUXILIARY DEVICES AND SCHEME OF CONNECTIONS

an automatic slowing down of the hoist as the cage approaches the dump by opening, successively, the contactors controlling the amount of resistance in the rotor circuit of the motor, thus gradually and automatically inserting this resistance and slowing the motor down.

This motor resistance is arranged so that the cage must approach the dumping horns at approximate speeds not greater than 1200 ft. per minute at a distance of 25 ft. below the dumping point, 900 ft. per minute at a distance 20 ft. below the dumping point, 600 ft. per minute at a distance 15 ft. below the dumping point and 300 ft. per minute at a distance 10 ft. below the dumping horns. This requires that the hoisting engineer must apply his brake properly each time a hoist is made. If this is not done, all contactors and the main oil circuit breaker are opened, cutting power off the motor and applying the air brake.

In first considering this problem of safety gate protection it was thought that a mechanically or electrically operated device to actually open and close the gates would be required. Accordingly, such an equipment was designed and drawn up. It consisted of steel gates provided with rollers at the bottom running in steel guides, the gates having a rack attached to them, through which they were to be opened or closed by an electric motor having a pinion on its shaft in mesh with the rack on the gate. By means of an automatic contactor control system for the motors, these gates were arranged to automatically open when the cage stopped at the man landing and to remain open as long as the cage remained there, and to close automatically just as soon as the cage left the man landing, either going up or going down.

The contact-making device controlling all this automatic operation was to be supported from the guides and to be engaged by a wheel on the cage. It was designed so that in the normal operation of hoisting coal there would be no engagement between the contact-making device and the wheel on the cage, this only being effected when the man-landing switch of the control system was closed, which had to be done before men could be hoisted. The gate-operating motor was to be equipped with a solenoid brake arranged to be applied fully to hold the gate at the end of its travel in each direction, either completely open or tightly closed.

Estimates covering the cost of this proposed scheme showed that it would be comparatively expensive and require a considerable time for its production, so the whole scheme of a mechanically or electrically actuated gate was held in abeyance and the problem approached from another angle.

Reference to the safety requirements as outlined by Art. 8 of the Pennsylvania Bituminous Mine Law was had in order to obtain all the detailed information possible. This article of the law reads as follows: "All shafts shall be provided with safety gates controlled by the cage at the top and intermediate landings, and said gates to be approved by the inspector."

In analyzing the basic intent of this law it seemed clear that safety was the fundamental requirement and that there was no intent in the law to circumscribe or prescribe the specific means by which the safety features were to be secured or to require certain methods of securing this, to the exclusion of all others. Consequently, it was believed that there was no sound rea-

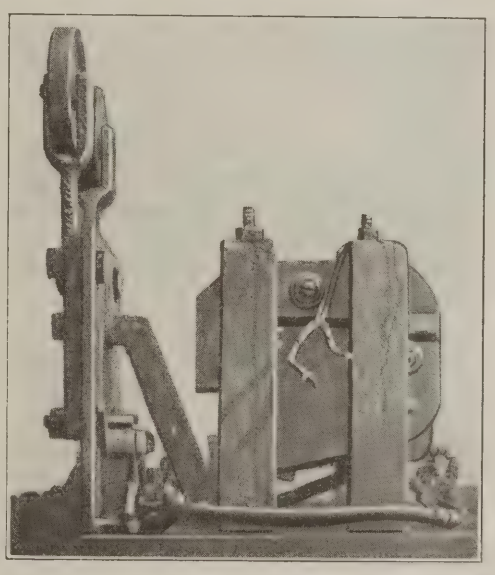


FIG. 3. TOGGLE, TOGGLE MAGNET AND ROLLER CONTACT ARMS

son for interpreting the law to be satisfactorily complied with only by gates mechanically or electrically opened or closed. Therefore, in seeking the second solution, there was eliminated entirely the proposition of any mechanical or electrical devices for actually opening or closing the gate.

It was thought that the complete protection that the law sought to obtain would be provided by fulfilling the

two following conditions: (1) The shaft gates must be at all times locked in the closed position, except when men are being hoisted, and then only when the cage is directly opposite the man landing. (2) In the event that the shaft gate is left open for any reason the hoist will be rendered inoperative, and it will not be possible to move the cage an appreciable distance either up or down.

Believing that if the two basic requirements as above stated were met the safety standard would be complied with in every possible way, some solution was sought which should completely satisfy these conditions.

Having in mind the excellent protective features provided by the flyball governor overwind device, for all contingencies and emergencies which might occur in the normal operation of the equipment in hoisting coal, and in man-landing protection, it seemed but natural to the man to whom this problem was presented at this time that this device operating in conjunction with some specially designed auxiliary parts might be made to meet also the additional requirements of complete safety gate protection.

This proved to be the case, but in order to get a clearer idea of the way in which the normal operation of the device was modified by the auxiliary devices designed, the operation in the normal hoisting of men will be outlined. This is as follows:

In the operation of hoisting men, the bottom cager gives the usual man-hoisting signal, in this case three bells. The hoist operator then closes a single-pole, 220-volt switch on the operating platform. This switch places the man-landing features of the overwind device in operation, and at the same time energizes a signal light at the top of the shaft or surface landing and a signal light on the hoist dial; also a signal light at the bottom landing of the shaft. Upon noting the light, the bottom man signals the hoist operator to start, knowing from the signal light that the man-landing features of the overwind device have been placed in operation. If for any reason the hoisting engineer should fail to shut off the power and apply the brakes just as soon as the cage passes the man landing, the power is automatically cut off and the air brake applied, thus bringing the cage to an absolute stop before it reaches the dumping position.

In the actual mechanisms applied to the overwind device no originality is claimed, as they are in daily service on some types of automatic push-button control elevators; but the feature of selective operation, whereby the safety gate at the man landing can only be opened when hoisting men, and then only when the cage is directly opposite the landing, is possibly new in its connection with and application to the type of overwind device on this hoist.

Referring to Fig. 2, which shows the auxiliary devices and the scheme of connections, a roller contact device is attached to each of the two cages. A collapsible toggle, having two arms, is attached to an "eye" beam between the two shafts, this toggle being operated by a 220-volt magnet, as indicated. It is located so that when the magnet is energized the two arms are thrown out into such a position that each may be engaged by the roller contact device on the cage in that shaft over which the arm projects. Each gate at the man landing is held closed by a bolt, which is arranged to be raised by a magnet whose winding is energized from the 220-volt control circuit, and is wired in series with the contacts which are opened and closed by the toggle arms. In the normal operation of hoisting coal the toggle magnet is not energized and the toggle collapses, the roller contacts on the cage not engaging the toggle arms.

When men are to be hoisted the hoisting engineer, by closing the single-pole switch which places the man-landing overwind in operation and lights the signal lamps, also energizes the 220-volt toggle-operating magnet, which throws the toggle arms out into position where they may be engaged by the roller-contact device on the cage. When the cage comes exactly opposite the man landing, the roller contact on the cage engages the toggle arm and causes this to close the circuit to

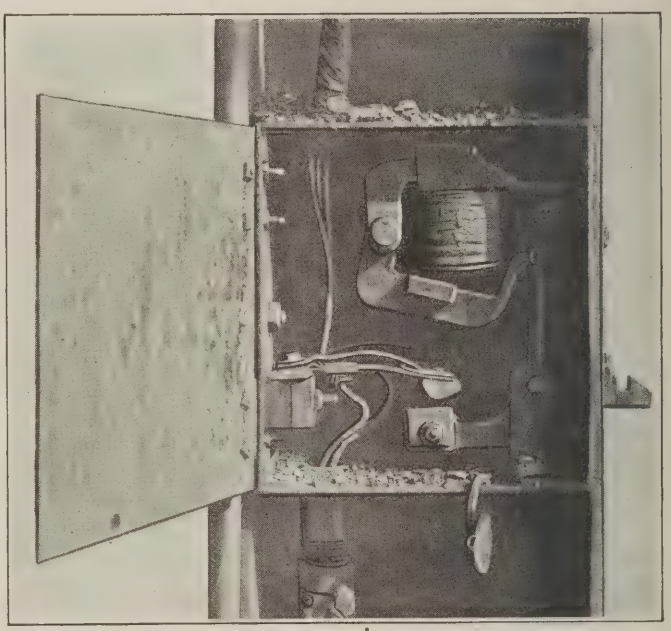


FIG. 4. MAGNET WITH GATE BOLT, GATE LATCH AND INCLOSING BOX

the gate bolt magnets, and lifts the gate bolt, which permits the gate to be opened. The control circuit of the hoist is wired in series with the contacts which are closed by the gate hand latch. As soon as the hand latch is released and the gate opened, the control circuit is broken, all contacts opened, and therefore the air brake automatically applied to hold the hoist fast with the cage at the man landing. As long as the control circuit is open, the hoist is inoperative and cannot be moved.

In order to prevent the operator from opening the single-pole switch placing the man-landing protection in operation, before the cage has reached the landing, this switch has been arranged so that it cannot be opened unless the air brake is applied. This is accomplished by a magnet which holds the switch fast after it is once closed, the windings of this magnet being energized when the switch is closed. The air brake of the hoist is provided with a contact actuated by the piston, so that when the piston falls, which it does when the air brake is applied, it opens the 220-volt circuit of the magnet holding the double-pole switch closed, and this switch may then be opened.

While the opening of the single-pole man-landing switch would not in any way affect the safety gate protection, inasmuch as the gate could not be opened until such time as the switch was thrown in again, it does affect the safety protection as installed by the hoist builders for hoisting men, and this additional protective feature was incorporated to comply with the wishes of the mine inspector.

In the application of these auxiliary devices the mechanical details were made at the shops of the mine. The magnets and cores for the toggle operation were such as are standard in the equipment of mine-hoist motor contactors, while the magnets and cores used for the gate bolt-lifting mechanism are standard as used on the control boards of push-button-operated elevators.

The fact that the brakes of the hoist are air-actuated and that all operations are dependent on one 220-volt control circuit, taken in conjunction with the application of the type of flyball governor overwind device, has made more easily possible the accomplishment of the complete and comprehensive safety features provided.

It is considered that every safety requirement has been fulfilled, and this with a minimum of operating parts and resulting complications. It may be further pointed out that if from any cause outside normal operations the 220-volt control circuit is broken, that the power to the hoist motor is automatically cut off and the air brakes applied.

The fact that the gates have to be manually operated is thought to be an additional safety feature. With a mechanically or electrically lifting gate, there is always the possibility of the gate striking a person, with resulting injury. With a mechanically or electrically operated swinging gate there is the possibility of sweeping a person into the shaft. With the manually operated gate there is no possibility of injury as the hoist is inoperative until the gate is closed and the control circuit completed.

The flyball governor overwind device had been operating satisfactorily for more than a year previous to the application to it of the safety gate protective features, about ten months ago. Since that time both have been operating together with perfectly satisfactory results.

It is hoped that this article may be of benefit to others having a similar problem to solve; also that it will prove of general interest to many operators of electrically driven hoists.

Combustion of coal is not a simple oxidation of carbon and hydrogen to CO_2 and H_2O, but is a complex process. The volatile matter from heated coal contains tar, saturated and unsaturated hydrocarbons, carbon monoxide and hydrogen, all of which must be burned in the space above the fuel bed. These materials all react among themselves and with the products of their combustion. Each reaction exerts its influence upon the others and can not be considered separately. The high temperature in the furnace favors the formation of simpler compounds so that the final products to be burned are largely soot, CO and H.—*Bureau of Mines Bulletin No. 135.*

Important Development of Large Coal Tract in Greene County, Pennsylvania

The development of a 7600-acre tract of coal land in Greene County, Pennsylvania, by the Buckeye Coal Co., has reached such a point that shipments of coal are about to take place. The Buckeye company is a subsidiary of the Youngstown Sheet and Tube Co., and the coal plant at Nemacolin, Penn., will supply coal to the byproduct plant of the parent company at Youngstown, Ohio. It is expected to make the Buckeye operation a model plant with a capacity of 6000 tons of coal daily, giving employment to some 1500 men. The Buckeye mine is said to be the first development on a large scale in Greene County, and likely the mine will not reach full capacity for several years. Shipments will be made at present by water or until the completion of a railroad spur from Crucible, eight miles distant.

The main openings to the coal at this plant are shafts about 250 ft. deep and lined throughout with concrete; a unique feature of the airshaft is its circular section —being 20 ft. in diameter. The main or hoist is elliptical in cross-section. Considering the large daily tonnage desired, it was decided to hoist the coal in skips instead of by cages; this is in line with recent developments made at some mines which are expected to become record producers.

The air shaft is completed and a fan has been installed with a capacity of 400,000 cu.ft. per minute. Other mine openings at this plant include a man and material slope 857 ft. long driven on a 19 deg. pitch and concreted from the surface to the coal. Until the completion of the main shaft and tipple, the product of the mine is hoisted through this slope and onto a temporary tipple—six cars per trip. A shop equipped to handle all ordinary mine work and repairs has been erected and equipped.

Especial attention has been paid to the housing problem at Nemacolin. Houses for the superintendent, chief engineer, store manager and doctor have been completed. There have also been built 120 houses for the workmen; of these 80 are five-room dwellings and 29 are six-room houses. To add to the comfort of the employees, 76 of the houses have been equipped with hot air furnaces; 35 houses have bathtubs while the remainder have showers. Every house has a toilet and electric lights. Some 400 acres have been reserved for a town site on a knoll overlooking the Monongahela River; the town covers about 50 acres.

The sanitary condition of the Nemacolin community has been provided for in a sewage disposal plant which has been constructed with the approval of the State Board of Health. Both Protestant and Catholic churches will be built, and plans have been completed for a six-room school building with provision made for additions. The streets of the town will be named after the leading generals of the recent war. The main thoroughfare will be known as Pershing Boulevard; other streets and avenues will be named Foch, Haig, Petain, Diaz, Bliss, Wood and Joffre respectively. The local officials of the Buckeye Coal Co. are C. M. Lingle, general manager; W. H. Gages (formerly mine foreman of the Frick company at Connellsville), superintendent; A. W. Hesse, chief mining engineer, and G. F. Bell, chief clerk.

Mudding Coal at St. Eloy, France*

SYNOPSIS — *The French feed mud into the crevices of the coal in heated ribs so as to extinguish the fire in them. This mud may be fed in from the surface or forced in from below, a tank being preferably used as the immediate means of delivery. Apparently the operation of the tank by compressed air has been found greatly preferable to the use of such water pressures as are apt to be available. Moreover, water operation is wasteful of water and slower than air pressure.*

THE flushing method is the most efficacious means for the fighting of mine fires. It was already practiced at Commentry[1] before 1878, and H. Fayol, in his study of the fires of that mine in the *Industrie Minérale,* 1889, shows the excellent results obtained by that process. The material was delivered not only from the surface but also from the mine, the flushing material being placed in the latter instance by diaphragm pumps which forced the material to be flushed into a borehole that sloped upward in the coal.

This process, which will be termed the "process from below," is still practiced in many mines, the muddy liquids being forced into the coal by pumps, as at Monteau-les-Mines, where disk and ball pumps are still used.

In the application of the process from below, an innovation was introduced at the mines of Aubin, in 1910, by M. Clavelly. This consisted in the use of a flushing tank which was described in the *Bulletin* of September, 1912. It was an iron tank, or barrel, connected at one side with a water line under pressure and having, at the other side, a valve through which the flushing material was ejected.

The flushing materials were introduced in the tank by an opening fitted with a self-closing device. They were carried off, of course, by the flow of water, the liquid being agitated from the outside so as to mix the material with the water, thus permitting it to be flushed into the borehole.

At St. Eloy, flushing from below has been practiced since September, 1915. At first a flushing tank identical with the one used at Commentry was used to deliver flue ashes, but a great quantity of ashes was quickly used up and the available stock at St. Eloy and in the neighborhood soon ran out.

For this reason, the management proposed the use of washery waste with 50 per cent. of ashes, the former being valueless material of which there was practically an inexhaustible stock. But this waste is much heavier than flue ashes, and using the same velocity of ejection half the material was left at the bottom of the tank. To make it possible to use these wastes, it was necessary to increase the speed of evacuation; and for this purpose the pressure of a compressed-air line was utilized to force the mixture into the boreholes.

The flush tank is operated by air pressure and is similar to that used at other mines, notably at the mine of the Companie de Béthune, where it was resorted to for strengthening the concrete lining of the heading by an application of cement grout.

It is an iron barrel (Fig. 1) into which is introduced the material to be injected and the water needed for the injection. It is fitted at its lower end with the outlet pipe *V*. This pipe is connected with the borehole, and at the top near one end is the tube *A*, connected with the compressed-air line. After the tank has been closed, the mixture is kept in agitation by a stirring device, operated by a handle from the outside. As soon as the material is well mixed compressed air is let in, and it forces the mixture into the borehole. As soon as the tank is empty, new materials are introduced, and the machine is again ready for operation. The water could be fed into the barrel by the opening by which the flushing material is introduced, but it is more convenient to connect with the water line through the pipe *E*.

Self-Closing Valve Saves Time

In order to avoid waste of time at each operation, the opening for the introduction of the material is fitted with a self-closing valve, which can be operated rapidly by a lever placed outside the tank. A second pipe *A'*, similar to the pipe *A*, is placed at the top of the tank. Through this the pressure of air is released before the tank is refilled.

The self-closing plug *R* is provided for cleaning purposes. The capacity of the tank is 119 gal. It is mounted on a truck, and the whole apparatus weighs 1610 lb., the tank weighing 1221 lb. and the truck 388 lb. The mines at St. Eloy have now three flushing machines of this type.

The rapidity with which the material is flushed depends on the effective pressure of the water or of the air with which the tank is supplied. When compressed air is not used, the effective pressure at the flush tank is much lower than the static pressure of the pipe lines, on account of the large loss of head in the pipes. A head of 197 ft. was used, but the pipe line was about 1312 ft. long, and the pipe had an inside diameter of only 1.29 in.; moreover, it had many elbows. The speed of the water reaching the empty tank was only about 3.28 ft. per second, corresponding to a theoretical effective pressure of 2.15 in. of water.

When the flushing tank is filled up and is delivering a flow in the borehole, the speed is still lower because of the resistance of the coal to the passage of the fluid. Thus slowed down, the speed of the current is not sufficient to carry along the heavy elements in the flushing material.

The use of compressed air at a pressure of 56.9 lb. per sq.in. gave the material a theoretical speed of 82 ft. per second, assuming a specific gravity of the fluid mass such as to reduce the value of the head from 131

*Abstract of Chapter I of an article by M. A. Plassard, assistant manager of the West Canadian Collieries Co., Ltd., published in the Bulletin de la Société de l'Industrie Minérale. St. Eloy is about in the geographical center of France in the Department of Puy de Dome. A small basin of coal takes its name from St. Eloy.

[1]Commentry is located near St. Eloy, but in another coal basin.

ft. to 104.6. In fact, because of the resistance of the borehole, and because of the presence of a small quantity of air in the water, and of various corrections to be made to the theoretical formula, $v = 2gh$, the theoretical speed is not as significant as it at first seems. The actual speed is more readily determined by an observation of the time needed to empty the flushing tank; 119 gal. flows out through an orifice of 1.31 sq.in. in about 30 seconds, when the resistance to mudding is at a minimum.

When the resistance of the cracks increases, the speed of evacuation decreases; but it is nevertheless sufficient to carry away all the breaker refuse so long as mudding is continued. The same result would obviously be obtained with the flushing tank if water pressure only were used; provided that sufficient effective pressure were available. Lacking such free head, a pump can be connected with the intake line, and it will provide the required pressure.

The air acts on the fluid mass like a piston and does not modify the proportion of water. In using the flushing machine with water pressure, or rather with a water current, the water continually thins the initial mixture, the operation being stopped when the mixture is sufficiently thin. This necessitates using an inflow of water equal to at least twice the capacity of the flushing tank.

Even if the pressure obtained with water is readily made equal to the air pressure, the difference in operation would still give the air pressure an advantage as regards consumption of water and speed of operation. The speed of evacuation when compressed-air is used being amply sufficient to carry away the material without leaving any residues in the tank, the outlet pipe has been placed at the lowest point in the tank. So disposed, it is possible to utilize the full capacity of the flushing machine.

It is obvious that elements that are too bulky cannot be profitably introduced into the flushing tank. Such materials are frequently found in flue ashes. They comprise clinkers, broken bricks and clay lumps, the last of which break up but little when thrown into water. Large quantities of coarse material are found also in the basins, where the waste from washeries is drained away; so the washery waste does not flush without residue unless screened.

To clear the flushing material of those undesirable elements, it is passed over a screen pitching at an angle of 45 deg. with 0.78-in. (20-mm.) round holes. The flushing tank can be operated by two men, or even by a man with the help of a boy. When the flush tank is empty, the water inlet is opened, and the material is introduced by shoveling it into a removable funnel. The assistant aids the material to slide into the tank. The loading being done, the attendant waits until the water has completely filled the tank, when the water inlet is shut.

The agitator is then turned a little, to render the mixture homogeneous, the air inlet being opened meanwhile. The lowering of the slush in the tank is soon evidenced by the fact that the pallets of the agitator turn with greater ease.

As soon as the tank is empty the compressed-air inlet is shut and the air outlet opened. In this way no compressed air is forced into the coal which is being mudded. In fact, the discharge of air in place of water and mud into the heated mass would, if it occurred, be one of the objections to using compressed air for fire mudding. But the process described above makes it unnecessary to discharge any important quantity of air into the borehole. All that does enter passes in with the water and is the outcome of the agitation of the mixture during the discharge of mud.

However, the discharge of air into the borehole would seldom do any great amount of harm. The coal to be flushed may be classified as follows: (1) Coal in a

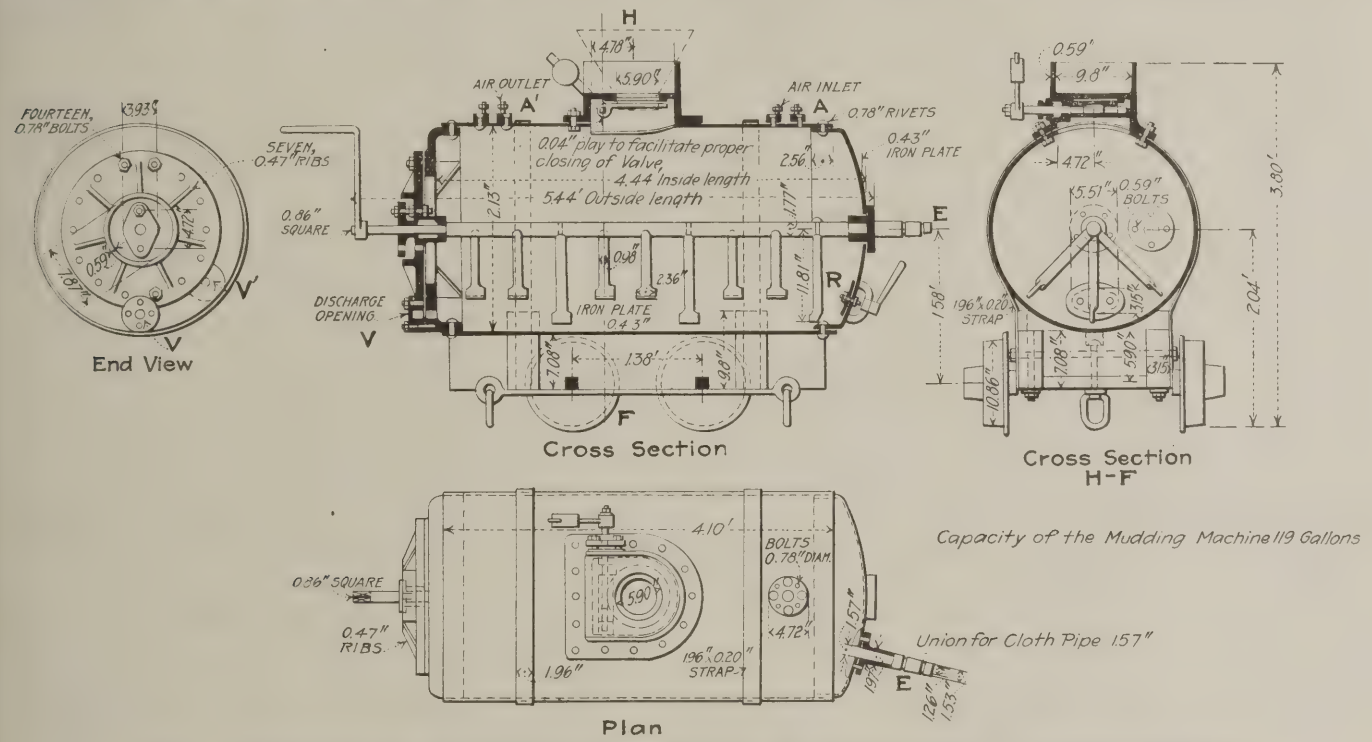


FIG. 1. MACHINE FOR SMOTHERING FIRES IN COAL BY INJECTING MUD INTO THE CREVICES

cold or little heated district, where the flushing is merely preventive. (2) Ribs in such mine areas as it is necessary to keep open, and which are generating combustible gas and developing points of spontaneous combustion. These ribs include those of abandoned roadways where the roadways have not been filled with refuse. (3) Ribs on fire.

The first case is by far the most usual one in the methodical handling of a fiery mine, and here the entrance of air into the borehole does not create any inconvenience. In the second case, air might favor the formation of an explosible mixture. For this reason its introduction must be carefully avoided. In the third case, the air would of course intensify the fire, but the effect of the air would decrease as the flushing material accumulated.

Flushing Is Done by Compressed Air

It is possible to avoid any forcing of air into the coal, but should such an untoward accident happen there are few cases where it would entail serious inconvenience. In the flushing work at St. Eloy, the compressed-air method has been used in all cases, even without using the air outlet, for that adjunct has only recently been added to the flushing tank. Yet no inconveniences were experienced from air forced into the coal.

However, if danger seemed probable in any particular case, an immediate transition from the compressed-air method to the hydraulic method would allow the operator to continue the flushing with entire safety. The same apparatus, in fact, can be used with both water pressure and air pressure; all that is necessary is to have in store materials sufficiently light for such pressure as is available.

If the materials in use are so large that residues are left, the only provision necessary is that the outlet for the muddy fluid be high enough above the bottom of the tank to be free of possible accumulations of the material, the residues of several flushing operations. The old water intake *E*, placed at the mid-height of the tank, may be used as outflow pipe and the water be introduced by the former outlet pipe *V*. With a view to avoiding even that change, which would make it necessary to bring the flushing apparatus to the surface, a second outflow pipe *V′* was added to the flush tank so that the method of operation could be changed without any difficulty by simply transferring the connection from *V* to *V′*.

Use Auxiliary Tank to Keep Air From Coal

Where no light materials are available, it is sometimes necessary to operate under high pressure even where it is essential to keep air entirely out of the coal and where no high-pressure water supply can be secured. In such a case compressed air could be utilized, but it would have to be delivered to an auxiliary apparatus, the water entering the flushing tank under pressure. If a hose pipe were used to connect the two tanks, it would be easy to obtain from its movement a warning of the moment when the air of the first apparatus started to pass into the flushing tank.

At each operation the flushing tank received half a mine car, or 9.35 cu.ft., of ashes or breaker refuse, which occupies space which would accommodate 70 gal. of water. The actual water displacement of the materials, however, will be 20 per cent. less than their volume. What occupies the same volume as 70 gal. of water will displace only 58 gal. of water. The tank holds 119 gal. so, roughly speaking, the volume of water used is equal to the space occupied by the material. With two men, 4 minutes is needed to introduce the materials, 2 minutes to agitate the mixture and empty the tank. Hence it is possible to charge, make and discharge the mud in 6 minutes if the inflow reaches or exceeds 15 gal. a minute. At St. Eloy the inflow of water was slow, and the complete operation required at least 7 minutes.

In practice, this rapidity of operation cannot be attained because of the difficulties in placing the cars loaded with flushing material. Then there are unforeseen circumstances such as obstructions in the pipe lines. As a result the record at St. Eloy hardly exceeded four complete operations an hour, corresponding to about 35 cu.ft. of introduced materials. The volume of air used, measured at the line pressure, is roughly double the volume of the materials; that is to say, it is at most 70 cu.ft. an hour, a negligible quantity.

As stated, the main advantage of the use of compressed air was that it enabled us to utilize materials which were too heavy for use when using such water pressure as was available. But operation with air has made the work three times as quick as with water pressure and has required only one-sixth part of the water needed when water pressure was the motive power.

To establish a comparison between the two plans of operations, the broad outlines of the operation with water may be outlined briefly. The flushing apparatus had a capacity of 119 gal. and an effective head at the flushing machine of from 1.96 in. to 2.75 in.

Operation Under Water Pressure

At each operation, 9.35 cu.ft. of flushing materials, or the equivalent of 70 gal. of liquid, are introduced. The end of the previous operation leaves the flushing apparatus full of water, so it is necessary to empty 58 gal. of water by opening the cock on the discharge line, thus making room for the materials to be introduced which, dumped into the water, will add 58 gal. to the volume of that fluid.

The flushing apparatus is then closed, the agitator is put in motion, and the water-inlet valve is opened. By degrees the materials mixed with the water are carried away. When the resistance of the pallets has sufficiently decreased, the water is shut off. About one-sixth of the charged material remains in the tank after each operation, so the moment suitable for stopping the operation is not clearly defined; but it is better not to extend it too long, as the consumption of water is in proportion to the duration of the operation.

After every third operation, the residues must be cleaned out by the mudhole *R*. The average length of time occupied by a complete operation is 40 minutes, including 5 minutes for emptying half of the tank and introducing flushing material, 20 minutes for forcing mud into the borehole and 15 minutes for cleaning out the residues, handling the cars and miscellaneous unforeseen delays. The speed of operation when the

resistance to mudding is light is 1½ operations per hour, corresponding to 9.35 cu.ft. × 1.5 = 14 cu.ft. of material, from which one-sixth that is residue has to be deducted. As a result only 11.7 cu.ft. of materials per hour are delivered instead of 35.3 cu.ft. with the air method, which works more rapidly and does not leave any residue.

The consumption of water is given by the product of the time the evacuation lasts with the flow of the water current during that time. For that flow we will have a figure close enough, though too high, by taking the flow of the intake current in the empty flushing machine. When we flushed with water pressure, that flow was about 13 gal. (50 liters) per minute, which gives for the 20 minutes of evacuation a flow of 265 gal. (1000 liters), to which must be added half the capacity of the tank, or 60 gal. (225 liters), for the tank must be emptied at the beginning of the operation, and also one-third of a full tank (40 gal.), because the tank must be emptied at every third operation, so that the residues can be cleaned out. Consequently, the consumption of water totals 365 gal. (1395 liters), and this flushes a space of about 9.35 cu.ft., equivalent to 220 liters, or 58 gal.[2]; that is to say, about five times as much water is used as material flushed, whereas with the air method the water used and the material delivered are roughly equal.

Problems Connected with Mining at a Depth in Great Britain

George Blake Walker (president) in his inaugural address before the Institution of Mining Engineers of Great Britain, dealt largely with the future conditions of coal mining. He stated that the seams comparatively near the surface were about exhausted and that as mining was prosecuted at greater depths the rock temperature increased. At one operation near Doncaster the men suffered from boils and anemia, and their working efficiency was reduced 20 per cent.

It is of great importance that the mine ventilation current should have as little effect on the rock exposed in the entries and other mine workings as possible. As airways and entries which have a smooth surface cause less friction to the ventilating current than those which are less smooth, for this reason, it was noted, cement linings on airways had been used largely in some French collieries—notably at Courrières. This practice is said to be quite economical. The airways were roughly shaped to a circular or oval form and were then coated with a shell of cement a few inches thick by means of a cement gun. The principal value of this coating is in preventing leakage of air into the gob and the heating of the intake air from old mine workings or gobs.

In the Doncaster district the seam underlying the Barnsley bed is utilized for ventilation; intake or return airways are driven in this seam independent of the workings in the Barnsley bed. This method permits of the separate ventilation of panels and districts so that, should excessive temperature prevail in a certain section, it could be reduced and the workmen be protected. This system would seem to lend itself admirably to a plan which might include the cooling of the mine air at some future time. Refrigerating apparatus has been considered in this connection as making it possible to reduce the temperature of a large volume of air 10 deg. at comparatively small cost.

Mr. Walker notes that if we have reached a point where underground workers have become inefficient then the human element would have to give way more or less to mechanical appliances. Coal-cutting machines have been in use in English mines for many years, but hitherto this apparatus has been largely confined to the thinner seams. It does not seem that their use has been considered economical in seams thicker than 4 ft., but when these machines are to be used in workings in which excessive temperatures prevail then they likely will be introduced into the thicker beds. Explosives would largely be done away with at great depths as here the coal would break down quite easily under pressure. Furthermore, the animal haulage which has been supplanted by mechanical means in recent years would have to undergo further reduction as the mines became deeper.

In sinking to coal at a depth of 3000 ft. and over a large expenditure must be made for shafts. Shafts as now constructed are made 20 ft. and more in diameter, and two such openings might easily represent an expenditure of $300,000 irrespective of equipment. This development might only be justified when areas of 5000 acres or more would be tributary to the shafts in question. But the difficulties of high temperature would tend to limit the extent of the workings; in this case shafts would have to mine out smaller territory, which might be prohibitive to private capital and require state action. Eventually it would be a question of the cost of mining the coal, making the expenditure not worth while.

The International Geological Congress recently issued a report on the coal resources of the world and estimated the total probable reserve at 7,397,550 million tons. Of this amount Great Britain has one-fortieth, while the whole empire controlled about one-fourth. The fact that the United States, whose competition must be considered more than ever in the immediate future, possesses more than half of the world's supply of coal, makes it necessary to conserve this (Great Britain's) supply. Furthermore, this estimate of coal reserve was based on being able to mine coal to a depth of 6000 ft. from the surface. The British Royal Commission on Coal Supplies settled on a depth of 4000 ft., below which it would not be profitable to mine coal. However, Mr. Walker suggests that these depths are open to criticism and the available quantities of coal were greatly overestimated. The Royal Commission on Coal Supplies reports 39,483,000,000 tons available in Great Britain; if this quantity were reduced by 20 per cent. it would leave 31,586,400,000 tons. As the production of British mines for 1910 to 1914 inclusive was an average of 270,000,000 tons per annum, then the reduced reserve would be exhausted at this rate in 116 years.

In connection with the depth at which mining might be profitably carried on it was suggested that if conditions were unfavorable at 3000 ft. (already practically reached at Doncaster), then it would seem to be useless to estimate at depths between 3000 and 4000 ft.—much less at the greater depths of 5000 and 6000 feet.

[2]Seventy gallons less one-sixth residue, which by chance is the same figure as that given for the water displacement of the flushing material.—[Editor].

Baltimore Coal Trade in 1918

THE year 1918 came into being with weather records the lowest in the history of the Federal Weather Bureau, and nearly twenty thousand homes in Baltimore out of all classes of coal. Industrial Baltimore was so short of fuel that many plants worked only part time, some being forced to close for brief periods because of lack of coal. Even the public utilities ran short, and the words "coal famine" were the mark of a reality and not a mere figure of speech. Many schools and churches suspended for a time. Such was the condition through much of January and February.

The year ended with the glow of peace spreading over the world, with a cancellation of war contracts and with the release of coal for industrial and domestic purposes in such volume that all thought of famine is at an end for the time being.

Of the new year there is not much to relate so far, save that it has all the earmarks of bringing rehabilitation changes to business that must be overcome before the fuel industry is again on a truly stable competitive basis following the release of all Government control. It can be said, however, that the trade holds a confident view for the future. That no firms of real consequence went to the wall during the trying days of the war is a subject of congratulation, and it is the belief there will be a bigger business here in local trade, coastwise and export movement than was recorded in the banner seasons of 1914 and 1915, when the export movement for the first named year ran well over a million tons and for the latter a round two million tons.

Pier Facilities Considerably Enlarged

In the past few years Baltimore has swung into a new position as to the possibilities of modern coal handling. The pier situation here, for instance, is interesting. When Baltimore made its first real bid for export business it had an antiquated pier at Canton owned by the Pennsylvania; now there has been completed there a giant new pier of modern design. The old Curtis Bay pier of the Baltimore & Ohio had its decided limitations; now there is a remarkable pier of modern belting-system handling which alone could dump 12,000,000 tons a year, and which has set world records in loading. It was at this pier that the "Tuckahoe," the ship constructed by the Shipping Board in 27 days, was loaded in two hours and fifty minutes. The Western Maryland's pier at Port Covington was only a moderate factor, and the Locust Point pier of the Baltimore & Ohio was merely a harbor-delivery point of moderate capacity in years gone by.

After the Fuel Administration control and the drop in the immense coal handling here by reason of war conditions the pier business vastly decreased. Curtis Bay kept running on navy, Shipping Board and some coastwise coal when bottoms could be secured; Locust Point and Port Covington were closed, and the Canton pier of the Pennsylvania was used for economy sake by the Railroad Administration to handle all harbor delivery, Baltimore & Ohio, Pennsylvania and Western Maryland shipments. With the splendid pier facilities here of all coals, however, and the prospect of a large export and coastwise trade as soon as vessel bottoms are released for general water movement, Baltimore seems due for the greatest coal-handling records of her history.

Industrially Baltimore too is prepared to go ahead. Many great plants that handled war work and the public service corporations have installed modern coal-handling machinery. One of the finest coal handling plants in the country is owned by the Consolidated Gas, Electric Light and Power Co., of Baltimore, at its Westport power branch. This tower is one of four units of the coaling equipment at the plant. Still another unit is under construction.

Of the immediate past in the coal trade here it is to be recorded that the months of 1918 in this section were about a duplication of the conditions all over the east. Soft coal supply was desperately short all during the winter months, and while some relief came through in the spring, there were constant complications from war conditions and Government control. Changes to jobbing methods, regulation of production as to quality and price changes at frequent periods, priority rules that were set and upset, commandeering—all are too vividly remembered to be repeated at length.

Demand Drops with Signing of Armistice

The signing of the armistice found the soft-coal trade a little easier here as to supply, as most industries had been able to stock up with fuel, even if it was of very inferior grade in many cases. After that time the increasing releases of the better coals caused an easy market, in which there was some price cutting. As a whole, however, the trade rounded out the soft coal year in good form and with good prospects.

The anthracite situation during 1918 was ever a serious one until after the armistice was signed. The year was begun with thousands of homes in this city without fuel, and only the most expert handling of the situation by the retail coal dealers, with approval of the fuel administration, saved a much worse situation. Baltimore ended the real winter season in March pretty well cleaned out of all hard coal. It was estimated that the suburbs and city would need a total of 896,345 tons for the coal year—based on a consumption in 1916-17 of 657,921 tons in the city and 63,428 tons in the immediate suburbs, a total of 721,349 tons. The balance was asked to cover stored shortage, cellar replacement, increased population needs and increased burning by several industries which were included in the allotment. The request was rejected, and Baltimore was allotted 713,316 tons for the city and 61,000 tons for the suburbs. Up to Nov. 11 on this allotment the city and suburbs had received less than 450,000 tons. Because of the two-thirds delivery plan and the fact that many consumers had undoubtedly managed in some way to get practically their full allotment, while the corporation demand for hard coal had cut heavily into the apportionment received, the day of the signing of the armistice found 12,920 homes in the city still without coal, as shown by a public census. Heavy receipts since then, however, have relieved the situation entirely.

With December figures off, they not having been compiled by the local fuel administration, the hard coal situation here by months was as follows:

	Received, 1918	Received, 1917	On Hand End of Previous Month	Tons Delivered	Tons Not Delivered of Two-Thirds Plan
April	67,174	50,681	30,809	69,304	267,761
May	55,757	66,782	32,555	66,928	270,837
June	58,773	64,751	22,968	58,312	263,819
July	49,271	59,929	21,772	55,037	233,434
August	50,750	45,415	16,958	37,582	199,245
September	57,314	44,428	22,276	50,704	162,270
October	45,406	37,178	21,777	57,504	103,081
November	45,618	46,905	35,123	40,135	84,073

During the progress of the war little complaint was heard from the public about price increases, most of the consumers recognizing that freight and wage increases and mounting overhead charges made the moves necessary; but the dealers at the close of the year were feeling the effect of the high rates through cancellation of orders still on the books following the warm weather and the thought in the public mind that the ton price is now so high as to be avoided as far as possible. Comparative prices here for the present market, as set here Nov. 9, and for Sept. 9 and September of 1917, are given herewith:

	Nov. 9, 1918	Sept. 9, 1918	Sept., 1917
Hard, No. 1	$11.90	$10.85	$9.20
Hard, No. 2	11.90	10.85	8.90
Hard, No. 3	12.15	11.10	9.15
Hard, No. 4	12.25	11.20	9.30
Pea	10.40	9.31	8.30
Buckwheat	8.60	8.60	6.70
Lykens Valley, No. 2	12.60	11.55	9.65
Lykens, Valley, No. 3	13.00	11.95	9.90

Deep down in the hearts of the coal men here there is probably little regret that 1918, a year of constant uncertainty, is gone. The retailer had his problems and at times feared that Government regulation would put him out of the running or seriously interfere with his earnings; the jobber had to veritably fight for life at times, but came out triumphant; the operator had so many problems that his troubles were truly legion.

Denmark's Coal Supply

Denmark's fuel problem, states Erwin W. Thompson, United States commercial attaché at Copenhagen, in a recent report, was quite satisfactorily solved during the first four years of the war by a recourse to wood and peat, aided by the well-organized and quick work of Denmark's coal distribution committees. At the beginning of the fifth year of war, says Mr. Thompson, this coal question should be considered again, the more so as the conditions for production and the political conditions abroad do not give Denmark any bright prospects of a good supply for the coming months.

It early became evident, continues the report, that the coal question would be a most difficult one for the entente. In September a London paper said that the coal problem in England was serious. In the beginning of October the British coal controller stated that even if peace came soon, the coal problem would not nearly be solved. England lives from hand to mouth with regard to coal. The supplies are very small, and the military demands are swallowing a great part of them. France is at present consuming 6,000,000 tons more than the normal annual rate, and Italy's demands are very heavy.

It will therefore be understood that the decreased production is keenly felt at home. In the first half of 1918 the production in the United Kingdom was 117,000,000 tons compared with 127,000,000 tons in the first half of 1917 and 140,000,000 tons in the first half of 1914.

If we turn to Germany as the second largest supplier of coal for the Danish market, the prospects are still darker, as the labor problem and transportation difficulties must be taken into consideration. Transportation is the most difficult in the fall, on account of the harvest. This influences the neutral countries, both the Swedish and the Danish import having been on the decline in recent months.

When judging of the coal prospects for the coming winter, these general conditions in the producing countries must be taken into consideration, and some special conditions in connection with the latest foreign political developments. The freight on English coal to Norway was recently reduced from $20.10 to $6.70 per ton, but a similar reduction can not be expected in the Danish trade. A Danish reduction of the coal freight is, however, being contemplated in consequence of the reduction of the insurance premiums. The ship owners have not yet decided to make these reductions, and the importers are looking forward to it with some anxiety because it would mean a loss to them on their stocks. The possible result of this situation will be a decreased import. The British export price of 83 crowns per ton f.o.b. Newcastle for steam coal plus 77 crowns for freight and 14 crowns for expenses and profit to the importer, makes a selling price of 170 crowns ($45.56) in Denmark. It would therefore be desirable if the negotiations now going on could be made to give a favorable result for the consumers without hitting the importers too hard. Then, of course, the question is whether England will not meet a freight reduction by increasing her export price which, among the Scandinavian States, is highest for Denmark.

The prospects for a continued sufficient import from Germany are still darker, is Mr. Thompson's belief. Most of the ports from which Denmark got her supplies are now in the hands of the revolution. German coal is shipped partly from the Baltic ports, partly from the Elbe, Weser and Ems ports. From Emden on the Dutch border and via the Dutch city of Delfzejl several of the most important shipments were made along the North Sea coast up through Kiel Canal. This transportation is hardly possible under the present conditions, and upon the whole it is to be expected that German supplies will be very small for some time to come.

The importation of coal from Germany was one of the most important items in the four monthly trade agreements between this country and Denmark. As the present agreement expired Nov. 31 a meeting was called but had to be postponed because the German delegates could not come, probably because of recent inner political complications. An agreement with Germany will hardly be made before Dec. 1 if the situation in Germany continually develops along these unfortunate lines.

The Danish coal supplies are sufficient for three to four months, but the prospects that the German imports will decrease and possibly cease altogether is a very serious matter, even if a near peace gives hopes of larger supplies from the west.

Six Men Rescued by Breathing Apparatus

By JOHN T. RYAN
Pittsburgh, Penn.

SYNOPSIS—*The fire in the Mt. Braddock mine on Jan. 20 was caused by the caving of the mine roof under a burning slate pile. Fortunately only six men were in the workings at the time. The air was reversed and all the men rescued. Some were in air of breathable, though questionable, quality, but had to be brought out in breathing apparatus because they had to be hauled in a trip through a zone of vitiated return air. Earlier in the day two men with no apparatus, finding that a rabbit was able to breathe the mine air for 20 minutes and live, went into the mine on a car trip. Evidently the rabbit was too slow in succumbing to the impure air to be a safe indicator, and the men stayed in the mine too long and were drawn out dead. The successful rescue men were seven hours in the mine while four of the rescued had been detained underground 24 hours.*

WHAT is probably the most successful and interesting piece of rescue work, and one which demonstrates the utility of the self-contained breathing apparatus, occurred on Jan. 20 at the Mt. Braddock mine of the W. J. Rainey Co., Mt. Braddock, Fayette County, Penn., where six men were recovered alive by the aid of breathing apparatus.

On the morning of Jan. 20 the firebosses at this mine discovered indications of smoke in the return airway, and no men were allowed to enter the mine except six who went to start the pumps and locate the fire. The fire was later discovered by another party, which found that it was located near the outcrop just to the right of the main slope and the air course. The ground beneath a burning slate dump had caved in and the burning material in the dump had ignited the coal pillars.

As may be assumed from what has been already said, the mine is approached by a slope. The active workings are about 1¾ miles from the mine mouth. The main haulage slope is paralleled by the manway, and both the slope and the manway were used for the return of the mine air. The fire was on the intake airway, and consequently the gases generated were all carried through the mine. The Rainey company's officials made heroic efforts to get to the fire and were making headway when the smoke forced them out; most of them were partially overcome by carbon monoxide.

The rescue teams of the companies working adjoining mines were called upon but owing to the condition of the roads their arrival was delayed. Three men from the Orient Central Rescue Station arrived early in the afternoon with breathing apparatus, which they quickly assembled. They entered the mine by way of the main slope and traveled down it about 4000 ft. to the main parting, encountering much smoke.

There they found two men, one unconscious and the other conscious. These men had found a leak in a compressed-air line and had enough presence of mind to remain at that point. The conscious man told the rescue team to give the signal to lower a trip, which was done, and the two men were loaded on the trip by the rescue team; all were hoisted quickly to the surface.

The recovered men were unconscious when they reached the slope mouth and were taken in hand by John S. Struble, inspector for the H. C. Frick Coke Co., who had just arrived with his rescue team. Eventually, by means of artificial respiration and oxygen they were revived. Struble then took charge of the work and the recovery of the other four men later was due largely to his good judgment and untiring efforts.

After looking over the map he decided to change the ventilation and prevent the gases from the fire getting to the section of the mine where the other four men were supposed to be located. His rescue crew, equipped with breathing apparatus, constructed a temporary brattice, a more permanent stopping being then constructed by men without apparatus. Apparatus men remained nearby while the permanent stopping was being constructed, so that they could aid the workmen if help were needed.

Bureau of Mines Rescue Car Arrives

Mean time the United States Bureau of Mines at Pittsburgh had been notified, and five men in a rescue truck left for the scene of the accident 20 minutes after word was received. They made record time until they struck a mud road about five miles from the mine. There the truck became mired. The crew was picked up by Stephen Arkwright, inspector for the H. C. Frick Coke Co., and J. T. Ryan, of the Mine Safety Appliances Co., of Pittsburgh, who were on their way to the mine in another car. They arrived about the time Struble had completed the brattices, the purpose of which was to direct fresh air through an overcast to the left side of the mine.

An organization was then perfected to take charge of the outside, and Struble, Arkwright and D. J. Parker organized an exploration party of ten men equipped with breathing apparatus, safety and electric lamps, and a canary. They entered the mine, following the direction of the intake as newly established. In following the fresh air they were required to travel a circuitous route where the going was bad, but they proceeded carefully and marked the route thoroughly with chalk in case they had to return the same way; finally, after 2½ hours of travel, they came to the main haulage slope immediately below the main parting.

Before the party proceeded through the door which separated the intake and return, two of the men went ahead and examined the return air with safety lamps and the canary. The air in the return at this point being clear, the party went through the door to the slope and located a telephone and made a report to the outside. After taking a rest they proceeded down the left slope, at which point was a pump. It was thought

that two of the men would be found there. After going about 600 ft. they saw a light 400 ft. ahead, apparently in the hands of a staggering man.

They approached it cautiously and found Charley Lerch, who fell to the ground just as they reached him. He was given oxygen from one of the breathing apparatus and quickly revived. He was able to tell that his "buddy" was back somewhere along the slope and unconscious. Arkwright, McCaa and Ryan took him back to the firebosses' shanty at the parting and gave him stimulant and oxygen, which brought him around in good shape.

Others of the party then proceeded down the slope and found Elmer Matthews about 3000 ft. from the parting, or about 2000 ft. beyond the first man recovered. By dint of hard work they revived him with artificial respiration and oxygen, but he was unable to walk and had to be carried back to the parting, where he readily responded to first-aid treatment. These men were unable to give any information as to the location of the other two men, so after a conference it was decided that these men were evidently in the vicinity of the other two pumps, which were located at the bottom of the right-hand slope.

Arkwright, Parker and Ryan, with five men equipped with apparatus, proceeded down the right-hand slope to explore for the other two men, leaving the other members of the rescue party to look after the two just recovered. The latter party communicated with the surface and had a trip sent down with blankets, stretchers, hot coffee and other stimulants. Arkwright's party located the two pumps, but found no trace of the men other than a safety lamp.

After exploring all the working places, they started out along the manway and found James Russell, who was partially conscious and quickly responded after oxygen was given him. He had no idea of where he was or how long he had been there and could give no information about his companion. Two of the party remained with him, and the others continued up the manway and found Frank Largon about 300 ft. beyond.

He was in bad condition, and in consequence he did not respond to treatment for almost a half hour. While three of the party worked on him, the others returned to the main parting for stretchers and assistance, upon the arrival of which the two men were carried out to the parting and were given stimulants and plenty of oxygen.

Did Not Want to Be Resuscitated

Largon had made up his mind that he was going to die, and he apparently did not want to change his fate. He refused to breathe oxygen, and at one time the whole party was working on him, rubbing him, holding safety lamps around him to keep him warm, meanwhile trying to get him to take stimulants and oxygen. He finally wanted to fight Struble, and the anticipation of this pleasure was sufficient inducement for him to decide to get well.

Now came the problem of getting these four men to the surface, a distance of 4000 ft. The most direct route was by way of the slope. It was plainly evident that on account of falls, partially closed passages and the exhausted condition of the rescued men, it would be impossible to carry the rescued back over the route the rescue party had traveled on entering. The rescuers were also confronted by the fact that, while the air was good on the slope at this point, about halfway up the slope the return from the fire section joined the return on the haulage slope.

To determine the condition of the air it was decided to send a canary and some safety lamps to the surface on a car trip. This plan was communicated to the outside to Mr. Sincocks, general superintendent of the W. J. Rainey Co., who had been overcome earlier in the day, but who was again back on the job. As soon as the trip reached the surface Sincocks examined the canary and found it had been overcome, and the safety lamps had been extinguished.

This information was communicated to the party underground, and after a conference it was decided to have additional rescue apparatus sent down for the four recovered men and for those whose oxygen was partially exhausted. It was also decided that a fresh canary and additional safety lamps should be sent in so that the condition of the air could be tested again when necessary. Fortunately there was plenty of equipment on hand, as additional apparatus had arrived from the Orient Central Rescue Station, and Rescue Car No. 6 of the United States Bureau of Mines had just arrived from Houtzdale, Penn.

Rescued and Rescuers Prepare to Leave Mine

The foregoing program was quickly carried out. When the trip arrived at the parting the canary had been overcome, but the safety lamps were still burning. The four rescued men were then seated comfortably in separate cars. Apparatus was adjusted on them, and two of the rescue crew were assigned to each car in which the men were placed. All the apparatus were tested carefully, and after eleven of the party were in their places, McCaa and Zorn examined each apparatus and turned on the oxygen, then examined one another's apparatus and got aboard.

Struble, at the telephone, gave instructions to hoist in two minutes. (Those two minutes seemed like an hour.) The trip started, and in 10 minutes the fourteen men, all wearing breathing apparatus, reached the surface in fine shape. They emerged from the mine at 8.10 a.m., Jan. 21. The four rescued men had been underground just 24 hours, and the rescuers seven hours, having entered the mine about 1 a. m.

The rescue crew was composed of the following men: Stephen Arkwright, inspector, H. C. Frick Coke Co.; John Struble, inspector, H. C. Frick Coke Co.; D. J. Parker, mine safety engineer, United States Bureau of Mines; Bert Dwyer, George McCaa and E. D. Gardner, mining engineers, United States Bureau of Mines; J. H. Zorn, rescue foreman, U. S. Bureau of Mines; J. T. Ryan, Mine Safety Appliances Co., Pittsburgh, Penn.; E. N. Barrett, H. C. Frick Coke Co., Footedale Rescue Team; S. J. Cornisky, H. C. Frick Coke Co., Leisenring Rescue Team.

The rescue crew from the Orient Central Rescue Station, who rescued the first two men, was composed of Mike Sopchick, Frank Krum and August Klause, and was under the direction of Charles Opperman, who is superintendent of the Orient station. These men had received training under the Bureau of Mines only the previous week, and they deserve credit for their heroic and successful work in face of great personal danger.

The one unfortunate incident in connection with this accident was that during the morning of Jan. 20 two men attempted to enter the mine without breathing apparatus. They were let down the slope on a trip of cars and when hauled out 15 minutes later were dead.

It appears that prior to their entering the mine a rabbit (in the absence of a canary) had been sent down on a trip and when withdrawn some 20 minutes later was found to be all right. These incidents forcibly impress the fact that a canary is the only dependable medium for detecting carbon monoxide, and also that men should not do exploratory work about mine fires unless equipped with self-contained breathing apparatus or a canary, preferably both.

The work of the rescue parties who recovered the six live men demonstrated what can be done with self-contained breathing apparatus when in the hands of experienced mining men who are also thoroughly trained and familiar with the apparatus.

All the members of the rescue party that recovered the last four men were equipped with breathing apparatus, but in their underground explorations they were able to travel about 24,000 ft. in fresh air without having to use that equipment. When the four men were found an unusual situation had to be met, for, while the air was breathable in the remote workings where the men were located, there was yet such a quantity of carbon monoxide on the main slope that the canary sent out by the rescue party was killed in the short space of time (10 minutes) in which the trip was hauled up the slope. For this reason it was necessary to put breathing apparatus on the rescued men to get them to the surface.

Orient Central Rescue Station the Result of Operators' Cooperation

By L. U. Leslie
Uniontown, Penn.

Fifteen coal and coke companies in the Connellsville region recently united in the establishment of a central mine-rescue station with teams numbering 200 men. These men are responsible for the safety of 8000 miners employed at the operations. A two-story brick building has been constructed and equipped with mine-rescue apparatus, and the station is in permanent charge of Charles Opperman, Jr., in the capacity of captain. Mr. Opperman holds state certificates for both first-aid and mine-rescue work.

The establishment of this central mine-rescue station is held to be a substantial step forward in the advancement of safety in the coal mines. It places under unified control an important phase of coal mining and permits speedy mobilization of the relief facilities of all the companies interested within a short time in case of disaster. The station is equipped with a heavy motor truck, which, carrying full equipment, is capable of reaching any mine belonging to any member of the organization within a half hour after the receipt of a call for help.

Captain Opperman is located permanently at the rescue station. He is charged with the responsibility of keeping the equipment of the station available for immediate use; in addition, he is instructor in mine-rescue and first-aid methods. Mine-rescue teams have been organized for some time at the various operations, but the new plan places all teams under the command of Captain Opperman. He is now giving instructions to teams from the various operations. These teams are composed of from 5 to 10 men each and are required to report regularly for instruction and drill. At the expiration of their training the men will take examinations, and those who show that they have mastered the principles of their work will be given certificates.

Although the organization is complete and the work of instruction already started, other operations in the region are not excluded from participating in the benefits of the mine-rescue station. The trustees and executive management of the station stand ready at any time to receive the application of other operators in the region for admission into the united mine-rescue organization. Operations now included in the mine-rescue organization are the Orient Co., the Fayette Coke Co., the Uniontown-Connellsville Coke Co., the Tower Hill-Connellsville Coke Co., the Thompson-Connellsville Coke Co., the Struthers Coal and Coke Co., the Connellsville Central Coal and Coke Co., the Brier Hill Coke Co., the Taylor Coal and Coke Co., the Crucible Fuel Co.. the Consolidated Coke Co., the Puritan Coke Co., and the Lincoln Coal and Coke Company.

Material advantages leading to reduced rates for workmen's compensation premiums were one of the leading factors in the organization and establishment of this mine-rescue station, but the operators were also moved by a desire to surround their men with all possible safeguards against accident. The knowledge that a competent relief organization is at all times ready to respond to a call for aid has already served to improve the spirit of the miners. Their interest has also increased in mine-rescue and safety methods.

The building in which the rescue station has its headquarters is erected at Orient, the mining town of the Orient Coke Co., and is known as the Orient central rescue station. The other operations in the organization are in close proximity to the headquarters, in what is known as the Republic district of the region.

The apparatus is housed in a specially constructed two-story brick building the plans and specifications for which were approved by the Bureau of Mines. The building has been inspected and sanctioned by the state insurance board. It is equipped with ten sets of Fleuss-Proto mine-rescue apparatus and all necessary supplies.

Pittsburgh to Receive More Power

Carl W. Schleuderberg, of the Westinghouse Electric and Manufacturing Co., declared at a recent local meeting of the American Electrochemical Society, held at Pittsburgh, Penn., that some large interests were planning for the construction of huge electric plants both at the mines and near available water power. These plants would develop some 700,000 kw. It is expected that the plants thus established may be able to produce current at prices as low as those established for Niagara or any other power in the country. This will be done though there exists at no point a source of power like that at Niagara Falls, which produces about 500,000 horsepower.

Who's Who in Coal Mining

THERE is a dynamic young man down in West Virginia who is carving an important niche for himself in the coal industry's hall of fame. His name is Walter H. Cunningham, and besides acting as secretary of the West Virginia Coal Association he finds time to serve as the secretary-treasurer of six independent coal companies and still do a lot of professional work as a consulting engineer.



WALTER H. CUNNINGHAM

Some men are just successful; nobody knows exactly why. Others stumble blindly into the doorway of opportunity and manage to forge ahead without showing evidences of great virtues. A few men are downright lucky and land on a road where the traveling is comparatively easy. But the case of Walter Cunningham forms no parallel with the foregoing examples. That he has succeeded in a gratifying fashion for a man so young cannot be doubted. That he has gained the honest respect of his West Virginia and Kentucky associates in the mining game is likewise true beyond peradventure. It is further a fact that his climb to a position of importance has come without assistance or pull.

In such a man there are always certain qualities that stand forth prominently and form the foundation of his individual success. So it is with Cunningham. His prime virtues are optimism and imagination. The first creates in him a cheerfulness that is contagious and that surrounds him with a host of friends. The second gives him an outlook on life that extends far beyond the boundaries of conventional engineering practice.

Most technically trained men are so matter-of-fact that their natural enthusiasm with reference to the average industrial project has been entirely subdued, if not wholly eliminated. Mr. Cunningham is no less a conscientious and careful engineer because of his ability to see possibilities that are yet in the making.

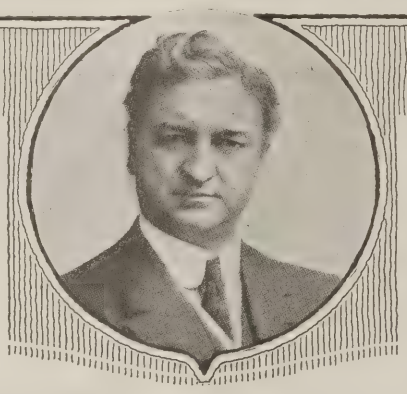
Difficulties cause no despair in his heart, for they are always met with hope. He is ever cheerful because he has beliefs—belief in friendship and belief in all the decent things that go to make living worth while. Walter Cunningham's smiling countenance provides him with a key that opens all doors. Those who meet him are impressed with the thought that he must be successful in order to be so happy. This fact inspires confidence and smooths roads that would be rough traveling to the fellow having less buoyancy. The kind of cheerfulness possessed by the young secretary of the West Virginia Coal Association is the type that has excellent wearing qualities. For this outstanding virtue was clearly in evidence back in 1899, when young Cunningham entered Lehigh University, filled with an ambition to become a great mining engineer. He is today a living proof of the idea that a happy disposition and a whole-hearted cordiality are the very best tonics for the mental and physical constitution of a man. While many virtues defer the day of recompense, the spirit of cheerfulness pays cash down.

Not yet 40 years of age, his life has been a busy one ever since those vacation days when as a youngster he earned his first dollars working in and around the mines in Pennsylvania. His earliest important work was with the Davis Coal and Coke Co., in 1906, as a mining engineer in Maryland and West Virginia. Leaving this company, he moved to Kentucky, where he served first as a manager of mines and later as general manager of a corporation producing a large annual tonnage of coal. This varied career has given him an understanding of mining, both from the viewpoint of the engineer and of the operator. It is for this reason, as well as his famous smile, that he has formed connections with many coal companies, and that his services have been in such wide demand for advice along expert lines.

Walter Cunningham is not the kind of man who can never see a cloud, but rather the sort of fellow who can see both the cloud and its silver lining. He has attacked life strenuously and has perfected the art of laying all emphasis, not on what has happened, but on the ends and aims that lie ahead. If he has served his chosen industry with greater credit than the average man, it is because he has founded his philosophy of life on the sound logic that no calamity is ever insurmountable; no sky is ever so bleak but somewhere, sometime, the sunshine will break through.

The Coal Industry of France

By ARTHUR J. BALDWIN, Vice President McGraw-Hill Co., Inc.



I HAVE seen Lens — the center of the great coal industry of northern France. Through the courtesy of the British General Staff, and as a guest of the British Ministry of Information, I was taken over the battlefields where Lens once stood. Lens is the name of the city that is the center of the great coal-producing region which bears that name. In this district before the war were numerous villages and towns where the miners who worked in the collieries were housed. Approximately 180,000 people inhabited the region. They are all gone. Their homes are gone. The mines where they used to work are utterly destroyed.

Germany seized these coal fields on her initial drive in 1914. The conflicting armies knew well the value of these fields, and a mighty struggle took place for the possession of the mines. German soldiers were billeted in the cellars. German artillery was hidden in the towns. German pill-boxes of solid concrete were constructed in some of the homes to repel the infantry attacks. This made the houses and towns a target for the British artillery.

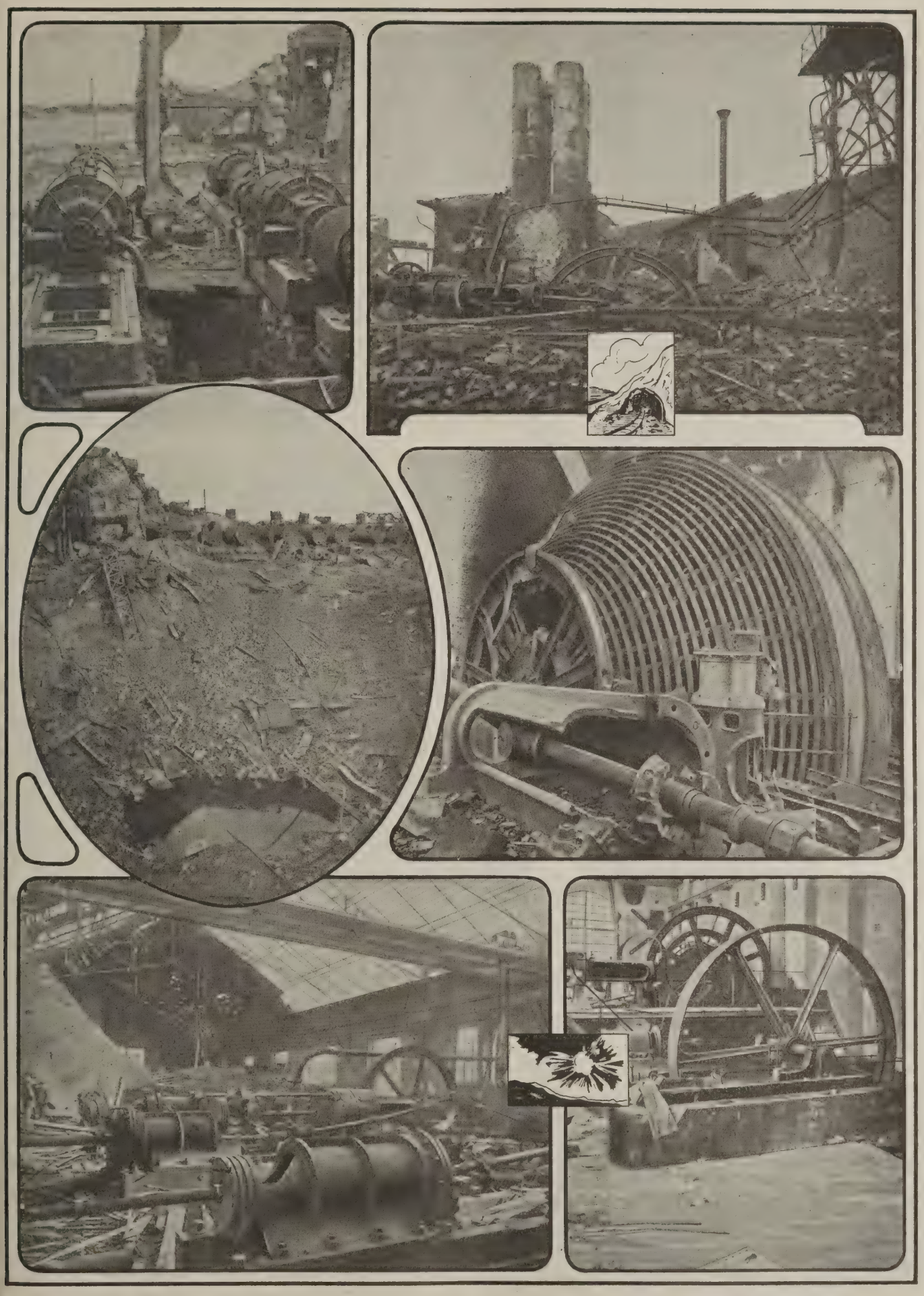
And so since 1914 there has been almost a constant rain of shells of all caliber, until the whole region is devastated, and nothing remains but masses of ruins. What the artillery did not destroy well-planned German mines accomplished. The shafts were blown up, underground workings destroyed, and water was diverted so that the mines were flooded.

Nearly all of the coal produced in France is bituminous of a good quality. France has little anthracite and is also short of coals for making gas and coke. The coal fields of France have a total area of nearly 1200 square miles. The territory, or rather the coal basin in which Lens is located, is from 5 to 10 miles wide and covers an area of more than 400 square miles. In the pre-war period this district furnished approximately 70 per cent. of the entire French production. The Lens region also was the chief byproduct coking center.

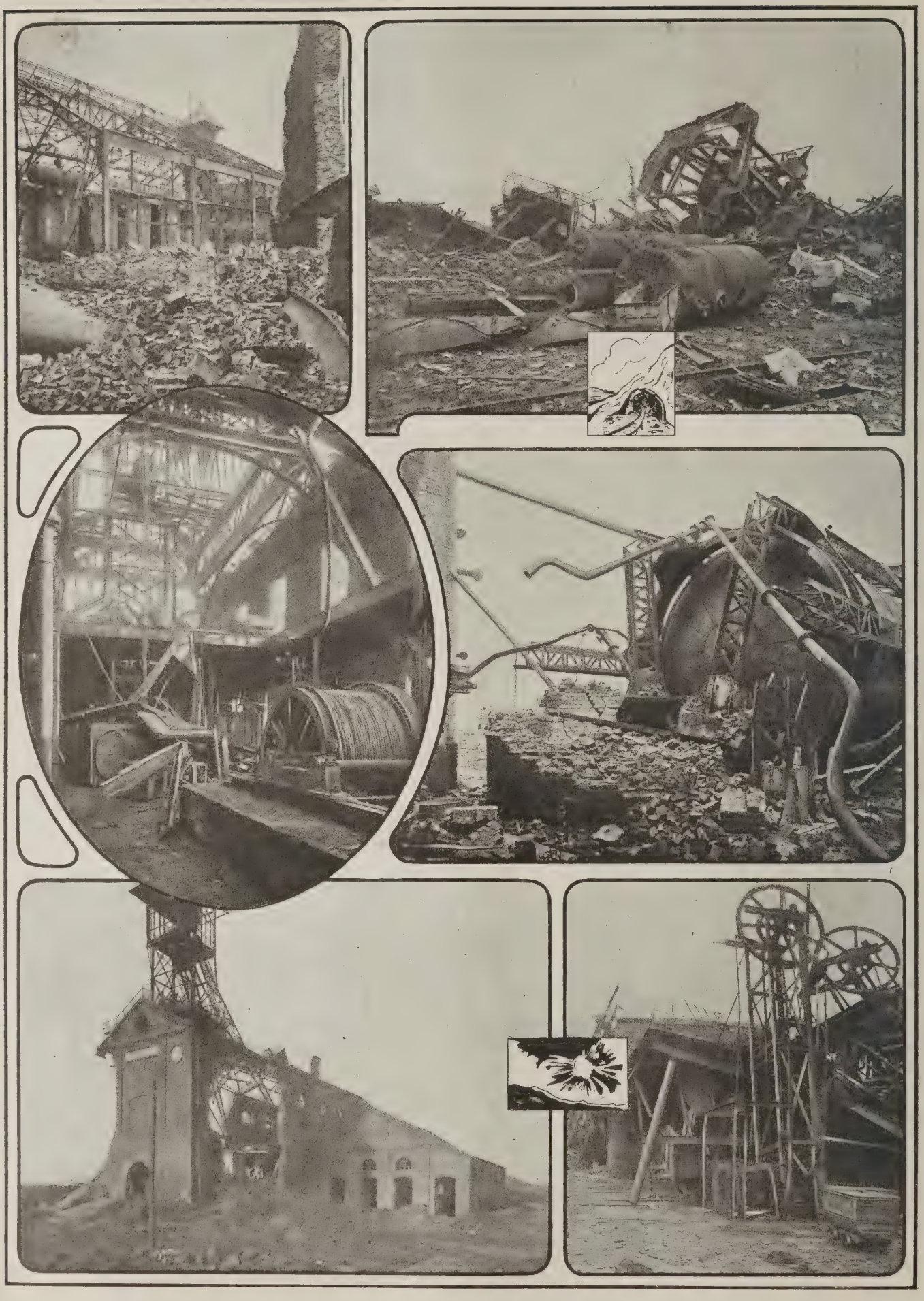
The greater part of the coal was produced from beds that lie more than 1000 ft. below the surface. A number of the shafts exceed 3000 ft. in depth. At many of the collieries 10 and even 12 separate and distinct seams of coal were worked. One of the beds in the vicinity of Lens averaged 23 ft. in thickness, while at a number of mines the seams were successfully worked when they did not exceed 18 to 20 in. in thickness. The output per individual employee in the French mines was never equal to the large production of the individual American miner. In 1913 the average production of each French coal miner was slightly more than one ton per day. Many problems occur in mining the French coal seams that are not common to American practice. The thinness of many of the beds makes it desirable to employ the long-wall system of mining. But even this plan of working is rendered difficult in places, due to the deep pitching of the coal. Many of the seams are overlaid by a weak shale roof, and safe mining is only carried on by the employment of an extensive and complicated system of timbering. At many collieries the roof is sustained through an elaborate system of flushing solid material into the worked-out sections of the seam. All main gangways and important entries are protected by brick or concrete masonry.

As is evident from the accompanying photographs, the surface construction is largely of steel. The power plants, washeries and tipples were modern in every respect, but the underground methods of mining as a general rule have not advanced rapidly in recent years. Nearly all of the mining is hand work, and it will be one worthwhile result if in the rehabilitation of the French collieries ancient practices are abandoned, and mining machines and other mechanical devices are introduced. Here lies hope for American manufacturers.

The question is asked—When will the mines again be opened? The difficulty is this: There are no railroads for transportation; there are no workmen; there are no places for housing the workmen. The people who left there have been scattered, and there is at present no incentive for them to return. There is nothing that can be salvaged from the work of past years; the whole region must be reconstructed anew.



"Shafts were blown up, underground workings destroyed, and the mines flooded"



"The whole Lens coal region is devastated, and nothing remains but masses of ruins"



"Nothing can be salvaged, the whole region must be reconstructed anew"

New Apparatus and Equipment

Kerosene Thawing Devices Serve a Number of Useful Purposes

The Aeroil Coal-Thawing Outfits, Inc., of 1 Broadway, New York City, has recently placed on the market two thawing devices similar in purpose and principle of construction but varying in details of shape to suit convenience of application. The first of these is intended especially for thawing out cars filled with frozen coal. It consists of large twin blast torches, burning kerosene, built to direct their flames upward and drawing their fuel supply from a common pressure tank.

This outfit consists of a pressed steel tank of 10 gal. capacity provided with the necessary hand air pump, pressure gage, air and fuel regulating valves, hose, extension pipes and the two burners; also the necessary instructions. It is stated by the manufacturers that one man can easily operate six of these outfits and that each will thaw out a car of frozen coal in from 30 minutes to 2 hours, depending on weather conditions. Frozen car doors may be opened in about 10 minutes.

The second piece of apparatus is similar to the first except that it is smaller (5 gal. tank), has but one torch intended to be held in the hand, and is built for thawing out coal chutes, hoppers, gates and the like; also for melting ice on switches, ladders, etc., thawing out frozen air and water pipes, and for similar uses. It may also be used for brazing, welding and heating generally. This torch may be so manipulated as to be entirely safe and not detrimental to woodwork. Its use insures not only an efficient means of performing various thawing operations about the mine but entirely avoids the danger incident to wood fires arising from flying sparks or blowing coals.



TWIN TORCHES THAWING OUT A COAL CAR



SINGLE PORTABLE THAWING TORCH

Mine-Car Loader with a Bucket Conveyor for Scooping up the Mineral

The mine-car loader illustrated herewith is well adapted for certain mining conditions. It consists of three parts—the truck, scooping mechanism and the elevating conveyor. As will be seen, the motion of neither of the two moving parts last mentioned is reciprocating, but continuous. As there are two scoops making synchronous passage from the coal pile to the point of dumping and back to the coal pile, no time is lost. The travel of the buckets is so directed by sprockets that when a bucket is discharged it is promptly withdrawn clear of the hopper head.

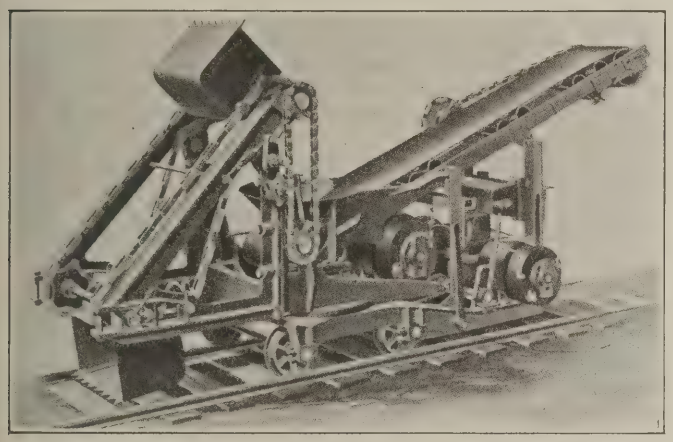
The scooping mechanism is so pivoted that it can dig to the side as well as in front of the machine. The material, however, on being delivered to the conveyor, reaches the car behind the loader no matter at what angle the scoop may be working. The machine is self-propelled and so dimensioned that it can easily be moved around the mine. It will load at the rate of over a ton a minute and may be operated by unskilled labor.

While too high for thin seams, the over-all vertical dimension being 6 ft. 7½ in. with one bucket at the highest position and 5 ft. 6¾ in. with the buckets at mid positions, the whole equipment is compact, rigid

and durable. The three parts—truck, digging head and conveyor—can readily be dismounted and as readily reassembled. Thus the machine can easily be taken underground and moved from level to level.

The levers for operating the loader are located at one side and thus the operator is in full sight of the several movements. He has, however, nothing to do but keep the machine close up to the coal pile and swing the shovel from side to side of the roadway as needed. The loader is fitted with motors wound for 230 volts direct current, and these provide power for all operations. The motors are entirely inclosed, and all chains and gears are protected in use by suitable guards. The framework is of steel, the digging head is mounted on a large ball bearing, and all parts are protected as much as possible against dirt and water. All chains are provided with take-ups, and the digging edge of the bucket is filled with renewable tooth sections.

The maximum overall length is 15 ft. 9 in.; the track gage is small (only 24 in.), but that could readily be increased. The capacity of the machine is 1.75 tons per minute with full buckets, and the average capacity is 45 tons per hour. The weight of the complete machine is 4 tons.



VIEW OF McDERMOTT SHOVELING MACHINE

It is claimed for this machine that it eliminates the shovel idea. There are those that feel that the appropriate movement of a machine is not a backward and forward motion, but a continuous action. The first locomotives were to have feet which would push the carriage along the track, much as the bicycle in the early days was propelled by an occasional thrust of the foot. "What could we do better than imitate nature?" was the reflection of the earlier inventor.

The first idea of the flying man was to imitate the reciprocating wing movement of the birds, but continuous action is better suited to airplane machinery than any other, and the propeller works on that principle. The first idea of the steamboat designer was to propel oars reciprocally like an oarsman, but the rotary propeller, either a paddle-wheel or a screw, was finally thought to be the only solution of the problem. Only the continuously running flywheel saved the steam engine from comparative failure, and even today the steam turbine with its continuous action bids fair to put the reciprocating engine, despite its continuous-action parts, out of business. However, there are exceptions, and reciprocation, in the drill and the mining machine, the cage, elevator and steam shovel, still takes a highly successful place in the mechanical arts.

Other advantages claimed for this machine are that the material is not thrown onto the conveyor belt but is delivered to a hopper, and that the loader and car remain stationary during the digging and filling. Charles A. Lawrence, general superintendent of four iron mining companies in Michigan, whose address is Palatka, Mich., has been loading medium coarse iron ore with this shovel for 18 months, and he states that in two to four hours 75 to 100 tons can be handled by three men. In loading by handshovels a man will handle on an average about 15 tons per day. The shovel is manufactured by the Wellman-Seaver-Morgan Co., 7000 Central Ave., Cleveland, Ohio, and is known as the McDermott continuous twin-scoop loader.

Legal Department

INJURY THROUGH FALLING ROCK—In an action by a miner to recover damages for injury sustained through a fall of rock from the roof of an entry in defendant's mine, plaintiff's omission to make an inspection was no defense, in the absence of a showing that such inspection as he was required to make would have disclosed the defect resulting in the accident. And where a miner is required to remedy defects in the roof of a mine only when so directed by a superior, it is the operator's duty to furnish the means of obviating such defects as may be encountered. (Alabama Supreme Court, Dodd vs. Choctaw Coal and Mining Co., 79 Southern Reporter, 54.)

RIGHT TO ADVANCE PRICE—Prices were quoted on coal on the following stated condition: "All quotations are for immediate consideration; that is, subject to prior sale, also any advance as outlined by the Fuel Administrator and conditions generally existing in the coal fields over which we have no control." It is held by the New York Supreme Court, in the case of Carlisle vs. Lovell, 171 New York Supplement, 996, that orders for coal have been accepted by the sellers, the prices fixed by them could not be advanced to meet new prices fixed by the Fuel Administrator before delivery, although the new prices became effective before the selling jobbers placed orders at the mines to fill the particular contracts. No reason appears why the jobbers might not have presented the buyer's orders as soon as received, and thereby bound the owners at the mines by valid contract, which would have protected them in turn in the performance of their contract with their customer.

PRECAUTIONS AT ABANDONED SHAFTS—A section of the Oklahoma coal-mining laws declares: "In all mines where operations are temporarily or indefinitely suspended, the superintendent and mine foreman shall see that a danger signal be placed at the mine entrance which shall be a sufficient warning to persons not to enter the mine, and if ordinarily circulation of air through the mine be stopped, each entrance to said mine shall be securely fenced off and a danger signal shall be displayed upon said fence." Another section of the statutes makes a mine owner liable for injury sustained by another through violation of the quoted provision. In the recent case of Pinkston vs. Whitehead Coal Mining Co., 175 Pacific Reporter, 364, it is decided by the Oklahoma Supreme Court that the statute operates for the benefit of all persons on such mining premises, whether they be there with the consent or permission of the mine owner or not. And it is held that an operator may be held liable for death of a young man who descended into an unguarded shaft to recover a piece of jewelry dropped by a young woman companion, and who was suffocated by mine gases.



Anthracite Prices and Many Other Restrictions Suspended

Maximum prices on anthracite coal, together with all other coal and coke regulations except three, were suspended effective Feb. 1, in a blanket order issued on Jan. 31 by Fuel Administrator Garfield.

The only restrictions not suspended, as to coke and all coal, are: Those requiring that contracts be made subject to maximum prices if reinstated, subject to cancellation by the Fuel Administration and subject to requisition or diversion of coal by the Fuel Administration; those prohibiting reconsignments of coal; those requiring shipments of coal to tidewater to go through the Tidewater Coal Exchange. The tidewater and reconsignment regulations were retained at the request of the Railroad Administration, to avoid congestion of coal at tidewater, and the resultant embargoes.

The order includes the suspension of price and zone regulations on coke and bituminous coal which, it was announced Jan. 17, would be effective Feb. 1. As the Administration's control of the oil industry already has been suspended with the exception of certain natural gas regulations, the effect of the order of Jan. 31 was said to be that the Fuel Administration's controls are now relaxed to the present limit of safety, pending the proclamation of peace, when the Administration automatically will terminate.

It was pointed out that as the responsibilities of the Fuel Administration under the Lever Act continue as long as a state of war officially exists, any of these suspended regulations may be reinstated or others may be put into effect should occasion arise. An instance of the continuing activities of the Administration was found in its Bureau of Labor, which will function actively during the armistice. Any dispute failing in settlement between the parties at interest must be submitted as heretofore to the Fuel Administration for final disposition without stoppage of work.

The following statement was issued:

By his Executive Order of Aug. 23, 1917, the President adopted as maximum prices for anthracite coal the schedule of prices which had been acquiesced in by the industry while under investigation by the Federal Trade Commission under the so-called "Calder" resolution of the Senate. This involved one price for the railroad controlled coal companies and a price 75c. higher for the individuals. With the exception of a reduction of 60c. a ton in the prices for pea coal made Oct. 1, 1917, and two adjustments to cover increases in miners' wages, the Fuel Administration allowed the prices fixed by the president to stand pending examination of costs such as were made in the case of bituminous coal.

For the purpose of arriving at a fair increase in price to cover the increase in wages recommended by the War Labor Board last October, an examination was made to determine the costs of the various anthracite producing companies. The result of this examination showed that the general increases in the price of materials and labor had raised the cost of mining anthracite to such an extent that many of the companies were not receiving a fair return and that some producers of necessary coal were actually sustaining a loss on the sale of coal at the Government prices, in spite of the two increases allowed on account of advances to labor.

At the time this situation was discovered every indication pointed to an early peace and it was deemed unwise to increase the maximum prices so near the time when, on account of the end of the war, price restrictions would in the natural course of events be lifted entirely.

The foregoing statement is made at this time, when price restrictions are about to be lifted, out of fairness to those companies who have patriotically kept up their production to war needs, even at a cost which resulted in many instances in a loss, not only by the individuals, but also by some of the railroad companies, so that the impression shall not exist that the Government prices of anthracite coal in existence at the time of the lifting of restrictions were prices which the Fuel Administration had fixed on the basis of cost to the operators.

Had the Fuel Administration's active control over maximum prices on anthracite coal been continued, the cost examination above referred to shows that it would have been necessary, on the basis of the present wage scale, to raise these maximum prices possibly as much as 50c. a ton above those last fixed by the Government, in order to prevent financial embarassment and perhaps the closing of companies producing a substantial percentage of the necessary anthracite output.

Such a curtailment of production would eventually result in the demand exceeding the supply to such an extent as to increase the prices much higher than they would be if that supply were continued.

Examiner Reports Unfavorably in Western Kentucky Rate Controversy

A report unfavorable to the contention of the Ohio Valley Coal Operators' Association has been made to the Interstate Commerce Commission in the matter of rates from western Kentucky to various points in the Mississippi Valley and the Southwest. The examiner declares that evidence has not been produced showing that the rates complained of are unreasonable per se. He cites several instances, however, where the removal of prejudicial rates is desirable. The Commission may or may not follow the report made to it by the examiner.

Anthracite Committee of Fuel Administration Goes Out of Existence

The Anthracite Committee of the United States Fuel Administration, which has had direct control over the distribution of anthracite since its appointment last March, has gone out of existence in accord with the general order of Dr. Garfield relinquishing all price and other control over coal and coke. Communications regarding matters formerly handled by this committee should in future be addressed to the United States Fuel Administration, Washington, D. C.

Pooling of Railroad Equipment Resulted in Sufficient Car Supply

A total of 16,500,000 tons of coal was loaded into vessels at Hampton Roads between June 1 and Dec. 20, 1918. This is an increase of 1,500,000 tons in the amount of coal handled during the corresponding period of 1917. The regional director for the Pocahontas district is authority for the foregoing figures. In a report to the Director General of Railroads, he also makes the following statements:

To the common use or pooling of coal-carrying equipment and its distribution by central control and the pooling of coal at tidewater and at Lake Erie ports is attributed a practically uniformly sufficient car supply at coal mines, resulting in increased production.

Consolidation of coal-dumping facilities of the Norfolk & Western, Chesapeake & Ohio, and Virginian railroads at Hampton Roads, Va., together with pooling of coal by interested shippers under direction of the United States Fuel Administration, and shifting of vessels from one pier to another for loading under direction of the United States Shipping Board, made possible handling of a greatly increased coal tonnage for transshipment by water to New England, for bunker purposes, and for the Army and Navy and overseas, and materially lessened the delay to railroad cars awaiting dumping and delay to vessels awaiting berths at piers, under adverse shipping conditions.

During the last six months of this year nearly 400,000 tons of coal was transferred in cars from the rails of the Virginian R.R. after arrival at Norfolk, Va., to the rails of the Norfolk & Western R.R., and dumped over the Norfolk & Western piers, at a time when the facilities of the Virginian were inadequate to dump the coal as fast as it could be transported. This shifting of cars for dumping resulted in accelerated dispatch and was a factor in maintaining a free working supply of cars at the mines for reloading.

By arrangement with the United States Fuel Administration, certain tonnages of low volatile coal needed in the West were drawn more particularly from the Norfolk & Western R.R., and like tonnage turned east from the Chesapeake & Ohio R.R., reducing crosshauling on the Chesapeake & Ohio R.R., through yards where the movement was forcing in excess of facilities for handling.

The Norfolk & Western R.R., Columbus line; Chesapeake Columbus line, were used in common in moving western coal through Columbus and Cincinnati, Ohio, gateways from the mines of the Norfolk & Western and Chesapeake & Ohio, and in handling empties returning to mines through those gateways. This common use, together with the prompt receipt of loads by connections at Columbus and Cincinnati, which, being also operated in common, alternated in moving loads from the Chesapeake & Ohio and Norfolk & Western when offered and as necessary to keep traffic going forward currently, resulted in extraordinarily free movement of western coal traffic in very heavy volume.

Pending improvements on the Virginian R.R., to enable it to handle maximum tonnage of coal from mines for which it served as outlet, that road was relieved of handling traffic moving over its line overhead from connecting roads for destinations beyond the Virginian R.R. and such traffic taken over by the Norfolk & Western and Chesapeake & Ohio railroads.

Double service performed by Chesapeake & Ohio and Virginian railroads to coal mines served jointly by them was discontinued, and individual joint mines assigned to the Virginian or Chesapeake & Ohio respectively for single service, resulting in saving in fuel for engines, time of train and engine crews, and more efficient service.

The regional director for the eastern region lists the following as one of the greatest transportation achievements in his region:

The Lake coal and ore movement was followed vigorously throughout the year, and the volume of shipments offering were handled currently, with the result that there was a total of 29,388,242 tons of coal dumped at Lake ports prior to the close of navigation on the Great Lakes, or 917,963 tons in excess of 1917. The ore movement from the Lake ports for the season totaled 33,726,380 tons, which was 368,000 tons less than 1917; 1,622,000 tons less than 1916, and 6,343,000 tons in excess of 1915. The coal program was completed on Nov. 30, 1918, as compared with Dec. 12 in 1917, and the tonnage handled was the largest on record.

Gathering of Statistics on Coal and Coke May Have to Cease

Unless Congress will approve an appropriation of $40,000, asked by the Geological Survey, the coal industry will not continue to have the advantage of the special statistics which have been compiled by the Fuel Administration on coal and coke production and distribution. Owing to the increase from 5000 to 8000 in the number of coal mines, the Survey's appropriation is inadequate even for its regular coal statistical work. As Congress probably is not acquainted with the value that these statistics are to the coal industry, it is feared that the appropriation will not be allowed. In recommending the appropriation, the Secretary of the Interior said:

This appropriation is intended to provide for the continuance after June 30 next of the statistical work now conducted on an extensive scale by the Fuel Administration in coöperation with the Geological Survey of the Department of the Interior. The collection of the statistics of coal and coke production by the Geological Survey before the creation of the Fuel Administration in August, 1917, was necessarily largely and rapidly expanded to meet the fuel demands of the nation during the industrial crisis, and up to November last the work was on a scale of an annual expenditure of more than $400,000. Since then the demand for some of the classes of inquiries as to stocks of fuel, etc., has changed so that the extent of the work is now being rapidly reduced. Yet experience has shown to both the coal industry and the general public the real need of official information on the subject of coal production and distribution in the form of current statistics frequently collected and promptly issued by the Government, and it is the expressed desire of the Fuel Administrator that provision be made for the continuation of work on at least the reduced scale provided in the appropriation here recommended.

I regard as conservative the annual expenditure of $40,000 for thus keeping the public authoritatively informed as to the working condition of this nation-wide industry which represents a capital investment of more than one billion dollars for the bituminous coal mines alone, which altogether employs an industrial army of three-quarters of a million men, which furnishes not only the motive power for the railroads but one-third of the freight carried, and which represents the constantly changing development of the nation's largest mineral resource.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The termination of the world war seems from the indications in the newspapers to be drawing close. With it comes the end of our labor contracts. The fourth clause of the Washington agreement says: "Subject to the next biennial convention of the United Mine Workers of America, the Mine Workers' representatives agree that the present contract be extended during the continuation of the war and not to exceed two years from Apr. 1, 1918." So much for the bituminous region. In the anthracite region the contract will end at the same time.

Under those circumstances it seems the height of imprudence for the business concerns to reduce their stocks by using more bituminous coal than they buy. The Chicago & Alton R.R. in Illinois sees the matter in the right light. The Alton road on Jan. 16 gave orders that 50,000 tons of coal be stocked along certain of its abandoned tracks. The continued shortage of work is, however, showing the mine worker how the land really lies, and while some are only angered by the slack work and some are prone to say it must be met by increased pay for working days as a balance for those that are idle, some men are convinced that the mine worker will get all he can expect if he keeps his wages at the present level.

Wage Rate Already Graduated for Slow Time

In fact he should be quite content with that concession; for irregularity of employment is becoming quite general, and the mine worker must expect a little of it. Moreover, he may remember that his recent increase in pay was largely granted to satisfy him for the short time he was permitted to work. When he worked half time, he demanded enough to give him full-time pay. Almost immediately thereafter he got full time and his pay was not scaled back. Now he works short time he wants increased pay as a compensation for his irregular work. Like a man on an old fashioned mine engine he shifts from foot to foot, always rising with the step which is for the moment ascending. Now the short-time rod lifts him up. Then it is the steady-work rod boosts him a few feet. Again he chooses the short-time rod, seeing it is likely to help him upward. It would be all right if he were the only person in the world, but this constant climbing is at the cost of the working-man consumer.

Heidelbergers Will Submit Minimum Wage Demand

The strike at the Heidelberg collieries, Nos. 1 and 2, of the Lehigh Valley Coal Co. located at Dupont, Penn., came to an end on the evening of Jan. 27. The men are going to confer with the company through a committee. District President Yannis (District No. 1) advised the men to return to work and let the matter be settled in the appointed way. Further details about this strike which commenced Jan. 18 can be found on page 238 of this present volume. On Jan. 27, 1200 mine workers at Pine Colliery of the Delaware, Lackawanna & Western R.R. Co. Coal Department had a button strike.

United Mine Workers' officials say that at some of the collieries there has been trouble because men who filled two associated jobs during the war are no longer willing to do so, now that the scarcity of employees is decreased. Though one man could easily fill two positions they demand now that two men shall be employed.

In the Lehigh region the United Mine Workers of America have lost strength during the war. Before the war, there were 17,000 members and now only 13,000; the 4000 men who have left are said to be accounted for by the military draft and by migrations to munitions works.

The mine workers of the anthracite region are establishing coöperative stores such as are common in Illinois and Ohio. The Shenandoah mine workers appear to be taking a large part in starting the coöperative movement. On Jan. 29 a wholesale and retail store will be opened and more will follow later.

Anthracite mine workers have so anxiously sought wage increases and have used such unfortunate ways of securing them during the war that it is strange that they should begrudge meeting the increases in expense of the Lehigh Traction Co. of Hazleton by the payment of increased car fares. The mere penny a ride demanded did not hurt the mine workers' pocketbook, and it certainly was a measure of justice. At least, the Public Service Commission took that point of view and dismissed the complaints of two narrow-minded, reactionary locals which could not see that right was right regardless who the claimant might be that sought redress.

Russians Want Their War-Work Money Back

In Ellsworth, Penn., it appears that a demobilized soldier who had secured a job with the Ellsworth Collieries Co. spread the report that the United War Work Fund was merely a fraudulent scheme for depriving the men of their money. The Ellsworth men, for the most part, are intelligent workmen, but there are a large number of Russians among them, and they believed all that was told them. A meeting was held by K. K. McClure of the Department of Justice, and 300 Russians by their cries broke up the assembly.

According to Government officials each miner agreed to give $4.75 to the fund. The company collected in all $7596.88, but gave no receipts for the money. This also was thought by the suspicious to be evidence of irregularity. It is said that the money was put in the bank to the credit of the Ellsworth company.

Union organizer Garvin tried hard to allay the agitation which he firmly believes to be in every way unjustified, but the Russians are not to be convinced by arguments when uttered in a language that they do not understand. Moreover, they seem bent on dragging Ellsworth down to the level of the towns in the Dombrova basin of Russia. The Ellsworth company is truly worthy of condolence. It has done more for its men than almost any other company in the United States. For many years it has extended a friendly hand to the union.

It is only just to the union to say that it has reciprocated, but some of the Ellsworth foreign mine workers—the old Believers of Russia—sometimes seem almost beyond the compulsions of kindliness and generosity. At other times the work of the company among these people seems to be meeting with great success, though nothing like that attained with the Slavs and Italians who seem more amenable to sympathetic guidance and who learn enough English to absorb American ideals. The company is willing to return the money collected to anyone who makes a demand for it.

Would Legislate for Weighing of All Coal

District No. 29 of the United Mine Workers has passed a resolution condemning the committee on Mines and Mining of the House of Delegates in West Virginia for its adverse report on a measure requiring all mines at which ten or more men were employed to pay the miners by weight and which also required that scales be installed and maintained at such mines. The records of the House do not show that the bill has been voted upon yet. While no definite figures are obtainable it is not regarded as probable that there are more than 50 per cent. of the mines of the state of West Virginia equipped with scales.



SAFETY LETTER

from Consolidated Coal Co.
to its Safety Committees

Would you stand in front of a cannon and deliberately fire it off? Surely not. Then why use a short shooting cable when you fire off a shot?

On October 24, Fred, who had been employed in mines for twenty years, put off a rock shot of carbonite with a short shooting cable. In consequence he had to stand in the direct path of the flying rock and was hit by a piece which was flying like a cannon ball. His right side, arm and back were so badly bruised he could not go back to work for over a month.

Pieces of rock and coal don't always fly like this when a shot is put off but they are liable to do so at any time. Get well clear of the flying coal when you put off a shot and keep your shooting cable long enough to be able to do this. Cable costs so little, and accidents cost so much, so why take the risk?

EDITORIALS

A Million Years of Maturing or Only a Few Hours of Toasting

SOME DAY we may wonder whether it was worth while chasing coal 2000 or 3000 ft. below the ground, with trouble from bumps and squeezes, expensive hauls, steep dips, deep shafts, discomfort, danger and gas and what not, when by some contriving, the nature of which is perhaps not wholly clear up to the present, we could have converted lignite into coal or acceptable coke by a few hours of judicious toasting and could have secured a large quantity of byproducts in the bargain. We cannot perform these wonders yet, but we surely will be able to do so later. Then we shall be able to strip the top off an extensive lignite bed and toast it into good coal, the counterpart of anthracite. The byproducts and the saving in freight rate will pay us royally for our pains, and we shall be saved all the wastes, expenses and dangers of deep mining. The lignites are for the most part found under light cover. Of course, they are in many, many instances only minable by underground methods, and in some cases they may be extremely deep. To such profundities they will not soon be followed, but they may be worked in shallow depths abundantly if only the toasting problem can be satisfactorily solved.



Father Time: After 838,475 years of my patient effort, the peat has at length turned black!

It is interesting to notice the condition in Western Canada. Only 6.71 per cent. of its actual reserves of coal are semi-anthracite or bituminous. The other 93.29 per cent. is lignite or lignitic (that is, sub-bituminous). The higher-grade coals are in the mountains and are rare. The lignites are on the lower levels and are well distributed. If by toasting them we can get the service of high-grade coal from them, we may find that Saskatchewan and eastern Alberta will be even greater rivals of the Canadian Rocky Mountain region than they are at present.

Even now these regions are healthy rivals. Our readers, we feel sure, will be surprised to learn from the pen of James White that in 1917 the lignite production of Alberta was greater than the combined bituminous and semi-anthracite production of the province, for the lignite mines produced 51.3 per cent. of the whole coal output of Alberta.

We look upon anthracite today as the super-coal, the triumph of long ages of toasting. Some day we may change our point of view. Anthracite will be regarded as a fuel from which time and heat have leached the most valuable of byproducts, leaving a barren substance, suitable only for burning. Meanwhile soft-coal lignite, and even peat, the Cinderellas of the fossil fuel world, will be regarded as substances of greater value. Instead of saying "only lignite," we may say "only anthracite," regarding the latter as the more senile, and less useful, product of the mineral world. The very scarcity of anthracite is making such a point of view likely, for we shall soon be obliged to make anthracite substitutes in large quantity. We shall carry the toasting to the exact degree we think advisable, and incidentally we shall learn how to derive all manner of profit from that partial distillation. If highly mineralized anthracite had been more general, better distributed and in larger quantity, it would have stood in the way of the development of the coal-distilling industry; in fact it might have prevented the manufacture of coke of all kinds, for anthracite is an excellent smelting fuel.

But anthracite, being remote from the points where it was needed, and being minable for the most part with difficulty, has permitted the development of the coke industry; and it will doubtless have also to permit the development of the toasted-coal industry. After all, the world has the virtues of its defects. If we had all the mineral wealth we desired along certain lines, we might fail to develop other minerals, such as soft coal and lignite, which may hold even greater possibilities before us. We may find in them not only things "just as good," but better.

Mudding Coal at St. Eloy, France

AN ARTICLE in the present issue describes the manner in which the badly crumpled bituminous coals of St. Eloy are filled with mud as a means of extinguishing fires. The reader will assume, and assume rightly, that a bed uncrumpled and not creviced would not take so kindly as the St. Eloy coal does to this process of fire extinction.

Apart from this crumpling, French coal seems to have a quality of its own. We could imagine a slow-burning

anthracite thus readily extinguished, but it is hard to conceive of a coal having 35 to 40 per cent. of volatile matter submitting thus tamely to such a slow and incomplete process of sealing. It shows that there is something yet for us to learn about coals and their ways.

Perhaps this coal tends to give out carbon dioxide rather than methane. Some of the French coals have that peculiarity. It is evident that a coal which at an extremely low heat gives off non-combustible gas will be easily extinguished, whereas one which gives off a combustible gas will refuse to succumb to treatment. The question comes whether slack would not be better than washery waste or ashes, for coal thus thoroughly impregnated with infinitesimal impurities must be almost ruined for market purposes. In places in the St. Eloy district the seams almost combine and reach together a thickness of 86 feet.

Of all times in history, the present is the one time when the mine official must saturate himself with sound economic doctrine. He must remember that the fundamental laws of economics are quite as important today as are the laws of ventilation, haulage or hoisting.

Byproducts of Labor-Union Activity

LABOR unions have grown considerably during the war. They have gained more and more the ability to get what they demand, subject only to economic law. Workers in one industry, say coal mining for instance, press for an increase. They get it, and the artisans in other industries pay it. Immediately the other industries become envious of the good luck of the men in the coal mines and later they begin to feel the effect of the appreciation in the monetary value of the coal they purchase. So they in turn demand increases.

The situation resembles nothing more closely than an old pantomime stunt, in which Clown has his sausages stolen by Harlequin, and Harlequin no sooner rejoices in his pelf than he is robbed by Columbine. Then Pantaloon and Scaramouch rob and are robbed in turn. The humor of it never failed to bring down the house. Just in the same way the workers of various industries pick the pockets of one another. By demanding higher wages they cause a continued increase in the cost of living, in which all lose what they have gained.

But this continued increase is, on the whole, favorable to business. Under its influence prices of goods do not decline, they rise. In consequence it is safer to buy goods or to construct buildings than to retain money. Hence, trade is steadily encouraged, and waiting for better times is an unprofitable undertaking.

Unjust as is inflation in many respects, the public thrives on it. Inflation is often one of the byproducts of extensive labor unionism. It is a splendid stimulant, but it must always be remembered that it should be used with caution. The worst Russian "jag" has been inflation, and not vodka. In that vast region everyone wants to buy and no one to sell. We want a little of the keenness to buy right here, while Russia would greatly like our keenness to sell. A little inflation is like a cup of coffee—a good beverage which, if taken moderately, will clear our minds of the inertia of the night.

Did Labor Profiteer During the War?

REPRESENTATIVE HUDDLESTON, of Alabama, on Jan. 21 addressed the House of Representatives in defense of labor. He declared that labor did not profiteer during the war, and with a delightful indifference to the fact that many men's wages rose immensely in 1918, submitted a table showing only the increases between December, 1914, and December, 1917. The table he quoted also left out all account of the increases of many classes of workingmen, notably the miners. Yet there are a number of these in Huddleston's district.

But taking Representative Huddleston's table just as it is, one cannot fail to conclude that certain laboring men did most grievously profiteer. Some gained 65 per cent. increases and others only 6 and 7 per cent. Some which the table does not mention probably got no increased wage. We are asked to absolve all labor because the average increases in the pay of labor did not exceed the increases in cost of living. But the argument seems to be that some men had less buying power at the end of 1917 and others had more. So evidently some workingmen did profiteer.

As a matter of fact labor as a whole can never profiteer. The wage of labor can never be any more than labor produces. There is therefore a limit to the real payment of labor, and that limit is set by production. If production increases, then the real payment of labor can be increased, and that without profiteering. If the production does not increase every increase on the face value of wages is either not a real increase of wages or it is profiteering. The increase is obtained at the expense of other workingmen. Every increase of wage puts up the cost of living. Every change in the rate of pay of any one class of operatives decreases the real earnings of every other class. The high wage of the sheet-metal workers, the loftsmen and electricians, to quote Huddleston's misleading table, reduced the real wages of the bricklayers and others.

By lifting themselves they dragged other workingmen down. Labor as a whole cannot profiteer. Certain trades can; individuals also can; but speaking in general, we cannot one and all profiteer on one another. Labor cannot profiteer as a whole any more than a man can raise himself by tugging on his shoulder straps. If labor by striking could increase its real returns without reducing thereby the returns of other labor, the strike would be so beneficial to the human race that labor agitators would deserve statues in the public squares. As it is, strikes are but attempts to exploit the workers in all other industries than the one which is striking, or are attempts to rectify the conditions of some industry at the expense of others.

The profiteering of labor cannot be disproved or excused by showing that labor as a whole did not profit by it. The profiteering was only the more to be condemned because all did not share in it; and, in fact, had other workingmen not been made the poorer by it, it would not have been profiteering. But it must be conceded that part of the increase was not profiteering at all, especially in 1917. It was a contribution to the workingman to induce him to leave his home and meet the cost of entering a new and often temporary industry in a new and often makeshift town. He was entitled to payment for it, no matter who had to provide it.

DISCUSSION BY READERS

Drawing Pillars in Machine Mining

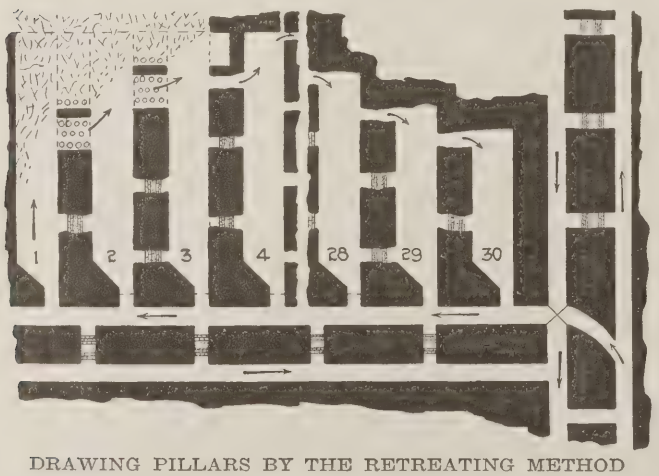
Letter No. 1—The inquiry of "Operator," regarding the drawing of ribs by machines, which appeared in *Coal Age*, Jan. 2, p. 32, was particularly interesting to me, inasmuch as the conditions with respect to the roof and height of coal are similar to those in our mines. We are using three types of machines, one of which is the same Sullivan shortwall machine stated as being employed by Operator.

The width of the rooms being given as 27 ft., I assume they are driven on 40-ft. centers, leaving pillars 12 or 13 ft. wide to be drawn. I would suggest, here, that better results can be obtained and greater safety secured by driving the rooms narrower, say 18 or 20 ft. wide, which would make the width of pillar 20 or 22 feet.

A machine will remove the supporting coal at the rate of about 15 to 18 sq.ft. per min., which is much faster than can possibly be done when using a pick. Moreover, in machine work there is not the same chance to set timbers for the support of the roof as in pick work.

In drawing back ribs, by machines, the cross-section of a 12-ft. pillar does not afford sufficient strength to break the rock, under 200 ft. of cover, when the first cut has been made with the machine. The consequence is that the weight of the roof rides over, crushing the narrow pillars and developing a squeeze or creep in the workings.

In the accompanying figure, I have attempted to show the general plan that we have adopted in our mine and



DRAWING PILLARS BY THE RETREATING METHOD

which has been found to work succesfully when drawing back the ribs by machines. The figure shows a section of the workings, on a pair of crossheadings driven to the left of the main entries. These headings have reached the boundary line and are being worked out on the retreating plan. The rooms have been started at the inby end and driven to the limit, in regular order.

As the limit is reached in each room, the work of drawing back the ribs is commenced by cutting through the rib in No. 1 room with the machine, and setting posts for the support of the roof, as the work progresses. When the pillar has been cut back 18 ft. from the face, a stump 4 or 6 ft. in width is left, and another 18-ft. cut is made through the pillar. The stump left is then drawn with picks and the timbers pulled with a chain-puller so as to cause a fall of roof. At times, a small stick of dynamite is used to destroy a post that cannot be pulled with safety.

Essentials in Pillar Work

An important feature in the work of drawing pillars is to keep the ends of the pillars in line. This gives a good line of fracture for breaking the roof, which relieves the pressure on the pillars and greatly assists the mining of the coal.

In order to remove ribs successfully, all the coal must be taken out, and if this is done conscientiously there will be no trouble. I have known of instances where thick stumps have been left in rather than pay pick prices for removing them. The result has proved, however, that this is a grave mistake, as success can only be achieved when all the coal and timbers are removed.

In other cases, a too sparing use of timber has caused trouble. It has the effect of throwing an undue weight on the pillars, which makes the coal difficult to mine and induces squeeze or creep. Enough timber must be used to hold the top perfectly sound, until the time comes to make a fall, when all timber should be removed and none left standing in the waste.

In closing, let me say that it is my belief that "Operator" will have no trouble in extracting all of his ribs with safety and economy, by adopting the methods I have suggested. This opinion is strengthened by the fact that we are working the same machines under, I might say, the same conditions. In case a mine is generating gas and locked safety lamps are required, a flameproof machine, such as the CE7 Jeffrey, Goodman, or other type, should be employed. D. F. M.

Meadow Lands, Penn.

Letter No. 2—In reply to "Operator," who asks for the best method of drawing pillars in machine mining, *Coal Age*, Jan. 2, p. 32, let me say that he has omitted one of the most essential things regarding his question; namely, the thickness of the pillars between adjoining rooms.

When mining under a sandstone roof, there is always great danger of bringing on a creep when drawing back pillars, either in pick or machine mining. Comparatively small pillars may be strong enough to bear the overburden, in driving the rooms to their limit or, as we say, in the "first working." But, when the work of taking out the pillars is started, the roof pressure will generally prove too great and the ends of the pillars will be crushed to such an extent that it becomes practically impossible to recover all the coal,

or even enough of the pillar coal to bring about a good roof fall and relieve the pressure.

At times where the coal is hard and the bottom soft, the latter will heave under the increased weight resting on the pillars. When that takes place, the pillars are forced down into the bottom, and it is impossible to use the machine or even to mine the coal remaining in the pillars.

Assuming, however, in the case presented that there is a good thickness of pillar, sufficient to bear the weight of the overburden until enough of the pillar coal can be taken out to bring about a good roof fall, it should be possible to recover all the pillar coal by adopting a proper method of working the seam. For instance, not a room should be turned, until the butt headings have reached their limit and it is possible to work out the coal on the retreating system.

Drawing Pillars in Five Rooms at a Time

Now, commencing at the inby end of the heading, five rooms should be started and driven on 60-ft. centers. The rooms should be widened to 24 ft., which will leave 36-ft. pillars between them. They should be driven to a distance of not less than 275 ft. and more, if it is possible to extend them further with safety and economy.

When these five rooms have reached their limit, the work of drawing back the pillars between them is commenced at the face of the last room but one on the heading. At this point, a crosscut is driven through the pillar, separating this room from the last one. The crosscut should be driven about the same width as the rooms.

With a sandstone roof, such as is here mentioned, it will be possible for the machine to make a cut clear across the face or end of the pillar. All props should be taken out except a good strong breakrow. This breakrow, of course, must be strong enough to protect the machine. As the work advances, and the space standing behind the breakrow becomes so great that it does not appear safe to make another cut in the end of the pillar, a second crosscut should be started and driven the same width as before, leaving a 6-ft. stump between the end of the pillar and the rib of the crosscut. When this crosscut has been driven through the pillar, it will often be possible to cut out all the stump with the machine, except 3 or 4 ft. on each end, which must be taken out with a pick.

Pillars and Rooms Worked on 45-Deg. Angle

For the success of the operation, it is important not to start to cut through the second pillar, until the first cut has been taken on the first pillar. The same plan must be followed in respect to each of the other pillars, which will make the line of the pillar work assume an angle of about 45 deg. with the heading and the last pillar will be about commencing when the first pillar is finishing.

At this stage of the work, five more rooms should be started in turn, keeping the face in each a few cuts in advance of that in the room next adjoining, so that the faces of these rooms will make about the same angle of 45 deg. with the heading, as is the case with the pillars that are being drawn back. It will be observed that the 45-deg. line marking the faces of the rooms will be opposed or at right angles to the 45-deg. line marking the ends of the pillars. When the first pillar is drawn back to the mouth of that room, the men drawing the pillar continue, by taking out the stump on the heading and the entry pillar, keeping the same 45-deg. line as before.

My understanding of the case presented by "Operator" is that he has a lot of pillars standing. Even in that case, the work of drawing the pillars should begin with the last one on the heading. If these pillars are any less than 20 ft. in width, I would start about six of them, putting in as many men as possible and working day and night, doing everything possible to induce a break in the roof. It is of utmost importance to leave no stumps remaining, but all must be removed, or blown out if it is necessary to lose the coal.

On the other hand, if the pillars are ample, the work of removing them should be started on the last pillar and the same plan followed that I have just described, keeping the ends of the pillars on a line of about 45 deg. with the heading. In removing pillars of a good thickness with machines, there should be no trouble to recover all the coal. But, if the pillars are not thick enough, there is bound to be trouble whatever method is employed for their removal.

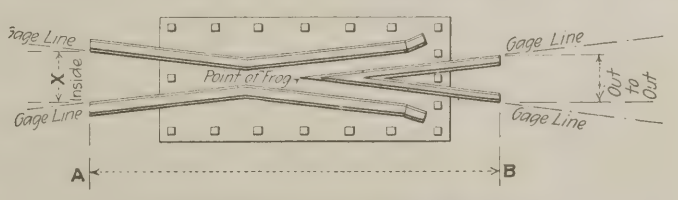
Room stumps should never be less than 50 ft. in thickness; or, when working with a single entry, a 50-ft. barrier pillar should be left to protect the entry. Never let a cutter cut out an entire stump, as the settlement of the coal will have a tendency to bind the cutter-bar and hold it fast. Always leave a small stump for the protection of the men and the machine.

McIntyre, Penn. THOMAS HOGARTH.

Mine-Track Switches

Letter No. 1—Referring to the inquiries, *Coal Age*, Nov. 21, p. 961, and Dec. 26, p. 1179, kindly permit me to draw attention to one or two points that should be emphasized, where trackmen often make an error in measuring a frog. When measuring the spread of the rails, the measurements must always be taken between the gage lines.

In a standard-gage frog, such as is used on surface railways, the gage lines are on the inside of the rails



A STANDARD-GAGE RAILWAY FROG

that form the wing rails of the frog, while at the other end they are on the outside of the rails forming the V of the frog. I might call one the "X measurement" and the other the "V measurement," the former being taken on the inside of the rails and the latter on the outside, as shown in the accompanying figure.

Let me say, here, that 95 per cent. of coal-mine frogs, however, consist of the V part only and do not include the wing rails that form the X section of a standard frog. Hence, the number of an ordinary V, or mine frog, is found by dividing the length of the V by the

spread, as measured out to out of the rails. For example, if the V is 24 in. long and the spread 8 in., the frog number is 24 ÷ 8 = 3, this being a No. 3 frog.

Speaking of the radius of a switch, let me say that few switches, in mines, are laid to any exact radius. In mine work, the radius of curvature of the lead rail is of use chiefly for aiding the calculations of the proper length of that rail, and other dimensions. In actual practice, the frog must be laid in a position, on the main track, to suit the opening at the room or heading. After passing the frog, the curve may follow any radius best suited to the conditions.

Also, conditions in mines regarding the speed and the pulling and pushing of trains, and the effect of the rope, in rope haulage, make it impracticable to estimate the proper elevation of the outer rail by the usual methods. Practical trackmen rarely exceed ⅛ of the gage, for the necessary elevation of the outer rail on a curve.

Wheeling, W. Va. R. Z. VIRGIN.

Reducing Ventilation at Firing Time

Letter No. 3—After reading the letter of John Verner, *Coal Age*, Nov. 28, p. 1000, in which he advocates reducing the circulation of air before firing shots in a nongaseous mine, I have since read Technical Paper 190 issued by the Federal Bureau of Mines, to which he has referred. The authors of that paper condemn the practice advocated by Mr. Verner, basing their conclusions on experiments made by them to determine the effect of a reduced circulation of air on the firing of shots in mines.

Taking these experiments as demonstrating the fact that such a practice is highly dangerous, I cannot see how shotfirers still cling to that method. There have been repeated explosions, and shotfirers have been killed, simply because they relied on their own experience and would not accept of what was told them. As mine statistics rarely cover cases of such accidents, except where five or more persons are killed, the many deaths of this nature that occur escape public notice.

CHIEF DANGER IN RAPID SUCCESSION OF SHOTS

As I understand it, the argument advanced in favor of this practice, emphasizes more the danger of an increased draft of air causing an explosion, rather than the firing of shots in rapid succession. To my mind, the latter condition is the more dangerous of the two.

On pages 33 and 34 of that paper it is stated that the authors kept a record of the time required to fire the shots in a certain mine, during 11 days. Two shotfirers were employed and an average of 160 shots were fired each night, the time of firing ranging from 1 hr. 27 min. to 3 hr. 45 min., although it required 30 min. for the shotfirers to reach their work after entering the mine, and the same time to reach the shaft bottom when their work was ended.

These results show a continuous firing of more than one shot a minute, in that mine, and make it certain that the shotfirers did not pause to ascertain whether any brattice had been blown down or other damage done after a shot was fired. They, undoubtedly kept on the run from one place to another.

Let me illustrate this condition, by supposing that 3 hr. is the time allowed for the firing of shots in a mine generating a very small amount of methane, say ¼ per cent., which would not be detected on a lamp. Now, if the fan is shut down before firing is commenced the air at the working face of each room will be still when the shots are fired. If gas comes from the roof or the top of the coal, it will be stratified in a thin layer and form, in a short time, a dangerous condition for firing shots.

The tables on page 26 of the same paper show that tests made in one entry, at the roof, revealed an increase from 0.29 to 2.84 per cent. of gas. In another entry the increase was from 2.52 to 3.72 in 2½ hr. The tests made in the last open crosscut, however, showed only a negligible increase in gas, making it appear that the gas accumulated at the roof in the places where it was generated, and that the air current was not strong enough to sweep it away.

Attention was drawn to the fact that, in practically all of the tests made, the oxygen content of the mine air was normal. The argument that the slowing down of the fan reduces the amount of oxygen in the mine is thus proved a fallacy. The danger from the cold air, in winter, entering a mine arises from its increase in temperature while circulating through the mine airways. This makes it possible for the air to absorb a large amount of moisture and dry out the mine, rendering it more dusty and dangerous. Let me suggest, here, that when the fan is stopped there is a fall of pressure, which may cause gas to issue from abandoned places in the mine.

URGES THAT FIREBOSSES TAKE MORE TIME

In closing, let me urge that more time be given for firing shots, and that the shotfirer should fire these in regular order, proceeding against the air. To fire 160 shots should require 5 hr., which would give ample time for the examination of each working place.

As showing the carelessness of many men, I am reminded of an incident that occurred when I was working in the Hart-Williams mine, in Illinois, Franklin County. We were timbering a pair of entries a little distance from the mouth and another gang was cleaning falls nearer the face. A certain driver had the habit of always setting open the door on the entry between the two headings, while he was waiting for a car to be loaded.

On one occasion, I shut this door, whereupon he came back and opened it and sat down against it. I was advised by my fellow workers not to make any trouble, but one can imagine my thoughts, being accustomed to work with safety lamps, where such a practice would mean danger. To my mind, ventilation is an important factor in mine safety. I want to say, in closing, that I have more faith in tests and experiments than in beliefs and theories. GASTON F. LIBIEZ.

Peru, Ill.

Letter No. 4—Whatever can be said in favor of this proposed practice in mines not generating gas, the principle cannot be applied to Pennsylvania mines where the danger of gas is almost always present.

The Pennsylvania mine law is very specific in this regard, and it can be said with truth if the firebosses

in those mines lived up strictly to the requirements of the law, there would not be much coal loaded the next day. In the fireboss' book would be found too many entries made such as "too much gas present," giving that as a reason for not shooting the coal.

Again, the Pennsylvania law demands the sprinkling of each place before firing shots, wherever gas can be detected by an approved safety lamp. While it is true that some of the most gassy mines, in this state, are the wettest and there is no need of sprinkling, it is still necessary to keep bratticemen busy and the fireboss must always make careful tests for gas, before shots can be fired. Under such conditions as these, the question of reducing the ventilation in the mine, at the time of firing shots, is an idle one. No superintendent, foreman or fireboss, would consider the proposition one moment.

I recall a miner who was working at the face of a room where a small amount of gas was generating, although not sufficient but that open lights were used. The man gave warning that he was going to fire, which he did, with the result that the gas coming from the coal fired all over the face. The funny part, however, was the man lost his head and dashed from room to room, knocking out the men's lights from their caps.

My advice is, keep a healthy circulation going, as much for the shotfirer as for the miner that his work may be done safely. R. W. LIGHTBURN.

Perryopolis, Penn.

Protecting a Mine Opening

Letter No. 1—It occurred to me when reading the short article of Raph W. Mayer, entitled "Unique Mine Portal," *Coal Age*, Nov. 14, p. 909, that it would have been possible to have secured far better results, in the case he mentions, by adopting some plan that would have permitted the mine to be operated continuously.

In his article, Mr. Mayer states that the mine opening is located in a hill that rises abruptly from the Monongahela River. The narrow bench, on the river, bank, is occupied by the double track of the Pennsylvania Railroad and, to avoid hauling the coal across the track, it was necessary to drive a tunnel, from the river, underneath the railroad.

The mouth of the tunnel, he states, was lined with heavy concrete walls extending back to the coal. As the opening was below the high-water mark of the river, it was necessary to close the mine during high water, by constructing a water-tight door, which was bolted to the face of the concrete walls of the tunnel and tightly sealed. In my opinion, the necessity of putting up and taking down this door, at each time of high water, would be a decided nuisance.

It appears to me that, providing the mining of this coal would warrant the outlay, it would have been far better to have extended the concrete walls 8 or 10 ft. further and sealed the inclosure against the inrush of water by an end wall. These walls should, of course, be carried up above high-water mark and a small tipple erected on this foundation. This would allow a balance hoist to be used for lifting the coal to a sufficient height to permit it to gravitate to the point of loading; or it could be loaded at once into the barges on the river. Such an arrangement would allow the mine to be worked continuously and would be much safer and less liable to inundation from a sudden and unexpected rise of the river. M. STAFFORD.

Chase River, Vancouver Island, B. C., Canada.

Perplexities of Mine Foremen

Letter No. 8—Having had a few years' experience as a mine foreman, and knowing some of the perplexities that he meets in his work, I would like to be permitted to cite one or two instances with which all mine foremen must contend, although these can hardly be called perplexities; they are simply troubles that a foreman must expect.

The mine of which I was foreman had no superintendent and, as a result, when things went wrong I was the one to suffer. We were working a 10-ft. seam of coal that had developed a shale-rock parting about 4 ft. from the bottom of the seam. In order to clean the coal, I put on six rock pickers at the tipple, besides employing a rock inspector, whose duty it was to see that every car that was shipped contained no rock.

Notwithstanding these precautions, however, it would occasionally happen that a car was shipped that contained a little rock and be refused at its destination. Of course, on such occasions, I would receive a personal letter from the head office, calling my attention to the fact in terms that were not fitted to put me in a good humor.

Another source of trouble was poor equipment. We were using steel cars, but had hardly enough of these to keep the mine running to its full capacity. When a wreck occurred, as it would occasionally even though we took every precaution to avoid it, one or more of the cars would be badly crippled, which necessitated such cars being sent to the shop where they would be out of service, perhaps from two to four weeks. To repair these cars, they had to be taken apart by hand, the plates straightened, and again put together by hand, as there was no machinery for performing that work.

BAD EQUIPMENT AND LABOR TROUBLES

But, one of my real perplexities came when the general manager sent me a hoist, if I could call it by that name. It was equipped with a 10-hp. motor and had a drum only 6 in. in diameter. With this hoist, he expected me to develop the main and back slopes, which had a grade of 6 per cent. against the loads. Can anyone suggest how this was to be done?

Not an infrequent source of annoyance was due to the fact that most of the men employed in the mine were Greek miners, whose knowledge of coal mining was limited. Their complaints were many. One day a miner came to me and said, "Well, boss, I no can work my place any more; too much bad top." I said, "All right, I will come up and see your place." Reaching there, I found his top a little bad, but an experienced miner would have fixed it and said nothing. I put up a post and crossbar for him and he went to work again and is there still.

On another occasion, I put two Greek miners to cutting a place through to another room, so as to shorten the haul. They fooled around three days, and then came to me and said, "We no can make nothing in that place;

coal too hard; too much money for powder." I said, "All right," and gave them a change. I then put two Americans to work in the same place and they made $315 clear of expense, the first full month they worked the place.

It was my misfortune to hire a young fellow as a motor nipper, but whom I found, later, to my sorrow, was a pro-German. The first two days he worked fine; the third day be caused a slight wreck, and the fourth day a larger one that stopped the mine all day. I wanted to have the man arrested, but the manager told me to give him his time and tell him to get out of town as quickly as possible, which I did.

In a machine mine, the foreman is always confronted with the possibility of a machine breaking down when cutting the coal at night. Then, if there is no mechanic or electrician around, the machineman goes home and there is no more coal cut that night. The next morning the mine foreman goes to the mine only to find the men complaining that their coal has not been cut.

Notwithstanding this scarcely avoidable occurrence, the management expect the foreman to keep the mine running. If the day's tonnage falls short, the foreman gets another letter that does not add to his pleasantness. But the foreman must maintain his equilibrium, under these trying circumstances, and do his best to keep his temper, which is one of the important assets of a good foreman.

PATIENCE.

———, Utah.

Letter No. 9—The case of the miner who complained to his foreman that the machinerunner had left several inches of bottom coal in his place, as described in a foreman's letter on this subject, *Coal Age*, Oct. 24, p. 793, has attracted some comment. In most respects, I agree with the Homer City miner, whose letter appears in the issue of Dec. 26, p. 1176, and who gives good advice.

In the first place, a mine foreman is responsible for some of his own troubles, which may come from not using proper discipline at the right time. A machinerunner has no right to be careless in cutting a man's coal, and the foreman should be particular to train his men in this regard, and see that each man's place is properly cut. Perhaps more bottom coal was left in this man's place than was necessary and, if so, the man was right in complaining to the foreman. But, assuming that the machinerunner was a member of the same organization as the miner, they were brothers, and one brother would not care to wrong the other or do so intentionally.

The Case Referred to the Mine Committee

The matter, in this case, being referred to the mine committee, it would seem that their duty was to call each of these men to meet them and to listen to their statements so that they, as a committee, could arrive at a proper judgment. Trouble often comes from a lack of proper understanding between the parties. It is not good policy for either a foreman or the mine committee to be obstinate. Right is sure to win.

Too often men expect too much of the mine foreman, especially if he is what they call "easy." Such a foreman will often make a concession rather than have trouble with his men. This foreman may have been justified in offering the miner extra pay for cutting out the coal that had been left; but, in doing so, there is always danger of establishing a precedent that will compel him to do the same thing again. Let me cite an instance where that occurred.

At a certain mine, the development was not sufficient to supply the demand for coal. As a consequence, men were waiting for places. In order to expedite the work, the foreman offered the entrymen 25c. a yard extra because rooms had to be turned as quickly as the entry was advanced, and this made trouble for the men driving the entries. The foreman promised that the extra pay would be continued as long as the conditions continued.

Not long after, however, there was a change in foremen, at the mine. The new man remained only six or seven months and a third man came to take his place. The company was still paying the extra yardage, although the conditions that required this had ceased. A little later, the office asked for the reason why the price paid for yardage was 25c. higher at this mine than at any of the others, and told the foreman he must go back to the old price.

Unfair and Arbitrary Ruling of Committee

When this decision was announced to the men, they at once took up the matter at their regular meeting, and the mine committee was instructed to notify the officials that there would be no more work done, unless the men were paid the same price as before. They admitted that the conditions that required the extra pay no longer existed, but claimed that custom makes a law and that the price was not changed at the time the conditions ceased. Probably that was owing to the foreman not wishing to do anything that would cause trouble.

It has been suggested that a miner is justified in expecting his share of the profits from the increased demand for coal. In my estimation, miners are receiving their just dues. They forget that coal companies have been put to extra expense in order to produce a larger tonnage with fewer men. New equipment and material have been required that were not needed under the old conditions. At the same time, the miner's pay has been advanced from $3.60 to $5 per day.

It is only right to ask what have the miners done in return for the advance made them. It must be admitted that a large majority of our miners have worked fewer days owing to their necessities being relieved by the increased pay that they received. There were some who would lay off to visit another mine where they had been told the men make more money. Eager to make the same, some have given up their places and gone to other mines, only to find that they have been wrongly informed and have returned to their old places, all of which means loss of time. Others not wishing to acknowledge their mistake, have taken up other work and will never go back to the place they were foolish enough to quit.

The increased price paid for digging coal has made it harder for a foreman to secure good daymen, because men can earn better money digging. A certain machinerunner who drew, on three successive paydays, $214, $170 and $186, asked the foreman to get another man in his place, claiming that his wife was sick. These are a few of the perplexities of mine foremen.

———, Penn.

ANON.

INQUIRIES OF GENERAL INTEREST

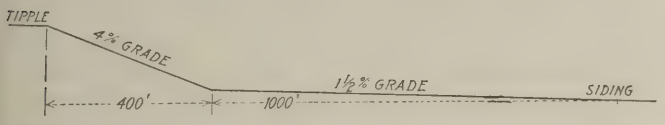
Engine-Plane Haulage

Kindly allow me to present a problem with which we are confronted in our mining operations. It is in regard to a proposed engine-plane haulage, extending from a sidetrack in the mine to the tipple on the surface. As indicated in the accompanying profile, starting from the sidetrack there is an upgrade of 1½ per cent. for a distance of 1000 ft., to the foot of an incline having a grade of 25 per cent.

The incline, which is 400 ft. long, has been previously operated as an engine plane; but we desire, now, to drop the loaded cars from the top of the plane the entire distance to the sidetrack in the mine. The loaded cars weigh 5000 lb., and the empties 1500 lb., each. There are three cars hauled in a trip. The daily output of the mine is 500 tons. I want to ask if the proposed plan will work successfully; if not, please explain the method of finding the flatest grade we can use and the size of engine required for the work. W. M. Q.

———, Penn.

It is difficult to obtain a clear idea of what this inquirer has in mind when he asks for "the flatest grade that can be used." The situation, as we understand it and as illustrated in the figure, consists of a 25 per cent.



PROFILE OF A PROPOSED ENGINE-PLANE HAULAGE

grade, forming an incline 400 ft. in length and running from the tipple floor into the mine. From the bottom of this incline an entry runs to the dip, on a grade of 1½ per cent., for a distance of 1000 ft., to the side track in the mine.

The weight of a loaded car being 5000 lb., a three-car trip would weigh 15,000 lb. To handle this trip on a 25 per cent. grade, assuming a track resistance of, say, 20 lb. per ton of load hauled and using a factor of safety of 5, will require a ½-in. crucible, cast-steel haulage rope, weighing 0.39 lb. per foot.

The test of the system will come when the three-car, empty trip, weighing 4500 lb. is approaching the side track and must drag the entire length of the rope behind it. The gravity pull, less the track resistance of the empty trip, at this point, is only about 22.5 lb. The gravity pull of the entire length of rope on both grades, may be about 45 lb., which makes a total force of 67.5 lb., acting to drag the rope from the winding drum and over the rollers on the track.

It is difficult to say if this force is sufficient to overcome the rope friction without more definite data for estimating the resistance. One thing, however, seems certain and that is it would not be possible, in this system, to make the number of trips required to put out 500 tons of coal per day. A three-car trip would carry $3(5000 - 1500) \div 2000 = 5.25$ tons, which would require $500 \div 5.25 = 95$ trips or, say a trip every five minutes, hauling 8 hours a day. *Coal Age* submits this question for further consideration by its readers.

Mule Power in Mine Haulage

We are desirous of ascertaining what is a fair estimate of the work that a good average mine mule or horse will perform when working under average conditions, in a level seam. Also, how does the question of grade affect mule haulage? This is a matter on which I have been unable to find reliable information based on coal-mining practice; and, as the question has presented itself several times recently, I shall appreciate any assistance that is available. H. R. S.

Plymouth, Ohio.

The work that a mule will perform in a mine will depend not only on the size and weight of the mule and conditions regarding track, rolling stock, grades and headroom on the haulage road; but also on the character and skill of the driver, the length of haul and time lost in changing trips or waiting for loaded cars. It is clear, then, that this question is not solely one of how much a good mule can haul on a level track.

Observations taken, from time to time, in practically level seams and under fairly average conditions in coal mining, make the estimated work of an average mine mule about 6 or 7 ton-mile hours; that is to say, the average mine mule will ordinarily handle, say 200 tons of coal, on a quarter mile haul, in 8 hours. In other words, for an output of 1000 tons of coal a day, five mules would be required, on a quarter mile haul.

It is understood that this is only an average estimate based on fairly good coal-mining conditions in respect to the several items previously mentioned. The tractive power of a mine mule is commonly estimated as one fifth of its weight; and, taking the track resistance of the mine cars as, say 20 lb. per ton, or 1/100 of the gross load hauled, it may be assumed that an average mule will haul twenty times its own weight, on a level track. In other words, a mule weighing 8 cwt. may be assumed to haul a gross load of 8 tons, on a level track.

The tractive power of a mule, however, decreases rapidly with an increase of grade of track. A 3 per cent. grade should be considered as the limiting, uniform grade on which a mule should be obliged to haul, for any great time or distance. When a haulage road has a varying grade of ups and downs, the impetus given the trip on the downgrade will often permit a mule to haul the load up the upgrade following, without inconvenience, although that grade may exceed the limit of 3 per cent. just mentioned. The 3 per cent. limit applies only to a continuous upgrade.

EXAMINATION QUESTIONS

British Columbia Examination Second Class, Dec. 17, 1918

(*Selected Questions*)

Ques.—What is meant by diffusion of gases? Explain Graham's law of diffusion.

Ans.—The term "diffusion," as applied to gases, relates to the mutual intermixing of the molecules of two or more gases when in contact with each other. Diffusion takes place according to a fixed law known as Graham's law of diffusion. The law states that the rate of diffusion of gases into each other or into air varies inversely as the square root of their densities, or specific gravities when referred to air as unity.

For example, in the diffusion that takes place between a body of pure methane and air, the relative velocities of their molecules are as $\sqrt{1}: \sqrt{0.559}$; or 1: 0.748. That is to say, for every volume of the gas passing into the air, there will be 0.748 vol. of air passing over into the gas. The mixture resulting when diffusion first starts between pure methane and air will therefore consist of 1000 parts of the gas to 748 parts of air. The specific gravity of the gas mixed with air is at once increased to 0.748, and the diffusion is less and less rapid as the specific gravity of the mixture approaches that of air.

Ques.—Is it possible that an explosion of firedamp in a safety lamp would be of sufficient force to pass the flame through the gauze? Explain fully.

Ans.—If the firedamp mixture entering and filling the chimney of the lamp is inflammable only small balloons of flame will be seen to arise from the combustion chamber of the lamp and disappear in the gauze chimney above. But, if the mixture is within the explosive range of the gas more or less violent explosions will take place within the lamp. The violence of the explosion, however, will be greatly modified by the presence of the burnt air and gas accumulated in the upper part of the chimney.

As the mixture entering the lamp approaches more closely to the maximum explosive point of the gas, sharp crackling sounds will be heard and the violence of these explosions increases. If the lamp is not now cautiously and promptly withdrawn from the mixture, the explosive action continuing within the lamp will drive out the accumulated burnt air and gas from the gauze chimney above, and it is then possible for a violent explosion to occur within the chimney and force the flame through the mesh of the gauze and ignite the gas surrounding the lamp.

Ques.—How would you remove a large body of firedamp from a section of the mine where the ventilating current is insufficient, without unduly reducing the quantity of ventilation in other sections of the mine?

Ans.—The removal of a large body of firedamp from a section of a mine where the ventilating current is insufficient will require increasing the quantity of air circulating in that section. Before anything is done, however, safety demands the withdrawing of all the men from the mine, except those engaged in the work of removing the gas.

It is possible to obtain some increase in circulation in the gassy section, by robbing the circulation in other sections of the mine, without unduly reducing the quantity of air required to keep those sections clear. But, for a further increase of the circulation in the gassy section, recourse must be had either to increasing the speed of the fan or assisting the ventilation by removing any possible obstructions in the airways, and by erecting special brattices to deflect the air current against the accumulated body of gas.

Only experienced men equipped with approved safety lamps must be employed for this work. Sufficient time must be given for the air current to act upon the gas and frequent tests must be made to ascertain the progress of the work. In the meantime, the lamps in use must be guarded as much as possible against a sudden rush of air should a fall of roof take place in the section.

Ques.—To what are explosions in coal mines due? Describe the varying conditions that may cause or contribute to an explosion, and state what precautions you would take to prevent them.

Ans.—Explosions in coal mines result from the ignition of a body of firedamp or a cloud of dust floating in the mine air. The ignition may be due to contact with the flame of a naked lamp, a defective safety lamp, or the improper use of a safety lamp by an inexperienced person. Ignition may be caused by the blowing out of an electric fuse, sparking of wires or electric motors, the breaking of an incandescent lamp, a gob fire, the ignition of a gas feeder in blasting, and a number of other causes producing heat or flame.

The accumulation of gas in void places in the roof or in abandoned workings; or accumulations of fine inflammable dust at the working face and on the roadways; or the use of mixed lights in mines requiring locked safety lamps in one or more sections; or the excessive use of powder in blasting the coal and the lack of judgment and experience in placing shots: all present conditions that contribute to an explosion taking place in the mine.

In order to avoid the occurrence of explosions in mines, it is necessary to remove the causes that contribute to produce them. The workings must be thoroughly inspected for gas, both before the men enter their places for work and while they are at work. All shots should be inspected, charged and fired by competent shotfirers. All electrical installations should be made by competent mine electricians. The roadways and air-courses should be kept free from accumulations of dust. In machine mining, the cuttings should be loaded out of the mine. No fine coal or slack should be stored in the waste. Eternal vigilance is the price paid for safety.

COAL AND COKE NEWS

Harrisburg, Penn.

Bituminous coal production in the central Pennsylvania field has been reduced approximately 35 per cent, because of a lack of demand for coal. Rather than demoralize the market by cutting prices, operators are closing down the mines temporarily. A little coal has been sold under the Government prices at $2.95, but it had already been mined and was loaded on cars awaiting shipment. Coal operators say the supply is long all over the country, especially in New England, where many of the large consumers have a stock on hand sufficient to last them from four to seven months. At tidewater points the demand has also suddenly dropped.

The outlook for both miner and operator in the central coal fields is becoming darker each day, and many miners will be out of employment. About ten days ago two operations in the Altoona section closed down, one at Woodland and the other at Kersey. Since that time the number has continued until at present it is estimated that fully 250 mines in the central territory are at a standstill. These are small mines, employing from ten to fifty men. Nine of the larger mines of the district have closed.

It is estimated that there were 400 wagon-loading mines in this section, and of that number comparatively few are working. In the vicinity of Phillipsburg production has fallen off alarmingly and the few mines now operating have only a few men at work. At Reynoldsville production is at a standstill, and at Kittanning many men have been discharged for lack of orders.

All of the large mines in Cambria County are working, but a score of the small ones have shut down completely and probably forty others are working only half time. These shutdowns are, in the main, due to the fact that only the best quality of coal is in demand, and that the small producer, who could sell any kind of coal before the war ended, has no market for his product at this time. The mild weather is also responsible for the falling off in production for the smaller mines throughout the state.

Uniontown, Penn.

Through a system of underground haulage the output of several mines of the H. C. Frick company is being taken out at the mouth of the Alice mine, near Charleroi, for transportation down the Monongahela River to the Clairton byproduct plant. The longest haul now made is over a distance of 2½ miles, but the system will be extended shortly to handle the output of the Colonials, covering a haul of approximately 4½ miles.

When the entire underground system is completed the longest haul will be in the neighborhood of eight miles. This plan eliminates haulage, openings at many plants, provides quicker transportation and means an immense saving in time, plant operation, labor and shipping.

The Frick company has not adopted the plan of a number of independents in observing "layoff" days. All plants are working six days a week, but the relaxing of the labor situation due to the return of soldiers and the suspension of the team-track mines has resulted in the elimination of extra shifts and overtime, which was used so extensively during the war in increasing production.

There was a drop of 35,000 tons in the output in the Connellsville region during the week ended Jan. 25, due principally to curtailed operations at the independent plants. A still further curtailment is presaged for the current week. The aggregate output was 604,331 tons, from which there was manufactured 276,416 tons of coke. Raw coal shipments aggregated 189,707 tons.

Charleston, W. Va.

More than two thirds of the production loss in the Pocahontas and Tug River districts was due to no market. New England buyers, it is said, are withholding orders in the hope that prices will decline and that is responsible for an accumulation of tidewater shipments. It is predicted by Pocahontas coal men that instead of Pocahontas prices being lower they will probably advance as soon as there is the slightest hardening of the market. Prices quoted for run of mine coal in the Pocahontas district range all the way from $2.35 to $3.

Production has been affected to some extent in the Fairmont region by the attitude of the railroads, which, it is claimed by producers, are determined to secure their supplies of fuel at lower prices than are now prevailing; and since much Fairmont coal is used for railroad fuel, this is said to be making some difference in the amount of coal sold in the region. Coal is no longer requisitioned for the railroads. The new difficulties which have arisen may assume equal importance to those in controversy when the question of assigned cars was paramount. Embargoes are now in effect in connection with shipments consigned to Staten Island and Arlington piers.

Market conditions in general are responsible for low production in the Kanawha region, where the output is far below normal. In fact, insofar as it is possible to tell, operations, generally speaking, are limited to about three days out of a week, and consequently overhead expense is running high. This in turn is effectually having a tendecy to make prices firm. Summer weather throughout the country has played an important part in holding down production in the Kanawha district.

Congestion is affecting operations in the New River district to as great an extent as it is elsewhere in the state. One result of congestion was seen in the district on Jan. 27, when the Shipping Board imposed an embargo on tidewater coal which may be in effect for several weeks. Operators hope to offset their inability to ship to the east by beginning the shipment of coal to the West within a week or so, now that there are no longer any zone restrictions.

Victoria, B. C.

The Government of the Province of British Columbia has announced that it will stand by the settlers of Vancouver Island who are claiming the coal rights in connection with the lands they occupy providing they can prove that such claims are based on sound premises. It will be recalled that the Dominion Government last year disallowed the Provincial Act, giving the settlers a further period in which to record their applications, this measure being termed "An Act to amend the Settlers' Rights Act, 1904." One of the objections taken by the Federal Administration is that such legislation proposes to authorize the alienation of rights which were conveyed by the Province to the Dominion and by the Dominion conveyed to the Esquimalt & Nanaimo Railway Co. in consideration of the latter constructing a railway on the Island.

Among other points advanced by the Provincial Government in its answer is that there is no difference in principle between the Act of 1917 and that of 1904, both being identical in character, and that the Dominion is inconsistent in disallowing the one and allowing the other to stand. This legislation, and the conflict which it has caused between the Federal and Provincial Administrations, involves title to considerable of the undeveloped coal areas of the Island. This is now, for the most part, in the hands of the Canadian Collieries (D) Ltd., to which company it was transferred by the Esquimalt & Nanaimo Ry. Co

Acting on instructions from Hon. William Sloan, Minister of Mines, the Chief Inspector of Mines of British Columbia has arranged for a series of practical tests of the efficiency of the Gibbs mine rescue apparatus and the Paul breathing apparatus. These began on Tuesday, Jan. 28, at the Government mine rescue station at Nanaimo and will continue until the efficiency of the machines is thoroughly demonstrated.

PENNSYLVANIA

Anthracite

Lykens—A number of miners were penned in the mines for several hours recently when a string of cars broke loose on the electric slope and dashed to the bottom, tearing out the props and letting loose about fifty tons of coal and rock.

Larksville—Responding to an advertisement of the Hudson Coal Co., carpenters by the dozen, with their tool chests, applied at the Plymouth No. 5 colliery the day after the big breaker burned, and every applicant was put to work. The intention is to push erection of the new breaker to completion with the utmost dispatch.

West Pittston—A cave-in which recently occurred on Elm St. is supposed to be due to the abandoned workings of the old Clear Spring mines. A considerable area was affected. No damage resulted, as no properties are located in the area disturbed. J. L. Cake, owner and manager of the colliery, was on the scene shortly afterward and had men filling in the hole with ashes

Bloomsburg—Representatives of the various coal companies operating in Columbia County met with the county commissioners on Jan. 28, regarding the assessment of coal lands. The commissioners, believing that the coal companies have not been paying a just tax because of the low valuation at which their land has been assessed, some time ago employed M. J. Flynn, a mining engineer, as an expert to assist them in fixing a proper valuation.

Upper Lehigh—The project started by the Anthracite Forest Fire Association to fight against forest fires in the hard coal region has the hearty support of the anthracite coal operators. This place was selected for a new lookout tower to be erected by the association on a site for which the M. S. Kemmerer Coal Co. has given full rights. Telephone communication enables prompt advice and location whenever a fire starts. The nearest tower to Upper Lehigh is located on Broad Mountain, south of Hudsondale colliery, and enables the guard on duty to see the surrounding country for miles. It is expected that more of these watch towers will be erected by the coal companies in various parts of the mining region.

Hazleton—"Broken time" has again come to the anthracite field, after nearly four years of steady, high-pressure production. Upper Lehigh and Hazle Brook, both Wentz collieries, will operate five days. Beaver Brook colliery of Dodson & Co. will work four days a week. Madeira Hill & Co., operating at Harleigh and in the Schuylkill region, will work three days. The Lehigh Valley Coal Co. went on a seven-hour a day schedule last week. G. B. Markle & Co., of Jeddo, will work full time, storing its surplus coal. The Lehigh and Wilkes-Barre has not curtailed its working time as yet. With the shorter time all repair work and overtime has been stopped. The Wentz companies have all employees on a strict eight-hour basis. Washery and culm bank operations are nearly all suspended, and stripping work and development is practically dead.

Bituminous

Clearfield—Three miners, all residents of this section, were killed on Jan. 29 when a pocket of gas in the Goodyear mine at Smoky Run exploded. The victims were blown into a pool of water by the force of the explosion. The bodies were recovered.

Uniontown—First steps toward the conquest of Cuban fuel markets by Fayette County coal and coke will shortly be made by a party of Uniontown coal men and bankers. Wilmer H. Wilkey, Jacob H. Linn, A. Plumer Austin, J. Edgar Hustead and Harold W. Semans, representative local fuel producers and capitalists, sailed from New York on Jan. 26 and will spend several weeks examining the Cuban market conditions with a view to exporting Fayette County coal and coke to the island. Other local interests are planning for the investigation of South America also.

Uniontown—Verdict of accidental death with no blame attached to W. J. Rainey was returned by the coroner's jury inquiring into the dealth of Samuel Hardy and William C. Foltz, miners, asphyxiated at the Mount Braddock mine Tuesday, Jan. 21, when a fire on a slate pile on the surface burned through to the working. The inquest was conducted by Mine Inspector Richard Maize, who commended highly the work of Mike Sostchech, Frank Krum and August Klaus, members of the Orient rescue team, who performed valiant rescue work.

WEST VIRGINIA

Gilmer—Parkersburg and Clarksburg people have acquired control of the Gilmer Fuel mine located at this place on the Coal & Coke Ry., this company having been owned and operated prior to this time by outside capitalists.

Cameron—Further information obtained in connection with the plans of the recently organized Dunkard Valley Coal Co. discloses the fact that a drift mine will be operated here by the company and that the estimated capacity of new work in tons per day will be 2500. No development work, however, has been started, but such work will be commenced soon. Equipment and material needed has not so far been ordered. The office of the company will be in Morgantown.

OHIO

Lima—The Lima Coal Co. will soon begin the work of opening a new mine near Charleston, W. Va. The mine has been projected for several months, but only recently was permission secured from the Railroad Administration to build the necessary switch. The mine will have a capacity of about 400 tons daily. It is located on the Coal & Coke Ry.

Chillicothe—A 6 ft. vein of good quality cannel coal has been discovered on the farm of Nelson Johnson, in Franklin township, Ross County. The extent of the vein is undetermined.

Pomeroy—At the annual meeting of Subdistrict No. 2 of District No. 6 of the United Mine Workers of America, George Cecil of Wellston was elected president; William Lamb of Jackson, vice president, and Henry F. Bartles of Minersville, secretary-treasurer. A new board was also elected.

INDIANA

Vincennes—About 30,000 lb. of mine powder and the brick house in which it was stored were burned in a fire of undetermined origin at the Oliphant-Johnson Coal Co. mine, at Bracewell near this city. Mine officers state that the loss cannot be estimated at this time. The fire was discovered about an hour before time for the men to enter the mine. The powder house was located a short distance from the fan-house, which supplies the mine with fresh air, and smoke blown into the mine made it impossible for the men to work. The dynamite building is located some distance from the powder-house site. Had the powder been of the explosive kind the disaster would have been much more serious.

ILLINOIS

Caseyville—The shaft of the Ruby mine here caved in a few days ago, throwing 75 men temporarily out of work.

Christopher—The Illinois Public Utilities Commission has approved an agreement of the Burlington R.R. with the Old Ben Coal Co. relating to the construction of a 33,000-volt electric power transmission line.

Danville — The Illinois Public Utilities Commission has approved an agreement with the Missionfield Coal Co., relating to the construction and maintenance of a 2300-volt electric power transmission line at Oakwood, Ill.

ARKANSAS

Hartford—The Central Coal and Coke Co. has installed a 7 ft. 6 in. x 5 ft. Sirocco fan at its No. 4 mine.

Foreign News

Sydney Mines, N. S.—President D. H. McDougall, of the Nova Scotia Steel and Coal Co., announces that the company will take advantage of the slack spell in steel production to overhaul its plant and make necessary repairs and additions. The cost of production at the collieries has been for some time past extremely high, rendering it impossible to compete in the general coal market and affecting the cost in iron and steel production. It is hoped to effect such improvements as will enable the company to resume its position in the coal market. The plans include the installation of new and thoroughly up-to-date byproduct coking ovens. The company also proposes to push development at the Wabana iron ore mines, in Newfoundland, so as to enable the production of iron ore much in excess of its former output at materially reduced costs.

Personals

H. C. Price has been transferred from the Ennis mines of the Turkey Gap Coal and Coke Co., to the superintendency of the mines at Dott, W. Va.

R. Q. Mahoney has resigned his position as mine foreman for the Turkey Gap Coal and Coke Co., Dott, W. Va., to engage in the automobile repair and supply business.

W. L. Honaker, who has been assisting W. C. Cooper with the engineering work in West Virginia, has accepted a position as mine engineer with the Superior Coal Co., Superior, W. Va.

William C. Moore, of Terre Haute, Ind., resigned Feb. 1 as assistant state mine inspector. Mr. Moore has served for the past three or four years, working chiefly in Vigo and Clay Counties.

D. H. Frazier, for the past seven years superintendent of the Turkey Gap Coal and Coke Co.'s mines at Dott, W. Va., has resigned and is now with the Mallory Coal Co., in Logan County, as general manager.

H. G. Happersett, until recently cashier of the Bank of Matoaka, Matoaka, W. Va., severed his connection with the bank and has accepted a position as superintendent of the Bradshaw Coal Co. Bradshaw, W. Va.

E. J. McKiernan, chief clerk at the Alliance Colliery of the Alliance Coal Co., has been promoted to the position of sales manager for the Alliance, Harewood and Cranberry Creek companies, with offices at West Hazleton, Penn.

John W. Smith is the new general superintendent of the Ingram Branch Coal Co. operating in Raleigh County. Before becoming associated with the Ingram company, Mr. Smith was the superintendent of the Alpha-Pocahontas Coal Co., at Alpoca, W. Va.

Edward H. Coxe, of Pittsburgh, Penn., has been appointed general manager of the Snowden Coke Co., to succeed Isaac Taylor, of Uniontown, who was recently elected president of the company. Mr. Coxe will be located at Brownsville, and have his office at Braznell, near Brownsville.

George Fraser has resigned the position of superintendent of the coal-mining operations at Cassidy's, Vancouver Island, of the Granby Consolidated Mining and Smelting Co. **George Hargreaves** also has resigned the position of mine manager. The duties of both the foregoing offices have been assumed by **R. R. Wilson**, formerly general superintendent of the Crow's Nest Pass Coal Co. Mr. Wilson is a son of W. R. Wilson, general manager of the Crow's Nest Pass Coal Company.

C. M. Moderwell has been appointed "Manager for the Receivers" of the O'Gara coal properties in Southern Illinois. The receivers are to be congratulated on their choice, as Mr. Moderwell is a man of very great experience in the coal industry, especially in Illinois. For a long time he was president of the United Coal Corporation, operating mines in the Franklin County district. When those mines were sold to the Old Ben Coal Corporation, he was connected with that concern in the capacity of vice president. Later on he resigned, and gave all his time to C. M. Moderwell & Co., a firm engaged in the jobbing business in Chicago.

Obituary

John B. Frost, superintendent of transportation for the Uniontown (Penn.) mines of the Oliver & Snyder Steel Co., died recently at his home at Uniontown. Mr. Frost had held that position for 18 years.

Joseph Earl Beury, one of the leading coal operators of the New River field of West Virginia, succumbed after a brief illness to an attack of influenza on Saturday, Jan. 25, at Turkey Knob, W. Va. Mr. Beury leaves a widow and five children.

William Ernest Minor, vice president and general manager of the Reliance Coal Co., Cincinnati, Ohio, died on Jan. 25 at Washington, D. C., of appendicitis, following an operation as the result of an attack which occurred as Mr. Minor was preparing for a hunting trip. Mr. Minor was widely known in the coal trade, with which he had been long and successfully connected. He was a Yale graduate of 1900, and was for a time connected with the Standard Oil Co. Mrs. Minor and four children survive him. He was 41 years of age.

Coming Meetings

Northern West Virginia Coal Operators' Association will meet at Fairmont, W. Va., Feb. 11. Secretary, F. J. Patton, Fairmont, W. Va.

Appalachian Coal Operators Association will meet at the Seelbach Hotel, Louisville, Ky., Feb. 14. Secretary, James E. McCoy, Knoxville, Tenn.

New England Coal Dealers' Association will hold its annual meeting March 19 and 20 at Worcester, Mass. Secretary, C. R. Elder, Boston, Mass.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Canadian Mining Institute will hold its annual meeting March 5-7 at the Windsor Hotel, Montreal, Canada. Secretary, H. Mortimer-Lamb, Drummond Building, Montreal, Canada.

American Institute of Mining Engineers will hold its 119th meeting Feb. 17-20, 1919, in the Engineering Societies' Building, New York City. Secretary, Bradley Stoughton, New York City.

American Institute of Electrical Engineers will hold its annual midwinter convention Feb. 19-21 at the Engineering Societies Building, New York City. Secretary, F. L. Hutchinson, New York City.

Recent Coal and Coke Patents

Gas Producer. A. M. Gow, Duluth, Minn., 1,272,252, July 9, 1918. Filed Dec. 20, 1917. Serial No. 208,079.

Coal Mine Drill. J. A. Walker, Springfield, Ill., 1,271,396, July 2, 1918. Filed Apr. 5, 1918. Serial No. 226,892.

Coal Mining Machine. A. Rea, Helper, Utah, 1,271,617, July 9, 1918. Filed Feb. 14, 1918. Serial No. 217,134.

Automatic Furnace Grate. C. A. Horn, New York, N. Y., 1,271,710, July 9, 1918. Filed June 2, 1917. Serial No. 172,416.

Coal Mine Trap Door. T. Lewis, Frankfort Heights, Ill., 1,291,796, July 16 1918. Filed May 25, 1917. Serial No. 171,062.

Grate and Grate Bar. A. C. Brazil, Rio de Janeiro, Brazil, 1,272,906, July 16, 1918. Filed Jan. 29, 1918. Serial No. 214,384.

Mining Machine. H. A. Kuhn and W. W. Macfarrin, Pittsburgh, Penn., 1,273,503, July 23, 1918. Filed Jan. 14, 1909. Serial No. 472,304.

Combustion Accelerator for Boiler Furnaces. G. W. Wyman, Delmar, Del., 1,271,983, July 9, 1918. Filed June 26, 1917. Serial No. 177,073.

Automatic Damper for Stoves and Furnaces. M. Lezius, Cleveland, Ohio, 1,272,064, July 9, 1918. Filed Nov. 30, 1914. Serial No. 874,694.

Ash Conveyor. A. Girtanner, assignor to American Steam Conveyor Corporation, Chicago, Ill., 1,272,794, July 16, 1918. Filed Feb. 12, 1917. Serial No. 148,102.

Stoker Driving Mechanism. M. Alpern, assignor to American Engineering Co., Philadelphia, Penn., 1,271,649, July 9, 1918. Filed Oct. 2, 1914. Serial No. 864,620.

Gas Producer Feeding Mechanism. C. W. Lummis, assignor to Morgan Construction Co., Worcester Mass., 1,270,962, July 2, 1918. Filed Mar. 10, 1916. Serial No. 83,396.

Means for Operating Overhead Valves of Coaling Apparatus. W. E. Hale, assignor to R. H. Beaumont Co., Philadelphia, Penn., 1,272,037, July 9, 1918. Filed Dec. 5, 1917. Serial No. 205,520.

Publications Received

Miners' Safety and Health Almanac for 1919. Compiled by R. C. Williams, Assistant Surgeon, United States Public Health Service. Miners' Circular 24. Department of the Interior, Bureau of Mines. Illustrated, pp. 48, 5⅜ x 9 inches.

Natural Gas: Its Production, Service and Conservation. By Samuel S. Wyer, of Columbus, Ohio. Smithsonian Institution, United States National Museum. Bulletin 102, Part 7. The Mineral Industries of the United States. Illustrated, pp. 67, 6¼ x 9¾ inches.

Trade Catalogs

Economy Drawing Tables and Sectional Filing Cases. Economy Drawing Table and Manufacturing Co., Adrian, Mich. Catalog N. Pp. 32, 7 x 10 in., illustrated. Sectional filing cases and specialties of a kindred nature.

Lakewood Clam Shell Buckets. Lakewood Engineering Co., Cleveland, Ohio. Bulletin No. 26. Pp. 24, 8½ x 11 in., illustrated. The principal features of the design and construction of Lakewood clam shell buckets are pictorially described.

Jacobsen Balanced Horizontal Screen and Picking Table. Jacobsen & Schraeder, Inc., Chicago, Ill. Bulletin. Pp. 4, 8½ x 11 in., illustrated. Describes the operation of the equipment and enumerates some of the advantages of the Jacobsen balanced shaker screen.

Sullivan "WA-5" Air Compressor. Sullivan Machinery Co., Chicago, Ill. Bulletin 75-D. Pp. 12, 6x9-in., illustrated. Describes a small, reliable steam-driven compressor built for standard pressures in capacities from 100 to 500 cu. ft. of free air per minute.

Fairmont Railroad Car Retarder. Fairmont Mining Machinery Co., Fairmont, W. Va. Bulletin No. 10. Pp. 4, 6 x 9 in.; illustrated. Describes a device for handling railroad cars under the tipple, the car being at all times under the control of one of the trimmers on the car. Possesses features of safety, economy and efficiency.

The Theory of the Storage Battery. General Lead Batteries Co., Newark, N. J. Technical Bulletin No. 28. Pp. 16 + cover; 6 x 9 in.; illustrated. Aims to give those who are interested in storage batteries and their construction an account of the recent improvements in manufacture, and to correct some erroneous ideas regarding their performance.

For Fuller Acquaintance. Beckwith Machinery Co., Pittsburgh, Penn. Circular. Pp. 12 + cover; 9½ x 12¾ in.; illustrated. Just what its title implies—information relative to the company's organization facilities in Pittsburgh. Interior and exterior views of the factory and warehouse are given, with a partial description of the machinery handled.

Industrial News

Indianapolis, Ind.—The Morris Coal Co. has increased its capitalization from $10,000 to $30,000.

Jasonville, Ind.—The Jasonville Fourth Vein Coal Co. has increased its capital stock from $10,000 to $40,000.

Freeburg, Ill.—The Mulbery Hill Coal Co., of this place, has increased its capital stock from $7,200 to $60,000.

Terre Haute, Ind.—The Glenjean Coal Co. has been incorporated with capital of $100,000, to engage in coal mining.

McArthur, Ohio—The Ferris Coal Mining Co. has been chartered with a capital of $25,000 by George L. Ferris and others.

Oakland, Cal.—The Merchant Calculating Machine Co. announces the opening of an Eastern sales office at 237 Railway Exchange Building, Chicago, Ill.

Toledo, Ohio—The Zanesville & Western Coal Co. has been chartered with a capital of $50,000 by I. W. Sharp, B. S. Brady, J. G. Backman, A. Cullen and H. A. Mullen.

Louisville, Ky.—The Louisville Coal and Coke Co. has filed notice of an increase in its capitalization from $15,000 to $25,000. to provide for general business expansion.

Indianapolis, Ind.—The Indiana and Eastern Coal Co. has been incorporated with capital of $25,000 to engage in the mining of coal. The incorporators are Edward A. Ogle, Ward H. Hackleman and Burrell Wright.

Raven Run, Penn.—The Raven Run Coal Co. has filed articles of incorporation with a capital of $1,000,000 to operate coal properties in the Raven Run district. H. B. Price, Philadelphia, is the principal incorporator.

Louisville, Ky.—The Louisville Coal and Coke Co. has filed amended articles of incorporation increasing its capital stock from $15,000 to $25,000. The amendment was signed by M. M. Kling, H. J. Kling and J. L. Eyl.

Terre Haute, Ind.—The Youngstown Coal Co. of Indiana, has been incorporated with capital of $10,000 to engage in coal mining. The incorporators are Arthur Shelburne Robert Orme, Albert Ferguson, A. J. Orme and Charles Baker.

Shelburn, Ind.—The Shelburn Coal and Mining Co. has been incorporated for $100,000, to mine and sell coal. August H. Skoglund, Carl S. Carlson, Leonard H. Skoglund, Ernest P. Nelson and Edward Hagelin are the incorporators.

Connellsville, Penn.—S. R. Goldsmith, of Connellsville, has acquired coal properties in Preston County, West Virginia, including plant for operation, and is arranging plans for the installation of additional machinery to increase the present capacity.

Buckhannon, W. Va.—F. E. Harne, of Cumberland, has been elected president of the Buckhannon Valley Coal Co., which will shortly begin development work at Sago, the company only recently having been organized with a capital of $20,000.

Peoria, Ill.—The Urbandale Coal Co., of East Peoria, has filed a certificate with the Illinois secretary of state of an increase in capital from $5000 to $50,000. The president of the company is Isaac Kommers, Jr., of Chicago, nad the secretary H. Schradzki, of Peoria.

Morgantown, W. Va.—The Chaplin-Keener-Kerr Co. has been incorporated with a capital of $25,000 to engage in the development of coal properties in the Grant district of Monongalia County. B. M. Chaplin, J. L. Keener and Raymond E. Kerr are the incorporators.

Fayetteville, W. Va.—Fayette County is to be the seat of operations of the Herndon Coal Co. just organized. About $100,000 is to be expended by the company on the construction of a plant. Charleston men interested are C. C. Lewis, L. C. Summerfield and Angus McDonald, and Fayettsville men are C. C. Herndon and James D. Boone.

Charleston, W. Va.—Mining operations in Boone County will be conducted by the Ashford Coal & Coke Co., made up largely of Charleston business men who have capitalized the new company at $25,000. The general offices of the company will be located in Charleston. The principal figures in the new company are J. L. Johnson, W. D. Holmes, George D. Cochrane, and R. A. Stewart, of Charleston; W. C. Delaney, of St. Albans.

St. Louis, Mo.—The municipal dock at the foot of North Market St. is nearing completion, and the first sailings of the St. Louis-New Orleans fleet will be from there. An electric crane has been installed and connections made with the railroad tracks. Loading of barges will begin in a few days It is expected that with the development of the river traffic quantities of coal which have heretofore gone by the rail routes will be handled by river.

New York, N. Y.—Nearly five million dollars, or to be exact $4,367,107.55, was disbursed in pensions by the United States Steel and Carnegie Pension Fund during 1918. Of this amount $215,021.59 went to pensioners attached to the various coal companies of the corporation, the H. C. Frick Coke Co. receiving $69,442.44; Hostetter Connellsville Coke Co., $1,041.60; United States Fuel Co., $137,400, and the Tennessee Coal, Iron and Railroad Co., $7,137.55.

Heiner, Ky.—Papers have been filed with the Secretary of State of Ohio increasing the authorized capital of the Daniel Boone Coal Co. from $325,000 to $575,000. The additional capital is to be used in taking care of the opening of a new mine, known as No. 3, at Heiner. This mine was put into operation soon after the first of the year and has a capacity of 1500 tons daily, making the total capacity of the three mines approximately 3500 tons daily. The mines are located on the Louisville & Nashville Railroad.

Cleveland, Ohio—On Sept. 17, 1918, the steamer "Col. James M. Schoonmaker," of the Shenango fleet established a new high record for coal. At Huron, Ohio, she took on a cargo of 14,767 net tons and 1100 lb. for delivery at Duluth, and thus displaced her record of 14,751 tons as made Sept. 26, 1917, by a little more than 16 tons. By this performance the "Schoonmaker" now has established her sixth coal record since 1913 and has gradually increased the high-water mark in this commodity by 1039 tons during the five years.

Nashville, Tenn.—The East Laurel Mining Co., 1 Arcade, has been incorporated with a capital of $50,000 to engage in general coal-mining operations at its properties near Gernt, Tenn. It is proposed to develop about 1800 acres for initial operations, to have a capacity of 500 tons daily. The company is arranging plans for the installation of the necessary machinery including tipple screens, air punches, slope hoist, mining cars and other apparatus. John P. Williams, Jr., is president-treasurer; J. P. Pearson is vice-president, and I. F. Ligon is secretary-manager.

Buffalo, N. Y.—Delaware & Hudson coal interests will again have direct representation here by the opening of an office at 1028 Prudential Building by J. B. McMurrich, the company's representative at Oswego. His son, K. D. McMurrich, Jr., will be in charge. When the office was discontinued in 1902, the Lake trade was dropped and the state and Canadian business was divided between McMurrich at Oswego and Millspaugh & Green, of Syracuse. Mr. McMurrich has long felt that in Buffalo he would be in closer touch with his Canadian trade than at Oswego.

Charleston, W. Va.—A coal-weighing bill similar to one introduced at the last session of the Legislature has been introduced in the House of Delegates by Representative G. R. Blizzard, of Fayette County. This bill provides in brief that every person and corporation operating a mine in which ten or more men are employed shall pay miners by weight and, therefore, that all operating concerns shall have duly tested scales at their plants, the county sealer of weights and measures being required to test the scales twice a year and oftener when occasion shall require it.

Kansas City, Mo.—The Consumers Coal and Mining Co. has been organized in Kansas City by J. M. Grodzins, president; J. J. Rooney, vice president; J. R. Barber, secretary, and A. H. Rapp, treasurer. The capital stock is $250,000. The mine is at La Cygne, Kan., and coal is now being shipped. The peculiar feature of the company is that it is advertising "a way to obtain cheap coal," that way being by purchasing stock in the company. A stockholder secures a reduction of 10 per cent. on cash transactions and 5 per cent. on charge accounts. A local firm has taken the exploiting of the proposition and is advertising it extensively. The La Cygne mine is expected to produce 200 tons a day.

Birmingham, Ala.—Adams, Rowe & Norman, Inc., have announced the opening of a coal and coke sales agency, Feb. 1, with offices located on the seventh floor of the Brown-Marx Building. The new firm is composed of three of the best known and most successful men connected with the trade in this district. W. C. Adams, for the past several years sales manager for the DeBardeleben Coal Co., is president; E. J. Rowe, sales manager of the Yolande Coal and Coke Co., is vice-president and secretary; and J. A. Norman, formerly of the Bonnyman-Norman Coal Co., is vice president and treasurer. These men will sever all other business connections and devote their entire attention to the activities of the new firm, having already contracted for the distribution of the output of mines.

Charleston, W. Va.—Under the terms of a bill introduced in the State Senate by Senator Lewis of Fayette County, it is made unlawful for any coal operator or his agent to employ any one but a sober engineer or drum runner in the operation of any hoisting or lowering machinery in connection with any mine worked by shaft, slope or incline. The bill also stipulates that such an engineer shall not permit any person, unless he be specially deputized, to interfere with the operation of machinery. Intimidation of the engineer or drum runner is also forbidden by the bill. Where a mine is operated by shaft or slope not more than ten persons are to be permitted to ride in a cage or car, and where a cage or car is loaded no one is to be permitted to ride on a cage or car. It is made mandatory upon the operator where ten or more men are employed under ground to have on hand a stretcher, woollen water-proof blanket and all necessary medical requisites.

Charleston, W. Va.—Under the terms of a bill introduced in the Senate of West Virginia by Senator Morton, of Webster, it is provided that whenever the mineral or other interests in or right appurtenant to land in this state have heretofore passed or shall hereafter pass in any way from a claimant in possession of the surface of the land, the continuity of the possession of mineral interests and rights shall not be deemed thereby to have been or to be broken, but the possession of the surface by the original claimant from whom such mineral interests or rights passed or by those claiming through or under him or by virtue of a judgment against him in an action to which the holder of said mineral interests or rights was not a party sha be deemed to have been and hereafter to be the possession of such mineral interests and rights in said land for the benefit of said person, his heirs and assigns to whom said mineral interests or rights have or shall have passed as already stated.

FOREIGN MARKETS AND EXPORT NEWS

Cut in Ocean Freight Rates

On Jan. 22 the Shipping Board announced a reduction in ocean freight rates over various routes, including some special rates on commodities to Belgium. This will afford an opportunity to American manufacturers to compete on even terms with foreign industries in the race for world trade. The British and French rates have already been lowered, and it was imperative that American rates be lowered to enable the expansion of the industries of this country. The American coal industry has reached greater productive capacity than ever before, and operators must seek an outlet for their product in foreign markets or else fall back on a plan of decided curtailment. The new rate for coal from American gulf ports to Chile is $16.50 a gross ton, while coal from Hampton Roads to the Hawaiian Islands is $20 a ton.

Great Britain's Coal Exports

During the war England was forced to abandon between 5,000,000 and 6,000,000 tons of her annual coal export of about 7,000,000 tons to South America. The United States increased its coal exports to Argentina, Brazil and Uruguay from 440,000 tons in the year ending June 30, 1914, to 1,619,000 tons for the year ending June 30, 1916. Something of the magnitude of the disorganization wrought in the British coal trade by the advent of the war may be perceived by a glance at the statistics dealing with the rush of mine workers to the colors when the war began. In the first year of the war 191,170 miners enlisted and in June, 1916, the total had risen to 285,000. On the latter date the net loss of mine labor had been reduced to 133,000 men through extraordinary efforts to return soldiers to the mines, but this program was interrupted early in 1918 by the necessity of returning 75,000 miners to the battle lines.

To	1913	1914	1915	1916	1917	1918 (To Nov. 30)
France	13,014,000	12,497,000	18,281,000	18,080,000	19,283,000	16,954,000
Italy	9,906,000	8,895,000	5,947,000	5,937,000	4,435,000	3,873,000
Norway	2,335,000	2,660,000	2,824,000	2,653,000	1,192,000	1,311,000
Sweden	4,837,000	4,533,000	2,749,000	1,674,000	622,000	1,010,000
Denmark	3,102,000	3,246,000	3,297,000	2,457,000	897,000	1,007,000
Holland	1,998,000	1,732,000	1,796,000	1,347,000	381,000	76,000
Spain	2,721,000	3,259,000	2,255,000	2,141,000	836,000	465,000
Portugal	1,358,000	1,068,000	926,000	803,000	254,000	141,000
Belgium	2,245,000	1,173,000	.....	.....	.....	.....
All others	35,173,000	22,767,000	7,695,000	5,566,000	9,991,000	7,090,000
Total exports	76,689,000	61,830,000	45,770,000	41,158,000	37,801,000	31,927,000
Consumed at home	210,741,000	203,834,000	207,436,000	215,217,000	210,672,000	176,800,000
Total production	287,430,000	265,664,000	233,206,000	256,375,000	248,473,000	208,727,000

The accompanying table (see above) gives the British coal exports for the past five years. The figures are in gross tons of 2240 lb. and include coal, coke and briquets. England's export restrictions, aside from keeping within the country the necessary quantity of coal for war operations, made an effective weapon in the conduct of the war, not only in assisting her allies, but in exacting favorable terms with neutrals.

Foreign Trade in 1918

The year just closed was a record maker in foreign trade, although exports fell a shade, 1.2 per cent, behind those of 1917. December exports were only three times exceeded in previous months and years, but the year's total, $6,150,000,000, while 12 per cent. larger than in 1916, dropped $76,000,000 below 1917. Imports for 1918, which totaled $3,031,000,000, were 2.6 per cent. larger than in 1917, but still were less than half the size of the exports. Total trade in merchandise in 1918, $9,181,000,000, exceeded 1917 by only about $3,000,000. Silver exports in 1918 broke all records, totalling $253,000,000, or three times those of 1917. Gold exports were only one-ninth those of 1917, the record year, while imports were only one-eleventh of those of 1916, the peak year in this respect.

Why Great Britain Dominates the World's Coal Markets

In the foreign commerce of England coal occupies an exceedingly important place. This can readily be realized when it is known that the value of the coal exported from the United Kingdom in 1913 was no less than 8½ per cent. of all the goods exported by England that year. In fact, the British overseas trade in coal is more than twice that of the whole of the rest of the world put together.

In seeking the causes of the astonishing growth of British exports of coal during the last half century, one finds that the increase is attributable first to the growth of the demand in Europe (due to industrial activity following the settling of political difficulties) and South America, and next to the improvement in the means of transportation.

England disposes of 87 per cent., or nearly the whole of her exports of coal, to the European and Mediterranean market, ports in Belgium and to the north of Belgium taking some 26 million gross tons; the French and Mediterranean ports (including North Africa) take 30 million gross tons; South America takes well over 4 million gross tons.

Great Britain's distant markets, as a whole, are comparatively unimportant to her except to one coal field—South Wales—because of the high freights required by long voyages; it is only the high quality of the Welsh steam coal which gives it the exceptional position it occupies in foreign markets. Physically the Welsh steam coals are semi-bituminous, quite hard and durable, and capable of standing shipment well.

Another thing that favors England is the fact that her two richest coal basins—those of Wales and Newcastle—are handy to tidewater. The average railroad haul of the Welsh coal produced for export is less than 50 miles. Contrast this with our long haul to shipping points! English coal owners can load and ship their product in the most economical manner and consign the cargoes to any point overseas. Ocean conveyance, too, is cheaper in English commerce because of the tremendous amount of raw and other material she imports in her returning vessels.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Jan. 27 states:

The scarcity of orders to the West Indies still continues, and naturally but a few charters are being effected. We have numerous boats asking for such business both prompt and February loading. The South American market is very dull, owing to the scarcity of tonnage. We would quote the Chartering Committee's rates as below:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 3000 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons fuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum) — Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates.) On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Range, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net to Rio or Santos, $18.50 net to Buenos Aires and $19.50 net to Montevideo.

Markets in Which American Coal Can Compete

If the problem of ocean freights and adequate shipping facilities can be worked out satisfactorily, the markets given in the tabulation below would be thrown open to American coals on a competitive basis. The figures given are as of 1913, before the world war disturbed the established channels of trade, and they approximate the tonnages that are imported in normal times by the respective sections named.

	Gross Tons
Atlantic and Mediterranean ports	35,767,749
West coast of Africa	567,037
Asia, Pacific Islands and Australia	433,062
East and west coast of North America	189,332
East coast of South America	6,334,553
West coast of South America	605,345
Bunker coal	19,161,267
Total	63,058,345

It will be perceived from the table that were the United States to enjoy a complete monopoly of the world's coal markets it would amount to about 10 per cent. of our total annual production of bituminous coal. This monopoly, of course, is impossible; and to set our cap at the South American mar-

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
1-20-19	Nor. Bk. Oaklands	Montevideo	1,464	....
1-20-19	Amer. S.S. Dallas	Rio de Janeiro	5,508	1,370
1-21-19	Amer. S.S. Calispell	Antilla, Cuba	3,039	446
1-21-19	Amer. S.S. Lake Galera	Havana, Cuba	3,005	320
1-22-19	Dan. S.S. Dania	Montevideo	3,904	1,090
1-25-19	Jap. S.S. Kirin Maru	Bremerton, Wash.	3,735	900
1-25-19	Amer. S.S. Lake Medford	Barbados, B. W. I.	3,000	300
Sewalls Point				
1-22-19	Amer. S.S. Lake Beacon	Cienfuegos, Cuba	2,823	414
1-24-19	Amer. S.S. Lake Fostoria	Havana, Cuba	2,536	294
1-25-19	Amer. S.S. Goodspeed	Havana, Cuba	2,774	275
Newport News				
1-20-19	Amer. S.S. Calicorock	Havana, Cuba	3,133	302
1-21-19	Swed. S.S. Harald	Havana, Cuba	2,188	1
1-21-19	Brit. S.S. Orange River	Buenos Aires, A. R.	6,005	1,.84
1-21-19	Nor. Bk. Spica	Rio de Janeiro	1,333	....
1-22-19	Nor. S.S. Munorway	Havana, Cuba	5,933	377
1-23-19	Amer. S.S. Freeman	Rio de Janeiro	4,274	888
1-24-19	Amer. Sc. Brigadier	Fort de France (Martinique)	441	....



How the Government Will Help Solve Your Export Problems

COAL operators who are desirous of obtaining more definite information regarding the extensive plans of the Department of Commerce in relation to the expansion of our foreign trade can avail themselves of the vast fund of knowledge possessed by our own Government agencies. The possibilities of the application to industry of the organization created by Secretary William C. Redfield of the Department of Commerce is shown in the diagram. From reports of the various trade commissioners now returning to this country it is felt that the work of the Department should be of infinite value to those who are seeking foreign markets. Aside from the information given in the chart, there is being issued a monthly index on statistics pertaining to specific articles of import and export, as well as general information on markets for given products. Application for information regarding export business should be addressed to the Bureau of Foreign and Domestic Commerce, Washington, D. C.

kets alone would mean an outlet for little more than 1 per cent. of our annual output. Everything being equal, England's hold on the European market cannot be broken; but at the present time Great Britain is experiencing considerable difficulty with her coal miners, and her output has fallen off to an abnormal extent. Herein lies America's opportunity. Whether we succeed in retaining permanently the foreign markets that we will assuredly enter in the near future is problematical. There will be every advantage in England's favor when the world once again settles down to normal. In the event that we should succeed temporarily or permanently in entering foreign coal markets, it is a foregone conclusion that grades equal to New River and Pocahontas would enjoy the bulk of the export trade, as these coals not only possess characteristics that should find favor with foreign consumers, but they can be advantageously transported to tidewater. The State of West Virginia alone, with an output of more than 97,000,000 short tons of soft coal in 1918, could more than take care of the entire world's fuel markets.

Canadian Ocean Rates

The freight rate on steamships plying regularly between Canada and the British Isles has dropped to $1.50 a cubic foot, it was announced in Montreal on Jan. 23. Canadian shippers say that vessel space will soon be seeking cargoes, thus reversing the conditions which have prevailed for four years. The rate before the war was 30 cents a cubic foot.

Coal Shortage in England

To relieve the shortage Great Britain is turning attention to the potential coal resources of Ireland. Operations are about to be commenced in County Tyrone and borings will be made at Coalisland and in the district between there and Lough Neagh. Lignite abounds in the region and its utilization is to be undertaken at once. It is to be stripped from its bed by rotary cutters and made into briquets by a secret process, which is said to make lignite a good coal substitute. Machinery already installed will be capable of producing 15,000 tons of briquets weekly.

Coal Needs of France

Considerable discussion is prevalent in French circles as to the position of France with respect to her future coal supplies. The suggestion has been made that Germany should supply France with some millions of tons of coal, to be set off against indemnities and as compensation for the havoc wrought by Germany on French territory.

France, in normal times, imports about 23,000,000 tons of coal annually. In the future she expects to eliminate the necessity of importing coal by the exploitation of the coal beds which she will claim from Germany as being part of her own territory, and which she looks forward to as eventually coming within her own borders. Not only has France advanced the claim that Lorraine rightfully belongs to her, but she also states that the new boundaries should include the region of the Saar.

If France succeeds in gaining her demands, about 18,000,000 tons of the 23,000,000 tons she now imports annually would be available. This, in turn, would have a far-reaching effect on the coal trade of England, for France is Great Britain's largest customer for coal. It would seem that not only would the French market be considerably restricted so far as British coals are concerned, but that plans (or visions) of a large export of American coals to France will suffer quite some modification.

German Coal Situation

For the present the coal situation throughout Germany is so threatening that all other questions are overshadowed. The daily production in the Ruhr district is less than 10,000 tons, against 24,000 tons during the war and 33,000 tons in peace times. Upper Silesia is producing 2000 carloads daily, against 11,000 carloads in war times and 14,000 carloads under peace conditions. The reserve supplies of coal in the hands of consumers are virtually exhausted.

As a result of the coal shortage large factories in many German cities are already closed down, and it is thought that a number of the biggest plants in Berlin will have to suspend operations if the situation does not improve soon.

The lack of sufficient rolling stock to transport even the comparatively small quantity of coal being mined further aggravates the situation. Labor conditions, too, have served to complicate matters. A strike epidemic is prevalent in the coal districts, and it is impossible to get enough workers at the mines.

MARKET DEPARTMENT

Weekly Review

Bituminous Production Falling Off Through Lack of Demand—Prices Lowered on Some Grades of Soft Coal—Operators Investigate Foreign Markets—Anthracite Mines Curtail Operation—Impending Labor Troubles.

NO ONE seems to worry much about production statistics these days, though as a matter of record it should be stated that the output of soft coal has fallen considerably below current consumption. An overstocked market, poor weather conditions (from the operator's and dealer's viewpoint) and the elimination of all control by the Fuel Administration are a combination of demoralizing circumstances from which the coal industry can expect no immediate relief.

It is still too early to judge of the full effects an uncontrolled competitive market will have on coal prices. If the statements of a number of prominent bituminous operators can be taken to mean anything, however, the nation will witness the closing down of many mines sooner than a reduction in the price of coal that will force them to operate at a loss. This is not to be taken to mean that the last ruling Government maximums are being adhered to as standard. In fact, reports of cuts in prices and offerings at considerable reductions below former figures are common, though in the majority of cases this is true only of the medium- and low-grade coals.

In the hope that it will enable them to furnish an outlet for the full productive capacity of their mines, many soft coal operators are investigating the opportunities and possibilities afforded by foreign markets. England, to which the European continent and South America had formerly looked for their fuel supply, now finds itself hard put to it to meet her coal obligations. Labor troubles and a multiplicity of other social and political ailments have served to hamper British coal output to an abnormal extent; and it is not at all improbable that if the Federal Government comes to the aid of American coal producers by establishing ocean shipping rates that will enable successful competition with English shipping, the United States will gain a worthwhile hold on the foreign coal markets.

At home no improvement in the demand for soft coal is expected until well along in the spring. Even then much depends on the manner in which industry in general resumes activity. The railroads, the largest consumers of coal in the country, have stopped making requisitions on the mines, and the national association of bituminous operators has made concrete proposals to Director General Hines looking to a speedy settlement of the vexing question of railroad fuel prices. No decision has been made as yet, though Mr. Hines promises to devote his attention to the matter after he gets through with his hearings before the Interstate Commerce Committee of the Senate.

Operators, as a rule, are optimistic regarding the future, believing that once the political situation in Europe is cleared the long pent-up flood of orders for a vast quantity of material will be let loose, and that the United States will come in for a goodly part of the new world's business.

The anthracite end of the coal industry was surprised on Jan. 31 by Dr. Garfield's announcement that all prices and restrictions on hard coal were to be removed, effective Feb. 1. In concrete, this means that Government supervision of the entire coal industry is now a thing of the past. Control is unnecessary, for there is little if any demand for any grade of anthracite coal. It is becoming more and more difficult for the anthracite mines to dispose of their output. A number of collieries have shut down completely, while many others are working only three and four days a week. So listless is the demand for hard coal that the railroads have ceased the movement of coal trains on Sundays. Offerings of steam sizes of anthracite have been made at marked reductions from the so-called Government prices, but these have met with exceedingly little buying response.

To put the matter concisely, the market activity in both hard and soft coal is conspicuous by its absence, with a consequent slowing down of operation at the mines. That this will have a bad effect on mine labor is almost a foregone conclusion; already the murmurings of discontent grow louder and louder. Only the active resumption of industry on a large scale will ward off impending labor troubles in this country. Preachments and admonishments to sit still and "not rock the boat" are of no avail whatsoever. Only real, live tangible work will give employment to thousands now unemployed. When the country is busy, and then only, will our coal mines be called on to operate at top-notch efficiency.

WEEKLY COAL PRODUCTION

A considerable decrease occurred in production of bituminous coal during the week ended Jan. 25, the output declining to the low level of 9,159,000 net tons. This production, which falls approximately three quarters of a million net tons below the preceding week, and approximately one million net tons below the corresponding week of last year, is at the rate of 475,000,000 net tons per annum and is considerably below present consumption. Many consumers are now using coal accumulated during last summer and the present good weather enables certain consumers to await the outcome of the raising of the zone and price restrictions by the U. S. Fuel Administration before placing their orders.

The daily production of bituminous coal during the current week, estimated at 1,526,000 net tons, is below the daily average for the coal year to date and behind the daily average for the same period of last year. The total production for the period Apr. 1 to Jan. 25 is now estimated at 485,656,000 net tons and is 34,855,000 net tons in excess of last year's production for the same period.

The production of anthracite increased considerably during the week ended Jan. 25, and was slightly in excess of the average weekly production for the coal year to date. Preliminary estimates place production of anthracite for the current week at 1,886,000 net tons as against 1,786,000 net tons during the week of Jan. 18, and as against 1,719,000 net tons during the week of Jan. 25, 1918. The daily average during the current week, estimated at 314,000 net tons, is a slight increase over the daily average for the coal year to date, and but 3000 net tons behind the daily average for a similar period of last year.

Carriers' reports show a decrease in cars loaded in all districts compared with the preceding week, with the exception of Alabama, where the increase was slight. Material decreases occurred in western Pennsylvania (800 cars), in Ohio (2800 cars) and the district including Illinois, Indiana and Western Kentucky (5300 cars).

New England Shipments—Bituminous coal shipments to New England, during the wek ended Jan. 25, are estimated at 344,112 net tons, an increase of approximately 33,000 net tons, over the shipments of the week preceding. This improvement occurred entirely in the receipts through the rail gateways, the increase in this tonnage for the week amounting to approximately 44,000 net tons, over the week of Jan. 18. Tidewater shipments declined during the week approximately 11,000 net tons, and was brought about chiefly by the low tonnage loaded at Baltimore.

Tidewater Shipments—Shipments of bituminous coal from Atlantic harbors for the week ended Jan. 25 amounted to 683,994 net tons, and, as in the case of New England, tidewater shipments fell slightly below the performance of the week of Jan. 18. Shipments from New York and Philadelphia were in excess of the preceding week, while shipments from Baltimore and Hampton Roads fell considerably behind.

Beehive Coke—Production of beehive coke for the week ended Jan. 25 is estimated at 575,000 net tons, an increase of 18,000 net tons over the week preceding, and 75,000 net tons over the same week of 1918. The average production per working day for the current week is estimated at 96,000 net tons as compared with 83,000 net tons during the week of Jan. 25 of last year. The

operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production at 280,767 net tons of beehive coke and the operation of their plants at 74.6 per cent. of their full time as compared with 76 per cent. during the week of Jan. 18. Considerable improvement occurred in labor conditions during the week. The same operators produced 163,650 net tons of coal.

Byproduct Coke—Byproduct coke production in the United States for the week ended Jan. 25 is reported at 558,876 net tons as compared with 559,298 net tons during the week ended Jan. 18, and 366,208 net tons during the corresponding week of 1918. During the current week the ovens of the country were operated at 84.6 per cent. of their full time, operating conditions remaining approximately the same as the week preceding. Loss of capacity attributed to lack of market increased slightly in Massachusetts and Minnesota. In the former state approximately one-half of the capacity is now lost on account of this lack of business.

BUSINESS OPINIONS

The Iron Trade Review—The industry is being obliged to make further curtailment of operations to square itself with the light volume of buying. A canvass of the pig iron situation shows that at the present time thirty-nine active stacks with an estimated daily capacity of 15,000 to 20,000 tons, have been blown out or banked, most of these since Jan. 1. Mill activities are not far from 60 per cent. on the average. The best showing appears to be in plates, sheets and merchant mill products.

Bradstreet's—Wholesale and jobbing trade is still at a waiting stage. Retail trade is less active, and the industrial pace, particularly in textile and iron and steel lines, is slower. Even collections are rather more tardy, and the number of unemployed is officially reported larger, this being confirmed by the advices of reduced active mill, blast furnace, and mine capacity from a number of points, of old orders running out, and of munition works turning over capacity to peace lines.

Dry Goods Economist—From most sections of the country come reports of good business despite the unseasonable weather, a falling market and a probability of strikes in some centers. Retailers are steadily reducing stocks. As a rule they are buying a little more freely than of late, but conservatism is the rule, except where manufacturers guarantee to maintain their prices for a definite period. The attitude of labor in textile and garment manufacturing plants is probably the most disquieting feature of the week's business.

The Iron Age—Export inquiry is awakened by the sharp cuts given to ocean freight rates on both sides of the Atlantic. The disparity of British and American charges has not been materially reduced but the change is sufficient to cause concern abroad, particularly over the possibility of United States steel and iron being imported to the exclusion of the home product. Some thousand-ton lots of finished steel for England are now in storage here awaiting favorable vessel rates, and stocks there made at high costs are not yet liquidated. In open competition an American mill has sold tin plates to Japan. The British fixed price is $43 a ton higher than the Pittsburgh quotation, and a less freight differential is all that is necessary to throw the business to the United States on a price basis.

Atlantic Seaboard

BOSTON

No significant developments. Continued anxiety on part of shippers over tidewater situation. Coastwise movement extremely light, especially of steam grades. Increase all-rail due to high rates by water. Gas coals also show better receipts. Railroads taking clean-up shipments on old contracts. Operators try to induce buying, but market unresponsive. Several Hampton Roads shippers practically without orders. More steamers tied up. Railroad supply comes forward in barges from New York at lower rates. Boston retailers reduce steam prices. Anthracite receipts show increase all-rail. Cancellations now the order of the day. Current deliveries at retail much reduced.

Bituminous—The market is at a standstill. Removal by the fuel authorities of all restrictions as to price and movement seems to have no appreciable effect on the current situation. Certain of the higher grade coals from central Pennsylvania are still being sold in a very limited way at the recent Government figure, but the inferior grades on the other hand can hardly be disposed of as a gift. As low as $2.25 f.o.b. mines per net ton has been heard, but it is not believed that any considerable tonnage can be placed even on that low level. The attitude of interests here who control mines is to sell what the market will absorb at a fair figure and then shut down until conditions improve. It is of course true that a large number of small operators who were able to make shipments last year now find mining too expensive, and in this way a fairly considerable tonnage will be lost this season. From present indications, however, it will not be missed, for New England consumers are still loaded up to the risers with coal taken during the scare last season.

The wide differential between rail and water delivery throughout this territory continues a source of great anxiety, especially to shippers from the Southern ports. The present decline in prices of the Pennsylvania coals is all the more disturbing, and all hands seem powerless to provide a remedy. In Boston today, in what is normally a market almost exclusively for Hampton Roads coals, a large proportion of Pennsylvania coal is now being used, and bought through channels other than the regular retail distributors. This is purely because of the great difference of price, and it is in recognition of this situation that Boston retailers who deal in Pocahontas and New River have already reduced prices, in some cases $1 a ton. There have been rumors that the Railroad Administration would be asked to advance all-rail rates as a remedy, and strange as it may seem something may be carried through on this line. It is at least in line with current enconomic theory.

Receipts by water of all the steam grades are extremely light. Little coal is being shipped from Baltimore for this territory, and dumpings at the Virginia piers have also been reduced to a minimum. A large number of mines have been embargoed because of failure to dump coal at the shipping port, idle operations are increasing in number from week to week. Deliveries inland on contract are limited to only a few cars daily, even from points like Providence, Boston and Portland, and with high-grade Pennsylvania grades open to the few buyers who are in the market it is easy to seen why they are not enthusiastic over paying premiums of $2@$2.50 for Pocahontas and New River.

Strenuous efforts are still being made by operating interests to induce buying in New England, but steam users are likely to continue unresponsive for a long time to come. Talk about possible labor difficulties and shutdowns fails to budge them, and with all the textile mills practically on a five-hour daily basis, it can readily be seen that present stocks will serve for a good many weeks beyond what was estimated last fall.

There are several Hampton Roads agencies that are practically without orders. Groups of mines are shut down until coal now accumulated at the Norfolk and Newport News piers is moved. Prices have shaded quite radically, one quotation being rumored at $2.25 for New River as compared with $2.70, the recent maximum. One or two shippers are venturesome enough to send coal forward "on the market," but recent experiences are not at all encouraging. Conferences are being held, but no solution has yet been reported.

The number of steamers tied up because of the lack of orders is steadily increasing. Steam colliers supplied to shippers in place of bottoms requisitioned last year for overseas are also being tied up at the expense of the party holding the charter, and meanwhile the Shipping Board gives no intimation of a possible change in rates. The ocean freighting situation has been somewhat cleared up during the week, but no further announcement has been made of any interest to coastwise shippers. One of the sidelights on this peculiar situation is the extent to which railroad-owned barge transportation is being used to freight railroad fuel to the eastern railroads. At current rates this transportation costs the railroads something like $1 less per ton than Shipping Board steamers, aside from the heavy demurrage clauses that apply to the latter, and a considerable tonnage has come forward in this way that would otherwise be freighted in steamers.

The Boston retail dealers reduced the price of bituminous in teams to $9.25 per net ton, this being a drop of $1 from the price that prevailed all winter.

Anthracite—Receipts of domestic sizes continue to show an increase all-rail. For the last eight days of January the average daily movement was 511 cars, a figure that had not been reached for some months. By water, too, shipments are in much better volume. Recent cargoes show an increasing proportion of stove and chestnut, now that the demand for these sizes is easing up from the big city markets.

Retail demand throughout New England is much reduced. In many cases deliveries to consumers were only about one-third of what had been estimated for January, and, as has so often been the case, just at the time when the shippers are in position to furnish what the trade has been howling for during the months past, orders are melting away like snow in July. Cancellations are now the order of the day in every direction, and we are in for a dull spell in anthracite as well as in bituminous.

NEW YORK

Removal of restrictions fails to affect local market. Plenty of coal available. Demand slow and dealers are not willing to place new orders. Independent coals quoted below company schedule. Anthracite steam coals in oversupply. Bituminous in good supply with demand slow and prices easy. New demurrage rules go into effect. Bunkering slow due to diversion of vessels to other ports. No immediate improvement expected.

Anthracite—Receipts of domestic sizes strictions on maximum prices of anthracite had little effect on the local situation. The announcement, which came as a surprise, had been anticipated for the past few weeks, but it was thought it would not be forthcoming until the middle of February at the earliest. Coming as it did at a time when coal is plentiful and demand slow, it did not affect market conditions.

The trade has been marking time. Weather conditions during January were anything but suitable for a heavy consumption of coal. Its accumulation has been such that producers and distributors have been receiving nearly as many cancellations as new orders, and consequently shipments from the local tidewater docks have been slow. Deliveries to inland dealers have improved considerably, these dealers having much better facilities for storing coal than the New York dealer has. These conditions are reflected in the report of cars dumped here during the week ended Jan. 31. For that period 4569 cars of anthracite were dumped as compared with 6558 cars the previous week, a decrease of 1989 cars. During the first month of the year 23,756 cars were dumped as compared with 26,261 cars in December, a decrease of 2505 cars.

The lack of demand is reflected in production, many of the mines being idle, and others having their working hours reduced. Reports received here are to the effect that most producers are storing the smaller sizes.

There is no desire on the part of dealers here to stock up. Most all have their coal pockets filled, and even with cold weather would have enough to meet all requirements for several weeks. Instead of the buyer seeking the seller conditions are the reverse, and in some instances inducements have been offered to move the coal. Quotations show many variations. Independent product has for several weeks been quoted at company or lower prices. All domestic sizes, including pea coal, are plentiful.

The steam sizes are on the toboggan. Little headway is being made to reduce stocks, and considerable storing is being done. Buyers are being favored with heavy concessions, but there is no demand.

Dr. Garfield's order resulted in a reduction in the retail prices of coal in Manhattan and the Bronx. Domestic coals, including pea coal, were reduced an average of 25c. per ton and steam sizes 35c. per ton, the change taking effect Feb. 3.

Delos W. Cooke, State Fuel Administrator, issued an order that the removal of the restrictions did not affect the regulations governing the sale and distribution of coal in less than half-ton lots in the City and State of New York, and that for the rest of the winter the price of coal in less than half-ton lots shall not exceed 60c. a hundred pounds at the cellar, when called for, and 70c. when delivered. Wagon venders and other peddlers must sell at the same prices. At retail dealers' yards the price is 55c. a hundred pounds on the cash-and-carry basis. In all other parts of the state existing rules as to the price and distribution of coal in less than half-ton lots shall continue in force until further orders.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$7.80	$8.55
Egg	7.70	8.45
Stove	7.95	8.70
Chestnut	8.05	8.80
Pea	6.55	7.30
Buck	5.10@6.05	5.90@6.25
Rice	4.65	5.10
Barley	4.15	4.30
Boiler	4.60	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—No immediate change in local conditions is anticipated as a result of the suspension of price and zone regulations on Feb. 1. The trade was notified on Jan. 17 that the Government would relinquish supervision of the industry, and it was prepared to adjust itself to the new conditions should it have been necessary. For several weeks past it has been well nigh impossible to obtain the Government maximum prices for almost any grade of coal unless it was of the very highest quality, and the fair and cheaper grades have been offered at prices considerably below the Government figure.

The situation has resolved itself into one of supply and demand. Conditions have not been favorable for coal consumption and most manufacturers are well stocked. In addition most textile factories have cut down their hours of operation, which in itself has considerably lessened consumption.

Operators and shippers are striving to land orders for immediate delivery, but their success is small. Consumers in the main are filled up and nothing save big inducements could make them add to their stocks. Indeed indications are that notwithstanding predictions of increased prices for certain grades it will be possible to buy at lower prices than present quotations before May 1. Hardly any shipper expects improvement before June 1.

Bunkering of vessels has slowed up due in part to the diverting of many bottoms to other ports. This has caused an easing in prices for high-grade coals.

Little attention is being paid to the making of contracts. As most of the consumers expect cheaper coal in the spring they are not anxious to sign up for next year's supply at anything like the present quotations. Some selling agents believe that contracts will not be signed up until June.

The new method of apportioning demurrage charges went into effect on Feb. 1. This method contemplates the charging of demurrage against those shippers to the pools on whose coals the charges have accrued after giving them the benefits of credits earned by those who have moved their coal in less than the free time.

The dumpings of bituminous coal at the local tidewater docks for the week ended Jan. 31 were 6187 cars as compared with 6103 cars the previous week, a decrease of 84 cars. For the month of January the dumpings amounted to 23,769 cars as compared with 25,169 cars in December, a decrease of 1400 cars.

Current quotations, based on Government prices at the mines, per net ton f.o.b. tidewater, at the lower ports, are as follows:

	Mine, Gross	F.o.b. N. Y., Gross
Central Pennsylvania:		
Mine-Run, prepared or slack	$3.30	$5.45
Upper Potomac, Cumberland, and Piedmont Fields:		
Run-of-Mine	3.08	5.23
Prepared	3.36	5.51
Slack	2.80	4.95

Quotations at the upper ports are 5c. higher.

PHILADELPHIA

No improvement in market conditions. All dealers carrying comfortable stocks of all the domestic sizes. Shippers continue to receive requests to suspend shipments. Practically no egg and pea coming here. Some individual coal being offered at company circular with few buyers. Steam sizes weak and causing much concern.

Anthracite—Conditions in both the wholesale and retail trade do not improve as the season advances, because the unseasonable weather does not warrant the forcing of fires for the consumption of family sizes. Owing to the unsettled condition of many of the industries, the steam coal market is demoralized, due to overproduction and the large stocks on hand.

The yards are comfortably fixed, and the dealers cannot believe they will not be emptied before spring. They are now ignoring the unfilled orders on their books, and are only making the deliveries when called upon. It is a satisfaction to note that so far they are holding the domestic market together, and while they are doing considerable advertising are not cutting prices. It will be remembered that their present gross margin of profit was not granted them by Mr. Lewis until he had the books of all the representative dealers examined by expert accountants. To cut into this now would not only be a reflection on the office of the local fuel administration, but would show that the dealers were insincere when they claimed they could not remain in business unless it was granted them.

It is plain that the individual operators are in a far more serious quandary than the dealers they supply. After the successful fights they waged in Washington to obtain, and retain, the differential allowed them by Dr. Garfield, it is not to be supposed they can now gracefully absorb it, even if their mining expenses warrant it.

We have it, however, on high authority, that there is some price-cutting among the smaller operators. At this writing, the practice is not at all general, and we are satisfied that where prices have been reduced it has brought little or no new business. The largest buyers in the city report having bought no coal from the individuals at company circular, and insinuate, that prices being equal, the big companies will receive the orders for any coal they may require between now and spring.

Restriction of production seems to be the only solution. The dealers have been paying their bills promptly because they have been quickly turning their coal into cash. Now, to persuade the trade to buy, when they are selling little, is to encourage longer credits. The retailers freely admit that where they are asking their customers to store more coal they are not receiving the money for it. It would not take long to have the buyer and the seller drop back into old habits, and this the wiser heads are anxious to avoid.

Shippers report that more dealers held their orders this week. By now there is practically no egg and little pea coal coming here. Whatever business remains is on stove and chestnut, but there are few yards without a supply of all sizes. Several dealers report selling horses this week, at a sacrifice by the way, and while in other years they have always dreaded snow, we have heard several express the wish for any change in the weather that will bring business.

The steam sizes show no improvement whatever, and we hear of buckwheat being offered around $3. There seems almost no demand for the smaller sizes, and the prices are correspondingly low. The companies continue to stock these small sizes.

BALTIMORE

Coal trade, back on a strictly competitive basis, finds new problems. Oversupply of soft coal here. Anthracite easy and demand light.

Bituminous—Many new problems—or old before-the-war problems in new dress—are facing the coal trade here in these days when the removal of Government restrictions has thrown business back on a strictly competitive basis. In the first place there is an oversupply of soft coal in this territory. Some hope is held out for the ready absorption of that part of the coal that can be classed as of better grade; but there is a tough road ahead for the other kind.

The demand that exists now is discriminatory. Jobbers, urged by mine connections, are working hard to convince consumers that now is a favorable purchasing season. This move, it must be admitted, has not been universally successful. Meanwhile there come reports of additional mine closings to await a more favorable market. Some mining sections have entered into a sharp competition.

Some days ago there were reports that Fairmont ¾ in. was offering as low as $2.40 to $2.50, as against the old Government maximum of $2.75, with little or no call at all for run-of-mine, which was a quarter less under the late Government figures. Freeport coals were also quoted as low, although the general run was a little better, a decided cut from the old figure of $2.75 as set by the Government. Then Pennsylvania coals entered into active competition, and in some cases fuels that had held at $2.95 maximum were offered at $2.75 and, in fact, less at times. These figures were too near production cost or below, and did not suit some operations, which have closed as a result. The trade feels that the congested market will gradually clear up and that then a better price will be maintained.

Anthracite—The demand remains light for anthracite in the face of the unseasonably warm weather. Dealers will be a little cautious in purchasing between now and spring, with cash costs undoubtedly at maximum. Few are willing to run the risk of being caught with any considerable reserves should a cut come in the wholesale rate. The supply here at present is more than adequate, and the only complaint heard is in regard to the light run of chestnut.

Lake Markets

PITTSBURGH

Sharp curtailment in production. Advanced prices announced. Coöperation of miners.

On the occasion of the relinquishment of price control by the Fuel Administration Pittsburgh district coal operators put out the following prices: Slack, $2.35; mine-run, $2.50; ¾-in., $2.60; 1¼-in., $2.75, per net ton at mine, Pittsburgh district. Government prices, which expired Jan. 31, were: Slack, $2.10; mine-run, $2.35; screened, $2.60. Thus mine-run is advanced 15c. A fact of prime importance is that about 70 per cent. of the mine capacity of the district is shut down. That is the form of expression, rather than that the capacity is merely idle.

On behalf of the operators it is asserted that some have been producing coal at a loss, selling at Government limits, and that under Fuel Administration regulations the Pittspurgh district was given a lower price, relative to cost of production, than almost any other coal-producing district in the country. It is asserted that some districts were given prices that were notoriously high, simply for the purpose of stimulating production, while the Pittsburgh district did not need, or at least was not active, in demanding at Washington, such an incentive.

Close relations are stated to exist between operators and miners in the district. The miners have large funds, which in an emergency they could use against the operators in a contest against wage reduction, but which they are quite ready to use in coöperation with the operators in an effort to secure a good price for coal, with such mine idleness meanwhile as is necessary to produce the desired results.

The market is not fully developed as yet, but it appears that standard grades of gas coal are selling at the adopted prices, as noted above. As to steam coal, there is no demand, and it is said that there are no sales of importance at lower prices, though cuts to the former Government price of $2.35 for mine-run may easily occur. For the time being the market seems quotable at the announced prices, based on $2.50 for mine-run, and gas coal may be regarded as steady at that figure.

BUFFALO

Market still exceedingly dull. Not much prospect of early improvement. Mines shutting down to reduce surplus. More anthracite as weather remains mild.

Bituminous—The dullness continues. Consumers will not buy to any great extent, for they have large supplies on hand. A Buffalo jobber sent out a salesman lately to sound the trade, but every card report sent in noted large stocks everywhere. Not a consumer visited was in need of coal, and nobody would buy.

At the same time the feeling, at least so far as the operators are concerned, is more confident than it was, for they believe they can reduce production enough to hold the prices substantially where they are. Occasionally a cut price comes in, but it is declared that the Pittsburgh price is absolutely firm and can be held after the Government control is dropped. There has been more doubt as to the chances of holding the Allegheny Valley price, for the price is not only higher, but the coal is hardly as popular as Pittsburgh and cannot be used as generally as a rule. The jobber with no close mining connection is hit hardest, for he will get no concession and his ability to find consumers who need coal is small.

Anthracite—The mild weather has added another snowless and almost frostless week, which means that anthracite is in greater

supply than the demand. Some distributors say that a sudden cold snap would be likely to send every consumer with a small supply looking for an immediate filling of his order, but no one is afraid.

The prospect of a surplus of anthracite is so good that shippers have in one or two cases made some inquiries about lake tonnage; but they have gone no further. They say that if the winter continues mild another month they will have coal to load into vessels, and maybe before that, but nobody really looks for a frostless February.

Reports from Canada agree that the surplus of all sorts of fuel except anthracite is still large, and it may turn out that there is enough of that, in which case the dealers will have a large quantity of miscellaneous stuff to carry over, for the demand for bituminous is smaller than it is here.

CLEVELAND

No. 8 operators are showing more backbone and conversationally, at least, are adhering to Government prices. The tearing down of Government barriers has not yet affected the market, though many expressions are heard that price reductions all around are inevitable not later than Apr. 1. Lake coal shippers have agreed with upper dockmen that the Great Lakes coal pool must be abandoned, and are seeking the Railroad Administration's aid in making this possible.

Bituminous—With the closing down of more mines in southern and eastern Ohio, the surplus of bituminous has become less apparent. Consequently, operators are talking once more of the proposition that price cutting will not serve to increase demand, hence the futility of asking less than the Government price. Such talk, however, is confined to the larger operators, who are well backed by contracts. Scarcely a day passes that a job lot is not offered at a marked concession to move it in a hurry, to keep a step ahead of car service, or that some No. 8 operator is not willing to let go of a small tonnage for 25c. or so under the maximum. All that is necessary to buy steam coal under the Government maximums is to "shop" for it.

One peculiarity of the present situation is that there is next to no demand for slack, making the coarser grades scarce in proportion. Usually, the reverse is the situation. Retail dealers especially are being besieged with "bargain lots," which, however, the larger dealers seem averse to taking on because of the difficulty of explaining the old price when the job lot has been disposed of. The steam coal market is feeling no effects of the dropping of all Government restrictions. The retail market is expected to be shaken up about the middle of February, when shipments of Pocahontas are due. The coming of cold weather has not spurred the retail market greatly, while more and more industrials are tapering off operations. The net result is that the bituminous market daily is becoming more slack. Only the feeling that they should preserve an optimistic outlook prevents the larger operators from using the adjective "stagnant" in its fullest force.

Anthracite—Dealers continue to compete for anthracite business. Some of the larger retailers are long on furnace grades, which seem much more plentiful than stove sizes. Anthracite shipments continue to increase, but demand is stationary because of the absence of real winter weather.

Lake Trade—As forecast, the final word concerning the Great Lakes coal pool, which in the 1918 season was conducted by the Ore and Coal Exchange, Cleveland, of which Herman M. Griggs was manager, is to be said by the United States Railroad Administration. Meeting in Cleveland, upper lake dock operators and lake shippers agreed that the pool, must not be continued in 1919. From an operating standpoint the pool has proved 100 per cent., but the mixing of coals is too great an evil to be tolerated again—was the unanimous opinion. Individual sales and shipping should be restored at the earliest moment possible, was the sense of resolutions adopted. The one stumbling block is excessive demurrage. Formerly, shippers were granted 5 days' free time at lower lake docks, with demurrage $1 a day thereafter. Now, however, only 3 days' free time is allowed, and the demurrage beginning with the fourth day is $3 a day.

DETROIT

Termination of zone rules and Government price control of bituminous coal creates a rather unsettled market, with fear that some operators may make Detroit a dumping ground.

Bituminous—With heavy stocks of bituminous coal in reserve piles of most of the large steam plants, and filling the storage yards of the greater number of retail dealers, the ending of the Federal Fuel Administration's zone restrictions and removal of Government price control are productive of considerable uncertainty among the coal trade in Detroit. There is a feeling, however, among jobbers and wholesalers that the restoration of an open market on bituminous is not likely to be productive of any immediate increase in their volume of sales in Detroit. Some of the jobbers anticipate that the lifting of the zone rules will enable them to move considerable coal into points in Indiana, which were inaccessible under the Government limitations.

Among the retail dealers there is just now more of a desire to cut down present stocks than to bring more coal into Detroit. Their attitude is caused by the fact that a large proportion of the stock on hand is of low quality, and a good deal of it in the shape of mine-run or other forms of bituminous that are not regarded as desirable fuel for household use. The coal was purchased by the retailers when predictions of an impending shortage were being circulated, followed by bulletins from the Fuel Administration urging that any coal be taken to assure an adequate supply for household consumers.

With the better grade of coal from West Virginia and Ohio mines now to be had, there is some anxiety lest operators in those districts, in their eagerness to sell coal, use Detroit as the dumping place for speculative consignments. Such shipments coming into competition with the stock already here, it is feared, might produce disastrous results for many of the retailers, who, because of the unusually mild weather this winter have made little progress in clearing their yards.

Anthracite—Not much anthracite is being received, and some of the dealers are not putting forth very strong efforts to increase the supply as they realize that customers who are now being supplied with bituminous likely would insist on getting anthracite. The plentiful supply of coke is taking the place of anthracite with many householders.

COLUMBUS

Weakness still characterizes the coal trade in Ohio. Warm weather is retarding domestic demand, while steam demand is held down by extra large stocks in reserve. Prices are cut to a certain extent.

The coal trade is still weak. The continued warm weather has caused a lull in domestic demand. In fact it now appears that much coal will be carried over by householders, and that will affect the trade next summer and fall. Another point brought out is the fact that many consumers stocked up on an inferior grade of coal, which is causing some trouble. Thus consumers will be slow to buy until rather late in the season. Retail prices are pretty generally maintained, as dealers are still selling high-priced coal. Some instances of cutting are reported, but these are not sufficient to demoralize the market. Pocahontas is still in good demand, but other grades are not wanted in large quantities. Retail stocks are still large. The lifting of the zone restriction will mean a general movement of Pocahontas to northern Ohio points, from which section it was held away by Government restrictions.

The steam business is dull. Stocks are still large, and since large consumers are rather slow in getting on a peace basis, there is little demand expected before April. Rubber plants are well supplied, and the same is true of iron and steel factories. Public institutions have sufficient tonnage for some time to come. Purchasing agents are following the policy of waiting until their stocks are consumed. Railroads are only buying a small percentage of former requisitions and are still bearing down prices wherever possible. Many mines producing steam grades exclusively have been closed down indefinitely.

CINCINNATI

Demand remains dull in all departments of the market. Removal of zoning restrictions will not immediately stimulate business, as shipments West are not regarded as advisable.

There has been no change in the state of the market during the past week or so, and there is at present no indication that there will be any change for some time to come. The dominating factor in the situation remains the fact that coal in storage is of much larger volume than usual, and with the winter nearing its end and comparatively mild weather the rule all through the Middle West, prospects of any considerable amount of consumption in the remaining weeks of the winter are not bright.

The removal of the zoning restrictions, heretofore confining West Virginia and Kentucky coal marketed through this point to a field much more narrow than normal, will naturally have some effect upon the situation, enabling shippers to go into the markets in the West where their fuel formerly went as a matter of course.

This effect, however, will not be felt at once to any considerable extent, both for the reason that these shippers and operators will not immediately be able to resume connection with the channels through which their coal formerly moved, and that the same situation exists in the West as here, with reference to the supply of coal in the hands of consumers. In fact, shippers in this section have received direct appeals not to make shipments into the Western markets just now, as it is feared by the trade there that such a move would tend to demoralize the market utterly, by bringing about a large supply of unneeded spot coal. The situation will, therefore, work itself out only very slowly, and it is not by any means cheerful.

LOUISVILLE

Domestic demand slightly better, due to small stocking running low and slightly colder weather. Steam demand very weak. Domestic values up slightly due to lack of steam demand to take care of screenings. Mines operating three days.

There has been some slight improvement in domestic demand during the past few days, due to small stocks beginning to run low and slightly colder weather. However, at that the retailers are far from busy, some reporting that they are not working half of their equipment capacity. Some houses report that customers stocked so heavily that they have not used half of their coal as yet, and that business is dull. Collections are fair only.

The general demand for steam coal shows little improvement, and there is not much encouragement just now. Discussions of the prospects for early shipments to the lake region have brought out the fact that the North is still well stocked, and may not start buying before midsummer, unless severe weather develops within the next month or two. In the local field there is little demand, as industrial concerns are not busy, some being almost down. Practically all of them have good stocks on hand.

Mines are in operation about three days a week as a maximum, many putting in only two days. These mines for the most part are the large ones which have good sales organizations. The small mines in many instances are not attempting to turn a wheel, being unable to secure business.

Prices on steam coal are being shaded by many operators at the present time on immediate delivery stock, especially screenings. However, some of the large operators have already advanced prices 15c. to 25c. a ton on domestic coal, due to the fact that it is costing more money to get it out, and they have no market for the resulting screenings. However, prices are generally well maintained in the local market and field. Retailers are holding on firmly, feeling that price cutting would not really get them anything in the long run.

BIRMINGHAM

Inquiries for steam coal slacken, but domestic market remains strong. Better grades of steam coal moving fairly well, while the poorer grades are not being so readily absorbed. Shortage of domestic fuel still very pronounced.

There is not an active demand for steam coal in the Birmingham market at this time, though sufficient business is being booked to take up the output of the mines prodcing the better grades of fuel, taken in conjunction with the contracts on hand. There is some accumulation of cheaper grades of steam coal—Big Seam and the like—though the surplus is not yet sufficient to affect market conditions. Coals of the poorer quality are being moved with more difficulty than formerly. The present hesitancy in the market is not due to any decrease in requirements, but to a desire on the part of consumers to await the transition from Government control to the normal influences of supply and demand, and such price adjustments as will necessarily follow, based on quality instead of cost of production. The prices of some grades will probably be lowered slightly while others will be advanced.

The supply of domestic coal has been so pronounced since Apr. 1, 1918, that the removal of Government regulations will undoubtedly pave the way for an increase in prices of the higher grades. Although the present winter has been an exceptionally mild one so far, there is little coal stocked on local yards, retailers delivering the fuel to customers as fast as received.

Coke

CONNELLSVILLE

Further market decline. Settlements on contracts. Operators restricting production.

The furnace coke market has weakened farther and is now quotable at $5@5.50, the Government limit, which expired with January, having been $6. There has been little activity in the open market, but spot coke of fairly good quality has been readily available in the past few days at $5, and possibly in most cases with a margin to brokers besides. There has been little buying, furnaces being well covered by contracts, with a few exceptions, and depending on contracts to keep them supplied.

There have been active negotiations in connection with contracts calling for an agreed price from time to time whenever Government control should come off. These negotiations are regarded as establishing the real value of coke better than the odd lot sales that may occur in the open market. Service plays an important part in determining coke values, as it is expensive to the blast furnace to receive either too much or too little coke from day to day, and thus higher prices may be paid willingly on contracts, than the prices at which odd lots could be picked up. One prominent coke producer has proposed to contract holders that $5.50 be the settlement price for February deliveries, and it appears that most of this interest's contract holders have accepted the proposal. In other quarters, however, settlements have been made at not over $5.25, and in some instances $5 appears to have been done.

The coke operators express decided determination to regulate production to demand and avoid the dumping of any coke. The present experiment may be more successful than some past attempts. Operators recognized that there should be a decline from the Government limit and insist that the decline that has occurred does not presage a continually declining market.

The foundry coke market has not really been developed, demand being so light. Under no particular pressure makers of standard foundry coke have reduced their price 50c. from the Government limit, and there are indifferent brands available at less, The market is quotable at $5@5.50 for furnace coke and at $6.50 for standard grades of foundry coke, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Jan. 25 at 277,324 tons, a decrease of 14,008 tons, and shipments of raw coal at 189,707 tons, a decrease of 5986 tons.

Buffalo—The demand is light. The furnaces do not get the cue yet as to what is expected of them, and they are not ready to buy in advance. With lighter running the local byproduct coke plants can about supply the needs here. With another plant running the demand ought to be taken care of in that way. It will be some time, though, before that is ready. Fuel coke will remain slack till there is a better movement in bituminous coal, which may not be right away. Vessel owners are getting no offers of rates on ore, but look for about the same rate and season in general as last year.

Middle Western

GENERAL REVIEW

Matter of prices now occupies chief interest. Region saturated with coal and practically little tonnage is moving. Franklin county operators talk of price increase.

The topic of the week is prices. On the one side there are the operators, who are face to face with their costs, know exactly what their properties can do, and are afraid to indulge in any price-cutting tactics. On the other side are the purchasing agents, with the big steam users, public utility plants, etc., who are confidently looking forward to a break in the market. They are doing everything they can do to bring about such a break. They claim they are taking their cue from the railroads, who, by the way, are the largest coal-consuming public the operator has to look to. What the result of this struggle will be no one can accurately foretell. Of course, there will be readjustments here and adjustments there, and in certain isolated cases prices will undoubtedly advance.

If common gossip is to be believed, the operators are not in a position to make any concession in regard to price, and at the same time operate their mines on a money-making basis, no matter how narrow the margin may be.

The weather has been miserable, so far as the coal man is concerned; in fact, the weather has been so mild that it is not necessary to go to Florida to enjoy the spring breezes. We are getting them right here in Chicago and the Middle West. This warm weather is a tremendous factor, as it affects both the domestic and steam consumer. If any actual figures are kept of the coal consumed this year, we venture to predict that these figures will be far below the average.

So far as actual market activities are concerned, there is practically no coal moving. The tonnage reports from the Geological Survey, for the first two weeks of the new year, were rather encouraging, as they showed a decidedly upward trend, but we do not believe that this upward movement will be maintained, as the country has reached a state where it is practically saturated with coal.

One of the purchasing agents for a railroad, having a huge mileage in this territory, was approached with the idea of selling him some coal. He listened attentively to what the operator had to say, and showed an intelligent interest in the problems that the operator was face to face with. He did not have much to say, however, and toward the end of the interview he remarked that if coal was offered to him for 10c. per ton, he would be unable to avail himself of the bargain, because his railroad has on hand as much coal as it can possibly use, both now and in the near future. This example shows pretty accurately the condition of the market.

There is considerable talk going around that the Franklin County operators, effective Feb. 1, will increase the prices from $2.55 per ton, f.o.b. mines, to $2.75 per ton, for the prepared sizes and that this 20c. per ton increase will be general on all the coal they produce. The Franklin County people have been well and favorably known for the excellence of their product, and if anyone is to obtain an increase over the Government price, after Feb. 1, these people are in a position to do that. This experiment is going to be watched with interest by the rest of the coal men.

When the news first came out, to the effect that the zone restrictions were to be lifted after Feb. 1, there was a lot of promiscuous buying of Eastern coal; but this buying has practically all stopped, as the users of Eastern coal realize that the coal season is practically done. It is safe to say that the majority of tonnage of Eastern coal moving into the Mid-West territory is shipped for domestic purposes only.

It has now been from eight to ten weeks since there was anything like an active market in the Mid-West territory, and it is believed that this inactivity will have resulted in the reduction of a great many storage piles, and that a substantial number of steam users will once more be in the market. It is hoped that this will be the case, because not much more is to be looked for this year from the retail trade.

CHICAGO

Retailers making every effort to dispose of their low-grade stocks to make room for Eastern fuels. Little signs of activity in steam trade. No concern about anthracite.

The retailers of Chicago are bending every effort toward cleaning up their yards of low-grade Illinois and Indiana coals, preparing to receive a new stock of the high-grade Eastern products, which they ordered to be shipped around Feb. 1. It is believed that whatever Eastern coal is to move in here has already been ordered, as the dealers have come to the conclusion that they have nothing more to expect from the winter months. This season has been the mildest experienced in many years, and it will not be an exaggeration to say that the average retailer will go into next year with a considerable supply of this year's coal on hand.

The Chicago steam trade is showing little signs of life. The best that can be reported is a car sold here and a car sold there, practically no sales being made of any substantial tonnage. The anthracite situation has ceased to be a factor in the market, as the public is geting all the anthracite at this time that they wish, and getting it without restrictions.

MILWAUKEE

Little doing in coal on account of mild weather. A drop in bituminous coal expected in February. Pocahontas reappears in the market.

"Nothing doing" is the laconic answer to all inquiries as to the state of the coal market. Mild weather has put a damper on both city and country trade, and deliveries are at such a low ebb that most of the trucks and teams formerly employed in the business are out of commission. Consumers of anthracite who were supplied with only two-thirds of their normal supply are refusing the remaining one-third, claiming they have sufficient fuel to last. Shipments to the interior are also nomiral in character.

Dealers predict a cut in prices of soft coal in February, following aggressive marketing on the part of Western producers, whose output has been greatly stimulated by the demands of the war period. There is no prospect of a letting down of anthracite prices, however. The nearest approach to a cut in this grade of coal was made by one dealer who receives his supplies by rail and who has waived the premium of 40c. per ton which has been allowed on rail coal.

A return of zero weather would help matters, but the spring will have to be unusually protracted and inclement to exhaust the piles of coal on the docks.

Pocohontas promises to become a factor in this market again. Dealers are receiving offers of the screened product at $3.25 at the mines.

ST. LOUIS

A demoralized market continues on everything. Summer weather prevailing and no steam or domestic demand.

The market situation in St. Louis is still demoralized, owing to the mild weather. There is practically no demand for domestic coal of any kind. Some Standard is moving into the poorer sections of the city, and the little anthracite that was ordered is being delivered, but a goodly portion of these orders have been cancelled, the consumer feeling that the weather conditions will not justify the putting in of any high priced coal at this time. The result is that the dealers are going to have a lot of anthracite egg unless cold weather comes in.

The country demand for domestic coal is similar to that of the city demand. Steam business is almost at a standstill. Many steam plants are working only half time, and some are not working at all. The storage piles are being used in many places, and even the railroads are not buying as they intimated they would. Instead they are resorting to their storage supplies. Never before at this season of the year has the market been in anywhere near as bad a condition as at the present time.

Car supply is good on practically all roads, but the movement on some roads is slowing up for no apparent reason. In the Standard district mines are idle for as long as ten days at a time. Screenings are piled up so that nothing else can be loaded, and seem to be the only size right now for which there is no market of any kind. The price got down to $1.20, and that does not move them. Two-inch Standard lump is still around $1.50 to $1.60, and 6-in. lump from $1.75 up. There is not much prospect for better times ahead in the Standard field.

In the Mt. Olive district prices, as a rule, are holding up to the Government maximum of $2.55. This field, however, is not working much better than the Standard field, although a fairly good tonnage is moving north. The tonnage coming into the St. Louis market seems to decrease on account of the difference in price between Mt. Olive and Standard.

In the Carterville field, Williamson and Franklin Counties, the past week showed a decided change for the worse. Many mines are idle because they have no orders, and others because they cannot move the screenings and nut. In a general way the Franklin County prices are being maintained, while in Williamson County there has been some cutting.

Effective Feb. 1, the Williamson and Franklin County organizations, under the leadership of F. C. Honnold, raised the price of domestic sizes to $2.75. These organizations, it is understood, will be merged as one, with Honnold as the directing head, J. L. Kieflein having resigned as secretary of the Williamson County organization.

A break in the price of these fields cannot be expected. These operators are convinced that they should get more money for their coal and they are going to demand it. The Government price on this coal has been $2.55, with special preparation of 10c. in some cases. There is much resentment among the retail trade and the steam users over this action on the part of the operators, but inasmuch as the operators are organized solidly in Franklin County, there is not much chance to make a change.

The conditions in these fields will improve rapidly with colder weather. Car supply is plentiful and movement fairly good.

COAL AGE

Volume 15 New York, February 13, 1919 *Number* 7

Enlarging the Coal Operator's Field for Profits

THE inherent ambition of every coal producer to dispose of his product direct to the ultimate consumer is just as much of a fundamental law in industrial life as is that physical law which concerns the action of gravity. Though the process may be slow and circuitous, the final result need never be in doubt; it is all a matter of evolution.

Unlike a great number of commodities which readily lend themselves to a direct exchange between producer and consumer, coal has always been a product which necessitated the services of an intermediary. First it is bulky and difficult to handle; then there is the wide geographical distribution of the product. Furthermore, the vast army of consumers scattered over the United States are but slightly acquainted with the source of the coals they use, and they so limit their sphere of activities and their knowledge of fuel matters that the middleman naturally came into existence and has performed a valuable service.

In truth, the middleman in the coal industry would be a permanent fixture were it not for the fact that severe competition and stern labor demands render it necessary for the operating companies to extend their sources of income. One way for the producer to do this is to assume the functions of the middleman. Competition always means consolidation. The middleman is the only factor acting between the producer and the consumer of coal upon whom a "saving" operation can be performed. Production costs have been reduced to a minimum, and with the return of bitter rivalry for markets there arises a need for increased profits. The logical way out is for the operator to add distribution to his field of productior

No one familiar with the situation can honestly question the value of the service which the middleman has performed. His is a work that must be recognized as indispensable even by those who regard him with disfavor. He may be eliminated, but the service he performs cannot be done away with, although the producer may take over his job in the ordinary evolution of things.

For several years there has been a decided trend along this line. More and more of the larger producing companies are establishing selling agencies in the various important cities. These agencies, however, up to the present time have catered mostly to the large consumers, including the railroads, leaving the small consumers to the middleman. The disturbed markets of today are causing the coal operators to reach out for this business, which individually does not amount to much, but in the aggregate totals a large tonnage. In nearly all states retail establishments are either being erected or are being purchased by the coal producers. New England in particular has witnessed such an invasion of the distributing field.

The coal industry for several reasons has never stood high in public favor. It has had few friends at court and has always been the popular object of newspaper attacks. Mine operators are only just now commencing to see the wisdom of standing together. Diffidence must disappear if profits are to remain. The public must know the true story of coal. Nothing is gained by an attitude of submission and silence.

Real efficiency will only come when the coal producers learn the art of distribution as thoroughly as have the meat packers and the oil refiners. Genius for organization is not confined to any single line of business. Anticipating such a process of development, the alert middlemen are fortifying themselves against approaching extinction. Some are becoming the sole owners of new and promising mines; others are consolidating their interests with those of friendly producers. In other words, coal distributors are not defying the inevitable, but are meeting it halfway. Thus the middleman in name may be eliminated, but his function will still go on, like John Brown's soul.

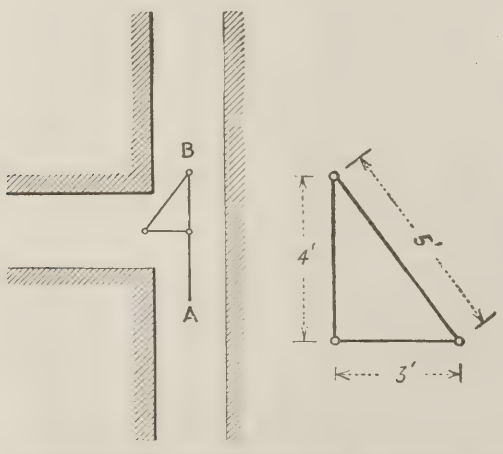
IDEAS AND SUGGESTIONS

Method of Driving Rooms Without the Aid of Regular Sights

BY OSTEL BULLOCK
Cleaton, Ky.

There are many men who study out the easiest and the quickest way to do things. In the mine where I am employed at present we have an engineer who does not get around oftener than once a month, and sometimes it is longer than that. Consequently, we had trouble from new rooms getting off centers before we could get sights put in them. This was annoying, as in such a case we would have to relay the road and retimber the places. Furthermore, getting off center weakened the pillar on one side and left a lot of coal on the other. I finally made a contrivance that answers the purpose. It can be constructed by any one in a few minutes and is accurate enough for driving short distances where no engineer is at hand to set points.

I took three small rings, as shown in the diagram. I then cut three lengths of small string—3, 4 and 5 ft. long respectively. After fastening these three strings to the three rings, I had a "triangle." To use this I take any two points *A* and *B* on the entry center line in front of a roomneck opening. Between these two points I strike a chalk line. Then, having found the intersection of the roomneck center line and the chalk line already struck, I place the ring forming the intersection of the 3- and 4-ft. strings at this point with the 4-ft. string extending along the chalk line in the entry. The 3-ft. and 5-ft. strings are then drawn taut. The room



HOW TO DRIVE ROOMS WITHOUT REGULAR SIGHTS

sights will be along the 3-ft. string. Then, by putting in a spad at the end of the 3-ft. string, and one on the entry, the set of sights thus made will serve for driving 60 or 70 ft. with only a small error.

Much of the accuracy obtained depends upon the care taken in placing the sights and the size of the strings and rings used. To turn at a 45-deg. angle it is only necessary to sight from the same point on the entry to a point in the center of the 5-ft. string.

To Remove a Broken Handle from Hammer or Sledge

BY A. P. O'CONNOR
Homer City, Penn.

Much annoyance is occasioned by the breaking of a hammer or sledge handle when there is no means at hand wherewith to remove the piece that remains in the eye. A good way in which to remove the troublesome piece is to place it in such a position that the eye is directly over a hole dug in the bottom, or one end may be placed on top of a rail and the other end on a tie (or similar arrangement), so that there is nothing to hinder the piece from coming out. Then throw a handful of dirt on top of the eye and pound it with a pole, ax, hammer or some such tool. Repeat this operation as rapidly as possible and note the surprising ease with which the piece will be driven from the eye.



REMOVING PIECE OF BROKEN HANDLE

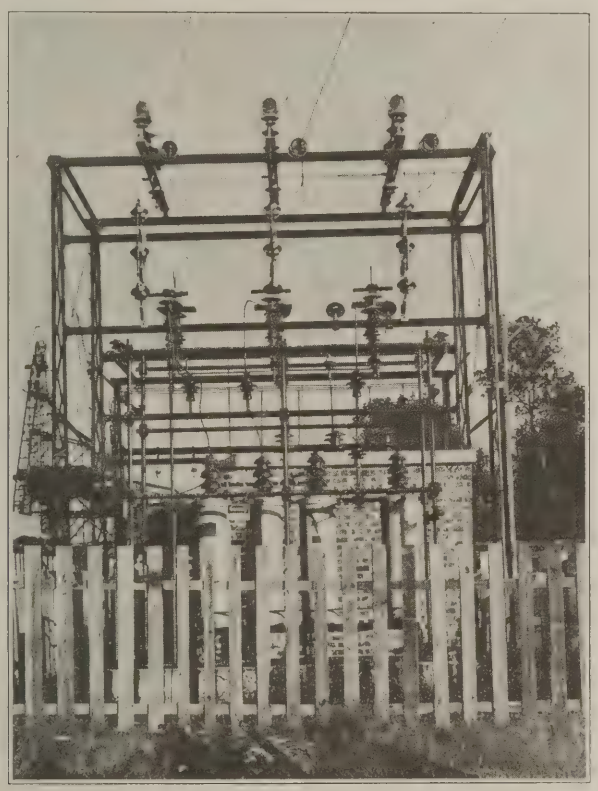
New Type of Outdoor Substation to Meet Severe Service Requirements

BY H. W. YOUNG
Chicago, Ill.

The increasing tendency of coal-mine operators to purchase power has resulted in the development of outdoor substations to meet the severe requirements of this service. There is a growing recognition of the fact that insulation should be of high quality so that heavy deposits of dirt will not cause failure by insulation leakage. This means that the equipment should have what is generally termed an abnormal factor of safety. This can be secured by the use of higher rated insulators than are ordinarily employed.

A new type of outdoor substation designed to meet the imposed conditions is herewith illustrated and a description of this equipment will be of interest at the present time. The power is made up of expanded steel sections heavily coated with rust-resisting paint, and so designed that it is shipped in sections easily bolted together at the point of installation. At the tower base is located a house of such dimensions that the high-tension auomatic oil switch and metering equipment can be easily installed and operated therein. The transformers on the opposite side of the tower are located within a steel inclosing frame which also carries the bus supports for both high- and low-tension transformer buses.

Control of the high-tension side is secured by means of a three-pole air-break switch operated from ground level by means of an interlocking switching mechanism. Lightning protection is secured by means of choke coils mounted on the switch base and so connected that incoming disturbances are reflected to the electrolytic arresters where they can be quickly discharged to ground. Between the line and the arrester are mounted



NEW TYPE OF OUTDOOR SUBSTATION

three single-pole disconnecting switches with limit fuses. By opening these switches the arresters can be safely inspected and adjusted. In case of arrester trouble, the limit fuse will operate and prevent excessive current flow.

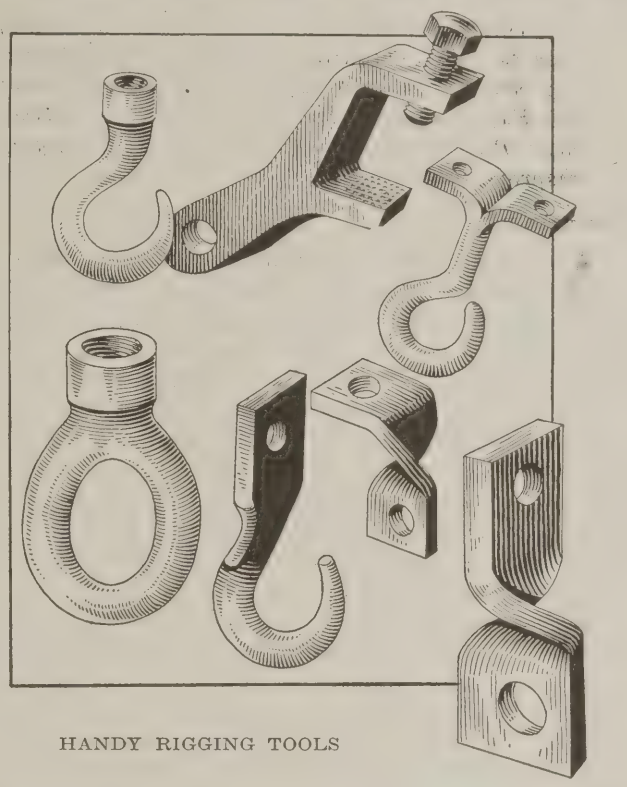
The high- and low-tension transformer buses are carried on bus supports having insulators of the same type as are used on the switching equipment. The general design is such that unskilled labor can be employed for both installation and operation, thus keeping costs at a minimum.

"Reputations are easily made; character must be hammered out on the solid forge of time."

Rigging Helps for Quick Erection of Block and Tackle

By Charles H. Willey
Concord, N. H.

The handy rigging tools shown in the accompanying illustration are all quite simple, yet they have proved useful; for with this assortment in the tool box or locker a block and fall or chain tackle can be rigged up



HANDY RIGGING TOOLS

readily and quickly almost anywhere. There is no need of dimensions or descriptions of these devices, as they must be made to suit local needs. However, a couple of clamps such as those shown have proved the handiest of the lot. The hole in the lug should be sufficiently large to receive a tackle hook, and if heavy work is to be handled the clamp should have two securing screws.

Carbon and Commutator Wear

By R. E. Hellmund
East Pittsburgh, Penn.

Carbon manufacturers, as well as builders of dynamo-electric machinery, have made numerous tests to determine contact resistances, friction losses, etc., of various brushes. While such tests are of interest, they contribute little toward the real practical need; namely, a substance that can stand high current densities and high sparking voltages with small wear.

In order to develop carbons having such qualities, it would seem essential to first make tests to determine how the wear is affected by current density, sparking voltage and peripheral speed. Present indications are that with many commercial carbons appreciable densities can be used if there is no sparking voltage, while sparking potentials up to 15 or even 20 volts across the brush cause little wear at certain speeds, if the current density is low enough. More data along this line should be of great advantage.

Effect of the Velocity of Ventilating Current Upon Mine Explosions

By G. S. RICE and W. L. EGY
United States Bureau of Mines, Washington, D. C.

SYNOPSIS—*A pet theory of many mining men is that ventilation should be reduced during firing. Certain experiments carried on at the Experimental Mine of the Bureau of Mines near Pitsburgh, Penn., would tend strongly to disprove this theory.*

A LARGE number of mining men, particularly in the Southwest, are of the opinion that the velocity of the ventilating current has a great influence in the origination of coal dust explosions. On this account they recommend that the fan be slowed down at shot-firing time, and in some cases have advocated closing the mine openings. The supposed basis for this theory is that a high-velocity air current would furnish more oxygen for the development of the explosion than a low-velocity air current; and further, that if the openings of the mine are not closed, air might enter and, traveling toward the advancing explosion, furnish it with more oxygen.

It is evidently assumed that the oxygen in a quiet atmosphere or in a current moving in the same direction as the explosion is not sufficient to feed the explosion and that a supply from other points is necessary for its development. In connection with this theory a number of tests made in the Experimental Mine of the Bureau of Mines are of special interest.

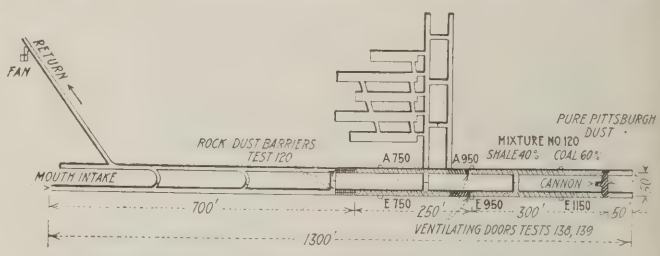
The great majority of the explosion tests in the Experimental Mine have been made with low-velocity air currents, the velocity being about 100 per minute. There are also many tests in which the velocity ranged from 100 to 200 ft. per minute. There are three tests, however, which were made under conditions which should certainly have shown some result of the velocity if this were a factor; these are tests Nos. 138, 139 and 120, in the Experimental Mine series.

In test No. 138, pure coal dust was distributed from the offset in 1250 cutthrough to E and A 950 (see accompanying diagram), at which points the entries were closed by rock-dust-protected ventilating doors, the entry door opening inby and the aircourse door outby. These doors were closed during the test so there was no air current moving in the explosion zone. The explosion was originated by firing the usual charge of 4 lb. of black blasting powder from the cannon in the offset, and the resulting flame or explosion velocities were high, and pressures strong.

In test No. 139, the arrangement of igniting the shot and the zone was similar, except that outby a coal dust ignition zone, in the 1250 cutthrough a mixture of 50 per cent. shale and 50 per cent. coal was distributed at the rate of 4 lb. per foot to E and A 950. No difficulty was encountered in this test in obtaining an explosion, the development being roughly symmetrical in the two branches with pressures of 25 and 17 lb. at E and A 950 respectively.

If closing the explosion zone so near the origin had no effect in preventing the origination of an explosion, closing the openings of an operating mine which may have large areas of open workings underground from which air would be available to assist in the explosion, were the theory mentioned correct, would certainly have no influence. These two tests show that for the development of a violent explosion there is no necessity for oxygen supply other than that present in the air in the explosion zone.

In test No. 120, June 11, 1914, which was made in the presence of many of the members of the Mine Inspectors' Institute of America, a high-velocity air current was used. The ignition zone in the 1250 offset and cutthrough was prepared with pure Pittsburgh coal dust, while in the entry and aircourse outby to E and



SHOWING HOW ROCK DUST WAS DISTRIBUTED

A 700, a mixture of 60 per cent. coal dust and 40 per cent. shale dust was distributed at the rate of 3½ lb. per foot. Barriers of various kinds limited the explosion zone at different points. An air current with a velocity of 850 ft. per minute was intaking on the main entry and returning on the aircourse. The arrangement permitted a comparison of the development of an explosion in two parallel entries, with dust distributed in the same manner and amount in each, but with the main entry swept by a high-velocity air current traveling toward the origin, while in the aircourse the air current traveled away from the origin.

When the shot was fired, dust clouds came from both entry and aircourse openings. Inspection of the flame recorders indicated the explosion had reached the end of the zones in the two entries. The explosion was a relatively weak one, with low velocities, as was intended. This was attained by using a high percentage of shale dust in the dust mixture.

When the instrument records were plotted it was found that the development of the explosion in the two entries was quite similar, the velocities in the aircourse, which was the "return," being a little greater than those in the entry, which was intaking. It required 3.2 sec. for the flame to reach E 1150 and 2.9 sec. to reach A 1150, while the records at E 750 and A 950 respectively were 6.5 and 5.1 sec. It will be seen that the velocity of flame from the origin to A 1550 was only a little greater than

that to E 1150. The average, as indicated by time of melting of foils, in entry and aircourse between stations 1150 and 750 were 182 and 121 ft. per second respectively. The pressures developed were light, being 5 lb. at E 1150 and E 750, 2 lb. at A 1150 and A 750. Thus there was practically no difference in the development of the explosion in the intake and the return.

It is believed from this and other tests that the velocity of the air current has no appreciable effect on the development of the explosion. The first effect of the shock wave of the igniting shot is to send out a pressure wave radiating in all directions, which reverses the direction of the air current when the latter is in the opposite direction. This is clearly shown by the pressure diagrams and records of the air vanes in many of the Experimental Mine tests.

It therefore makes no difference, so far as the propagation of an explosion is concerned, what the velocity was before the shot was fired, since immediately afterward the movement is away from the shot in all directions. After an explosion has passed any point, the current of gases and residual air reverses and flows back toward the origin, followed by fluctuations until equilibrium of atmosphere pressures is established throughout the mine.

It is therefore concluded that the theory of slowing the fan or closing the mine openings to reduce the possibility of the origination of an explosion is founded on false premises, and there is no reason in favor of following the practices founded on this theory. On the contrary, there is great reason for not doing it since the slowing down of the air current may permit the accumulation of gas in some parts of the mine and fail to carry off effectively the gases resulting from the shotfiring.

Algerian Market for American Coal

By Consul Arthur C. Frost
Algiers

With the exception of a negligible quantity of lignite and bituminous deposits, Algeria is dependent upon other countries for its coal supply. Before the war this commodity was imported principally from Great Britain. France, Germany, Holland, Belgium and the United States supplied the remainder. Since 1916 a large portion has come from France, in accordance with the policy of tonnage conservation.

Due to the difficulties of transportation, the imports of coal have rapidly dwindled since the beginning of the war. The total imports into Algeria, including bunker coal, have been as follows: 1913, 2,251,000 metric tons; 1914, 1,692,000 tons; 1915, 1,491,000 tons; 1916, 1,153,000 tons; and 1917, 757,000 tons.

For interior consumption the quantity and value of the coal and coke imported into the colony were as follows: 1913, 530,622 metric tons, value $2,073,000; 1914, 427,624 tons, value $2,685,000; 1915, 313,937 tons, value $3,722,000; 1916, 325,798 tons, value $6,661,000; 1917, 228,262 tons, value $8,310,000. Although the quantity received in 1917 but slightly exceeded one-half the quantity received in 1913, the value was over four times as much.

According to the statement of an official of the State Railways, Algeria was receiving monthly about 20,000 tons of coal the latter part of 1918. The State Railways are charged by the Government with the distribution of coal to all industries as well as to the railway lines in North Africa, including certain lines in Morocco. Double this quantity is needed to enable industrial establishments and public utilities to resume normal operation and to supply householders, who have been almost deprived of coal for the past two years.

Because of higher freight charges, American coal has in the past been unable to compete to any extent with British coal. The quantity and value of the coal imported from the United States from 1912 to 1915, the latest year American coal was received, follow: 1912, 3810 metric tons, value $17,000; 1913, 24,917 tons, $112,000; 1914, 22,062 tons, $102,000; 1915, 6455 tons, $68,000. In the spring of 1917 negotiations were practically completed for the purchase of 150,000 tons of American coal for delivery within a year. Owing to the entrance of the United States into the war and the requisition of tonnage this contract, arranged with the American coal companies through the Société Internationale d'Expansion Industrielle et Commerciale, 32 Avenue de l'Opera, Paris, France, could not be fulfilled.

The construction of a large American merchant marine presents an opportunity for the development of the coal trade of North Africa. In addition to coal for internal consumption in Algeria, the United States should be in a position to supply bunker coal, especially for its own ships. Before the war Algiers was one of the principal coaling stations on the Mediterranean. Due to war conditions, however, the number of vessels calling here for supplies has steadily dwindled, and, in fact, during the past two years Oran has exceeded Algiers in supplying vessels.

Furthermore, Algeria presents opportunities for return cargoes perhaps greater than certain other Mediterranean regions offering markets for American coal. To a large degree American exports to the Mediterranean consist of bulky commodities, such as cotton, grain, coal, petroleum, machinery and metal products, and exports from this region are largely made up of articles of small volume but of relatively high value, notably food products. The result is that most vessels westbound are in ballast or carry small cargoes only.

Algeria, however, exported before the war considerably over a million tons of iron ore, and the full resources of the colony in iron ore are yet to be realized. The region about Bougie has been called the Algerian "Bilbao." The colony exported as well considerable quantities of zinc, lead and some copper. Manganese, mercury, and antimony are also found. A great part of Algeria's minerals were before the war exported principally to countries other than France. England and Holland were the best customers, followed by Belgium, Germany, Austria-Hungary and the United States.

The coke production of the United States in 1917 was about 56,000,000 tons, of which approximately 34,000,000 tons was produced in bee-hive ovens and over 22,000,000 tons in the byproduct type. If the 34,000,000 tons of coke had been made in the byproduct oven, some 9,000,000 tons of coal might have been saved; this saving represents about 10 per cent. of the coal used for domestic purposes in 1917.

Missouri Coal Trade Conditions in 1918

By E. J. WALLACE
St. Louis, Missouri

IT WAS NOT with a flourish of trumpets that 1918 was ushered in by the coal trade. In fact it was unlike the incoming of the two previous years, for the Fuel Administration had a firm hand on the coal business in St. Louis.

The steam trade as a whole fared better in St. Louis than it did in any other city in the country east of the Rockies. No record has been made of any factory or industry going down for the actual need of coal. This was due chiefly to the splendid work of the St. Louis Fuel Committee, which was helped materially because Lieutenant-Governor Wallace Crossley, Fuel Administrator for Missouri, had jurisdiction over the East St. Louis, Ill., switching limits. As a result the available coal was distributed so that everyone got some.

The domestic consumer began the year with a hope that sufficient coal would come in to enable the delivery of more than half-ton lots. Things were more critical with the householder than with steam plants. There was little coal in the homes, and for the first few weeks the city was sorely beset. At this time the city opened its municipal coal yards in the poorer sections, and coal was sold in small lots to the needy.

Little Carterville coal came in as the year opened. The same applied to DuQuoin. The railroads seemed to get most of it, from the St. Louis viewpoint. Mt. Olive was the chief high grade, and Standard coal, which in normal times was beneath recognition for general domestic use, became a highly esteemed fuel.

Railroads Bought a Large Tonnage

The railroads drained both the Mt. Olive and Standard fields of an enormous tonnage over what they had taken in the past. The Terminal Railway of St. Louis, which was without any storage supply through lack of foresight, confiscated coal indiscriminately and was called to task by the Fuel Administrator. Incompetent railroad fuel agents were brought into the limelight, and for once their plan of holding up the operators proved their undoing and an expensive problem to their companies. There was no Pennsylvania anthracite coming in during the first few weeks of the year and no smokeless at all.

The coldest weather for 30 years was experienced in January, and the snow at times tied up everything. The Laclede Gas Light Co. was ordered to take conservation measures on account of its storage being used up. The Anheuser-Busch Brewing Association was ordered to sell to the gas company any part of 14,000 tons of Pittsburgh coal that it had in storage for the past 14 years. This saved the day for the gas consumer in St. Louis. The closing order affecting non-essential lines of business issued by the State Fuel Administrator saved gas and also light.

January was the real critical month in St. Louis and the territory adjacent. Mines in the Standard field, upon whose output St. Louis depended, were idle for from a week to ten days at a time through many causes, principally poor rail management.

February brought somewhat easier conditions. The Fuel Committee on Feb. 1 estimated that St. Louis was getting along fairly well with a shortage of 95 cars per day. The steam and domestic requirements were shown to be 550 cars per day. The retail demand was from 250 to 300 cars per day. There were 243 essential food and war contract plants that had to have 12,000 tons per week, and 227 other essentials needed 15,000 tons per week.

Much improvement was apparent as the month progressed, in spite of the Illinois Central R.R. and the St. Louis Terminals going to pieces. Embargoes were put on by the carriers and removed by the Fuel Administration. Cars were furnished mines one day a week, and it was almost another week before they were moved and from one to two weeks before they were delivered. There was much uneasiness over the proposed zoning and the elimination of the jobbers' margins. This affected the country trade seriously. To help them out, especially in southern Illinois and Arkansas, the Missouri Fuel Administrator diverted several cars of coal from St. Louis.

Roads Confiscated Domestic Coal

No Carterville came into St. Louis, and on the Missouri Pacific lines in southeast Missouri, Arkansas and Louisiana the situation was alarming. No rates from other than the Carterville field were in effect, and the Missouri Pacific confiscated nearly all the domestic coal that went that way.

Toward the end of February the weather moderated and conditions became easier. Some 1500 tons of anthracite had moved in, but no smokeless, and nothing from Arkansas. The carriers did not, however, show much improvement in their work. Mt. Olive coal had become easier, and Standard was available for some storage supplies although the carriers were apparently taking more tonnages from all fields than in the previous month. The mines supplying St. Louis for this month averaged from nine to twelve days' work, the poorest showing being on the Louisville & Nashville and Illinois Central lines.

At the close of the month retail conditions were easy, and when March opened the situation did not occasion any worry. The early part of March presented the weakest link in the chain, the Louisville & Nashville putting on embargoes without any valid reason. This carrier and the Illinois Central rendered extremely poor service until after the middle of the month, when there was an improvement. At this time the Terminal situation became somewhat like normal, and more prompt delivery resulted.

The supply of Mt. Olive coal became more plentiful, and at the end of the month there was an oversupply. However, it moved in heavy tonnages to Nebraska and the northern market. Carterville was scarce, little coming in at any time, while Standard became a drug on the market with unbilled coal at the mines and at East St. Louis, with some slight price reductions here and

there. The steam trade bought somewhat begrudgingly, and steam sizes were also heavy. The domestic demand was good in the early part of the month, but at the close it was not a factor. During the month about 3000 tons of anthracite moved in. There was no smokeless and no Arkansas.

The matter of contracting was purely a gamble, but many contracts were made during March. Most of these indicated that the shipper had less faith in future high prices than the consumer. The usual contract called for a maximum and minimum tonnage of the screened sizes, with the understanding that if conditions warranted it mine-run could be shipped at the Fuel Administration's price at time of shipment. These contracts for the most part just assured the buyer of his fuel at the Government price. It was a protective policy. The big railroad contracts were made at less than Government figures. This was where the operator was not so sure of the future as the consumer.

Opening of Coal Year Discouraging

The coal year opened in a most discouraging way to the shippers. There was no steam market. It could not be made. Even price would not do it. Sizes that were unavailable for many months, like No. 2, No. 3, No. 4 and No. 5, were going begging. Embargoes against Chicago by the Wabash and Chesapeake & Ohio was the principal cause, and the country demand ceased so suddenly that it hurt the feelings of some shippers who had saved postage by refusing to answer country inquiries for many months prior to Mar. 1.

For a few weeks previous to Apr. 1 an enormous tonnage of all kinds of Illinois coals eased the St. Louis situation. During April the St. Louis market was glutted with this coal, and prices on Standard coal were cut to suit the buyer if one could be found. With the same Government prices in effect as on Jan. 1, Standard lump went down to $2.25 and less, with mine run at $1.90 and screenings at $1.65. This condition prevailed to the end of the month.

Mt. Olive coal was plentiful during all of April, and it held to the maximum Government price. The Carterville situation was discouraging. In an effort to induce the public to buy the most available fuel, and to induce the retailer to store as much as possible, the St. Louis Fuel Committee increased the price of retail coal 30c. per ton. This was 21c. less than the retailers asked, as they produced figures to show that it cost $1.45 to sell coal at retail. The hauling charge is $1 of this. The prices set were a surprise to the public, who had expected a reduction.

Retail demand became good on Carterville coal, just the opposite of what was expected. Dealers had more orders for this grade than they could possibly fill in three to four months. It took from two to three weeks to get a car from the Carterville field, 100 miles away, to St. Louis over the Missouri Pacific and the Illinois Central. The general impression was that some of the roads were trying to render such service as would cast a reflection on Government control. Even the Terminal slipped back several notches, and conditions were trying. There was a good movement of anthracite during the month, several thousand tons coming in, but no smokeless and no Arkansas except the bituminous variety.

In May there was practically no anthracite moving in except some off-grade, off-size stuff, and no smokeless and but little Arkansas. The transportation problem remained as in April. The local steam market went down to its low ebb, and there were hundreds of cars of screenings unbilled that kept down the delivery of screened sizes. The Standard field showed improvement in other sizes as the month advanced, and there was a better tone to the market. This was helped by the railroads coming in for fuel. As a matter of fact they saved the Standard field from absolute demoralization. Railroad fuel is mine-run, and the screening problem therefore vanished. There was plenty of 6-in. lump and somebody got a lot of 6-in. mine-run.

The domestic demand from apartments and off-the-rail plants improved. The Mt. Olive situation was similar to the Standard on screenings, but it improved toward the end, aided by railroad orders and a much better domestic call.

The Carterville condition became alarming toward the close of May. Many dealers were far oversold, and the tonnage became smaller week after week. Then the operators refused to take on more orders until they caught up with those on file. The same applied to the DuQuoin field. There was a break in the maximum prices on Carterville screenings, which went as low as $2, with DuQuoin at $1.75. Standard went to $1.40 at this time.

At the close of the month there was a slipping back to former conditions apparent in the Standard field. This became more pronounced in the early part of June, at which time railroad buying let up. When the roads came into the market again coal was cheaper. So it was for everyone else who could use Standard, but the tonnage moved was nothing to what the condition required.

Freight Rates Advance on Coal

There was a fair movement of everything but screenings for a few days prior to June 25, when the freight rate advanced 20 per cent. on all coal. The Standard market pulled through June in somewhat worse shape than in May. Mt. Olive held its own. There was just demand enough for the supply. Some of this went into storage, while practically no Standard was considered. The Carterville and DuQuoin situation seemed to get worse. The railroad tonnage of these coals became greater, so did the domestic demand, which was insistent.

The heart-breaker to the St. Louis territory was the "no-more-anthracite-west-of-the-Mississippi" order that came in with the month of June. Over 40,000 tons were booked, with no chance of getting any. This caused a furore that was hard to down. The Chamber of Commerce held a protest meeting, but the local fuel committee explained it away on the promise of plenty of coke. Thousands of hard-coal burners were replaced by other stoves, for the coke supply did not materialize in time, and when it did the price was unreasonably high to the consumer. There were spirited contests for what little anthracite was stored. Transportation improved toward the end of the month.

In St. Louis, outside of the zone for Illinois coal, there was a continued demand for Illinois fuels. Some

moved to Nebraska in box-cars, and a little went into western Missouri on special permits. This was soon stopped when the privilege was abused through district representatives sending Carterville coal to their relatives while others who actually suffered for the lack of it went without. During all this time the mines in the Standard field were idle because of no market.

July brought some pleasant surprises. Instead of the market lagging, it picked up. To replace the 40,000 tons of hard coal orders began to come in, and it takes over two tons of Illinois coal (nearer three tons of some grades) to replace a ton of anthracite. So the domestic business resumed. A promise was made of 25,000 to 30,000 tons of coke for the remainder of the season, and the future looked brighter.

The Standard market was affected but slightly at first, but it improved as time passed. However, it was not a healthy proposition at any time during the month of July. The outside country call was good, with fine prospects, because the outlying sections could get no coal of higher grade. The steam demand was poor, and this handicapped the operators. There was some small storage of Standard coal reported, and the railroads waded in now and then when conditions were right and brought relief.

Mt. Olive Market Proves Steady

The old reliable Mt. Olive proved the steadiest of all; not an oversupply, but just enough to swing the call. The Carterville problem seemed to grow. The orders piled up and the incoming tonnage grew smaller. Many consumers were induced about this time to change from high grade coals to coals of a lower grade, which proved a help. Considerable so-called Arkansas smokeless moved in, with some Arkansas anthracite.

It was suggested at this time that too much urging for early storage might be harmful in St. Louis proper. The public was getting anxious about its coal at the end of July, and the dealers were unable to cope with the demand for prompt delivery.

In August it was much the same as in July with regard to Standard coal. Toward the end of the month it became weaker, even though the State Fuel Administrator permitted thousands of cars of this coal to be shipped to Michigan. This helped to steady the market. The Mobile & Ohio was in bad shape for the entire month. Prices for Standard coal were about the same as in July, and the domestic storage of this grade was pretty well taken care of. Steam storage was not so good.

Mt. Olive coal was the steady-going grade, with no changes from the July condition. Carterville and DuQuoin seemed to get worse. Orders kept piling up on the dealers for these fuels. The supply was getting smaller for many reasons, but principally because of decreased production. The railroads drew heavily on this field.

A survey showed that St. Louis was the best coaled city in the country for domestic, and perhaps the poorest in steam storage. No eastern coals came in and but a small tonnage of Arkansas. The latter went up $1.50 per ton, which almost made it prohibitive in St. Louis, although farther west it seemed to move. There was up to now a shortage of coke, but gashouse got easier, with little byproduct available. Country business began to pick up in August, and toward the end of the month transportation improved on almost all the roads.

The lightless day and night orders were a farce here. Mines were idle because of an overproduction of steam coal, and yet at the same time regular avenues of consumption were being eliminated. There was much sarcastic comment on the part of the public over the lightless night order and the skip-stop system. For a while these conditions threatened to create such a surplus of screenings that the price of Standard and Mt. Olive lump almost justified a higher Government price that would permit the screenings to be dumped as in Arkansas, in order to get out any lump at all. Chicago proved to be a good outlet for these cheap screenings.

Fuel Administrator Crossley at this time succeeded in getting Washington to cancel the order preventing brick and other nonessential industries in Missouri from procuring coal for storage and current needs. The Federal Fuel Administration sustained the plea of the State Fuel Administrator through C. E. Morrow, of the St. Louis Fuel Committee, and E. J. Wallace, advisor to the committee, that the basis for gashouse coke prices in the St. Louis and mid-west section should be on the rate from the Earlington, Ky., field and not from Pittsburgh. This rate was $1.70 or $1.85 under the Pittsburgh rate, and coke came down from $9.60 to $7.70 ovens at St. Louis with a refund dating back to July 8.

The market continued easy all through September on Standard domestic sizes. Steam was heavy, and screenings as usual were a drug. The railroad orders helped some, in fact these were life-savers for many mines. Retail business was off, other than for apartments and buildings, which were storing up all the the coal they could get. Mt. Olive moved along tranquilly as usual.

Situation Shows Signs of Easing Up

The Carterville situation showed some signs of easing up for the future, although little coal moved in. DuQuoin coal proved somewhat freer. Retailers began slowing up in their desire to fill every coal bin in St. Louis when the fuel committee announced that fully 75 per cent. of the domestic coal needed up to Jan. 1 was stored. Dealers began to figure out a winter of idleness if it continued that way, and eventually they found they were correct.

Country business was good in the St. Louis territory in September. Failure to get Carterville up to now begot a desire to play safe and take what was offered. This was Mt. Olive, if available; if not, Standard went. At some places in the territory steam plants that could just as well burn Standard were using Carterville, while whole communities could get neither on account of there being no Standard rates in effect to the places where Carterville was used for steam.

The new retail price on gas coke was set at $11.25 with byproduct at $13. The producers agreed to cut this to $12.50, which would be the anthracite price. The producers, however, did not keep their promise, and byproduct later became plentiful because the public would not submit to that kind of a policy. Some Arkansas anthracite—a few hundred tons—and about twice as much Arkansas smokeless came in, but no eastern fuels.

In October the shoe was on the other foot, as the operator began to worry. The market began to slump.

Standard conditions grew worse. Steam buying was light and slow. There was little done in the domestic line. Railroad business practically kept the Standard field going during October. The month was depressing, with an oversupply of all kinds of coal.

Mt. Olive fared better, but showed a weakening. There was some domestic business here, but it was railroad orders and a tonnage to the north and Canada that saved St. Louis from a broken Mt. Olive market. Even Carterville began to ease up toward the last, and the St. Louis territory began to get some. This tonnage gradually increased until at the end of the month some dealers asked that shipments be held up.

Contrary to expectations there was no cold weather in October. This was unusual and was the cause of a slowing up in the outside demand. At this time there were light shipments of Arkansas smokeless.

As November progressed conditions became still more depressing. There was a day or two of chilly weather during the latter part of the month but otherwise it was a record-breaking month for summer weather and no business. Standard mines were idle. Railroad tracks were congested and the yards were full of coal. Plants with storage stocks began to cut into them, and both wholesale and retail prices went to pieces. The latter suffered a cut of 50c. to 75c. and soon brought a like reduction on all other coals.

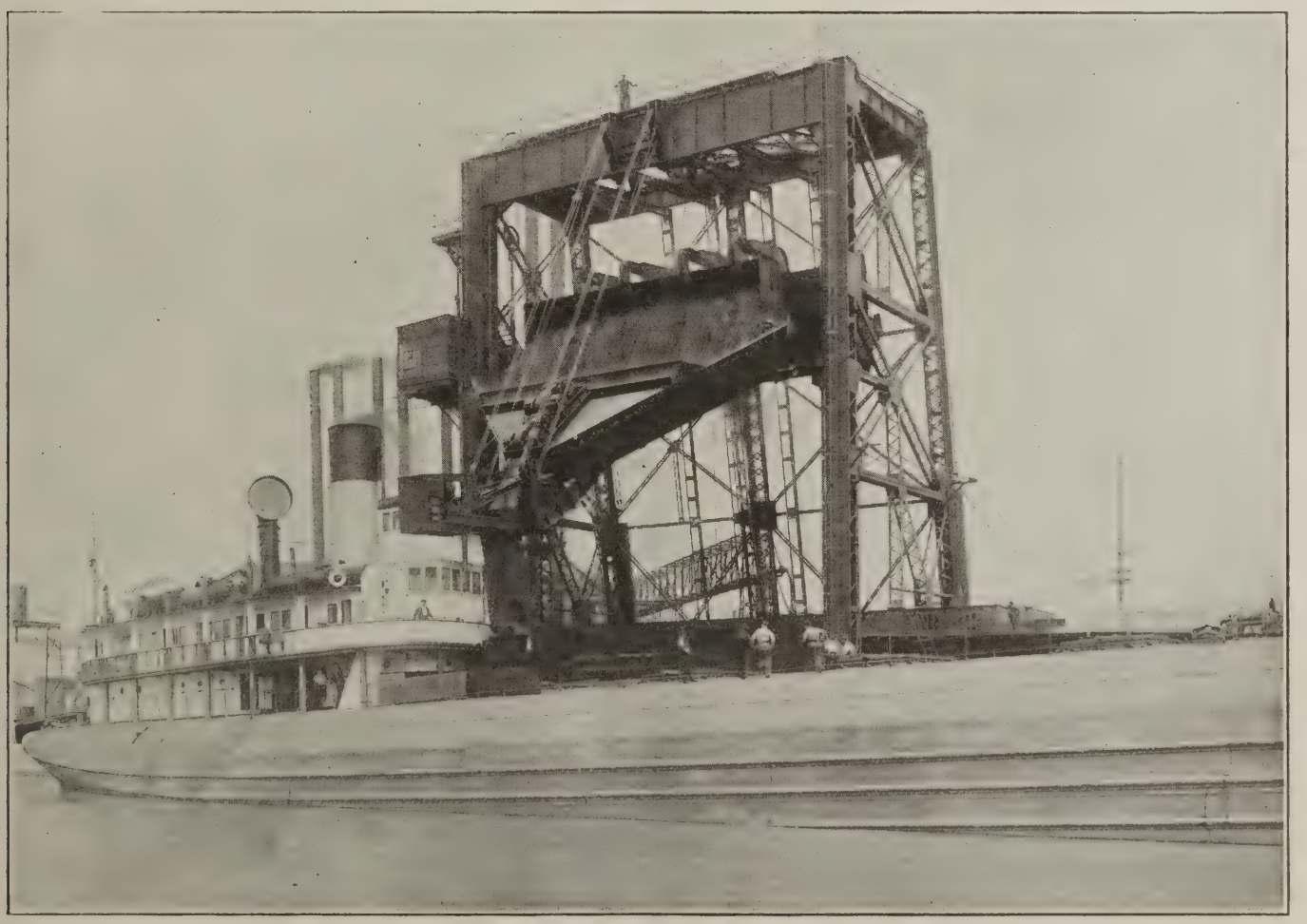
No call for either steam or domestic coal put the market squarely up to the railroads, who waded in splendidly for a few weeks and then laid off to use up their storage piles. Mt. Olive coal fared somewhat better than the other grades. It moved out and north with a railroad tonnage that stayed.

Carterville coal was virtually a drug on the market. On this grade, and also on Mt. Olive, the jobbers' margins were allowed by the operator. Standard got down to $1.40 for screenings, with $1.75 for 2-in. lump to $2 for 6-in., and these prices remained to the end of the year.

December weather conditions were remarkable, not a single cold day being registered during the entire month. It was the mildest winter since 1877. Dealers had nothing to do; domestic orders were being made for one-half and single tons. It was a standstill month.

Mines whose output came to St. Louis were idle for over a week at a time. It was usually outside business that helped them at all. The country call was slight, but it was well ahead of the city demand. Transportation, of course, became good, but the carriers still persisted in keeping unreasonable orders in effect, which only served to add to the disappointment.

The year, which had opened under such favorable auspices for the coal industry, proved a disappointment at the close. To the right thinker, the disappointment was acceptable, for it was brought about chiefly through the ending of the war. To the trade this was the one big factor, and all interested parties were glad of the outcome, regardless of its effect on the coal industry. With the coming of a new year vanished the dreams of a great united industry in this section. This will not be brought about until there is a head to each part of the industry that every member can trust.



CAR DUMPING MACHINE OF THE PITTSBURGH, BESSEMER & LAKE ERIE R.R. AT CONNEAUT, OHIO

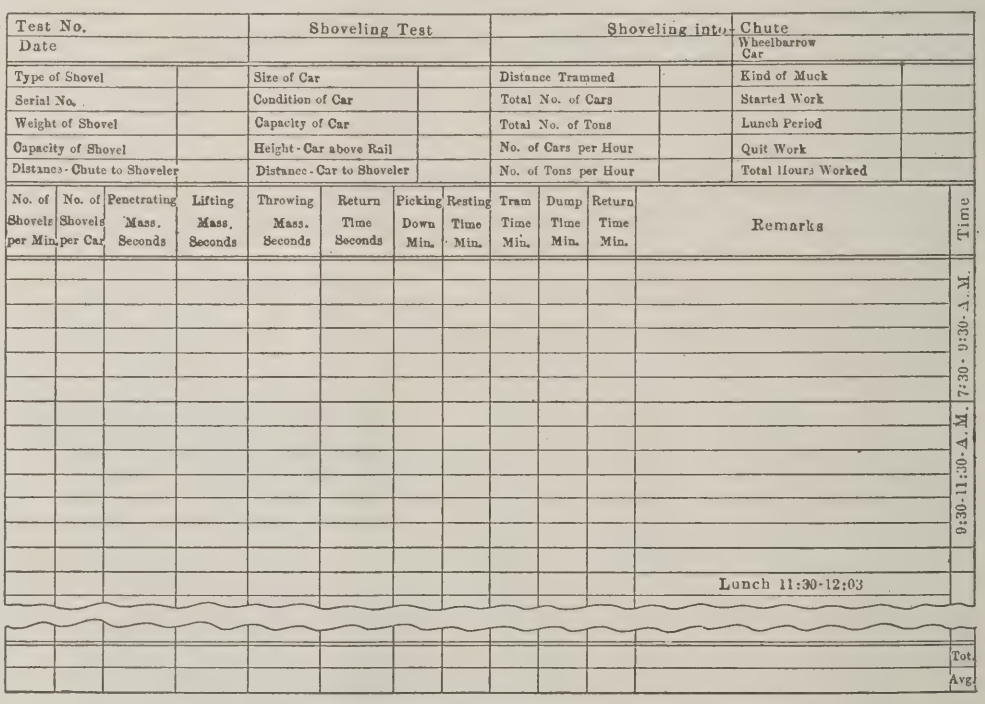
A Study of Shoveling as Applied to Mining—I*

By G. TOWNSEND HARLEY
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SYNOPSIS—*A series of tests was made to determine under what conditions a Mexican laborer would handle the greatest tonnage of muck in a given time, both underground and on the surface. Many factors influence the result, some of which are clearly set forth in this article.*

STOPING methods in which shoveling plays an important part are gradually being replaced by other and cheaper methods. But there will always be considerable shoveling done underground in stopes as well as in drifts, tunnels, winzes and shafts. At the mines of the Phelps-Dodge Corporation at Tyrone, N. M., the cost of shoveling in all stopes in 1917 amounted to 24c. per ton. In the top-slice stopes for the same period, it cost 27c. per ton, or 16 per cent. of the total cost of these stopes. The tonnage for shovelers from all stoping was 9.3 tons per man, and for top-slicing 8.2 tons per man. These stopes were not unduly hot, and there was not more than the usual amount of timber to interfere with the work of the men. The tonnages obtained per shoveler were considered low; first, because of a poor grade of Mexican labor, many of the men having come in from railroad grading camps; and second, because of a poor spacing of raises, especially in the top-slice stopes, where, in general, they were spaced 25 x 66 ft. centers. The average wage per laborer shift was $2.67 during the year. It was thought, however, that even under these conditions the men were not producing the tonnage that they should, so, with the consent of the management, the writer undertook to determine how the general efficiency of the underground shoveling could be improved. No predetermined plan for conducting these experiments was arranged, because we had no definite ideas as to the scope of the work or the number of elements into which the investigation would resolve itself, before all of its phases could be determined. We were sure, however, that any work that would thoroughly cover the ground would have to be in the nature of a systematic time study, combined with a course of instruction in correct shoveling methods and adequate and intelligent supervision of the work.

Two or three companies in the Southwest have done some work to determine the proper shovel to be used underground, but so far as is known the work has been limited to equipping certain parts of their mines with a particular type and size of shovel and thereafter watching the cost and efficiency records. In each case it seems to have been the shovel that held the 21-lb. load that gave the best results. Excepting personal communications from these companies, the only data available on scientific shoveling are contained in F. W. Taylor's book, "The Principles of Scientific Management," and D. J. Hauer's article, in *The Contractor* for Mar. 29, 1918, "A Hundred Hints for Shovelers."



Test No.				Shoveling Test				Shoveling into			Chute / Wheelbarrow / Car	
Date												
Type of Shovel				Size of Car				Distance Trammed			Kind of Muck	
Serial No.				Condition of Car				Total No. of Cars			Started Work	
Weight of Shovel				Capacity of Car				Total No. of Tons			Lunch Period	
Capacity of Shovel				Height - Car above Rail				No. of Cars per Hour			Quit Work	
Distance - Chute to Shoveler				Distance - Car to Shoveler				No. of Tons per Hour			Total Hours Worked	

No. of Shovels per Min.	No. of Shovels per Car	Penetrating Mass. Seconds	Lifting Mass. Seconds	Throwing Mass. Seconds	Return Time Seconds	Picking Down Min.	Resting Time Min.	Tram Time Min.	Dump Time Min.	Return Time Min.	Remarks	Time
												7:30 - 9:30 - A. M.
												9:30 - 11:30 - A. M.
											Lunch 11:30-12:03	
												Tot.
												Avg.

FIG. 1. TIME-STUDY SHEET USED IN THE TESTS

This paper discusses and draws conclusions from several thousand time-study readings, taken both on the surface and in the mines for nearly a year. A sufficient number of readings were taken on each factor in the problem for the plotting of curves of the performances and to obtain accurate indices of the work to be expected from this class of labor. The work here described is not as complete in all of its details as we would like to have it, because we were forced to stop the work temporarily, owing to the number of men going into the national service, and our inability to get others who could make time studies. The results obtained so far, however, have been of such a startling nature that we have decided to submit them at this time, subject to future modification. It is hoped, also, that

*First installment of a paper to be presented before the February meeting of the American Institute of Mining Engineers.





FIGS. 2 TO 4. PENETRATING MASS AND PREPARING TO THROW CONTENTS OF SHORT-HANDLED SHOVEL
Fig. 2—Position when starting to penetrate the mass. Fig. 3—Mass has been penetrated. Fig. 4—Position just prior to lifting shovel contents

a free discussion of this paper will lead to a disclosure of any errors that may have been embodied and offer some valuable suggestions for the conduct of future work.

As a first step, several weeks were spent underground making a general survey of the field and making time studies on various men, in order to see what points would need to be determined for a full consideration of the subject. The following factors are soon recognized:

1. The type, weight, size and design of shovel giving the greatest shift tonnage without too much wear and tear on the man would have to be determined. This work would also determine the point at which a shovel should be discarded as worn out.

2. A standard of comparison would be necessary if the ill effects of mine air, powder gas and smoke, temperature, humidity and poor light were to be estimated.

3. The layout and spacing of chutes would have to be studied with regard to their effect on shoveling directly into them, or loading into wheelbarrows or cars and tramming to them. This work would determine the proper distance at which shoveling into a chute should leave off and loading into a wheelbarrow or car be taken up. The information would also be of great use in planning the development of a stope.

4. Hindrances to work, such as timber standing in line of throw or closely spaced, men and supplies passing back and forth through working space, etc.

5. Manner of placing the shovelers to obtain maximum results from them, number of men in one working place, and size of working place required per man.

6. The hours of actual work and the cause and amount of delays, such as shoveler interrupted to help in other work, etc.

7. The capacity of a man for work as the day progresses.

TABLE I. WEIGHTS AND VOLUMES OF BROKEN ORE

Cubic Feet of Broken Ore per Ton	Pounds of Ore in 1 Cu.Ft.	Pounds of Ore in 1 Cu.In.	Cubic Inches of Ore in a 21-Lb. Load	Cubic Feet of Broken Ore per Ton	Pounds of Ore in 1 Cu.Ft.	Pounds of Ore in 1 Cu.In.	Cubic Inches of Ore in a 21-Lb. Load
10	200	0.1157	182	26	77	0.0446	471
11	182	0.1053	199	27	74	0.0428	491
12	167	0.0966	217	28	71	0.0411	511
13	154	0.0891	236	29	69	0.0399	526
14	143	0.0828	254	30	67	0.0388	541
15	133	0.0769	273	31	65	0.0376	558
16	125	0.0723	290	32	63	0.0365	575
17	118	0.0683	307	33	61	0.0353	595
18	111	0.0642	327	34	59	0.0341	616
19	105	0.0608	345	35	57	0.0329	638
20	100	0.0579	363	36	56	0.0324	648
21	95	0.0549	383	37	54	0.0313	671
22	91	0.0527	398	38	53	0.0307	684
23	87	0.0504	417	39	51	0.0295	712
24	83	0.0480	438	40	50	0.0289	727
25	80	0.0463	454				

8. Proper rest periods for men in order to maintain maximum efficiency.

9. Best means for instructing men and supervising work.

10. Payment received and manner of paying.

At the time this work was started, three types of shovels were in general use at the mines; a No. 2 scoop,





FIGS. 5 TO 7. LIFTING AND THROWING SHORT-HANDLED SHOVEL CONTENTS
Fig. 5—Shovelful has been lifted. Fig. 6—Preparing to throw shovel contents; a short step has been taken in direction of throw. Fig. 7—Contents have been thrown; note strained position in effort to throw a long distance with short-handled shovel



FIGS. 8 TO 10. PENETRATING MASS AND PREPARING TO THROW CONTENTS OF LONG-HANDLED SHOVEL

Fig. 8—Position when starting to penetrate mass with long-handled shovel. Fig. 9—Mass has been penetrated; note easy position of man. Fig. 10—Wrong way to start lifting; right foot and hand moved forward

used principally by contractors in development work, but favored also by a few of the shift bosses for use in the stopes; a No. 2 square-point D-handle shovel for shoveling off of a mat in the stopes; and a No. 2 round-point long-handle shovel, for scraping down a muck pile, shoveling off of a rough bottom, cleaning up, etc. The first task was to determine the average load that the various types and sizes of shovels would handle, in order to be able to determine whether the 21-lb. load, as advocated by Dr. Taylor, applied to underground work as well as to the surface work, and whether it was the best load for the average Mexican laborer of the Southwest.

TABLE II. CAPACITY IN CUBIC INCHES OF VARIOUS TYPES AND SIZES OF SHOVELS

Capacity in Cubic Inches	Size of Shovel — Blade, Inches — Width	Length	Square Point, Plain or Back Strap, Number	Round Point, Plain or Back Strap, Number	Scoop, Plain or Back Strap, Number	Scoop, Hollow Back, Number
249	9 7/8	11 7/8	...	2	.....	.....
278	10 1/4	12 1/2	...	3	.....	.....
302	9 7/8	11 7/8	2	...	.....	.....
308	10 7/8	12 3/4	...	4	.....	.....
340	10 1/4	12 1/2	3	...	.....	.....
340	11 3/8	13 1/4	...	5	.....	.....
363	10	13	*	...	.....	.....
373	10 7/8	12 3/4	4	...	.....	.....
384	11 3/4	13 3/4	...	6	.....	.....
414	11 3/8	13 1/4	5	...	.....	.....
446	11 3/4	13 3/4	6	...	.....	.....
457	11 1/4	15	...	...	2 E.P.	2 E.P.
521	11 1/2	15 1/2	...	...	3 E.P.	3 E.P.
564	11 3/4	16 1/2	...	...	4 E.P.	4 E.P.
579	12 3/4	15 1/2	...	...	1 W.P.	4 W.P.
622	12 3/8	16 1/2	...	...	5 E.P.	5 E.P.
633	13	16 1/4	...	...	2 W.P.	5 W.P.
665	12 7/8	16 3/4	...	...	6 E.P.	6 E.P.
706	13 3/4	17	...	...	7 E.P.	7 E.P.
721	13 3/4	17	...	...	3 W.P.	6 W.P.
761	13 3/4	17 1/2	...	...	8 E.P.	8 E.P.
802	14 1/4	17 3/4	...	...	4 W.P.	7 W.P.
832	14 1/2	18	...	...	9 E.P.	9 E.P.
881	14 5/8	18 1/2	...	...	5 W.P.	8 W.P.
910	15 1/8	18 1/2	...	...	10 E.P.	10 E.P.
934	14 7/8	19	...	...	6 W.P.	9 W.P.
1042	15 3/4	19 3/4	...	...	12 E.P.	12 E.P.

* Specially made Test Shovel. E.P. = Eastern Pattern Scoop. W.P. = Western Pattern Scoop.

These average capacities were obtained by repeatedly shoveling a weighed pile of ore with each of the shovels and counting the number of shovel loads required to move it. Table I gives the number of cubic inches of ore in a 21-lb. load, for ore breaking to different volumes per ton; and Table II gives the sizes and types of shovels that will average up to any given content. Owing to the variety of conditions in underground shoveling, such as the material of which the shoveling platform is made, whether of wood, iron or natural bottom; the unsized material shoveled; and the amount of moisture in the ore, causing it to be sticky at times.

These average shovel capacities were found not to accord with actual practice, except over test periods of long duration; for short periods they would vary as much as $\frac{3}{4}$ lb. from the average, while single shovel loads would vary as much as 3 lb. For Burro Mountain are, the tables show that it requires a specially made shovel with a 10 x 13-in. blade to hold the 21-lb. load, or 363 cu.in. In practice, however, we are using at the present time a No. 4 square-point shovel holding 373 cu.in. and a No. 5 round-point shovel holding 340 cu.in. At this time also, a time study sheet, shown



FIGS. 11 TO 13. LIFTING AND THROWING LONG-HANDLED SHOVEL CONTENTS

Fig. 11—Shovelful has been lifted. Fig 12—Preparing to throw shovel contents; a short step has been taken in direction of throw. Fig. 13—Contents have been thrown; note ease of position as compared with Fig. 7

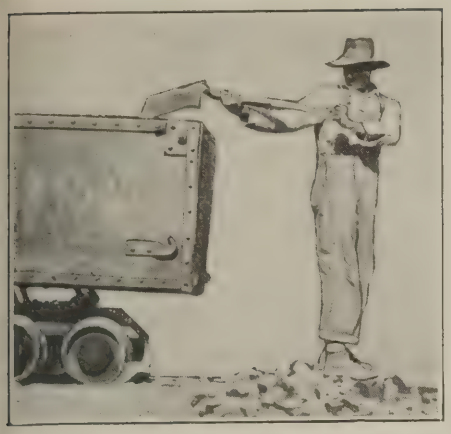


FIG. 14. CORRECT MANNER OF THROWING ORE INTO CAR
Car is only 4 ft. from top of ore pile

in Fig. 1, was developed that was used for all tests. In addition to the data placed on this sheet, an extensive log of the work was carried on. This undertook to explain, in detail, all delays, changes of work, rest periods, changes in conditions that would affect speed, high and low efficiency periods during the day, etc. Each night the study sheets and the log for the day were turned in at the office and the writer totaled, averaged and checked all readings, and entered them on special record sheets and charts in a convenient manner for comparison and study.

During the period of preliminary work, it was discovered that the work of a shoveler can be classified into the following divisions, each susceptible to comprehensive study and analysis, and to each of which can be given a definite relative time value.

Time spent actually shoveling, which may be divided into: Penetrating mass, lifting shovel contents, throwing shovel contents, and return to start of first motion.

Time spent picking down, considered as a rest.

Tramming and dumping time, with wheelbarrow or car.

Time spent resting, divided into: Definite rest periods and delays due to interferences, blasting, men and supplies passing, etc.

Time spent other than in shoveling was not counted in shoveling time. This included delays before starting to work, lunch period, quitting early at end of shift, and time spent on other work, helping machine man, timbermen, etc.

The motions listed are illustrated in Figs. 2 to 17. By studying each motion separately, it was possible to establish a standard time for each and, consequently, a standard of performance for the whole. It was possible, also, to discover which were the most tiring motions and how each was affected by length of time worked, length and distribution of rest periods, size of shovel, design of shovel, and length of throw. It was, of course, impossible to time all the motions made with any one shovelful; consequently these figures had to be obtained in rotation, each figure set down on the sheet being an average of 10 consecutive readings. For example, the day would be started by taking 10 readings of the number of shovels per minute and the average of these set down on the first line of the column of the time-study sheet. Ten readings would next be taken of the time for penetrating the mass, the average of which would be set down on the first line in the third column, and so on throughout the day. All delays and rest periods were timed and all wheelbarrow and car loads counted. As a check on the tonnage handled, a record was had of the number of shovelfuls making up a load, the average capacity of the shovel and of the wheelbarrow or car, an estimate was made of the tonnage in the original pile and, in many cases, the tonnage drawn out of the chute into which the man was shoveling or dumping the ore. At intervals during the day, a line was drawn across the time-study sheet, as in Fig. 1, and all subsequent readings were recorded below this line. This was done to watch the relative efficiency of the men at different times of day.



FIG. 15. PENETRATING MASS WITH HIGH-LIFT SHOVEL
Man not crouching as low as in Fig. 3

In order to obtain some standard of comparison for the underground work, some of the mine shovelers were brought to the surface and a record made of their work under ideal conditions; that is, with good air, good light, no timber to interfere, steady shoveling for various lengths of time, and standard lengths of throw for the muck. A platform was built on the side of the mine-

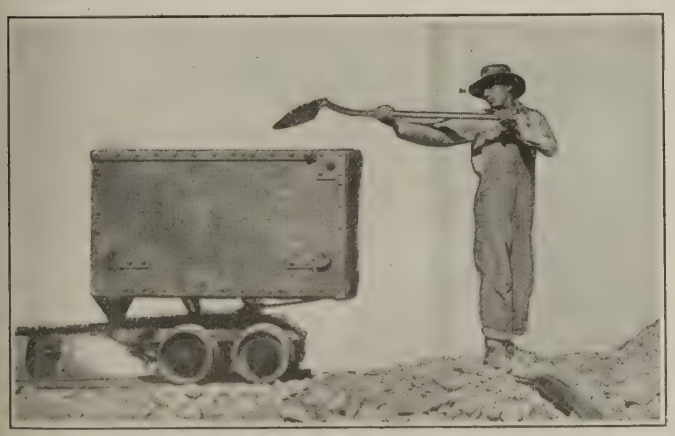


FIG. 16. CORRECT MANNER OF THROWING ORE INTO CAR WITH LONG-HANDLED SHOVEL
Car is 4 ft. from top of pile

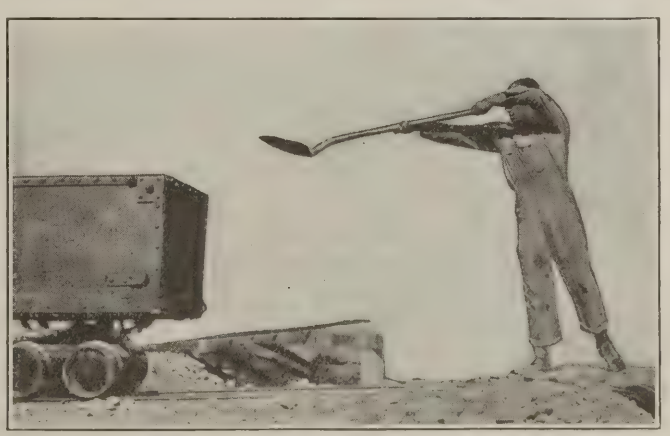


FIG. 17. SHOWING INCREASED EFFORT NECESSARY TO THROW ORE A LONG DISTANCE INTO CAR
Car is considerable distance from pile

waste dump, about 12 ft. below the year level, with a slide from the track above so arranged that no matter what quantity of muck was in the slide the toe of the pile was always in the same place on the platform and the shoveler did not have to move up as shoveling progressed. At several places on the platform trap doors were installed so as to obtain any desired length of throw into what corresponded to a chute in the mine. The muck thrown through these doors rolled down the side of the waste dump, out of the way, so that the opening was always clear. A track was laid along the side of the dump at the platform level, so that tests could be conducted in which the shoveler loaded the muck into a car, which he then had to tram a distance of about 100-ft., dump, and return to the muck pile again.

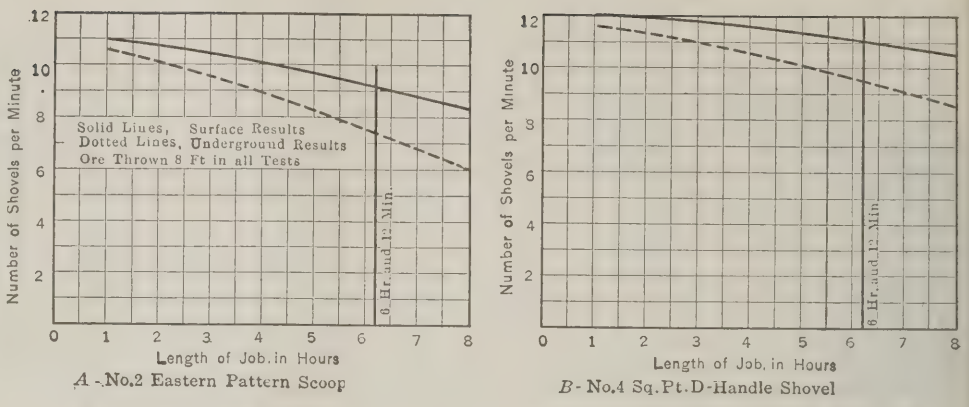


FIG. 18. EFFECT OF LENGTH OF JOB ON NUMBER OF SHOVELS PER MINUTE

In addition to obtaining the comparison standard, it was possible to form some definite conclusions, which were later checked satisfactorily under actual conditions in the mine, as to the most advantageous size, type, weight and design of shovels for general mine use, under the various conditions to be met with there. Tests were carried on for two months, three different shovelers, taken from the mines, being observed. Each of these men was warned that he had to work at his best speed, all during the job, but that he was not to overtax himself. He was told that when he became tired he was to take a few moments' rest, as it was better for him to rest at intervals than to try to work all the time, at the expense of speed and capacity. Later, we undertook to regulate the rest periods, to obtain the proper intervals at which they should occur, and their length. The results of these tests will be discussed in conjunction with the underground work.

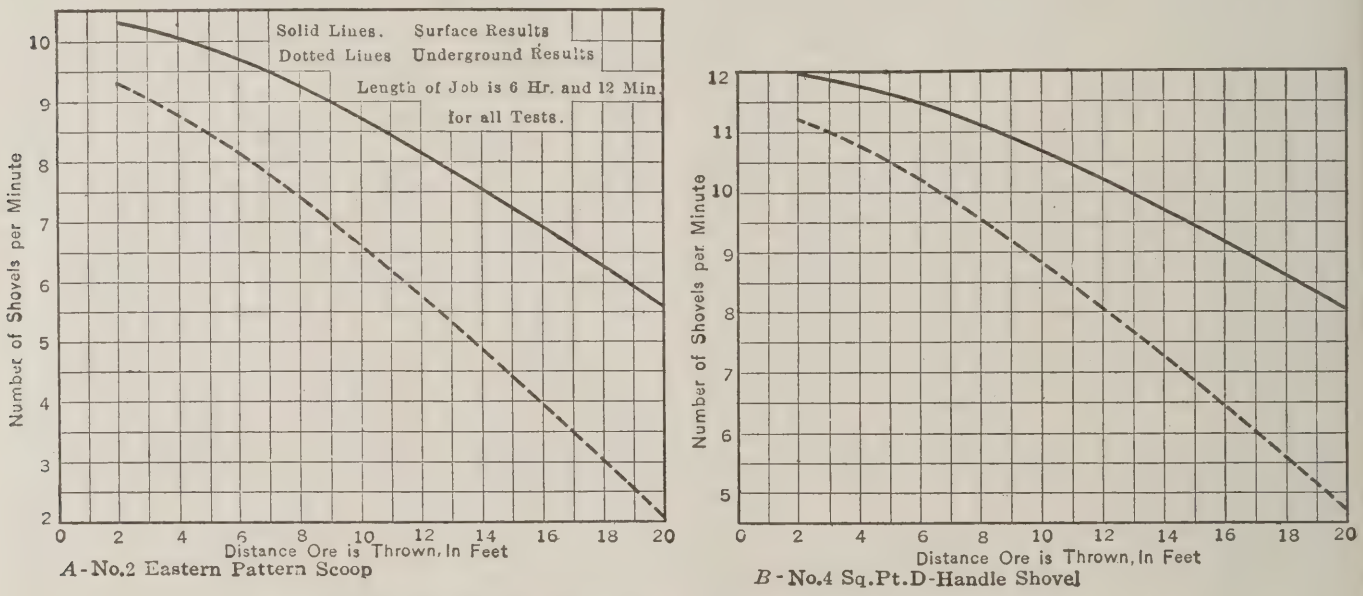


FIG. 19. EFFECT OF DISTANCE THROWN ON NUMBER OF SHOVELS PER MINUTE

All of the underground shoveling tests may be classified under one of three headings—shoveling directly

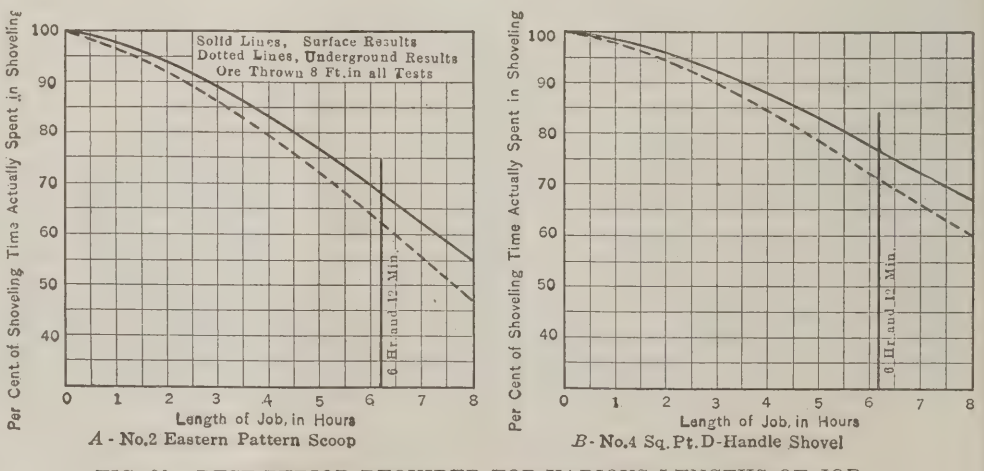


FIG. 20. REST PERIOD REQUIRED FOR VARIOUS LENGTHS OF JOB

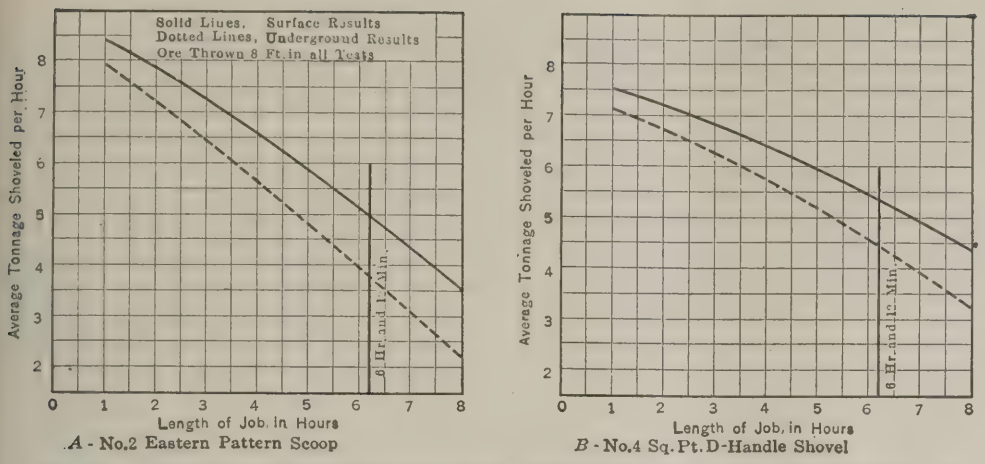


FIG. 21. AVERAGE TONNAGE SHOVELED PER HOUR FOR ANY LENGTH OF JOB

into chutes, shoveling into wheelbarrows and tramming to chutes, and shoveling into cars and tramming to chutes. Each of these series was conducted independently of the others, and was complete in itself. The men under observation worked for periods varying from 1 to 8 hours, and for each length of job they threw or trammed the muck over a wide range of distances, with various types and sizes of shovels. In all the underground tests the work was done under the actual mining conditions, with the one exception that the men were always under observation and consequently were working at a good speed for the full period of the test. In no case did the men overtax themselves, and we feel confident that all tonnages obtained and indicated on the charts are easily obtainable by a good, but not exceptional, Mexican laborer after he has been properly instructed, and under close and intelligent supervision, together with a wage paid in such a manner that he has a constant incentive to do good work.

It soon became evident that the great majority of shovels being tested were not suitable for efficient work, and although we continued to work with them to some extent, we have charted only the work of the No. 4 shovel, which handles the 21-lb. load, together with the No. 2 scoop, which was held in high esteem by many of the men in the operating department. In each of the charts of this series, Figs. 18 to 22, the results obtained during the surface tests are plotted alongside of corresponding results from underground, in order to accentuate the adverse effects of underground conditions on shoveling capacity. In Fig. 18 will be found the number of shovels per minute thrown into a chute at a distance of 8 ft. from the ore pile for jobs varying in length from 1 to 8 hours. In all of these charts, the length of job should be understood to mean the total working time, and when it is said that the length is 4 hours, the man was actually occupied at shoveling ore for 4 hours, and then his work was finished. All points on the curves are corrected averages for the time periods to which they correspond.

In connection with Fig. 18, the following facts will be noted: For all lengths of job, the number of shovels per minute is greater with the No. 4 shovel than with the No. 2 scoop. Both on the surface and underground, the speed of shoveling decreases more rapidly with the scoop than with the shovel, as the length of the job increases. A man working with a scoop underground can perform at only 72 per cent. of his speed on the surface for 8 hours, while with a No. 4 shovel, he can work at 82 per cent. of his surface speed. The percentage reduction in speed between surface and underground work is the measure, in part, of the effect of mine air, powder gas and smoke, temperature, humidity and poor light. Under the same condition of work, the difference in speed between the No. 4 shovel and the No. 2 scoop is due to the difference in the load handled. For short lengths of time, the difference in working speed between a scoop and a shovel is so small that, disregarding rest periods, the scoop is a slightly greater tonnage mover than the shovel; but for longer periods, the difference in speed is such that the shovel with its

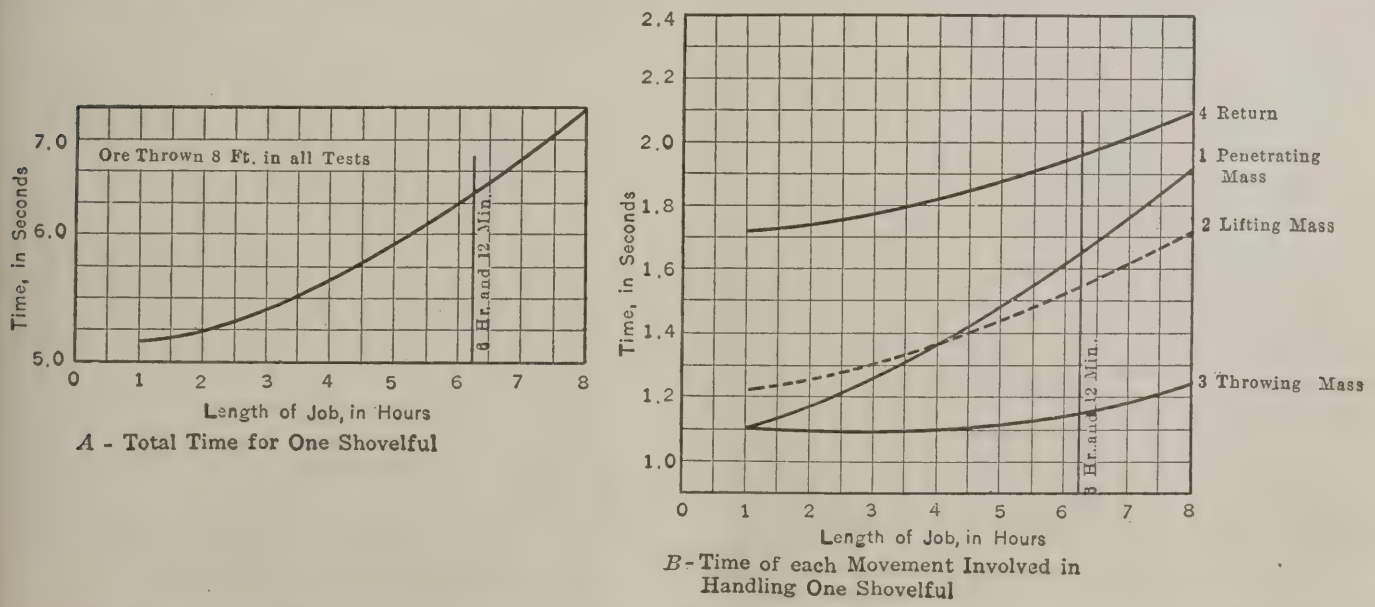


FIG. 22. SHOWING TIME CONSUMED IN HANDLING ONE SHOVELFUL OF MUCK WITH NO. 4 SHOVEL UNDERGROUND

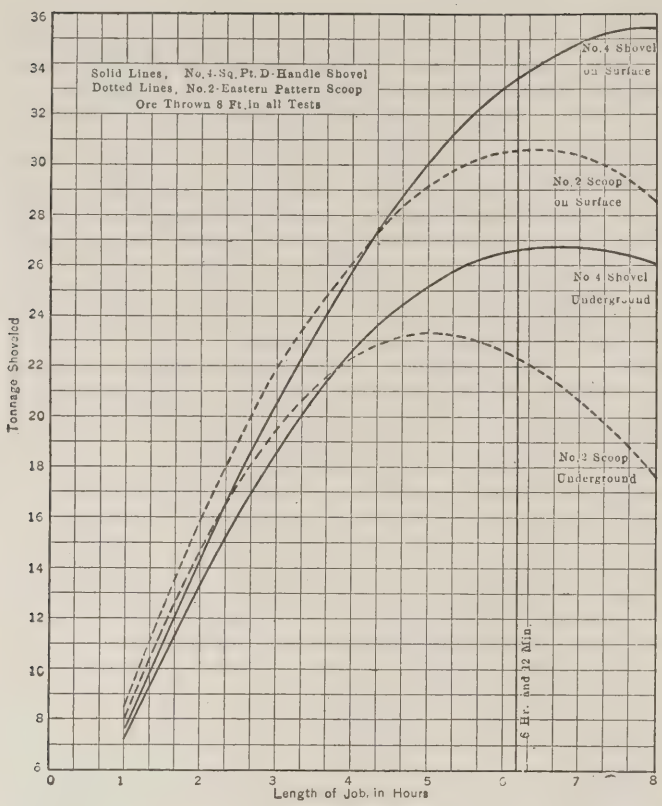


FIG. 23. COMPARISON OF WORK OF NO. 2 SCOOP AND NO. 4 SHOVEL

smaller capacity actually moves more muck than the scoop.

Fig. 19 indicates the manner in which the length of throw will affect the speed of the shoveler. These charts were worked out for a uniform length of job of 6 hours and 12 minutes, and for varying distances, as shown. The same relationship exists between the lines of these charts as on the charts of Fig. 18. The decrease in shoveling speed on the surface amounts to an average of 2.5 per cent. for every foot increase in distance thrown in the case of the scoop, and 1.8 per cent. for the No. 4 shovel. Underground, the working speed is decreased more rapidly, being respectively 4.4 per cent. and 3.2 per cent. per foot increase in throw. The rate of decrease, both on the surface and underground, is greater for the scoop than for the shovel.

To find the average shoveling speed for any length of job and for any distance that the ore has to be thrown, the number of shovels per minute for a throw of 8 ft. for the proper period, can be obtained from Fig. 18; this can be increased or diminished by the proper percentage obtained from Fig. 19, depending on whether the distance is less or greater than 8 ft. As an example, suppose that it is desired to determine how many shovels per minute a man will average, throwing a distance of 12 ft. for a length of a job of 6 hours, using a No. 4 shovel underground. Chart B, Fig. 18, shows that for 6 hours, throwing a distance of 8 ft., a man will average 9.6 shovels per minute. Chart B, Fig. 19, shows that to increase the length of throw from 8 ft. to 12 ft. diminishes the shoveling speed 15.7 per cent.; therefore for a 6-hour job, at 12 ft., the man will be expected to handle about 8.1 shovelfuls per minute.

Fig. 20 shows the amount of rest required for shoveling jobs of various lengths. Here again will be noted the same relations between lines that exist on the other charts in which times are given. The scoop again has a negative effect both on the surface and underground, causing a man to use up more time in resting than with a No. 4 shovel. The rest period, as considered here, is made up of the time consumed in delays, the time actually spent in resting, during which the man may smoke a cigarette and sit down for a few minutes, and the time used in loosening the muck pile, scraping up the dirt on the shoveling plat, or doing other light work; not actually shoveling, but closely related to it.

Over a long period it was possible to demonstrate the feasibility of accurately determining the percentage of the working day that a man will actually devote to shoveling. The working day at the Burro Mountain mines is 8 hours, one-half hour of which is given up to the lunch period, leaving 7½ hours as the total possible working time. It was found that of this 7½ hours, the man actually worked at shoveling for 82.5 per cent. of the time, or for 6 hours and 12 minutes, and on all the charts involving time, this particular length of job has been designated by a special line. The remainder of the possible working time, or 17.5 per cent., is spent on other work, quitting early for lunch or to leave the mine or commencing to work late at beginning of the shift or after lunch. Observations of this character

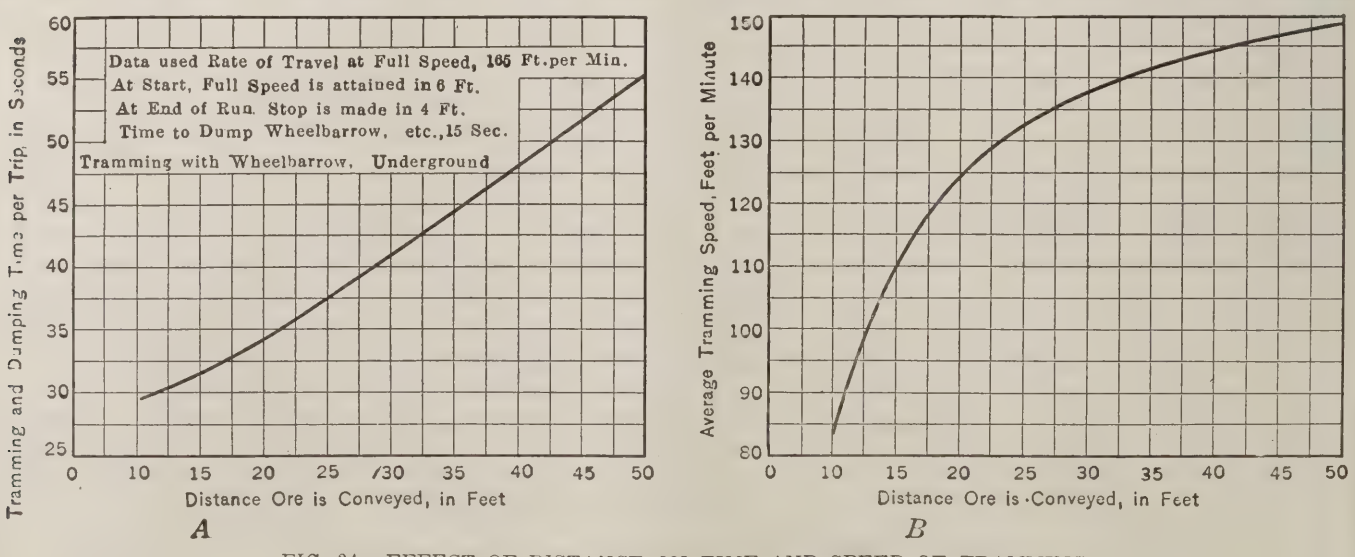


FIG. 24. EFFECT OF DISTANCE ON TIME AND SPEED OF TRAMMING

were gathered by some of the shift bosses, on several hundred-man shifts, and it is surprising how little the figures obtained by each have varied from the average finally obtained.

Fig. 21 gives the average tonnage per hour to be expected of a man throwing the muck a distance of 8 ft. over any period of time; and Fig. 23 gives the total tonnage shoveled for any period, over the same distance. These graphs are corrected to agree with Figs. 18, 19 and 20, but as an illustration of how closely the actual results obtained agree with the charts, the following figures are presented: For a job lasting 5 hours and 30 minutes, with a No. 4 shovel underground, according to Fig. 23, a man would be expected to shovel 26.0 tons a distance of 8 ft. Five representative tests actually gave the following tonnages under average conditions:

Length of job 5 hours and 40 minutes, tonnage.....	28.0
Length of job 5 hours and 10 minutes, tonnage.....	23.0
Length of job 5 hours and 25 minutes, tonnage.....	26.0
Length of job 5 hours and 50 minutes, tonnage.....	34.0
Length of job 5 hours and 30 minutes, tonnage.....	25.0
Average, 5 hours and 30 minutes, tonnage average.....	27.4

Fig. 22 shows how the time of shoveling one shovelful of ore is influenced by the length of the job, with the length of throw remaining constant. In Chart B, the total time of handling one shovelful of muck has been divided into its component movements. The lines representing the work of penetrating mass, lifting shovelful, and return, show a constant increase as the length of job increases. The actual increase in the time of each movement is not due so much, it is thought, to a decrease in the speed of making the move, which probably is fairly constant, as it is to an ever-increasing period of rest taken at the beginning and end of each movement, which, however, was too short to be accurately timed. Throwing the mass in the shovel is not influenced as much as the other moves, as the muck must be thrown along a definite path, which is limited to distance and height, and hence a constant speed must be maintained to carry it over.

The reader will be well repaid by a careful study of Fig. 23, and the following points should be noted:

1. The difference in tonnage handled by the same shovel, on the surface and underground, for any length of job, is the measure of the bad effects of underground conditions. For a job of 6 hours and 12 minutes, with a No. 4 shovel, the underground work is 20.5 per cent. less than on the surface.

2. The difference between the amounts shoveled with the No. 2 scoop and the No. 4 shovel, under same conditions, is the measure of the effect of the difference in load handled by the man.

3. Each line on this chart shows a peak at some particular length of job, and the total tonnage shoveled for

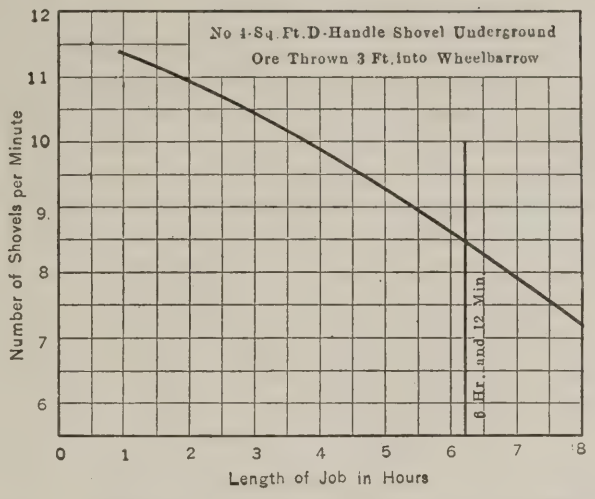


FIG. 25. EFFECT OF LENGTH OF JOB ON NUMBER OF SHOVELS PER MINUTE

any greater period than this is actually less. The point at which this peak occurs should be termed the "economic shoveling day," and a company should not require its men to work at shoveling any longer than this, except in emergency cases.

4. The presence of this peak accords with the experience of many superintendents and managers, who state that their men do more work in an 8-hour day, than they did on an old 10-hour basis.

5. The "economic shoveling day" is about 6⅓ hours, with a No. 2 scoop on the surface, and 5⅓ hours underground. With a No. 4 shovel, on the surface 8 hours is about the proper length of day, while underground 6⅔ hours seems to be about correct. As the men actually shovel only 6⅓ hours per day on an average and as their other work is generally of a light nature, the 8-hour day with the correctly proportioned shovel is probably the best; but with a scoop it is certainly too long.

6. For work on the surface, on jobs lasting longer than 4⅔ hours, the No. 4 shovel is superior to the scoop. Underground the No. 4 shovel demonstrates its superi-

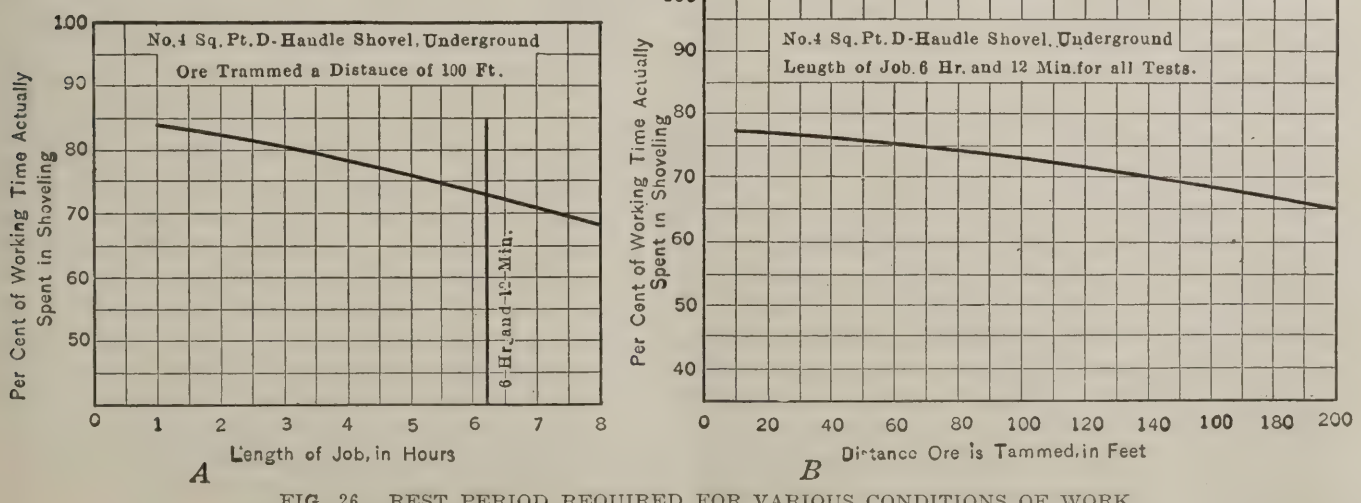


FIG. 26. REST PERIOD REQUIRED FOR VARIOUS CONDITIONS OF WORK

ority for jobs longer than 3⅔ hours. The scoop then may be considered as a task shovel for short-time jobs, but even here, its value is only slightly greater than the No. 4 shovel, besides tiring the man so that he is unfit for other work when the shoveling task is finished. There is also the additional danger of having some men continually trying to use the scoop for the full shift, thinking that the amount of work (and hence the amount of pay in the case of contract and bonus systems) is greater as the size of the shovel increases.

The following formulas show the manner in which use is made of the figures presented in the preceding diagrams:

Let W = Weight of load on shovel, in pounds;
N = Number of shovels per minute, Figs. 18 and 19;
P = Per cent. of time actually shoveling, Fig. 20;
L = Length of job, in minutes;
T = Total tonnage shoveled;
n = Number of shovels per minute for an 8-ft. throw, Fig. 18;
p = Per cent. increase or decrease due to various lengths of throw, Fig. 19.

Then

$$\frac{W \times N \times P \times L}{2000} = T \qquad n = N(1.00 \pm p)$$

Example 1.—What will be the total tonnage handled, using a 21-lb.-load shovel, throwing the ore 8 ft., underground, for a job of 5 hours duration? Chart B, Fig. 18, shows that for 5 hours a man with average 10.1 shovels per minute, and Chart B, Fig. 20, shows that he will actually shovel 79 per cent. of the 5 hour period, therefore:

$$\frac{21 \times 10.1 \times 0.79 \times 300}{2000} = 25.1 \text{ tons}$$

Example 2.—What will be the total tonnage handled, using a 21-lb. load shovel, throwing the ore 15 ft. underground, for a job of 6 hours duration? Chart B, Fig. 18, shows that for 6 hours a man will throw a distance of 8 ft. at the rate of 9.6 shovels per minute. Chart B, Fig. 19, shows that increasing the distance to 15 ft. reduces the capacity by 27.4 per cent., therefore:

$$N = n\,(1.00 \pm p) = 9.6\,(1.00 - 0.274) = 7;$$

hence,

$$\frac{21 \times 7.0 \times 0.79 \times 360}{2000} = 19.3 \text{ tons}$$

Shoveling Into a Wheelbarrow

The charts presented in the series, Figs. 25 to 27, follow as closely as possible the series just discussed, but offer only the results obtained with the No. 4 D-handle shovel. It was soon discovered that a throw of 3 ft. to the wheelbarrow gave the best results so far as number of shovels per minute and rest periods required were concerned, and in all subsequent work the ore was thrown into the wheelbarrow from this distance. It will be noted that, in Fig. 25, for any length of job, the number of shovels per minute is less than when throwing 8 ft. into a chute; this is due to the fact that the shoveler must place each shovelful carefully to keep the wheelbarrow from spilling its contents and to make it ride easily.

Chart A, Fig. 24, shows the length of time consumed in tramming and dumping a wheelbarrow over any distance, and Chart B shows the average tramming speed developed for any distance. For this chart, careful determinations were made of the distance in which it takes a man to acquire full speed and the distance in which, after having attained full speed, he can make his stop. The full-speed rate of travel in stopes will average 165 ft. per minute. The wheelbarrow in use is the No. 7, which holds 3 cu.ft. and stands 21 in. above the floor at the point of maximum height. The maximum load in a wheelbarrow should be about 300 lb. as larger loads are too exhausting, and lighter loads consume too much time in tramming and dumping.

Chart A, Fig. 26, shows the per cent. of time a man will work during any given working period, the length of tram in each case being 20 ft. The rest period is practically a constant proportion of any length of job, as that part of the tramming time in which the man brings the empty wheelbarrow back to the ore pile is virtually a rest period. For long trams, the work of tramming the loaded barrow is so heavy that a greater

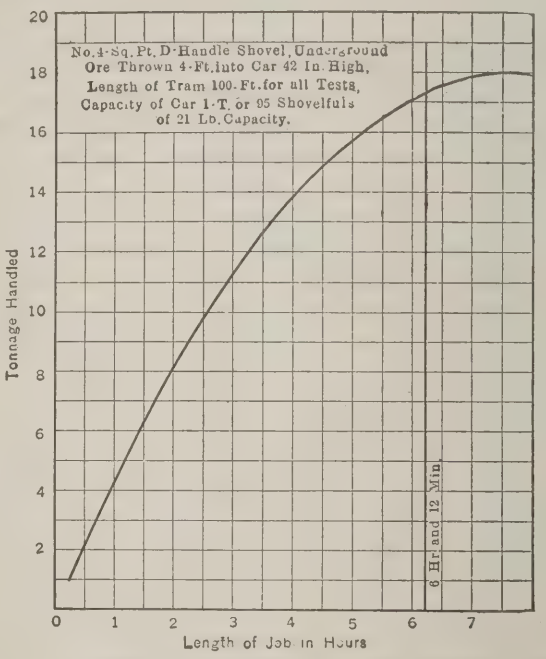


FIG. 27. SHOWING CAPACITY OF A SHOVELER USING A WHEELBARROW FOR VARIOUS JOBS

rest is required than is obtained on the return, and Chart B shows how the rest period increases for a constant length of job, as the length of tram increases.

Fig. 27 shows the tonnage to be expected of a man, based on Figs. 24 to 26, for any length of job, the length of tram being constant at 20 ft. This chart shows that the shoveler has not quite reached his maximum capacity at the end of 8 hours. Two reasons are advanced for this: (1) As long as a man can throw the ore into a chute, he has a fairly direct throw from the ore pile to the chute, and with a car he has a definite path to traverse each trip. With a wheelbarrow, however, the direction and length of tram are constantly varying, as is also the amount of interference from other trammers, timbermen, machine men, etc. The retarding influence of these factors increases as the length of the tram increases. (2) The sequence of operations, shoveling, tramming, dumping, etc., is of such short duration and changes so often from one to the other that it is hard to keep up any pace that may be set and probably an unnecessary amount of rest is indulged in for all periods.

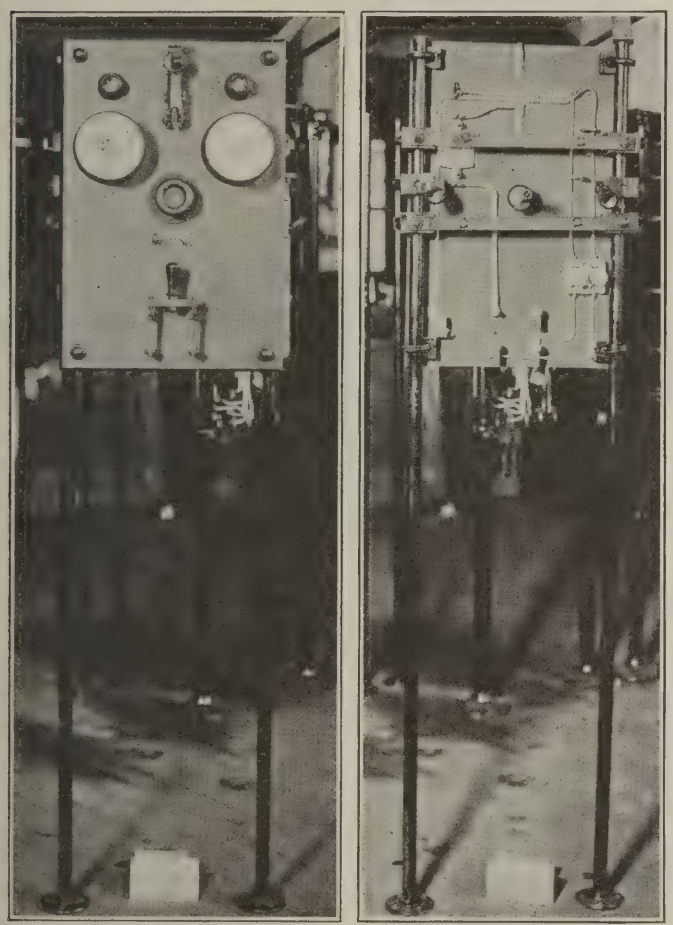
(To be concluded)

There are some indications that volatile combustible containing a high percentage of oxygen is harder to burn than one containing little oxygen. Whether the difficulty in burning it is due to the oxygen content or to some other chemical property can not be stated definitely.—*Bureau of Mines Bulletin No. 135.*

New Apparatus and Equipment

Ready-to-Wear Switchboards for Small Installations

The switchboards shown in the accompanying illustration, known as the Westinghouse "ready-to-wear" type, are each suitable for the control of a direct-current generator and three lighting circuits. They are particularly adapted to the smaller installations. One advantageous feature of this type of switchboard is that it can be placed in operation by simply connecting the leads from the generator and feeder circuits to the terminals provided for that purpose. This is in marked contrast with the expense entailed in the purchase of meters, switches, circuit-breakers, slate slabs, framework and the work of designing and assembling the complete panel on the job.



TWO VIEWS OF THE "READY-TO-WEAR" SWITCHBOARD

The installation of the old types of switchboard involved much detail work. First of all each piece of apparatus had to be ordered with careful consideration given to the type and capacity. Drilling templets of each must be secured and a considerable sum must be allowed to cover investment in machines and tools for drilling the slate and bending the copper strap connections. Finally, when the panel was built up and installed, it might operate and it may look pretty good, but one could never be absolutely certain of this from the start.

The accompanying illustration is typical of the types K.D. and J.D. panels, both of which are suitable for 125 and 250 volts in capacity up to 600 amp. They are manufactured by the Westinghouse Electric and Manufacturing Co., of East Pittsburgh, Penn. Both these types of panels permit a choice in the number and capacity of feeder circuits.

Flexible Quick-Make and Quick-Break Motor-Starting Switch

One of the new pieces of equipment brought out by the Westinghouse Electric and Manufacturing Co. during the past year is an interesting starting switch. This switch is designed for use where squirrel-cage motors are started with a full line voltage. It is known as the quick-make (and quick-break) starting switch, type 816. Its characteristics are 10 to 100 amp., 25 hp. maximum, three-phase, 220, 440 and 550 volts.

This switch is extremely flexible in application. In addition to being a motor starting switch, it can also be used to control feeder circuits; it may be supplied in any of the following combinations, each having the "quick-make and quick-break" feature, for either hand or shipper-rod operation: (a) Nonautomatic switch, (b) switch with low-voltage protection, (c) switch with inverse time element overload protection, (d) full automatic switch with low-voltage and inverse time element overload protection.

The switch is especially suitable for shipper-rod operation on account of the positive action of the contacts. It is impossible for the operator to retard the motion of the contacts after they have started to close—here can be no "teasing" of the contacts. Workmen who are accustomed to starting machines from line shafting by means of shifting belts have no confusing details to learn. They can start the motor-driven machine with the same starting motion they use in shifting belts.

The contacts are opened and closed in oil, thus effectually suppressing arcing. The contact is made or broken so quickly that the eye cannot follow the motion. A rolling action confines the arc to the tips of the contacts and prevents pitting or roughening of the seating parts where final contact is made. A strong spring holds the contacts firmly in the closed position. These features result in greatly prolonged life for the contacts.

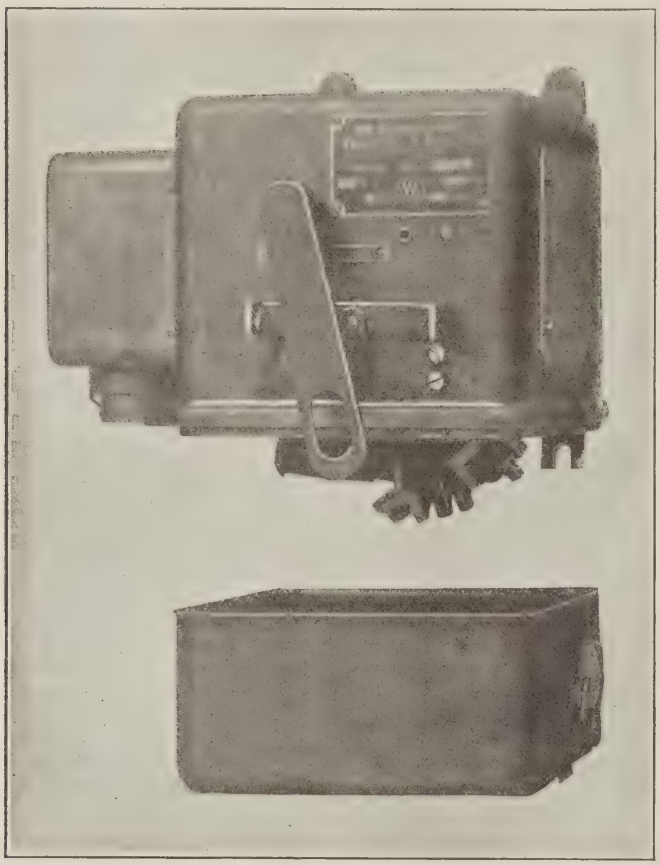
Drawn-steel construction is employed, giving maximum strength with light weight, and assuring uniformity and interchangeability when new parts are needed for replacement or repairs. The oil tank is supported by snap ring-latches. Removal of the tank clearly exposes the contacts and makes them easily accessible. When necessary to replace contacts each may be removed by taking out a single screw.

Contacts and contact supports are of the same construction used for Westinghouse Type A auto-starters and magnetic contactors. This minimizes the number of spare parts that should be carried.

These starting switches are dust-proof. Openings are provided for conduit wiring into the top of the case; terminals for connecting motor and line wires are accessible when the cover at the top of starter is removed.

Micarta insulation is used throughout. Overload and low-voltage attachments may be added with no change to the switch mechanism, as the toggle trip is common to all combinations of this switch.

The low-voltage protection not only opens the contacts on failure of power, but makes it impossible to close



STARTING SWITCH AND REMOVABLE COVER

them again until a return of voltage. Since the low-voltage coil is connected in the line circuit continuously, means have been provided to close the armature of the low-voltage circuit when the switch is in the "off" position, thereby giving protection to the coil and preventing burn-outs. A safety stop may be provided by connecting one or more push buttons in series with the low-voltage coil.

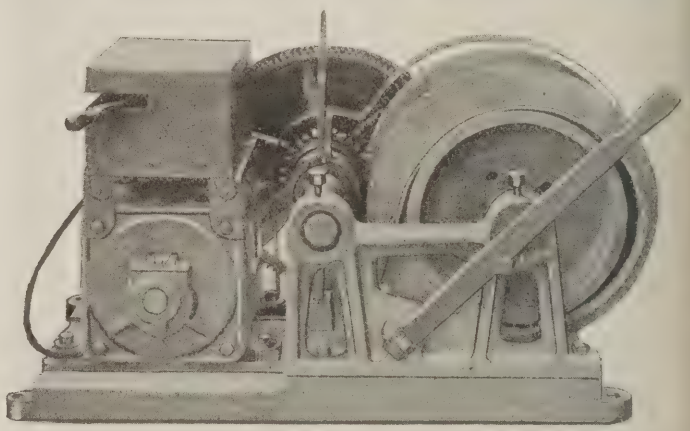
The overload relay is the same as that used on Westinghouse Type A auto-starters. It has the inverse time element feature and is equipped with a regulating device, adjustment of which controls the degree and duration of the overload possible on a motor or feeder circuit. This adjustment can be made without opening the switch cover.

The hand reset is an additional safety feature which makes it necessary to set the mechanism before the switch contacts can be closed. Whether the contacts have been opened through the operation of the low-voltage coil, the overload relay, or by moving the switch handle to the "off" position, it is impossible to close them again until the switch handle has been moved to the "reset" position. Thus protection is afforded workmen and valuable machinery which might be injured by accidental starting of the motor.

New Room Hoist Has Three-Jawed Clutch Instead of Sliding Pinion

The Flood City Manufacturing Co. will shortly place upon the market an improved type of room hoist, facilities for the manufacture of these machines having been about completed. These machines will be built in 3, 5, and 10-hp. capacity. All gears will be cut, the main gear being securely bolted to the hoist drum. This construction insures a certain economy since if, say, the gear is broken or its teeth stripped, it is unnecessary to buy a complete gear and drum, as would be the case if these parts were cast integral.

The bearings of this machine are equipped with interchangeable bronze bushings—that is, one size of



IMPROVED TYPE OF ROOM HOIST

bushing will fit any bearing on the machine. This reduces the number of spares necessarily carried.

An important feature of this hoist is the substitution of a three-jawed tapered clutch in lieu of a sliding pinion, thus obviating the liability of stripping gears when inserting the clutch while the motor is in operation or the current is turned on.

The machines are compact and may be moved easily from place to place about the mine. Equipped with a 5-hp. G.E. motor, one of these hoists will coil 300 ft. of ½-in. rope upon its drum and, if necessary, it may be designed to accommodate greater lengths. With the motor operating at a speed of 910 r.p.m., the average rope speed is 140 ft. per minute, while a rope pull of 1200 lb. is developed.

Allowing a car resistance of 30 lb. per ton, this 5-hp. hoist will handle the following loads:

Level	40 tons
1 per cent. grade	24 tons
2 per cent. grade	17 tons
3 per cent. grade	13 tons
4 per cent. grade	11 tons
5 per cent. grade	9½ tons
6 per cent. grade	8 tons
10 per cent. grade	6 tons
15 per cent. grade	4 tons

The manufacturers of this machine have had a number of them in operation in various bituminous mines, and the reports thus far received concerning their durability and utility are decidedly favorable.



Fuel Administration Activities Now a Thing of the Past

The large Fuel Administration building is almost deserted. Cyrus Garnsey, the assistant fuel administrator, continues to observe regular office hours each day, as do some of the heads of bureaus. The bustle, which was once so characteristic throughout the extensive structure, is gone. The outer offices, which for more that a year were crowded all day long with operators and others interested in the industry, waiting to present their particular cases, rarely are used now. There is no congestion of callers. Such little work as there is to be done generally is performed in a few hours each day, but it is mandatory until the actual signing of peace to continue to maintain the skeleton of the organization.

Preparations Almost Completed for Lignite Treatment Investigations

Plans are being completed by the Bureau of Mines to take up promptly the lignite investigation for which Congress just has authorized the expenditure of $100,000. A survey is being made to determine the location of a plant at a point where the chances of success are greatest. It is practically certain, however, that the plant will be located in the Texas or the North Dakota field. Other deposits of lignite are obviously less suited for experimental purposes.

Only incidental attention is to be given the secondary products of the beneficiated lignite. All the major efforts are to be concentrated on obtaining a solid fuel and a gas fuel. It is realized that once it is demonstrated that lignite is susceptible to treatment which will produce a desirable fuel a a cost permitting of profit for private enterprise, the principal purpose of the investigation will have been accomplished. The matter of developing byproducts would go ahead rapidly once a profitable industry had been established.

It is the object to gather together at a single small demonstration plant those elements that have apparently been successful in the work that has already been done in efforts to utilize lignite. Care will be taken not to dilute the effort by extending it beyond the plant which it is expected to operate.

The work will be under the general supervision of O. P. Hood, the chief mechanical engineer of the Bureau of Mines, and under the immediate charge of S. M. Darling.

Former Railroad Head Recounts Difficulties of Handling Coal and Coke

Reviewing the work of the operating division of the Railroad Administration for the year 1918, W. G. McAdoo makes the following reference to the handling of coal and coke:

One of the heaviest tasks for the railroads during the past year has been in providing necessary transportation for fuel. This has only been accomplished by effective cooperation between the Fuel Administration and the Railroad Administration. It has been necessary to adopt extraordinary measures, and these as a rule have been cheerfully met by shippers, whose rights were at times very considerably affected. Foremost among these measures was the joint action of the two administrations in zoning the distribution of bituminous coal, the purpose being to avoid waste of transportation by prohibiting unduly long hauls to destinations which could otherwise be served and especially where such prohibition avoided the cross hauling theretofore prevailing to a considerable degree. The effect of this zoning has been to assign to each of the producing districts a certain fixed area within which to market its coal, any shipments outside of this area to be made only by permit of the Fuel Administration.

Another factor which worked advantageously in the interest of fuel production was the establishment of the Eastern Railroads Coal Car Pool for handling the coal cars owned by railroads in the eastern section of the country. This pool was created just prior to Federal control, but its administration since Jan. 1, 1918, has been under the direction of the car service section. This method of handling coal cars has some objections, but unquestionably has been very helpful in providing an increased car supply for the production of coal.

Two of the individual coal problems of the country are those of supplying the coal needs of New England and the Northwestern States, the latter from the upper lake docks. The New England movement must of necessity be handled largely by ocean, and this was made difficult in the early part of the year by the lack of shipping. By coöperation with the Shipping Board this difficulty was overcome and by the end of September the New England program, both all-rail and ocean, was so far met that the administrator for that district was unable to absorb coal as rapidly as it was being shipped, and toward the end of October requirements for the year were reduced. The coal for the Northwest must of necessity be handled during the season of open navigation on the Great Lakes, and the program of the Fuel Administration this year has been fully accomplished with less demand for equipment than ever before and practically no congestion of movement.

The foundation of successful operation in the steel industry lies in an adequate supply of coke, byproduct coal and steam coal. Every effort had been made during the year to maintain adequate supply of these fuels at such plants, and it is a matter of record at the War Industries Board that practically all of the transportation needs of coke, byproduct coal, and fuel coal for the steel industries have been promptly and adequately met.

A step of much importance was taken by the establishment of uniform rules for rating of coal mines by which car supply is directed. These were made effective as of Oct. 10, 1918. Previously roads were using different methods and with varying interpretations. On the uniform basis which now obtains a more equitable distribution of cars as between districts, railroads, and mines is possible than heretofore.

A factor which has an important bearing on the question of coal-car supply is the extent to which this type of equipment is used in handling stone, sand, and gravel for construction and road-building purposes, and curtailment of such noncoal use has been necessary. Cheerful coöperation and assistance has been received from all shippers thus adversely affected.

Senate Manufacturing Committee Has Given Up Anthracite Investigation

Temporarily the Senate Manufacturing Committee has given up the investigation of the anthracite coal situation, though Senator Vardaman is in receipt of many telegrams saying that the temporary suspension of operations in the hard coal industry was unwarranted and unjustified.

Senator Vardaman proposes to make a quiet investigation of his own, and if he finds any truth in the accusations he intends to call those responsible to account. Some of these telegrams contain the most absurd statements imaginable, such as there is plenty of empty cars; that the lull in the coal trade is but temporary; that it is the evident intention of the coal companies to continue the scarcity in order to maintain the present prices, and that the coal companies should make every effort to continue operations, so as to avoid unemployment.

Senator Vardaman would have it understood that he is not through with the other investigation either. He proposes to call in the immediate future several independent operators, some miners and a few coal dealers. He could not say just when the hearing would begin, but he thought it would be in the near future.

Railroads Carry Out Less Than Half Their Program for Improvement

Less than half of the Railroad Administration's program for improvement of the roads last year was carried out. Of the $1,218,960,000 authorized capital expenditures for leading lines only $573,334,000 was spent, according to an administration report, including an estimate for December.

For additions and betterments to tracks and property $265,931,000 was spent, and for cars and locomotives $289,388,000. Of the latter amount the railroad companies individually spent $171,872,000 and the Railroad Administration $117,516,000. Only $18,000,000 was expended on new lines and extensions.

Among the larger capital expenditure items by individual railroads were the following: Pennsylvania lines east, $54,037,000; Pennsylvania lines west, $11,765,000; New York Central, $38,421,000; Santa Fé, $22,385,000; Illinois Central, $24,830,000.

A coöperative arrangement has been made between the Geological Survey and C. A. Allen, the state mine inspector of Utah, for uniform collection of coal figures and for the sending out of joint questionnaires.

Research Graduate Assistantships at University of Illinois

To assist in the conduct of engineering research and to extend and strengthen the field of its graduate work in engineering, the University of Illinois maintains fourteen Research Graduate Assistantships in the Engineering Experiment Station. Two other such assistantships have been established under the patronage of the Illinois Gas Association. These assistantships, for each of which there is an annual stipend of $500 and freedom from all fees except the matriculation and diploma fees, are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics or applied chemistry.

An appointment to the position of Research Graduate Assistant is made and must be accepted for two consecutive collegiate years, at the expiration of which period, if all requirements have been met, the degree of Master of Science will be conferred. Not more than half of the time of a Research Graduate Assistant is required in connection with the work of the department to which he is assigned, the remainder being available for graduate study.

Nominations to these positions, accompanied by assignments to special departments of the Engineering Experiment Station, are made from applications received by the Director of the Station each year not later than the first day of March. The nominations are made by the Executive Staff of the Station, subject to the approval of the President of the University. Nominations are based upon the character, scholastic attainments, and promise of success in the principal line of study or research to which the candidate proposes to devote himself. Preference is given those applicants who have had some practical engineering experience following the completion of their undergraduate work. Appointments are made in the spring, and they become effective the first day of the following September. Vacancies may be filled by similar nominations and appointments at other times.

The Engineering Experiment Station, an organization within the College of Engineering, was established in 1903 for the purpose of conducting investigations in the various branches of engineering, and for the study of problems of importance to engineers and to the manufacturing and industrial interests of the State of Illinois. Research work and graduate study may be undertaken in architecture, architectural engineering, ceramic engineering, chemistry, civil engineering, electrical engineering, mechanical engineering, mining engineering, municipal and sanitary engineering, physics, railway engineering and theoretical and applied mechanics.

The work of the Engineering Experiment Station is closely related to that of the College of Engineering, and the Heads of Departments in the College constitute the Executive Staff of the Station. Investigations are carried on by members of the Station staff and also by members of the instructional staff of the College of Engineering.

Additional information may be obtained by addressing the director of the Engineering Experiment Station of the University of Illinois, at Urbana, Illinois.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

At length the official result of the election of Dec. 10, 1918, is received, the international tellers having reached a final tally. Frank J. Hayes is reëlected president with 114,355 votes as against 88,507½ cast for John H. Walker. The other offices voted for with the votes recorded are as follows: For vice president — John L. Lewis, 131,798½; Thomas Kennedy, 66,458. For secretary-treasurer—William Green, 144,642; J. L. Sims, 50,336. It will be seen that both Lewis and Green are reëlected.

The time for new contracts is when the war comes to an end or on Apr. 1, 1920, should peace not be declared by that time. Unfortunately the New River and Winding Gulf mine workers want a new scale Apr. 1, 1919, and they advocate a conference during February and March. The old contract undoubtedly requires a meeting 60 days before renewal, but the new contract, being based on a date not known in advance, it is hard to see how a conference can be held, except fortuitously, even approximately 60 days before that date.

The operators are willing to go on paying the present wage rates and think that with the market as it is the mine worker should be satisfied and he certainly should. The decisions of Special Umpire Allison O. Smith of the United States Fuel Administration, as just reported, have all been favorable to the mine workers, so they have not even this cause for dissatisfaction.

Union Cannot Ask Disposition of Fund Not Contemplated by Testator

An old fund, established 40 years ago by Franklin B. McGowan, of the Philadelphia & Reading Coal and Iron Co., for the benefit of employees of that company, ceased operation when the compensation law came into effect. The United Mine Workers of America, District No. 9, want it reëstablished and made operative for the benefit of orphans all over the district.

As this is contrary to the wish and intention of the testator it is not unnatural that the trustees, who would be liable for a breach of trust, declare that they are not disposed to grant what is asked of them. President James Matthews, of District No. 9, and other officials of the same district, fully recognize, apparently, the justice of the statement of the trustees. They understand that, while the trustees would be glad to use the money to alleviate the sufferings of the orphans of the anthracite fields, particularly in District No. 9, or to apply it in part on the expense of building the Locust Mountain Hospital, now being constructed for the treatment and care of men injured in the mines, they cannot make any such provision, for those thus benefited would only in part be the parties in interest.

The trustees pointed out that only those who contributed to the fund were such rightful participants and that any individual member of the company who had paid dues until the fund was discontinued could file objections and bring the trustees and company into court and demand their share of the fund if the trustees and the company gave the money for the purpose requested by the union.

In the course of the discussion between the union officials and the trustees it developed that there was one point of unanimity. They did not at first agree on the purpose to which the fund should be directed, but they all believed the fund should be reëstablished in some shape or other. The company and trustees propose that a form be inserted in the pay envelopes of each employee of the company for the first pay period in February, a signature on which will serve as a request of the signer that the operation of the fund be reëstablished. Mr. Matthews gives this plan his indorsement, and on Jan. 21 he and his coadjutors issued a statement to all the men urging them to sign in favor of the proposition as it will give them and their dependents added protection. The fund will not relieve the company in any way from the past, present or future obligations resting on it under the state Workmen's Compensation Law.

The fund will pay $300 in case of death at the mines by accident, and smaller amounts will be paid those who are incapacitated while working in or about the mines. A sum of from 25c. to 50c. will be deducted from the monthly pay of each employee. The trustees are W. J. Richards, president of the Philadelphia & Reading Coal and Iron Co.; W. D. Pollard, president, Safe Deposit Bank, Pottsville; and former Judge O. P. Bechtel, of Pottsville.

West Virginia Miners Oppose Price War

A plea for coöperation between miners and operators was made a few days ago by F. C. Keeney, president of District 17, United Mine Workers. In it he stated emphatically that his organization would not countenance "cutthroat" competition and the resulting reduction in wages to miners. His statement follows:

"There are certain operators, in the Clarksburg, Fairmont and Morgantown coal regions, asking their employees to accept a reduction in wages, saying that, if the mine workers would accept this reduction, it would enable the operators to get in the market, and furnish the miners steady work. Operators of the type just mentioned are to the fair operators who want to maintain the present prices what a nonunion miner is to the union miner.

"The mine workers recognize, in years that have gone by, that the operators of West Virginia were able to stay in business only by a very small margin, and in many instances bankruptcy was the result of the 'cutthroat' competition. The operators were forced to compel the miners to accept a wage that afforded a mere existence. But since the world war broke out and the United States Government became the determining factor in that great struggle for human rights, the coal industry for the first time in its history has been enabled to get proper recognition.

"The United States Fuel Administration fixed a selling price for coal that allowed the operators a fair profit, while it enabled them to pay the miners a living wage. After this experience it is almost inconceivable that certain operators should want to resort to the chaotic condition of the past. But seeing that certain operators are taking this position, we want the miners' position understood. The United Mine Workers of America will resent with all the force at its command any attempt of the operators to reduce wages.

"The miners want the coöperation of the coal operators and must have it in order to stabilize the coal industry. It is the basic industry of the nation and should have first consideration from the American public. We know that a great many of the coal operators are doing everything in their power to maintain such a selling price for coal as will enable them to give a living wage to their employees.

"We feel that the coal operators who are attempting to unstabilize the coal industry should not be given any consideration at the hands of the United Mine Workers of America, and they will not receive any consideration so far as I am concerned. It is an age of getting together and coöperation, and one in which we all recognize each other's rights; so we may just as well accept now the conditions as they are, as try to amend them and finally accept them later."

EDITORIALS

An Overdose of Reconstruction.

THE United States has a case of nerves. It has been worrying over much about its condition. A great congress of business doctors was called by the United States Chamber of Commerce, and it proceeded to tell Uncle Sam that he had eaten too much, devoured too many indigestible things, and was faced by too much of similar fare that would surely kill him if he attempt to consume it. The doctors assured him that all kinds of reconstruction dope would be necessary if he hoped to survive.



Uncle Sam didn't at first believe that he was so desperately sick. He had symptons, it is true, but then we all have symptoms, even when in the best of health. Straightway, as soon as he was told he was in a hard pass, Uncle Sam set himself down and tried to feel all the diseases the experts told him he ought to feel. He hadn't a spot without a pain, unless, indeed, it was a spot he hadn't pondered over. With such a sensitive bundle of nerves, with such a heated imagination, he could feel pain anywhere by taking due thought. The M.D.'s told him that he ought to feel sick all over, and he did. He has fairly worried himself into the "flu."

Let him bid goodby to his many doctors. The medicine they give may help a little, but it has to be continued and the dose increased if it is going to do any good. Subsidies, unusual Government developments and what not tone the part but wreck the stomach. The medicine soon ruins the whole man. What he need is cheerfulness and faith, and then we can leave in the shadow the old Uncle Sam who contemplates only whoas and woes, and go forward with the new Uncle Sam, buoyant and triumphant.

In this era of world reconstruction the great cry is for increased efficiency. This, of course, means the more general adoption of scientific management. The question is, How can we get this better efficiency and consequent higher individual production if the labor unions persist in their opposition to studies in time and motion in industrial plants? The stop-watch is necessary in the compilation of records to promote individual efficiency. If shorter hours and higher wages are to continue, and labor is going to earn more than formerly, it must be educated to know the necessity of increasing unit production.

Will Prices Go Up or Down?

THERE are a lot of injustices in the world as the result of the world war. Some exceedingly valuable artisans have seen their wages remain stationary when the wages of those in other industries were going up without stint. They read of the plethora enjoyed by other people and went home to every form of stinted fare and meager comfort. The bricklayer and the stonemason heard about the large wages of the riveters and calkers, yet had to be content or leave the industry. They and a number of others will be looking, now that the war is over, for a readjustment in accordance with living costs.

Such adjustments can only be upward, for so long as wages in general are high, cost of living must continue high. The labor unions will not permit the present wage scale anywhere to be lowered. This change in the rates of pay of the artisans who have not hitherto secured increases will make for higher prices. In fact now seems the best time for building. Construction is likely to be more, rather than less, expensive later. The present is the time for much construction work. It can never be done at lower prices

It is a common saying that wages are too high for business expansion. Many wage scales are indeed extremely high as we look backward, but it does not appear that even the highest are anything but normal as we look forward. And the future price of services, as of real estate and goods, is what really concerns us. Why lament that we cannot buy labor at 1913 prices when we have to manufacture or produce to sell during 1919?

The inflation of currency is widespread. If America alone had it we might expect it to fall like a wave in the ocean. But it is found everywhere, and is plainest in those countries where wages used to be lowest. Russia and Germany, which used to have low wages, now compensate labor more largely than ever, though of course the values of the coins in which wages are paid are far more inflated than our own. They are moreover uncertain. They all may be, and some will surely be, lowered when the period of revolution terminates.

But, nevertheless, no one can say that inflation is a purely local condition, peculiar to America. It is an international condition and in large degree it will endure. A little later the cost of living may descend, but the cost of construction is likely to rise. Even the cost

of living will depend on the harvest of the coming year, and conditions this winter may well not be favorable, for mild winters without much snow expose the winter wheat to all the rigors of the season.

All shelves are bare and many raw materials are short. It is said that in the Middle West the department and dry-goods stores were almost swept clean by the Christmas trade. The white-goods trade that followed swept the shelves completely, and buyers made trips to the East to try and replenish their stores, shipping the goods home by express. Everyone is now in need of goods. Most of us have been saving and have the money with which to buy. Banks are well supplied with the wherewithal for loans. What is lacking is confidence, not in credits so much as in the stability of prices. That confidence must soon be re-established, for prices of many things are lower than they are likely to be later. When the fact becomes duly impressed in the mind of the public there is going to be some spirited buying and a further inflation of values, especially in surficial forms of real estate.

The coal-mine manager today can do no more profitable and patriotic work among his employees than to campaign vigorously for a continuation of the thrift habit that secured such a good start in this country during the days of the war. Hoards of agents hawking all sorts of doubtful investments are busy tempting workmen to convert their Liberty Bonds and invest the proceeds in worthless securities. Every obstacle should be placed in the way of these cheaters and every incentive should be put forth to encourage the hard-working wage earners to avoid a return to the ways of extravagance and improvident spending. Nothing will do more to keep the wheels turning and promote a resumption of industrial activity than a continuation of nation-wide thrift. Accumulated wealth reproduces itself, and in doing so labor must be employed.

Because This Is a Government of the People

BECAUSE this is a Government of the people and by the people, it has the psychology of the people. It rises only with great difficulty above and beyond them. When times are good the nation buys, and it jostles to get what it needs. When times are bad it waits. When the public crowds to enter a door, or to circle round a mountebank, everyone else is drawn to do the selfsame thing. Similarly Uncle Sam, who is the American people in composite, will be found trying to go where everyone has gone. Because, by reason of our representative system, he is a cross-section of the public, he is almost sure to have the national psychology as his own.

Thus it is that we find the Government is skimping just now in its buying of railroad material, especially coal, and in its improvement of railroad lines. It is restricting its public building program. It will be found also that cities in the East are hesitating to build sewers, public buildings, disposal works or roads. The national mind, like the corporation mind, is the mind of the people. When the individual halts and fears, we all halt and fear. We all oppose expenditures. Uncle Sam sees John Smith has a wobbling step, and he sets his gait to suit.

However, given a public with hope in its breast, with a strut and with spirit, and Uncle Sam is a new man. He remarks that the day is bracing and spends a billion without much ado; and everyone of his grown children—the states in the Union—and all his smaller children—the municipalities or towns—do the same. So eager is he to get his work done that he rudely jostles the individual or corporation, seeking the same goal.

Too bad Uncle Sam has our psychology. If he had one of his own how he would trim the rocking boat of state! How he could create briskness and cheerfulness out of fear and despondency, and prevent surfeiting and congestion in times of overconfidence! He would serve us better, would our Uncle Sam, if only he were less like us.

Will War Bring a Foreign Psychology?

THE nations of Europe always had a psychology different from ours. No one, perhaps, knows why. Perhaps our energy is the cause. We must be ever up and doing, must make or break, must see things to an early conclusion. Whatever the reason has been, we were the people—the people of all the whole world—who discovered that sometimes it paid to conduct a business at a loss. And often indeed we so conducted it.

The arguments we had were good; that there is no use denying. We liked them the better because they were a trifle hard for the outsider to understand. But logical and solid in a way they certainly were. No! they will not be repeated here. Better that they should be entirely forgotten, for while they are true for the individual if he alone goes where they lead, they are not true, emphatically not true, for the industry as a whole or for the nation as a unit.

If an individual could induce all other individuals to sell at a profit, and he were to sell at a small loss, then it might be advantageous to him to do it rather than close down his operation. But if the other individuals show a disposition to cut their prices below producing cost, then it is up to the individual, who in a time of depression wants to keep running, with any degree of steadiness, to accept a little further loss. This is the "eternal spiral," if we may quote the expression of the British economists and twist its meaning to suit the present subject. They apply it to wage rises and costs of living. Here it is applied to the acceptance of a loss as a cause of progressively lower prices.

It is untrue, then, that it pays the individual to accept a loss, for he cannot prevent other individuals from doing the same and making other losses necessary. It is better to look at matters with more philosophy. It is better to say that selling for less than cost is a crime against the industry. Worse yet, it is a crime against the state; for if every individual in every industry did it, there would be a using up of capital; and the progress of mankind would be stopped, and civilization itself would be thrust even backward. Profitless operation is a using up of past accumulations. It is a destroying of fluid capital and an acquiescence in the decay of fixed capital.

So we need a psychology that will protect us against cutthroat competition, against our own self-destroying energies. Everyone but the American business man has it, and why not we?

DISCUSSION BY READERS

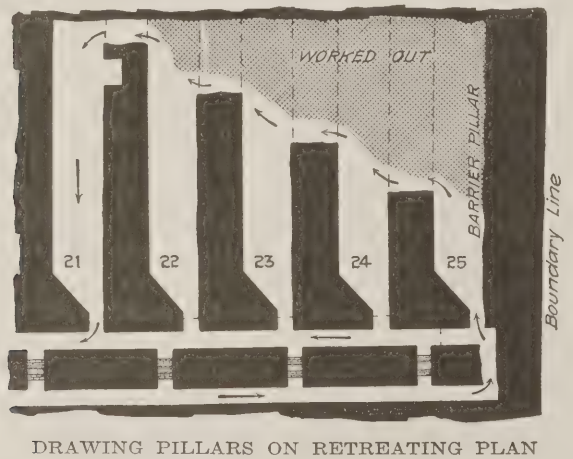
Drawing Pillars in Machine Mining

Letter No. 3—In looking over the inquiries in *Coal Age*, not long since, I ran across one from a brother foreman who asked for the experience of others who have used the Sullivan shortwall machine, in drawing pillars. Unfortunately, he has neglected to give the thickness of the pillar and some other data that would be of interest; but I am glad to give him my own experience along this line.

During the time that I was foreman of No. 1 mine of the Jefferson & Clearfield Coal and Iron Co., I was ordered to draw all the ribs in a part of the mine known as the "Ninth left." The coal in this section was 5 ft. high, overlaid with a slate roof, and pitched about 6 per cent. across the rooms, which were about 300 ft. long and varied from 20 to 35 ft. in width. These rooms were turned on 50-ft. centers.

Before going further, I want it understood that this work was driven before I took charge of the mine. The shape that it was in was a disgrace to any mine foreman. The mine was a machine mine entirely, no pick miners being employed, and I was obliged to undertake the task of drawing back the pillars with the machines.

After a short study of the situation and the conditions, I decided to adopt the plan shown in the accompanying figure. Starting at the last place on the heading, I determined to take out five pillars at a time, keeping the ends of the pillars a short distance, one in advance of the other next following, as I have shown in the sketch. This gave me a good line of break, more or less corresponding to the strike of the seam.



DRAWING PILLARS ON RETREATING PLAN

My method of attack, as shown on the left of the figure, where the pillar has been cut through at the face and a second cut started, was to cut through the rib, making a 15-ft. opening each time and leaving about 6 ft. of a stub between each cut and the last one. This 6-ft. stub, at the inby end, protected the cutter while at work. Sometimes this could be taken out by the machine, after the 15-ft. cut had been completed. At other times, it would be necessary to take the stump out with picks, which was done before the next cut was started.

One thing is important, and that is to see that all the posts are removed and none left standing in the gob. This is necessary, in order to keep a clean line of break extending across the ends of the pillars. I removed better than 90 per cent. of the coal from these pillars and rescued two-thirds of the timber. Considering the great variation in the thickness of the ribs, in this case, it was better than I had expected. I hope that my experience may be of benefit and help, not only to this brother foreman, but to others who have similar work on hand.

SAMUEL JONES.

Johnstown, Penn.

Letter No. 4—In reply to the inquiry regarding the drawing of pillars in machine mining, *Coal Age*, Jan. 2, p. 32, it would be easier to suggest the best method to apply in that case had the inquirer given the size of the pillars left between the rooms. He gives the width of the rooms as 27 ft. and the depth of cover 200 ft.; but says nothing of the width of pillars that are to be drawn, which is an important matter.

However, I want to give, frankly, a little of my own experience in drawing pillars by machines, in a mine of which I had charge as foreman. In one section of the mine, I determined to try drawing the pillars on the retreating system, keeping one pillar about three cuts in advance of the one ahead of it or outby, thus making the pillar work somewhat after the fashion of a longwall face.

FAILURE REQUIRES ADOPTION OF A NEW PLAN

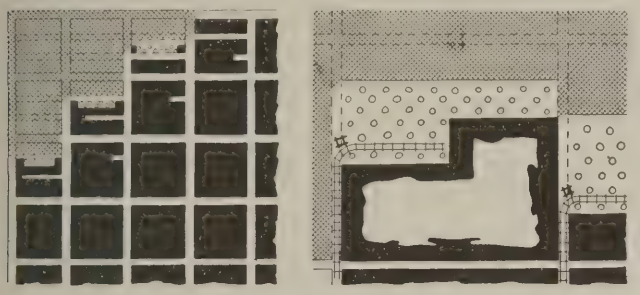
The coal was overlaid with a strong sandstone roof. For a while, the plan succeeded well and gave good results, although I watched with some anxiety for the breaking of the hard sandstone roof, which had not yet taken place. Much to my dismay, when the roof broke, it broke right up to the face of each pillar, in each case cutting off the straight face of the pillar.

Evidently, another plan had to be adopted if we were to succeed in drawing these pillars, by machines, under this roof. In order to start the work again, I had to cut across each pillar and open up a new face. But, from that time on, there was trouble, as the posts that were stood behind the face were not strong enough to break off the hard rock forming the roof. After some study, I decided to adopt an entirely different plan that I was convinced would give better results and save pillar coal, much of which had been lost in the previous method.

As shown in the accompanying figure, the plan now adopted was a longwall panel system, retreating. Eventually, I tried two systems, both of which are shown in the figure. By the first system, as shown on the right, the face of the panel was taken out in lifts. This

method was fairly successful, but did not give as good results as the second method, which is shown on the left of the figure. The drawing of the posts in one lift was left, until the next lift was finished. By this means there were always three rows of posts behind the lift that was being worked. As shown in the figure, one or two cribs were built at the side of the lift where the track entered, so as to give greater protection at that point.

As just stated, the second method, shown on the left of the figure, was the better of the two. In this method,



SHOWING TWO SUCCESSFUL METHODS OF WORKING

each pillar was split into two or three parts, according to the size of the panel. The hatched portion of the figure shows the portion of the mine where the coal had been worked out, the dotted lines indicating how each panel was split. As shown in the figure, a stump was left at each end of the cut, in order to give better protection for the machine while it was at work. These stumps were afterward taken out with the pick.

The aim in splitting a pillar was to divide it so as to provide two cuts for the machine in each part. These cuts were made on the gob side; but when the two cuts were finished, if the place was in good shape, I would frequently continue and take a cut on the other side, which made a total of three cuts for one split of the pillar.

I consider that this second plan is the safest and most practical method for taking out pillars with machines when the coal is overlaid with a hard rock roof that is difficult to break. WM. DICKINSON, SR.

Oak Hill, W. Va.

Effect of Prohibition in Mining

Letter No. 1—Now that the required number of states have ratified the constitutional amendment passed by Congress a short time ago, and national prohibition will soon be a fact in this country, I recall again the remark made by J. H. Tipton, *Coal Age*, Dec. 12, p. 1087, to the effect that "too much emphasis" has been placed on the matter of intemperance among the miners.

This suggestion was made by Mr. Tipton in discussing the hindrances to coal production. While I agree with most of what he has said and do not want, for a moment, to disparage the numerous good points made regarding the effect of other hindrances to coal production, I must take issue with him on that one point.

Too much emphasis, in my opinion, cannot be laid on the evil effect of intemperance among miners. It has been the cause of the loss of thousands of tons of coal when that was most badly needed. It has been responsible for the personal injury of many mine workers, because a drinker has been permitted to enter the mine when unfit for work and in a condition in which he could not be held responsible for his acts, which endangered not only his own life but the lives, also, of his coworkers.

In his letter, Mr. Tipton offers some important suggestions for overcoming hindrances to the production of coal. He makes special mention of improving the living conditions of miners, and speaks of the need of greater efficiency on the part of foremen in charge of mines. I am convinced that if proper living conditions are provided and some form of amusement and recreation furnished the men, in mining towns and camps, there would be less drinking, and the chief hindrance to the production of coal would be removed.

If one takes the trouble to compare the loss of production due to intemperance in a mining community where these things are provided, with the loss from the same cause in a community where no such privileges are offered and nothing done to keep the miner out of the saloon, it will be found that the loss will be considerably greater in the latter instance than in the former.

Let me repeat what I said in the beginning, that too much emphasis has not been laid on the effect of intemperance to reduce the production of coal. As long as the manufacture and sale of liquor is a legal business and the doors of the saloon are open to miners and other industrial workers, the effect can only be to hinder production in all industries. But, to none will national prohibition prove a greater boon than to coal mining.

Pittsburgh, Penn. EDWARD H. COXE.

Living Condition at Mines

Letter No. 1—As the readers of *Coal Age* all know, labor conditions have been very unsettled, during the past two years at least, and there is not much improvement apparent at the present time. The principal trouble is experienced in isolated mining districts where the dwellers have not the same privileges that are afforded residents of larger towns and cities.

The thought that has been uppermost in the minds of many coal operators, not only in such isolated districts as I have mentioned, but elsewhere, is how hard it is to get labor and to hold it. The labor question, indeed, has caused much thoughtful discussion. Various remedies have been suggested, some of which have been tried out with good results, while others have proved failures.

Having spent all my life in and around coal mines and, for the last 15 years, serving as a mine official, I have been led to make a careful study of the miner, both at work and at play. Let me say then, here and now, that with few exceptions, the natural disposition of the miner is one of pride. He asks no one to give him anything but justice, being proud of his ability to earn his living and pay for all his necessities.

The argument has been advanced that to close the saloon and abolish booze will solve the labor question in mining; but that is only partially true. While it will make sober men out of drinkers, it will not hold mine workers in isolated districts that are devoid of those common privileges that make living worth while, such as schools, churches, good roads and dwellings, with

places of amusement and recreation. Observation while living in such districts makes this conviction, in my mind, a fact.

From time to time, when good men were quitting our mines for work in other places, my inquiries as to the cause of their leaving would almost always bring the following responses: "There are no good roads in this town."—"The schools here are no good."—"There are no churches here that we can attend."—"My family are unable to get what they need at the store," etc. Seldom did it happen that a man would leave because of a simple error in his accounts, which was always quickly corrected at the office and the man satisfied.

When I would take a man to task for getting drunk and laying off he would promptly reply that there was "no place but the saloon" where he could go and spend an hour or so when out of the mine; "no shows, poolrooms, bowling alleys, or even a reading room," where he could spend his spare time. Many would claim that they did not want to stay at home all the time and must go somewhere.

Taking these facts into consideration, let me ask if coal operators have ever wondered why they could get and keep labor with less difficulty where a mine is located close to a town, than where it is located in an isolated district; even though the working conditions in the former were inferior to those in the latter instance. Can anyone deny that it is the duty of mine officials to deal strictly, fairly and honestly with men in their service? Does anyone doubt that that is the only way to get and hold their confidence?

Efforts of Mine Officials Necessary to Promote Satisfaction Among Employees

It may and generally will require much extra effort, on the part of mine officials, to secure for their men these privileges, which are accounted as essential to good living conditions. The question of "good roads" is one to be taken up and advocated strongly by the operator who pays the taxes. Likewise, the matter of providing "good schools" is one that will depend on the influence and the interest that the mine management and officials take in matters relating to the school board.

As to the "church," very often a small donation of either money or ground, on the part of the operator, will encourage the residents of the camp to build a church and pay their share toward the maintenance of its services. Where this is not practicable, at the present time, there are generally two or more houses standing empty that could, with a few necessary changes, be made available for service, both Protestant and Catholic. Other places could be provided as "reading rooms, poolrooms, and bowling alleys."

A wise management will endeavor to provide the occupants of the company houses with such conveniences as they may desire or need for their comfort. Some dwellers may even desire electric lights. Most will desire baths and toilet conveniences. Speaking of baths, however, it must be admitted that there are some, among the foreigners, who will not take proper care of a bathroom should it be provided for them. These should not have such conveniences, until they are educated sufficiently in their proper use and care.

Finally, in regard to the "company store," there should be provided a good uptodate department store, where the miner and his family can procure what they need and desire, at prices at least as low as the same goods can be bought elsewhere. Customers should be treated with the utmost courtesy and fairness.

The education of the miner has elevated him to a standard of living where the conveniences and privileges I have mentioned have become necessities to him and his family. What the miner needs, aside from good working conditions, are home surroundings that he is qualified to appreciate and amply able to purchase, for the comfort of himself and family. All that I have mentioned can, under proper management, be made self-supporting and not a source of expense, but a source, rather, from which will come an increased production of coal.

A. A. Allen, Asst. Genl. Supt.,
Pittsburgh, Penn. United Coal Corporation.

Perils in Reconstruction

Letter No. 2—Now that the war is over and the mines will soon be running full-handed again, we begin to wonder what hindrances will arise in the future to restrict the production at the mines. No one is expecting to witness soon again the conditions that hampered the mining of coal and caused so much suffering a year ago. During all that trying period, miners proved their patriotism and showed that they were worthy of the trust reposed in them.

Now, however, the situation that confronts us is of a different nature than what existed during the time this country was at war. We are now facing a crisis that will demand the best judgment of operators and miners alike. The most difficult of the problems liable to arise is the adjustment of labor questions. Unfortunately, as we are all well aware, there is a dangerous propaganda that is being circulated daily among our miners. If this is not soon checked, it is bound to create conditions that the miners themselves do not desire. Strange as it may seem, the miners are unwittingly permitting themselves to fall victims to what we can describe by no better term than "Bolshevism."

Earnest Appeal to Labor to Make Good

No one doubts, today, that we are entering upon the most important period respecting the future of this and other countries. Regard for one another's welfare must now take the place of selfish ambition and it is for the people of America to prove to the world that the love of one's fellowmen is a more powerful factor in securing equity and justice than is violence and bloodshed, which must follow in the wake of Bolshevism. It is to be hoped that the laboring element of this country will prove all that is claimed for it by the President, who has stated that he considers it the most important asset of the nation.

One condition that it behooves all mine superintendents and foremen to consider carefully and prepare plans to meet is the homecoming of our boys, who responded so nobly to the call of their country in its hour of need. No doubt, the quick return of the boys will change industrial conditions throughout the country; but the effect in coal mining should prove a benefit by displacing some who are unacquainted with mining conditions and whose employment was forced by the urgent need of men to get out the coal.

When we consider that there was enough work for these men before they entered the war, and realize the large number of them who have been slain or crippled for life, and others who will not return because of affiliations formed abroad, it should be clear that there will be work and *steady work* for all.

In closing, let me urge that we give this matter serious consideration and prepare ourselves for the change that is coming and is even now here. Any intelligent foreman will welcome the advice and knowledge to be gained through a practical discussion of ways and means to meet the situation with fortitude.

Plymouth, Penn. JOSEPH R. THOMAS.

Letter No. 3—I have been impressed with the numerous predictions that have been made from time to time, in regard to what was going to happen after the war. While some have claimed that the end of the war will mark a period of unprecedented prosperity, others predict that it will bring a time of trade depression and uncertainty. Still others believe that we shall pass from war to peace as easily as sliding off a log.

Now, while I despise the attitude of a pessimist, the thought that impresses me most is that, looking at things as they are, big changes are in sight. But, before there will be any great change for the better, we shall experience a change for the worse. Everyone, therefore, should put his house in order and prepare himself to meet this change when it comes.

EFFECT OF RECONSTRUCTION WORK IN EUROPE ON LABOR IN THIS COUNTRY

The work of reconstruction in Europe, many believe, will call a large number of our foreign labor home. If this should take place it would undoubtedly imperil many of our industries, particularly the mining of coal. At the same time, it must be remembered that there will be thousands of those in foreign lands who will seek a home on American soil when the first opportunity offers, and this influx may more than offset the loss to us of those who return to their own country.

Also, the anticipated scarcity of labor in this country will be largely counterbalanced by the return to their homes of our 3,000,000 soldiers in training and in service. In addition to this, the shutting down of munitions factories and the slowing down of our shipbuilding will greatly augment the available labor force here. It is well known that thousands of our miners left the mines to work in these factories. Moreover, the slacking down of mills, closing of factories and the cessation of other war activities will greatly reduce the demand for coal. In fact, according to the market reports, there is an increasing amount of coal already on hand; and this, in face of the fact that production at the mines has been greatly impaired by the influenza epidemic, shows that the demand for coal is already falling off.

What will be the effect of our Government withdrawing its protective hand that has, for some time past, controlled both the price and the shipment of coal, it is hard to say. Competition will increase, in the coal industry, with the result that the price of coal will be lowered and this, in turn, will reduce wages, which means a struggle, unless the price of living necessities is likewise reduced. Should these things occur, we would face a new peril in the form of labor disturbances.

No doubt, it will be argued that the building of a great merchant fleet will soon enable the carrying of our coal all over the world and that this will act to stimulate the coal trade. It is asserted that we can produce coal as cheaply as England; but, our country being a self-supporting nation, making larger exports than imports, presents the difficulty that our ships carrying coal to foreign ports must return in water ballast, while English ships will take home a cargo of much needed supplies. It does not take a scholar to estimate the difference in the price of our coal and that of England, in foreign ports, under these conditions.

Let us look boldly at these perils and do what we can to overcome them before they are upon us. We are proud to have brought peace to the war-ravished countries of Europe; let us not fail, now, in securing a lasting industrial peace to ourselves and the world.

McIntyre, Penn. THOMAS HOGARTH.

Quality of Mine Timber

Letter No. 1—Reading the recent letters, regarding the drawing of pillars in machine mining, which have appeared in *Coal Age*, calls to my mind an incident that occurred, a short time since, when the division superintendent, the mine superintendent and myself, were making an inspection of the mine of which I had charge.

On that occasion, we had stopped, in a certain miner's place, for a few moments' rest. While seated there, the conversation turned on the drawing back of pillars, which work had just been started in that section, and the division superintendent remarked that I should be sure to see that the rooms were well posted before ever starting to rob the pillars.

The miner, who was working the place, had been attentive to all that was said and, at this juncture, butted in with the remark, "Yes, but we need better posts than those that were brought in to me today. You would hardly believe that I broke one of them in two, trying to drive it up in place. They are entirely too small and not strong enough to support this roof. They make me think that they were made more for match sticks than for mine posts."

THE TRUTH SPOKEN FRANKLY AND BOLDLY

The miner, whose life was daily in jeopardy by reason of the poor quality of timber sent to him, was more outspoken than most men working in the mine would have been. That he had spoken the truth, however, was plainly evident and it made its impression where the lesson was most needed. It is unnecessary to add that a better quality of posts was sent into the mine from that time forward, particularly where they were needed in pillar work.

I mention this little incident in the hope of drawing attention to the quality of timber often furnished to miners, both in respect to the size of the sticks and the kind of timber employed. Ash, oak and other hardwood timbers are better adapted for use on roads and aircourses where they must remain for some time, while pine, hemlock, spruce and many like soft timbers give better service in rooms where the yielding of the posts is an important factor in observing the movement of the

roof and the pressure on the timbers. However, the size of all post timber, hard or soft, must be such as to give the required strength. FOREMAN.

———, Penn.

Freezing of Shaft in Winter

Letter No. 10—After reading the several letters that have appeared in *Coal Age*, in regard to preventing the freezing of a shaft in winter, it seems to me that half of the writers have forgotten that there are many mines that are equipped electrically and have no steam to use for this purpose. The other half seem to ignore the fact that the one main point that is necessary to be considered is the rise of temperature required to prevent the freezing of the water draining into the shaft.

Now, it does not appear to me that it would pay, where a mine is electrically equipped, to install a boiler for the purpose of generating steam when the weather is sufficiently cold to freeze the shaft, which would be at irregular intervals during the winter. Those who advocate the use of steam argue that this would increase the humidity of the mine air; but it strikes me that, if the air is preheated before passing down the damp shaft, it will absorb the required amount of moisture and accomplish the same purpose.

It is suggested in Letter No. 1, which appeared in *Coal Age*, Dec. 19, p. 1134, that all that is needed to heat the air is a hot-air chamber installed near the top of the shaft. If the suggested 12-in. pipe is not sufficient for the purpose desired, there can be any number of pipes, or a much larger pipe, installed to conduct the hot air down into the shaft.

For that matter, a rectangular pipe 3 x 8 ft. in section, giving an area of 24 sq.ft., could be used. Also, if necessary, two such hot-air chambers could be installed for heating the air. This method appeals to me as being more practical and simple than those suggested.

Holsopple, Penn. MINER.

[This letter will close the discussion on "Freezing of Shafts in Winter."—EDITOR.]

Perplexities of Mine Foremen

Letter No. 10—Among the several letters that have been written describing various perplexities that are the lot of mine foremen, none have impressed me so forcibly as the letter of John Rose, which appeared in *Coal Age*, Nov. 28, p. 1002. As Mr. Rose says, there is a class of miners that are continually on the hunt for the boss to make some complaint.

My experience is that there are few mine foremen who will not listen to a man when he has a serious complaint to make. A good foreman very quickly learns to know who the miners are that are never satisfied but are continually kicking about one thing or another. Were the foreman to attend to every such complaint, he would have little time left to see that the mine is kept safe and the coal moving.

When a mine foreman has done his duty and furnished the necessary material to make a man's place safe and the miner has not done his part to keep up his place, it is no fault of the foreman's that trouble overtakes the man. A foreman cannot waste his time going to look at such a place, especially when he knows that the miner will load no more coal if his place was timbered for him.

On the other hand, a good man can usually get all the help he needs from his foreman, who has come to know the value of the man's service in maintaining the output of the mine. After all, it is the man who produces the most coal who has no difficulty in securing the prompt attention of his foreman when he has a complaint to offer.

It is true that during the recent labor shortage, many mine foremen have spoiled their men by doing more for them than customary. This has resulted in some miners starting to do as they please; and, in a short time, they please to do very little. From fear of losing their men, many foremen have adopted these methods to hold them.

False Claims of Incompetent Foremen

Foremen who are constantly making concessions are prone to boast of their ability to handle men, when, in fact, the man has often proved to be the real boss. I am glad to say it is not so in every case. There are foremen who will not keep a man on the payroll if he does not work to their satisfaction. While such treatment may sometimes work a hardship on the men who wish to do right, by starting unmerited rumors of harsh dealing, good results will be accomplished in the end.

As an illustration of how unreasonable some men are, let me cite an instance that occurred a short time ago. The track on one of the main hallways, in a mine, had just been torn up by the derailment of a loaded car. There were 25 men working on that section and, not to delay their work, I started at once to find the trackmen. They were busy fixing the track in a place where two men were waiting to load a car.

Explaining the situation in a few words, I sent the trackmen to repair the track on the main haul, telling them to then return and fix the track for the two men in the room. I stated that it would not require more than 45 min. to complete both jobs. In spite of everything that I could say or do, however, the two men took their buckets and went home for the day, although their track was fixed and ready for them before they could have gotten out of the mine.

Unreasoning Acts of Men Annoy Good Foremen

It is such acts of unreasonableness on the part of men that perplex and worry mine foremen. The average foreman is full of "pep" and anxious to keep things moving while, at the same time, endeavoring to satisfy his men. He realizes that his chances are small of ever making good unless he can keep a satisfied bunch of men.

While not neglecting too long the little things that require his attention each day, a foreman must give himself chiefly to the larger and more important matters that affect the safe and efficient operation of the mine. The discussion of these conditions that are so well known to mining men has done much, within the past two years, to enlighten the general public and secure a fairer judgment on their part, regarding the men in charge of coal-mining operations.

Cleaton, Ky. OSTEL BULLOCK.

[The discussion of "Perplexities of Mine Foremen" will close with Letter No. 12 now on hand.—EDITOR.]

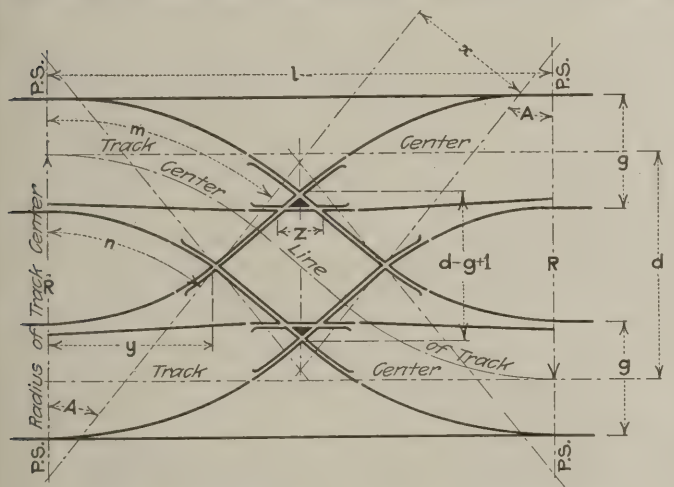
INQUIRIES OF GENERAL INTEREST

Diamond Crossover in a Mine

As mine foreman, I would like to be able to understand the method of calculating the different dimensions of a diamond crossover, such as is commonly used at a shaft bottom, for cross-caging, to enable the loaded cars to be run on either cage and permit of the removal of the empties. I shall much appreciate the favor if you can give me the formulas required to work out these several dimensions. FRANZ WALTHERS.

Buckskin, Ind.

When a diamond crossover is to be laid, the data commonly given or known are the gage of the track and the distance between track centers. Four frogs are required, two of which lie midway between the two tracks. The other two frogs are cast so that a small triangle of solid iron forms the center of each frog. The three sides of the triangle are parallel to the respective gage lines of the three rails crossing each other on this frog. To insure successful operation, these three gage lines must cross each other at three separate points, corresponding to the three apices of the triangle. The accompanying figure shows the general arrangement of the two main tracks, the crossover rails and the four frogs.



THE DIMENSIONS OF A DIAMOND CROSSOVER

It is important to remember that the arrangement of the tracks in a diamond crossover is symmetrical with respect to its central axes. The gage lines of the switch rails crossing the frog in the main track, each make an angle with the gage line of the main rail equal to the angle subtended by the curved switch rails, or the angle A, indicated in the figure.

The first step is to find the angle A that subtends each of the curved rails of the switch. To simplify the calculation, we will assume that the two gage lines of the switch rails cross each other 6 in. inside of the gage line of the main rail. Then, calling the distance between track centers d and the track gage g, the distance measured straight across the main tracks, between the two points where the gage lines of the two switch rails across each other, is $d - g + 1$, as indicated in the figure. The required angle subtending each curved switch rail is then found by substituting the given values in the formula

$$Cos\ A = \frac{g}{d - g + 1} \qquad (1)$$

The next step is to find the length l, out to out, of the diamond. This is the distance from point of switch (P. S.) to point of switch, measured on the straight track, as indicated in the figure. A convenient length of radius R, which is the radius of the center line of each switch, is first assumed. The chosen length of this radius must be such as to conform to the given track dimensions and the approximate desired length (l) of the diamond.

For instance, the shorter the radius chosen, the sharper will be the curvature of the switch rails and the shorter the diamond. On the other hand, where the room permits a longer radius can be chosen, giving easier curves but lengthening the diamond. Having chosen the radius R, the length l of the diamond is found by the formula,

$$l = 2R\,sin\,A + \frac{d - 2R(1 - cos\,A)}{tan\,A} \qquad (2)$$

The length (x) of the straight piece of rail, joining the opposite switch rails of the crossover, is next found by substituting the given values in the formula

$$x = \frac{l - 2R\,sin\,A}{cos\,A} \qquad (3)$$

It is evident that the radius of the outer curved switch rail is $R + \frac{1}{2}g$; and that of the inner curved switch rail, $R - \frac{1}{2}g$. Then, the length (m) of the outer curved rail, in each switch, is found by the formula

$$m = \frac{A}{180^\circ} \times 3.1416(R + \tfrac{1}{2}g) \qquad (4)$$

Likewise, the length (n) of the inner curved rail is given by the formula

$$n = \frac{A}{180^\circ} \times 3.1416(R - \tfrac{1}{2}g) \qquad (5)$$

In formulas 4 and 5, the value of the angle A must be expressed in degrees and decimal of a degree.

Finally, the distance y, indicated in the figure, or the distance that each center frog is in advance of each main switch point, is found by the formula

$$y = \sqrt{(R - \tfrac{1}{2}g)(d - g) - \tfrac{1}{4}(d - g)^2} \qquad (6)$$

When laying out the triangular frog, assuming that the gage lines of the two switch rails across each other 6 in. inside of the gage line of the straight rail of the main track, the distance (z) between the two frog points (see figure), measured on the main rail, is $z = 1/\tan A$, which gives this distance expressed in feet; or $12/\tan A$, expressed in inches. The center line of the two triangular frogs corresponds to the center of the diamond crossing the tracks at right angles.

EXAMINATION QUESTIONS

British Columbia Examination Second Class, Dec. 17, 1918

(Selected Questions)

Ques.—What would be the danger arising from a blownout shot in a mine atmosphere charged with coal dust and a small percentage of firedamp?

Ans.—The occurrence of a blownout shot and the projection of a considerable volume of flame into a mine atmosphere charged with coal dust, especially when a small percentage of marsh gas is present, would result in the flame of the shot igniting the mixture and an explosion would follow. If methane or marsh gas is present in sufficient quantity to form firedamp the mixture would be fired by the flame of the shot even though no coal dust were present.

Whether the local explosion started by a blownout shot will be transmitted throughout the mine will depend upon the condition of the mine air and the passageways. If these contain accumulations of gas or dust, the explosion may be propagated throughout the mine. The contracted roads and airways in thin seams, by preventing the rapid expansion of the gases produced by an explosion, tend to increase the violence of the blast and extend the explosion. Thicker seams and larger areas provide for a greater expansion of the burning gases, which lowers the temperature and tends to arrest the explosion.

Ques.—In spontaneous combustion in a coal mine, what gases are produced? What are the probable causes of spontaneous combustion and what general precautions would you adopt to prevent it?

Ans.—The gases produced by any combustion in a coal mine will depend on the supply of air. Where this is sufficient for complete combustion to take place, carbon dioxide (CO_2) is formed; but if the supply of air is limited so that the combustion is more or less incomplete, some carbon monoxide (CO) will be produced, the quantity depending solely on the limitation of the air supply. In a close place, the oxygen of the air being partly consumed causes an excess of nitrogen as the result of the combustion.

The primary cause of spontaneous combustion is the generation of heat accompanied with the production of some carbon monoxide in a mass of carbonaceous material, owing to the slow oxidation of the carbon. The action is greatly accelerated where carbonaceous or oily and bituminous matters are stored in a place where there is no ventilation and the escape of the heat is prevented. To avoid the conditions producing spontaneous combustion, no accumulations of oily waste, fine coal dust or other carbonaceous material should be permitted in the mine. In the storing of large quantities of coal, suitable provision should be made for ventilating the pile, so as to carry off the heat and gas generated in the mass.

Ques.—How many cubic feet of marsh gas will be required to be generated in a mine, per minute, to render dangerous a current of 60,000 cu.ft. of air per minute?

Ans.—The answer to this question will depend on first determining what is the danger line in the particular mine in question. In the mining of anthracite coal, the danger line may be assumed to be reached when 3 per cent. of gas is present in the return airway; but steps should be taken to avoid possible danger before this condition is obtained. In the mining of bituminous coal, much will depend on the inflammability and character of the coal in respect to the formation of fine dust. Where the coal is highly inflammable and the mine dusty the danger point is reached when the gas in the return airway much exceeds one per cent.

Therefore, replying to the question in regard to the quantity of marsh gas required, in this case and on the assumed basis, in a bituminous mine, it may be stated that the danger point will be reached when the gas generated is $60{,}000 \times 0.01 = 600$ cu.ft. per minute.

Ques.—The total rubbing surface of a square airway is 150,000 sq.ft.; the length of the airway is 4500 ft. and the quantity of air passing 75,000 cu.ft. per min. What is the velocity of the air current, in feet per minute?

Ans.—The perimeter of this airway is $150{,}000 \div 4500 = 33\frac{1}{3}$ ft. The airway being square, the length of one side is $33\frac{1}{3} \div 4 = 8\frac{1}{3}$. The sectional area of the airway is $(8\frac{1}{3})^2 = 625/9$ sq.ft., and the velocity of the air current $75{,}000 \div 625/9 = 1080$ ft. per minute.

Ques.—The quantity of air passing in an airway is 140,000 cu.ft. per min., and the water gage is 2 in. What is the horsepower producing the ventilation?

Ans.—The pressure corresponding to a 2-in. water gage is $2 \times 5.2 = 10.4$ lb. per sq.ft. The horsepower producing this circulation is, therefore, $(140{,}000 \times 10.4) \div 33{,}000 = 44+$ horsepower.

Ques.—In an airway measuring 7 ft. 6 in. high, 8 ft. wide at the top and 9 ft. 6 in. at the bottom, the anemometer reads 350 r.p.m.; what is the quantity of air passing?

Ans.—The average width of this airway is $\frac{1}{2}(8 + 9\frac{1}{2}) = 8\frac{3}{4}$ ft. and the sectional area $7\frac{1}{2} \times 8\frac{3}{4} = 65\frac{5}{8}$ sq.ft. The quantity of air passing is, then, $65\frac{5}{8} \times 350 = 22{,}968+$ cu.ft. per minute.

Ques.—Describe the various means used for conducting and regulating the air current in mines.

Ans.—The most common means employed for conducting the air forward in mines is a brattice constructed of boards or canvas nailed to a row of posts set for that purpose. The air bridge, either an overcast or undercast, is used to conduct an air current across a roadway or another air-course and thereby avoid the use of doors on the entries. A regulator is a partition built in an airway and having a small hole to enable a portion of the air only to pass.

FOREIGN MARKETS AND EXPORT NEWS

War Board Justifies British Import Restriction

Great Britain's action in applying import restrictions, which cover a wide range of commodities, is fully justified in the opinion of the War Trade Board. In order that the reason which prompted the British to take that action may be better understood, the War Trade Board comments on it officially as follows:

For over four years Great Britain has been subject to the shock and strain of a war which not only required the sacrifice of life and intense human energy, but also necessitated the most stringent economic readjustment and the sacrifice of private business.

It is not strange, therefore, that Great Britain should today wish to make every legitimate effort to keep her commercial and economic status from falling into chaos, and instead to restore it to a state of equilibrium. In fact, to do anything else would be strange.

As a natural result of such a normal, patriotic aspiration, in order to bring her own manufactures to a state of stability approaching that of pre-war days, Great Britain finds it necessary to impose such import restrictions for the time being as will permit her the opportunity to reëstablish domestic business conditions on a normal basis. The import restrictions being imposed by Great Britain are for such purposes and are not to be regarded as of a permanent nature. In making for the return of normal domestic conditions in Great Britain, inducing the social welfare of the empire, such measures will tend toward economic and social stability throughout the associated governments and this country. And such a tendency is today recognized as vitally necessary for the formation of a lasting and fundamentally sound peace.

Simplified Bunker Procedure

The War Trade Board announces that it has adopted a new and much simplified form for use in connection with the issuance of bunker licenses. The new form is a Combined Application and License (No. B-1c), and supersedes Bunker Forms B-1a and B-1b.

When Bunker Form B-1 has been completely filled out and signed by the applicant and approved and countersigned by the agent of the Bureau of Transportation or Collector of Customs, as the case may be, it will constitute a bunker license for all bunker fuel and ship's stores aboard the vessel and those desired to be taken on at the port where the application is submitted, as well as at any subsequent port in the United States or its possessions at which the vessel calls on the voyage for which license is issued, it no longer being necessary to obtain supplementary license at subsequent American ports when additional fuel or stores are desired.

A complete list of bunker forms at present in use follows: Bunker Form B-1c, Bunker Form B-3, Bunker Form B-4, Bunker Form B-5a or B-5b, Bunker Form B-7. Bunker Forms B-1c, B-3 and B-7 are required on all vessels. Bunker Forms B-4, B-5a and B-5b are not required of certain classes of vessels.

For further information, those interested should confer with Agents of the Bureau of Transportation, War Trade Board, or Collectors of Customs at ports where there are no agents.

Coal Exports From the Port of New York During 1918

Complete reports show that during 1918 there were shipped to foreign countries through the Port of New York 82,447 tons of anthracite, valued at $584,087; 48,717 tons of bituminous, valued at $349,369; and 10,937 tons of coke, valued at $174,114. In 1917 the exports from this port amounted to 134,252 tons of anthracite, valued at $987,178; 14,348 tons of bituminous, valued at $91,534; and 21,908 tons of coke, valued at $283,735.

Of the coal exported Canada received 68,763 tons of anthracite, valued at $482,834, an average cost of $7.02 per ton; 5487 tons were shipped to Newfoundland; 4669 tons to Cuba, and 220 tons to England.

France received 7140 tons of coke; Brazil, 1269 tons; Argentine, 2670 tons; and Italy, 220 tons.

The bituminous shipments were sent to many countries. Of the 48,717 tons exported Cuba received 1776 tons; San Domingo, 3988 tons; Canada 192 tons; Brazil, 27,065 tons; Argentine, 3750 tons, Dutch West Indian Islands, 2408 tons; Uruguay, 1750 tons; and the Falkland Islands, 3565 tons.

In 1917 Brazil received 1999 tons of bituminous through this port, and San Domingo, 755 tons. During the same period 98,402 tons of anthracite were shipped to Canada and 9445 tons to Newfoundland.

The shipments by months in 1918, as compared with 1917, are given in the accompanying table.

	Anthracite		Bituminous		Coke	
	1917	1918	1917	1918	1917	1918
January	7,934	490	2,049	530	1,660	1,599
February	4,981	1,184	1,731	2,157	1,211	44
March	13,720	2,607	3,224	4,508	505	956
April	8'339	7,107	171	3,081	1,325	633
May	16,714	4,444	995	8,117	1,900	2,153
June	14,693	6,761	1,939	6,807	3,650	1,605
July	15,967	9,340	448	7,440	3,434	117
August	3,942	10,460	967	10,149	1,763	333
September	26,988	13,602	593	3,449	2,901	106
October	3,288	11,656	43	1,045	1,539	203
November	10,856	9,182	1,229	221	304	494
December	6,831	4,614	959	1,213	1,716	2,694
Totals	134,252	82,447	14,348	48,717	21,908	10,937
Valuation	$987,178	$584,087	$91,534	$349,369	$283,735	$174,114
Average cost per ton	$7.34+	$7.08+	$6.37+	$7.17+	$12.95+	$15.92+

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Feb. 3 states:

In the West Indian business few charters are effected owing to the scarcity of orders. Steamers may be had of most any size and position for this business. Owing to the scarcity of tonnage, the South American market is very dull. The chartering committee's rates are as follows:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum) — Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates). On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Range, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net to Rio or Santos, $18.50 net to Buenos Aires and $19.50 net to Montevideo.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Jan. 27	Ital. Bk. Estrella	Puerto Ferrajo, Italy	1,826	....
Jan. 27	Am. S.S. Yaque	San Domingo City, S. D.	1,372	353
Jan. 27	Ital. Bk. Letizia	Bagnoli, Italy	1,916	....
Jan. 27	Am. S.S. Lake Shawano	San Juan, P. R.	2,477	396
Jan. 28	Am. S.S. Soestdijk	Buenos Aires, A. R.	6,013	1,615
Jan. 29	Ital. Bk. Herat	Puerto Ferrajo, Italy	1,853	....
Jan. 29	Nor. S.S. Roar	Manzanillo, Cuba	1,685	221
Jan. 29	Fr. Bk. Dunkerque	Iquique, Chile	3,785	56
Jan. 29	Am. Sc. Grand Turk	San Juan, P. R.	799	....
Jan. 30	Ital. Bk. Stefano Oberti	Piombino, Italy	2,165	....
Jan. 31	Am. S.S. Winterswijk	Rosario, A. R.	4,028	848
Jan. 31	Am. S.S. Craycroft	Havana, Cuba	2,736	395
Jan. 31	Swed. S.S. Mertainen	Montevideo, Uruguay	4,506	1,919
Sewalls Point				
Jan. 28	Br. S.S. Justin	Para, Brazil	458	1,382
Jan. 28	Br. S.S. Justin	Manaos, Brazil	519	....
Jan. 29	Nor. Sp. Karmo	Buenos Aires, A. R.	1,607	....
Jan. 29	Am. S.S. Lake Deval	Havana, Cuba	2,624	289
Jan. 31	Am. S.S. Lake Fluvanna	Havana, Cuba	3,003	214

NEWPORT NEWS

Jan. 27	Br. S.S. Trevince	St. Vincent, C. V. I.	5,142	462
Jan. 29	Am. S.S. Corrales	Antilla, Cuba	2,550	385
Jan. 29	Am. S.S. Garfield	Havana, Cuba	3,053	409
Jan. 29	Am. S.S. Sac City	Montevidel, Uruguay	5,924	....
Jan. 29	Am. S.S. Lake Aurice	Antilla, Cuba	2,802	444
Jan. 30	Nor. Bk. Plus	Rio de Janeiro, Brazil	1,690	....
Jan. 30	Nor. S.S. Clothilde Cunco	Cienfuegos, Cuba	451	268
Jan. 30	Nor. S.S. Clothilde Cunco	Cienfuegos, Cuba (Coke)	399	....
Jan. 30	Am. S.S. Mincola	Bahia, Brazil	3,350	....

Ships Being Released

Vessels are being steadily released from Government service by the United States Shipping Board and placed back in trade service again. Coupled with the recent cuts in ocean freight rates, this is expected in some quarters to revive the export business. Some confustion is still being reported in connection with chartering and freights. Criticism has been heard of the cut in rates to some French ports when there is no American tonnage available to those ports.

COAL AND COKE NEWS

Harrisburg, Penn.

Sweeping amendments to the Compensation law, are planned by the State Federation of Labor, representatives of which body were in conference on Feb. 5, with Representative David Fowler, and floor leader, for the United Mine Workers. The amendments will be contained in one bill which was scheduled to be introduced in the house during the week of Feb. 10 by Mr. Fowler.

Chief among the amendments will be the increase of compensation to two-thirds of the wages. Under the present law, 50 per cent. is paid. At present compensation commences on the 15th day the person is away from work on account of injury, and from that time on an allowance of 50 per cent. of the person's wages is allowed as compensation. It is proposed to reduce this time to seven days.

It is also proposed that a stipulated number of weeks be allowed for the loss of fingers, toes or ears. At present compensation is allowed for only the time required for the specific injury to heal. According to the labor men, a stipulated number of weeks is allowed for loss of fingers, toes and ears in the provisions of the compensation law now in effect in New York State.

Following a conference at the capitol on Feb. 4, between Governor Sproul and a delegation of business men from the anthracite region, announcement was made that a bill, regulating the anthracite coal-mining industry in the state and aimed particularly at the conditions that exist in Scranton and Lackawanna County, will be introduced in the Senate by Senator Albert Davis. The bill carries with it a maximum penalty of $5000 in fines and one year imprisonment. The bill is wide in scope, taking in any possible damage that can be done by surface subsidence caused by mining operations. Some years back, Mr. Davis, then a representative in the House, fathered the "Davis Mine Cave Bill," providing for the protection to streets and thoroughfares.

Charleston, W. Va.

Production in the Pocahontas and Tug River districts advanced from 365,000 to 390,772 tons during the week ending Feb. 1. This was due in part to a slight improvement in the demand for Pocahontas coal. Labor shortage is still running rather high, having caused a loss of 22,360 tons, other sources of loss in production being negligible. The fact that tonnage produced in the two districts has almost reached 400,000 tons indicates a decided improvement in the Pocahontas region and some revival of the demand for smokeless coal.

A generally dull market has been reflected in the large number of mines which are either shut down or are being operated very irregularly in the Fairmont region. On Saturday, Feb. 1, the number of idle mines amounted to 174 as against about 150 for the previous week. While mines were idle, there was no diminution in the car supply, the daily supply running well over 3000 a day. The amount of coal loaded, however, was far below that, loads running not over five or six hundred a day, with few loads going to the West. Orders here and there, however, were regarded as being an encouraging sign and as reflecting a somewhat improved demand. Railroads, however, are still holding off on fuel orders, and this of course has restricted production somewhat.

In the Kanawha district there has been little change in conditions. If anything, it was duller as far as marketing coal was concerned, during the week ending Feb. 1, than it had been even in previous weeks. While smokeless coal in other districts showed sporadic spurts, there was nothing to stimulate production in the Kanawha district, the market being extremely dull. Prices, on the other hand were holding up well. In the absence of any special demand for coal, the car supply was plentiful. Owing to the flat market, a large part of the mines were not operating or else were being operated during only a part of the week. The total net tons produced was 84,452.

In the New River field there was little change in conditions during the week ending Feb. 1, extreme dullness characterizing the demand for New River coal. However, there was an advance in price despite the fact that the market was so lifeless. New River producers are confident that there will be a resumption in the demand for smokeless coal before other kinds of coal show any improvement. The largest losses in production during the period already mentioned were due to no market.

New York, N. Y.

The Wholesale Coal Trade Association of New York, Inc., has taken up with Walker D. Hines, Director General of Railroads, the matter of demurrage charges on coal at tidewater and in a letter to Mr. Hines states that the present demurrage regulations provide for three days' free time at tidewater, averaged month by month, and $3 per day per car thereafter. The movement of coal over the railroads, the Association says, is so uncertain as to time that it is impossible to calculate with any degree of certainty whatever, when the whole or any part of a shipment will reach the port of transshipment.

Demurrage charges, the Association says, are intended to prevent abuse of equipment, and where the carrier has performed in reasonable manner its obligation of transportation, are undoubtedly proper and beneficial to the shipping public; but in the circumstances under which coal is moved to tidewater their principal effect is to place an additional burden upon the commodity which must be borne by the consumer.

The imposing of these demurrage charges is a discrimination against all users of coal who have to depend on getting their supply by the water routes from the railroad terminals. In addition to raising the price at all times, they will find it difficult to get a sufficient supply, except in time of depression, for the reason that the risk of loss to shippers is so great that they will not send coal to tidewater if they can sell it elsewhere.

The Association believes that transportation charges and penalties should take into consideration the conditions surrounding the handling of a commodity, and those conditions at tidewater for the transshipment of coal are such that unless there is relief in respect of demurrage charges at the ports the result will be to defeat the very purpose of those charges—that is, the quick release and return to the mines of coal carrying equipment—and force the sending of shipments all-rail, tending to longer employment of equipment and further congestion on all railroad lines.

PENNSYLVANIA
Anthracite

Pottsville—Seventeen of the "individual" mines, all shippers via the Reading Ry., are idle in the Schuylkill region. The reason assigned is that they are up against it because of a glut in the market and no place to store the product. All the Reading Coal and Iron Co.'s collieries are in operation with one or two exceptions. Great quantities of coal are being stored at Landingville and Abrahams.

Wilkes-Barre—A complaint against the alleged practice of the anthracite coal companies throughout the region in importing cheap labor from New York City and other Eastern cities will be introduced at the Conciliation Board, it was decided at a meeting of the tri-district board, United Mine Workers, held on Feb. 5. It was learned that the matter will be considered as a general grievance, and if not settled drastic action will be resorted to.

Lansford—Although many mines in the Schuylkill and Wyoming regions have either shut down or are working on reduced time, all the collieries of the Panther Creek Valley operated by the Lehigh Coal and Navigation Co. are still operating to capacity; and there are no indications that they will shut down or work on reduced time. A large proportion of the coal mined by the Navigation company is sent to New England markets via the Lehigh & New England R.R., which is controlled by the Navigation.

Hazleton—Coal operators of the Lehigh field who were interviewed on the curtailment of work schedules at the mines because of the slump in the market due to mild weather and the shutting down of munitions plants, were confident that the conditions would not last long and that the collieries will be back on full shift within four months. They discourage the suggestion that instead of cutting the time from eight to seven hours the mines suspend Saturadys and Mondays, as they fear the three-day holiday each week would give Bolshevik agitators a chance to create trouble among the idle men.

Scranton—Throwing more than 2000 experienced mining men and laborers out of employment, the Delaware, Lackawanna and Western R.R., Coal Department, on Feb. 4, officially closed its three largest collieries operating in this section. Two of the collieries, the Continental and Brisbin, will be abandoned and both breakers dismantled. The Bellevue colliery will close for an indefinite period, throwing 850 men into temporary idleness. The closing of both the Continental and Brisbin collieries will mark another interesting page in anthracite history. The two collieries were among the first operated in the Lackawanna Valley.

West Scranton—Following a dispute relative to the method carried out in the loading of cars, the People's Coal Co. has refused to further handle the output of the See-Rob Coal Co., and as a result the mine of the latter company is closed. Officials explain that the arrangement between the two companies provides that the People's company take charge of the See-Rob company when it reaches the foot of the plane leading into the Five-foot vein of the former company. Certain phases of the contract have been broken, according to officers of the People's Coal Co.

Bituminous

Charleroi—The washeries of the Donald Nos. 2 and 4 mines of the Consolidated Coke Co., Grays Landing, Penn., are being rebuilt and equipped with the most modern machinery. H. R. Blackford, general superintendent, is in charge of the work.

Greensburg—Helen M. Bygate, of Pittsburgh, and J. Fred Kurtz, of Connellsville, have sold a tract of 167 acres of Pittsburgh seam coal to the Whyel Coke Co., of Uniontown. This undeveloped coal land is in North Huntingdon township, near Irwin. The consideration was $175,000.

Uniontown—Edward O'Brien has resigned as a member of the Mine Foremans' Examining Board of the 23d bituminous district, and on recommendation of Mine Inspector Richard Maize, chairman of the board, the Court appointed Joseph Forbes, of Grays Landing.

Waynesburg—Deeds have been recorded of sales in this county to the Cumberland Coal Co. They include 101 acres from Daniel M. Anderson for a consideration of $56,482.91 and the coal under a small lot in Jefferson borough from Malinda Alexander for $143.35.

Meyersdale—The bottom apparently has dropped out of the coal business in the Meyersdale region. Mine No. 4 of the Keystone Coal Co., was closed down recently, and many of the smaller mines such as Stotler, Schell, Meager and others along the Salisbury branch have been idle for several weeks, with no immediate prospects of resumption. The Atlantic Big Vein Coal Co., which operates the old Keystone opening, it is reported, has ordered its miners to remove their tools. It is said that there are at present more than 500 miners idle in the lower end of the Meyersdale region. The mines of the Consolidation Coal Co. in this section are operated only about half time. Many men are leaving the region and going elsewhere in search of employment.

WEST VIRGINIA

Eldorado—With the completion of its plant at this place, on the Coal and Coke Ry., the Foy Coal Co. is going ahead with mining operations, but is storing the coal so mined.

Clay—Having completed the construction of a siding to its lease of 1200 acres in Clay County, the Lima Coal Co. of Lima, Ohio, proposes to proceed with the construction of its plant with a view to the development of the coal under lease.

ALABAMA

Bessemer—The Gulf States Steel Co. is installing electric meters on the long hauls in its Virginia Mines, near here. Electrical machinery has also been placed to generate the power for the haulage and other units which will be operated by electricity in future. A new slope is also being put down to shorten the distance to the workings, which will enable an increased production to be obtained from the mines.

KENTUCKY

Mayking—The Pine Creek Lumber and Coal Co. plans development of timber and coal properties near Mayking, one of the new coal districts of the state. T. L. Tackett, of Enterprise, Ky., and E. R. Hay, of Winchester, Ky., are the principals in this concern.

High Splint—W. R. Grant, of Pittsburgh, Ky., has leased 500 acres of coal land from the Cooper Ridge Coal Co., of Evarts, Ky., and plans development. The Cooper Ridge Coal Co. recently increased its capital to $75,000, for the purpose of developing properties at High Splint.

OHIO

Lisbon—Extensive development of coal lands in Columbiana County is planned by the Glenwood Coal Co., recently formed by M. L. Gailey and John T. Harrington, both of Youngstown. The deposits are located four miles from Lisbon.

INDIANA

Hammond—A new coal bunker, 200 ft. wide, 1000 ft. long and 25 ft. deep, is being installed at the Whiting refinery of the Standard Oil Co. It will have a capacity of more than 125,000 tons of coal.

Bicknell—Mine No. 1 of the American Coal Mining Co. at this place, hoisted 6123 tons of coal in eight hours, filling 128 railroad cars. The American mine, which is owned largely in Terre Haute, Ind., and Brazil, Ind., some time ago set a record for hoisting 5911 tons of coal in eight hours. A few weeks ago an Illinois mine loaded 6008 tons in eight hours. The achievement of the Bicknell mine places it 120 tons in excess of the Illinois mine.

Belleville—Damage to the extent of between $3000 and $4000 was done to the engine room and the gas engines of the Southern Coal and Mining Co. in the Little Oak mine Feb. 6, as the result of an explosion of gasoline. The fire was confined wholly to the engine room and was soon extinguished, but not until two expensive gasoline engines had been badly damaged. The lives of twelve men were jeopardized by the explosion and seven men had considerable difficulty in escaping. About 300 employees were idle for two or three days until the damage was repaired.

ILLINOIS

Danville—The Brady Branch mine, near Tilton, is contemplating several improvements, as it is expected the Wabash R.R. will build a switch to the dump mines and extend an incline from the ravine to the top of the hill. About sixty men are employed at the Carbon Hill strip mine, north of Tilton, and work has been exceptionally good until within the past few weeks. At the Brady Branch mine 150 men are employed.

Divernon—Divernon miners of the Madison Coal Corporation mine are reported to have broken the Sangamon County coal-hoisting record, with 1051 cars in six hours and eight minutes.

Litchfield—In consequence of much hardship because of the closing of the two mines in Witt, near this city, the residents of the village have presented a petition to Congressman Wheeler asking that he take up the matter with the proper authorities with a view to having the mines reopened. The closing of the mines in Witt in 1916 and the subsequent closing of all of the grocery stores in the village except one, caused the residents to appeal to the state charities for assistance. The people of the village are attempting to prevent a repetition of the conditions prevailing two years ago.

Springfield—All coal mines of central Illinois not under contract are now running only two days a week because of the warm weather and decreased fuel consumption.

Benton—The Pond Creek Coal Co., popularly known as the "Bobby Dick Mine," has been sold to a Chicago firm of coal operators, who will operate it under the name of the Freeman Coal Mining Co. This is one of the best small mines in the Benton territory and has been a prosperous property. The mine is located in Franklin County, and according to the last fiscal year mined for the year nearly 300,000 tons of coal.

ARKANSAS

Hartford—The Central Coal and Coke Co. has taken over the old Prairie Creek No. 34 mine at Hartford and is developing an up-to-date operation. Complete new equipment has been installed, as the mine was practically destroyed during labor troubles some time ago. The estimated capacity of the mine is to be 2000 tons per day. Construction and rehabilitation work is under the supervision of John A. McCurry, who will also be superintendent of the operation.

OKLAHOMA

Lehigh—The Oklahoma Mining and Stripping Co. will finish its mine at this place within a short time. A 6-yd. Bucyrus shovel is being used for stripping the overburden and two 3-yd. draglines for loading coal. The company is also developing a slope mine near Lehigh, and later on expects to start work on another.

Foreign News

Sydney Mines, N. S.—The Nova Scotia Steel and Coal Co. plant was closed down temporarily on Feb. 3. Four batteries of coke ovens will be kept in operation and the remainder allowed to cool off. During the suspension of operations the open-hearth and blast furnaces, stoves and coke ovens will be dismantled and undergo extensive repairs.

Personals

William Reid has resigned as mine foreman for the Dor-Mar Coal Co. at Savan, Penn.

H. C. Drum, formerly inspector, has been made assistant general manager of the Consolidated Coke Co., Grays Landing, Penn.

W. L. Fisher, formerly with the Consolidation Coal Co., at Jenkins, Ky., is now chief engineer of the Consolidated Coke Co., Grays Landing, Penn.

Frank Christopher, of Steyer, Md., has been appointed superintendent of the mines of the Diamond Coal Co. on Scott's Run, Monongalia County, succeeding C. W. McDowell.

W. Kinter has resigned as superintendent of the Locust Colliery Co., operating mines at Locust, Penn. He is succeeded by **J. Woods**, formerly mine foreman for the Pittsburgh Gas Coal Co., at its Whiskey Run mines at West Lebanon, Penn.

Lester E. Armstrong has accepted a position as advisory engineer with the Powdered Coal Engineering and Equipment Co., of Chicago. Prior to his service in the air branch of the army, Mr. Armstrong was associated with Babcock & Wilcox.

C. F. Ice, having completed his duties as chief of the division of inspection of the office of the district representative of the U. S. Fuel Administration for the Fairmont region, has again taken up his duties as the general inspector of the Consolidation Coal Co.

John F. Nealis, who recently received his discharge from the aero observation branch of the service, is now associated with the Powdered Coal Engineering and Equipment Co., of Chicago, as advisory engineer. Mr. Nealis formerly had charge of research work for the U. S. Steel Corporation.

J. M. McHugh, of Birmingham, Ala., who has been superintendent of the Edgewater Mine of the Tennessee Coal, Iron and Railroad Co. for a number of years, has been appointed general superintendent of coal mines for the same company, having jurisdiction over all operations in the Birmingham district. Mr. McHugh succeeds John F. Meagher, who died Jan. 16.

Lucius W. Robinson, for many years president of the Rochester and Pittsburgh Coal and Iron Co. and its subsidiary companies, has retired from the active business and operating end. **B. M. Clark**, former vice president in charge of operations, has been made president to succeed Mr. Robinson. **F. M. Fritchman**, general manager of the companies, has been given Mr. Clark's post as vice president. No successor to Mr. Fritchman as general manager has yet been named.

Industrial News

New York, N. Y.—The K-B Pulverizer Co., manufacturer of the crusher familiarly known as the "K-B," recently removed from its former address, 86 Worth St., to 70-72 Worth St., New York City.

Charleston, W. Va.—A bill has been introduced in the West Virginia legislature providing for an increase of $2000 per year in the salary of the chief of the mine department, making a total salary of $5000. The bill also carries increases of $900 per year to each of the deputy inspectors.

Birmingham, Ala.—At the recent session of the Board of Examiners held in the office of Chief Mine Inspector C. H. Nesbitt, there was a total of 68 applicants for certificates of competency as firebosses and mine foremen, 46 of whom passed the tests successfully, certificates being issued to nine who qualified as fireboss, five as second-class mine foremen, and 32 as first-class mine foremen.

Fairmont, W. Va.—A meeting of creditors—the first one—of the Initial Coal Co., which was declared bankrupt a short time ago, was held on Saturday, Feb. 1, to elect a trustee. Clarence D. Robinson, of Fairmont, a well known coal operator, has already been appointed receiver, qualifying under $25,000 bond. The assets of the company are in the neighborhood of $200,000, with liabilities considerably less. The operation of the company is in Barbour, the offices of the company being in Fairmont.

Birmingham, Ala.—Adams, Rowe & Norman, Inc., is the title of a new corporation, with offices in the Brown-Marx Building, which will devote itself to exporting and obtaining new markets for Alabama coal. Composing the new organization, which has a backing of millions of dollars, are W. Carson Adams, manager of sales of the Alabama Fuel and Iron Co.; G. J. Rowe, vice president and treasurer of the Yolande Coal and Coke Co.; and J. A. Norman, vice president of the Bonnyman-Norman Coal Co.

New York, N. Y.—Notices have been received from the United States Fuel Administration stating that monthly reports from distributors of anthracite and bituminous coal and coke on Forms A, B and C, from Pennsylvania anthracite to operators or sales agents on Form OA, and from railroad coal companies on Form 6, will be discontinued by the Bureau of Investigation, United States Fuel Administration, beginning Feb. 1. Reports of all shipments made during the month of January must be mailed promptly within the time required.

Pittsburgh, Penn.—An enthusiastic meeting of the coal-jobbing interests of Pittsburgh and vicinity was held in the ballroom of the William Penn Hotel on Monday, February 3, which was in the nature of a dinner in honor of George H. Cushing, Managing Director of the American Wholesale Coal Association. About 130 coal jobbers and their operator friends were present. Owing to the illness of A. R. Hamilton, of A. R. Hamilton & Co., who had been selected as toastmaster, it was necessary for Ira E. Bixler, president of the local association, to act in his stead. Mr. Bixler made a brief address of welcome and urged upon those present the necessity of organization, calling attention to the fact that the other branches of the industry had in the past outstripped the wholesalers and that it was necessary for them to protect their interests even as the retail dealer and producer had already succeeded in doing. Mr. Cushing addressed the meeting at considerable length regarding various phases of the present situation in the coal business.

Cincinnati, Ohio—The consolidation of ten operating and marketing coal companies into a single corporation to be known as the Hatfield-Reliance Coal Co. of Ohio, has been effected here by the Fleischmann-Hatfield interests. The new company will have an authorized capitalization of $3,000,000 preferred and $4,000,000 common stock, but it is understood that of this total of seven millions of stock only $3,700,000 will be issued just now. The companies affected are the Reliance Coal & Coke Co., of Cincinnati, and the Hatfield Coal Co., of Covington, Ky., both of which have large distributing organizations; the Lincoln Coal Co., Glomawn Coal Co., Hazard Junior Coal Co., all of Perry County, West Virginia; Reliance Coal & Coke Co., Reliance Iron and Coke Co., Licking Valley Coal Digger Co., West Virginia Workers' Coal Co., Plymouth Coal and Mining Co., all of West Virginia; and the E. J. Hickey Transportation Co., operating boat and barge lines. Pending the completion of the merger, with the election of new officers for the consolidated company, meetings of several of the companies involved were held in Cincinnati on Feb. 4, when officers were elected. The company will organize an extensive distributing system throughout the Middle West to market the large production which it will control.

MARKET DEPARTMENT

Weekly Review

No Life to Coal Market—Many Operations Shut Down—Soft Coal Prices Maintained, While High-Grade Varieties Are Advanced in Price—Await Outcome of Railroad Fuel Argument—Plenty of Anthracite.

THERE is no activity in the coal market. A noticeable feature, however, is the fact that the relinquishment of Government control, instead of resulting in lowered coal prices, has brought about an increase in price of the high-grade bituminous coals. Coal mined in Franklin County, Illinois, has advanced twenty cents a ton, while sales of West Virginia smokeless coals are being made at forty cents above the last-fixed Government price.

So extremely dull is the demand for all kinds of coal that hundreds of operations have been shut down, pending a revival of buying. No such revival is expected much before the first of May, when it is believed that consumers who have been using up their reserves will again be forced to come into the market. The shutting down of the mines has served to tighten the condition of the market, and it is not at all improbable that other grades of coal besides those already referred to will increase in price before the month is out. Wherever sales are reported at considerable concessions from the Garfield prices, investigation discloses that the coals so sold are in small lots and of an inferior grade.

Little contracting is reported for future requirements, the general tendency of large consumers being to await further developments. Another deterrent to active contract inquiry is that the question of what price the railroads are to pay for fuel has not yet been decided definitely. It is understood that the railroads insist on getting their coal supplies at a price out of all proportion to the costs of production, and that the national soft coal operators' association has taken the matter up with Director General Hines.

In years gone by the railroads, by many unfair practices, were enabled to buy their coal for far less than the cost of producing it. The operators, in order to avoid a loss, as a consequence were obliged to raise the price of coal to the public. This the operators refuse further to do, and the outcome of the conferences with the railroad head is being eagerly awaited.

Production of soft coal is still on the decline, the output of the bituminous mines during the week ending Feb. 1 being estimated at 8,345,000 net tons.

The continued prevalence of good weather has caused many of the collieries in the anthracite region to suspend indefinitely. Both dealers and consumers have plenty of coal on hand, and cancellations and suspensions of deliveries are the order of the day. Steam as well as domestic sizes of hard coal are plentiful, though there is less of the former coming to tidewater now because of the falling off in demand.

The output of anthracite coal during the week ending Feb. 1 is estimated at 1,821,000 net tons, exceeding production during the same period of 1918 by 57,000 net tons.

WEEKLY COAL PRODUCTION

Bituminous—The third successive week of decreasing production was recorded during the week of Feb. 1 when the output of bituminous coal declined to the lowest level during the past few years with the exception of Christmas week of 1918. The production during this week is estimated at 8,345,000 net tons and is 893,000 net tons below the production of the week of Jan. 25 and 1,271,000 net tons below the week of Feb. 2 of 1918. The average production per working day during the week of Feb. 1 is estimated at 1,391,000 net tons as compared with 1,872,000 net tons, the daily average for the coal year to date, and 1,744,000 net tons, the daily average for the same period of last year. The production for the coal year to date now totals to 494,081,000 net tons as compared with 460,417,000 net tons for the period Apr. 1, 1917, to Feb. 2, 1918.

Anthracite—Anthracite production during the week of Feb. 1 is estimated at 1,821,000 net tons, a decrease compared with the week preceding of 65,000 net tons, but exceeds production during the same week of last year by 57,000 net tons. The daily average per working day is estimated at 304,000 net tons and for the coal year to date at 312,000 net tons, compared with 317,000 net tons for the same period of last year. Total production for the coal year to date is estimated at 82,363,000 net tons and falls behind production of last year by 1,311,000 net tons.

Carriers' reports for the week ended Feb. 1 show that decreases occurred in all fields, compared with the week preceding. In the central Pennsylvania fields the decrease in cars loaded amounted to approximately 4600; in Ohio to 1700 and in the district including Illinois, Indiana and western Kentucky to 3011.

New England Shipments—Bituminous coal movement to New England continued on the downward grade during the week of Feb. 1, being estimated at 299,308 net tons as compared with 344,112 net tons during the week of Jan. 25. This decrease occurred in both rail and tidewater movements, all ports reporting a falling off in the tonnage loaded.

Tidewater Shipments—Shipments of bituminous coal from the north Atlantic ports and Hampton Roads during the week ended Feb. 1 are estimated at 667,206 net tons and fall behind shipments during the preceding week by 16,788 net tons. Baltimore was the only harbor to report an improvement over the week preceding, while New York and Philadelphia fell behind slightly. The Hampton Roads shipments also fell behind, the decrease at this port amounting to 16,577 net tons.

Beehive Coke—The production of beehive coke in the United States during the week ended Feb. 1 is estimated at 529,000 net tons as compared with 575,000 net tons during the week ended Jan. 25, and as against 468,000 net tons during the same week of 1918. The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production during the week ended Feb. 1 at 295,253 net tons, and the operation of their plants at 75.2 per cent. of full time compared with 74.6 per cent. during the week ended Jan. 25. Improvement is noted in labor conditions. The same operators produced 141,400 net tons of coal.

Byproduct Coke—The production of byproduct coke in the United States during the week ended Feb. 1 is estimated at 554,639 net tons and while approximately 10,000 net tons below the production of the week preceding, exceeded production during the corresponding week of 1918 by 188,000 net tons. The plants of the country were operated at 84 per cent. of their full time during the week as compared with 85.5 per cent. during the week ended Jan. 25. The loss of capacity amounted to 16 per cent. during the week of Feb. 1 and is due to repairs to plants which amounted to 6 per cent. and lack of business which amounted to 5.8 per cent. as compared with 1.4 per cent. during the week previous. Operating conditions changed but slightly in the various states, lack of market being reported for the first time by the operators in Alabama and increased losses of capacity occurring in all the districts reporting lack of market as the limiting factor.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running somewhat less than for the corresponding week of 1918. Road sales for immediate delivery were about the same, compared with the corresponding period a year ago. Our road salesmen are not offering fall lines as yet. Many more merchants are in the market at this time than in recent years, replenishing stocks depleted by excellent retail business. Collections continue excellent.

The Iron Age—Urgent needs are bringing forward delayed buying by the railroads. Besides cars and locomotives, 500,000 tons of rails are counted on. Some rail mills are without orders and none has more than four or five months' bookings. On foreign account 62 locomotives have been sold for Africa and Argentina. Car builders are expecting a release on 20,000 cars for France postponed on the cessation of hostilities. German steel output according to the London cable was about 16,500,000 tons in 1918 or about the same as 1917. A big Continental rail and construction material demand is reported.

Dry Goods Economist—The attitude of labor has engaged the attention of distributors and manufacturers of textiles this week almost to the exclusion of problems more directly connected with merchandising. In numerous and widespread centers operatives have quit work in the effort to enforce their demand for shorter hours with no reduction in wages, while in a few cases the operatives want not only shorter hours but an actual increase in pay. In some cases the operatives' refusal to withdraw their demands was answered by the closing of plants. In few instances have the operatives' demands been granted.

Dun's—Of disquieting features, the existing labor troubles, notably those in Eastern textile centers, are conspicuous, and the percentage of idle machinery has stead-

ily risen, either because of strikes or from the slow development of new orders to replace the expired or canceled Government contracts. Very heavy payments through the banks, as reflected in Clearing House transactions at the principal cities in the United States, continue the rule, total exchanges this week amounting to $6,255,465,712, an increase of 23.3 per cent., as compared with this week last year, and of 0.2 per cent., as contrasted with the corresponding week in 1917."

Bradstreet's—Some important branches of the woolen industry are reported firmly established on the newer basis of time run. Overtime in industry and on the railroads has definitely ended, but reports from steel mills, particularly at the West, is that the wheels are beginning to turn faster in answer to calls from new domestic business. Export trade has livened up a little in lumber, leather, and provisions, but iron and steel are declared to still lag in this respect. In distributive trade, while the general report is that affairs as a whole are still at a waiting stage, there are signs that Spring distribution, especially at the West, is a trifle more active, not so much in textiles as in shoes, millinery, hardware, agricultural implements, and building materials.

Atlantic Seaboard

BOSTON

Situation continues hopelessly dull. More and more difficult to absorb water-borne coal. Operators find situation here hard to understand. Lower rates on barges but no business. Steamer rates unchanged. Action on railroad fuel eagerly awaited. Pennsylvania shippers have ample contracts on file but shipments suspended to such extent that shutdowns are beginning to be the rule. Mills under heavy curtailment. Outlook anything but encouraging. Bottom has fallen out of anthracite market. Retailers put out 50 per cent. normal or less. Many shippers without orders. Price reduction general in Boston.

Bituminous—The current situation here is without any relieving feature. There is now practically no buying interest whatever, and as the season advances the trade realizes more keenly how far off is any material improvement. The current market is simply stagnant and the merest nibbles on the part of buyers are signals for the closest of figuring. Unless for special reasons a purchase is contemplated there is no buying at all. For more than 90 per cent. of the steam-users of New England a very substantial cut in current prices would be no inducement, so heavy are current stocks and so little faith is there in the future of the market. This has been proved time and again the past month, when both all-rail and at tidewater sacrifice offerings have been made in the effort to dispose of distress coal. As low as $1.50 per net ton has been heard on some of the West Virginia grades that are accessible to New York ports and where coal had to be moved in order to obviate heavy demurrage charges under the new rules in force with the Tidewater Coal Exchange. The outlook is for a hopelessly dull market throughout the spring.

The tidewater market is practically bare of inquiry. The regular shippers who normally have staple trade throughout the season are facing almost complete shutdowns at the mines in addition to the steamers under charter that must remain tied up for an indefinite period while the Shipping Board collects its monthly dues on Government form of charter. So difficult is it now for this territory to absorb cargo coal that factors with market coal on their hands are at loss which way to turn. It is reliably reported that a price alongside that is less than the f.o.b. figure at Hampton Roads was the only offer obtainable on such a cargo a few days ago, and at that the barge would have to wait several days for space to be made through daily consumption to take on the coal. In other words, prices have to be shaded nearly $3 per ton in order to induce the purchase of a single cargo, and that illustrates the state of the market in this territory at this writing.

Rates on barges from Hampton Roads that were quoted at $3.50 in the midst of the stringency last summer are now to be had at $2.75 even to points east of Boston, but the modification has little significance because there is such a dearth of inquiry. There is an accumulation of boats at practically every port because charters are so hard to place. Meanwhile steamer rates under the jurisdiction of the Shipping Board are unchanged and there is apparently no prospect of change until Apr. 1, if then. A few of the steamers heretofore in coastwise trade have been chartered to Cuba and to South America, so that today there are probably not so many steamers actually laid up as was the case a fortnight ago.

The attitude of the railroads has always been a big factor in the New England market, whether the latter is dominated by buyer or seller, and this year will probably be no exception. The trade is eagerly looking forward to a decision by the Railroad Administration on this complicated matter, but to judge from the reserves being carried by New England roads and the bargain-counter offers being made them by shippers who have coal they must move the matter is likely to be viewed much less urgently by the railroad authorities than by the coal interests.

Most of the Pennsylvania operators who have regular connections in this market have ample contracts on file, but the latter are useless at this writing because so generally have the consignees been supplied through other channels. Then too, consumption was estimated last year on a war basis and on the basis of a normal winter, and now with abundant water power and widespread curtailment it is physically impossible for a very large number of plants to increase their stocks even if there were an object in doing so. $2.30@2.40 is being freely quoted per net ton on medium-grade coal f.o.b. mines in central Pennsylvania but no business of any moment is reported. On the other hand an increasing number of mines have practically ceased operations. The movement of these coals into New England seems certain to diminish through February and March. No comprehensive business is being looked for now until June, at the earliest.

Anthracite—As orders are filled there is no new business to take their place. There are several houses here who have no unfilled orders on their books. The bottom has certainly dropped out of the anthracite demand for all sizes. The relatively few shipments that are being made contain a large proportion of stove and chestnut, apparently the only sizes that the public is at all interested in taking on. Retailers in all directions report that trade has fallen off at least 50 per cent. and that it is increasingly hard to find consumers willing to accept deliveries. For the most part the last "third" which retailers were restrained from delivering during the summer and fall has proved a myth and does not exist. The extremely mild winter has something to do with it, of course, but the psychology of the situation had also much to do with it.

The retail dealers of Boston reduced prices on Feb. 5 from $12 on broken egg, stove and chestnut to $11 for these sizes, $10 being the new price for pea. By this move the dealers acknowledge there was some ground for the reduction made by one of their number some weeks ago, the announcement of which attracted widespread attention.

NEW YORK

Demand for anthracite nearly at a standstill. Orders scarce and many individual operations reported as closed temporarily. Yards have sufficient supplies for several weeks. Company prices for the domestic sizes prevail. No change in mine prices expected. Bituminous situation quiet, with plenty of coal to meet all needs. Production greatly curtailed and many miners idle. Many loaded boats in the harbor.

Anthracite—There has been no improvement in either the wholesale or retail markets. Demand is practically at a standstill and orders have become so scarce that many of the mines are operating on half time or less. Several of the smaller operations, it is reported, have temporarily closed down entirely due to the lack of demand.

Locally the situation is bad. There is plenty of coal to be had but no buyers. Everybody seems to have sufficient supplies to last until Mar. 1, even if the weather should cause a heavy consumption, and there is no disposition on the part of retail dealers to do any more buying at present.

The differential between the Individual and Company prices no longer exists so far as buying is concerned, as the smaller operator realizes that he can secure orders now only by meeting the company terms.

Nothing definite has been announced concerning the rumor that mine prices might be changed. Some coal men do not expect any change from the present prices, at least not until Apr. 1, and then there are others who believe that instead of the differences between the two prices being equalized there will be the usual spring discount of 50c. per ton. On the other hand there are many who would not be surprised if there were no spring discount. However, no definite announcement is expected for several weeks to come.

The demand for domestic sizes is stagnant. There is no call and the surplus is heavy. Shipments to this harbor continue to average up well with those of previous weeks. Dumpings for the seven days ended Feb. 7 were 5014 cars as compared with 4569 cars the previous week, an increase of 445 cars.

Dealers are not inclined to buy heavily at this time, preferring to reduce their stocks rather than to carry over into the new coal year a lot of high-priced coal. A few days of real winter temperature would, however, stimulate the market.

The demand for the anthracite steam sizes shows no improvement, but the market is stronger because of the suspension of operations in many of the mines, causing smaller shipments. Many operators are taking advantage of the present situation to store these coals, and this tends to decrease the tonnage sent to tidewater. Quotations in Individual coals vary, with heavy concessions heard of rice and barley. Pea coal is practically unsalable, many shippers, according to report, asking for offers. There is no demand for it and the supply is large.

Bituminous—Even with the market quiet the situation is well in hand. With similar conditions existing a few years ago it would be expected that the market would be over-run with coal, but no such condition exists now. There is plenty of coal here to meet all requirements, but the surplus is not so large as to cause a break that would result in mines being willing to practically give their coal away.

Operations have been curtailed and the result has been that the market is not overburdened. One hears of certain grades being offered at concessions below what was the Government's maximum, but that was expected by many shippers. For the high grades these concessions are not so large as for the cheaper coals. This may be due to the demand of large consumers for high-grade coals and the continuance of the Government to take good-sized tonnages.

Operators are not disposed to take orders for Clearfield coals at lower prices than from $2.60 to $2.75 at the mine. They are taking into consideration the cost of production and rather than operate at a loss are inclined to suspend mining until the market is in better condition.

Lack of demand has already been felt in the mining regions and many mines have either been closed down temporarily or are working on a curtailed schedule. In the Fairmont regions it is reported that many thousand mine employees are idle because of the lack of orders.

With the coal year drawing to a close the matter of contracts for next year is attracting some attention. There are numerous inquiries, but it is not likely that either operator or consumer will hurry the signing up for next year's supply. Neither side seems anxious to obligate himself with the market in its present condition. The consumer inclines to the belief that cheaper coal is possible while reports have it that the operator believes higher prices, especially for the best grades will be the rule. There are some consumers who believe that by waiting until about June before signing up for next year's coal they will be able to strike a bargain, while there are others who believe they will do better by buying in the open market.

There are many loaded boats in the local harbor, some of which it is reported have been offered at low prices in order to save demurrage charges. Gas coal is in good supply.

Dumpings of bituminous coal at the local railroad docks for the week ended Feb. 7 were 6779 cars, an increase of 592 cars over the previous week.

PHILADELPHIA

Retail prices for anthracite drop as result of removal of Government supervision over mine prices and surplus of coal. Local market continues quiet. Demand is slow and dealers are not inclined to fill up at present time. Stove and chestnut is heaviest call. Bituminous market "dead." Removal of price supervision makes no difference in local situation. High-grade coal wanted and consumers are willing to pay price.

Anthracite—The removal of the Government regulations of prices on anthracite has resulted in a drop in retail prices in this city, the reduction varying according to size and the proportion of coal purchased by the dealer from individual operators.

The market is quiet. Demand has dropped and buying is slow. Most of the dealers have their bins filled and do not expect they will have to make heavy purchases until spring.

The heaviest call is for stove and chestnut, and this is limited and hardly makes a dent in the stocks available for shipment by the operators. Movement of egg and pea is slow, and shippers find themselves overstocked with these sizes. Reports from nearby counties indicate a better demand than in this city, with prices for individual coals stiffer.

With everybody complaining of the quantity of domestic coals on hand, the supply of the steam sizes is even greater. The curtailed receipts due to the closing down of numerous mines throughout the regions are more than sufficient to take care of all immediate requirements.

Reports from the coal fields indicate a heavy suspension of mining, and unless demand increases a further curtailment may be necessary. On Friday of last week it was reported that 17 mines in the Schuylkill region were idle because of the glut in the market. It was also reported that some of the railroads were considering the laying-off of some train crews because of the lack of shipments.

Bituminous—The situation has not been changed to any great extent since the first of the month when the price supervision was removed by Governmental order. The demand is slow and the supply of coal on hand large. While concessions have been heard of, they are not made for large lots.

Most consumers having plentiful stocks on hand are willing now to buy only high-grade coals and for these are willing to pay substantial prices. The cheaper coals are not in demand unless the buyer is hard pushed and has been unable to secure the better qualities.

BALTIMORE

Soft coal market remains heavily overstocked, and prices on forced sales are much off old Government maximum. Anthracite in plentiful supply, and some dealers hard pressed to find places to put it. Independents offer inducements.

Bituminous—The bituminous market here is more than liberally stocked at present. It is hard now for mines to place any but the better coals. The tidewater terminals are all jammed with loaded cars. Some forced sales in this market are being made much off the old Government maximum. For the first time there was talk of offerings of fuel around the $2 mark, the coal thus pushed being from the Fairmont district. The less desirable coals running on pool No. 18 here too were offering cheap in many cases, and some sales were recorded on a mine basis of $2.20. Better grade coals generally ranged all the way from $2.50 to $2.75 mine basis for the most part. An effort is being made to clean up the congestion here by placing the coal with plants that can store a little more ahead. It may take a few weeks, however, to get things so far straightened out as to give a healthy market again. Numerous mines remain closed, and there is some talk of labor uneasiness as a result. Labor in some sections is finding it hard to understand that high wage scales do not necessarily mean continuous work.

Anthracite—Hard coal has poured in liberally of late and dealers here, in the face of the light demand due to the continued mild winter, are in some cases hard put to find outlets. Some with limited yard capacity have coal awheel that they do not know what to do with. Dealers who are well stocked now are cautious in ordering as they fear being caught by a change of prices at the mines. There has been talk that the company mines may advance rates 25c. to 50c. and that the independents will then sell at the same rate. As a matter of fact independents are already offering inducements for orders, waiving in many cases the 75c. difference allowed by the Government formerly, and agreeing to sell from Feb. 1 at any rate that may be established by the company mines. Retailers are moving slow in all purchasing, however, and the market is generally listless.

Lake Markets

PITTSBURGH

Asking prices on Government basis. Scarcely any contracts. Demurrage coal at cut prices. Operations at 30 to 35 per cent.

The advanced prices published by Pittsburgh district coal operators, on the basis of $2.50 for mine-run, 15c. less for slack and 10c. more for ¾-in., proved not to be even a seven-days' wonder but rather a two or three days' wonder, and they are now practically forgotten. The asking price for mine-run is $2.35, the former Government maximum, but bids at less are frequently accepted, particularly in the case of coal on track and requiring immediate sale to avoid demurrage. Demand is so light that such coal is an important market influence, though the quantity involved would be quickly absorbed in a market of normal dimensions.

Operators are looking for the curtailed output—30 to 35 per cent. of capacity—and a growing demand from consumers to right the situation and put the market on a steady basis. They insist that cost of production at the lowest cost mines is not much under the Government figure and at many small mines is above it, also that no one is going to sell coal at a loss. Buyers do not regard arguments based on cost figures as conclusive, and accordingly are holding off.

The contract season is on, but scarcely any contracts are being made. One contract, however, is definitely reported, 3000 tons monthly of ¾-in. gas coal over the twelvemonth at $2.60, the full Government limit. The contract probably represents the exception rather than the rule. It is improbable, however, that there will be much shading of prices in the case of contracts, for a time at least, but spot lots that must be moved may go at any figure.

The market is quotable at about the following range, depending largely on grade, but the higher figures being fairly well maintained as asking prices on contracts: Slack, $2@2.10; mine-run, $2@2.35; ¾-in. gas, $2.45@2.60, per net ton at mine, Pittsburgh district.

TORONTO

Market quiet and featureless. Drop in price of anthracite. Industrial reconstruction slow. Bituminous little in requisition.

The coal market remains quiet and featureless, and dealers are doing little more than mark time. Such orders as are being received are mostly from the class of consumers who buy from hand to mouth. The price of anthracite has been reduced from $12 to $11.50 per ton, otherwise prices remain unchanged. There is no noticeable improvement in the demand for bituminous, the movement of which is likely to remain slow for some time to come. It is now fully apparent that industrial reconstruction, which was expected to take place rapidly, will be a gradual process, as but little actual progress is being made in that direction—manufacturers generally pursuing a conservative policy as regards projected changes and expansions.

BUFFALO

No improvement in coal situation. Anthracite orders being cancelled. Prices being held by shutting down mines. Jobbers find trade past managing. Prepaying freight charges.

Bituminous—The trade remains quite as dull as formerly. The weather has upset everything. Other industries as well as coal are disturbed by it, and trade is affected. The warm winter would have been welcomed a year ago, but now it has spoiled all sorts of calculations. Consumers of coal are using less fuel than they would in an ordinary winter. They have more coal on hand than they have any use for, and sometimes more than they can well store.

The mines are so far in command of the situation, for they shut down as often as the coal fails to sell. The new order, that does not permit the reconsignment of coal is likely to help the situation, so far as the mines are concerned, but it hurts the jobber; and he is badly enough off now. If coal must be shipped from the mine direct to the consumer it will not stand about waiting for a market. Buffalo has had little unsold coal on track this winter, and the little that was caught in that way suffered. Some of it sold for freight or even less.

Now comes the order to prepay the freight on all slack coal that is shipped into Canada by the Niagara or St. Lawrence River routes. This means that the shipper must put about twice as much money into the business as formerly, but it is done to protect the railroads from coal that is left on their hands. Some members of the trade see justice in it, though it will be opposed by all shippers. The dropping of the Government arbitrary prices has made no particular change in bituminous prices, which remain as before.

Anthracite—Distributors are still saying that consumers are not well stocked up here, but they are also aware that with a few days more of mild weather they will refuse to stock up at all, and will buy by the ton or two. There is still time for considerable winter, though not for any such winter as that of last year. At present many orders are being cancelled.

While the prices of anthracite are being held firmly by the railroad-controlled companies, the extra price allowed to the independents has been dropped, still the demand is light. Consumers complain that they must pay about twice what they did a few years ago, but it is easy to show that the cost of producing and marketing coal has also doubled lately. Word comes that preparations are being made for a still further advance in the freight rate, and possibly of the mine price also.

CLEVELAND

Prices of bituminous coal have stiffened, if anything, since Government control has been completely relinquished. The matter of price, operators declare, is entirely dependent upon the action of the Railroad Administration. More anthracite is being received, and a cut of 40c. in retail prices is due.

Bituminous—The larger operators have declared war on the "bolsheviks"—the smaller operators and jobbers who are undercutting prices. Asserting that price-cutting cannot stimulate business, and that it only weakens the indusry's contention that high labor and transportation charges have seriously impaired the margin of profit, the larger interests are refusing, as a whole, to make concessions and are spreading propaganda to this effect. The result has been smaller offerings of standard No. 8 coal underneath what was the Government maximum.

As has been the case for some time, mine-run can be had by "shoppers" for from $2 to $2.35. Most of this continues to be "car service" coal, in which the price is almost wholly a matter of bargaining between seller and buyer. The standard quotation on No. 8 coal remains $2.35. Contract coal is going at this figure, and the larger interests claim to be intending to stick to it until Apr. 1. Prices for the coming year will be regulated by the price the Railroad Administration offers, it is believed. As proof of this, lake coal will not be priced until the railroads take a stand. It is believed that if $2.35 is not maintained $2.15 will be the minimum offered.

Probably one-third of the normal tonnage of coal northern Ohio consumes now is coming into the district. Half-time now is a good average at southern and eastern Ohio mines. This is held not half bad in the light of adverse trade conditions. Mine workers admit they have no grounds for complaint, yet the idleness is not to their liking. No outright offers to shade the present scale are reported, but it would not be surprising if some operators sounded out labor on this proposition shortly.

From some quarters comes the advice that steam-coal users had best take advantage of the present lull and stock up in anticipation of protracted negotiations between operators and the mine workers when the wage scale question is opened. Whether this is sales-promotion talk or a sincere warning is difficult to determine. No sales for this reason are reported, for those who heeded the Fuel Administration's warning and laid down coal for this winter are willing to take their chances next time, they say.

The retail coal trade continues stagnant. Some Pocahontas is expected soon after Feb. 15, and it will be priced at $7.50 for the prepared sizes. It will compete with coke at $12.15 and West Virginia splint at $7.10. A fair demand for Pocahontas is anticipated, for long-time users say they will abandon substitute anthracite or bituminous at the earliest possible moment. Pittsburgh coal retails, delivered, at $6.35. The larger retailers have not yet reduced appreciably, though smaller dealers are offering job lots of "car service" coal at reductions of fom 50c. to $1.

Anthracite—Egg now is as plentiful as the furnace grades, egg retailing for $11.25 and chestnut for about $11.55. These prices will be reduced 40c. in a few days, the high-priced independent supplies being about exhausted. While anthracite is by no means plentiful, all the demand for it is being met.

Lake Trade—As the winter wears on and the dock piles at the head of the lakes melt much slower than usual, talk of a later opening becomes more prevalent. Few cargoes will be going up the Great Lakes before the first week in May, it now appears. Lake coal is being placed, but price is being deferred. Many lake shippers have now come out for restoration of the original demurrage rules, which provided seven days free time and demurrage thereafter at $1 a day. The free time has been cut twice—first to five days and then to three. At

three days individual shipping cannot be done, is the claim. The lake shippers' committee is awaiting word from Washington setting the date of the conference with the Railroad Administration in regard to demurrage revision.

DETROIT

With lower temperatures encouraging the hope for more active domestic buying, many Detroit retailers fear open market conditions will bring in a flood of coal, hindering sale of their heavy stocks.

Bituminous—Burdensome stocks of bituminous coal held by local industrial plants and by a large proportion of the retail dealers are still a source of uneasiness in the Detroit trade. Because of these stocks the volume of new buying is small. The users of steam coal are not cutting down the stocks on hand as rapidly as had been anticipated. Transition from war to peace conditions is accompanied by a general reduction of activity in manufacturing lines, due both to Government delays in settling accounts with the contractors.

A considerable part of the business now coming to jobbers and wholesalers is derived from the steam plants that customarily buy in small amount, practically on a hand-to-hand basis, because of their lack of facilities for storage. Prices are said to be holding fairly steady at the Government level, except in a few instances involving mine-run stock. One concern is reported to have sold some of this class of coal at about $5.60 delivered.

The problem presented to many of the retailers by removal of the Fuel Administration's restrictions is a serious one. Unsold stocks of bituminous fill their yards. A considerable part of it is rated as inferior in quality and much of the stock is mine-run, which the dealers bought when a more desirable coal for domestic use could not be had. Unusual weather conditions have prevented realization of the active demand that was expected. The dealers are still hopeful of getting this stock into consumers' hands if the weather will only remain cold long enough to stimulate buying. They realize, however, that their situation will be made precarious should shipments of a better quality of coal come into Detroit in any quantity.

Anthracite—Mild weather has made possible large conservation of the anthracite so far received and most of the dealers have a small supply on hand. Because of their desire to reduce troublesome stocks of bituminous, before the end of the coal year, it is probable no very strenuous effort will be exerted to bring into Detroit a larger amount of anthracite than the city's allotment from the Fuel Administration.

COLUMBUS

There is practically nothing doing in the coal trade. Business is at a low ebb, and there is little in the future to encourage the coal men. Steam stocks are large and retailers are only buying in small lots. Prices are still unsteady.

The coal trade in Ohio has now reached the lowest ebb in the memory of many of the older members of the industry. Demand is at a minimum, and little is expected within the coming month. The raising of the zone restrictions has not caused much demand for coal, as stocks were generally sufficient for the present. Some Pocahontas has been moving into localities where it was zoned out, but this is not expected to last for any time. Retailers are loath to increase stocks in view of the exceedingly warm winter. In fact they are inclined to wait until their stocks are quite low before replenishing. Retail prices are generally well maintained, but there is enough cutting to make the market unstable. Householders have sufficient stocks to go through the winter, and the indications appear that some will be carried over. Little anthracite is now coming into this territory.

The steam trade is quiet in every respect. Buying is limited to actual needs, which are small, as most of the larger consumers have stocks to last for several months. The change from war to a peace basis is not going on rapidly, and that is holding up the fuel business. Public service concerns have sufficient stocks of fuel, and the same is true of public institutions. In fact little is expected in the steam trade until after Apr. 1. Screenings are plentiful and cut prices for that grade are the rule.

Production is at a low ebb in all of the producing fields of the Buckeye state. This is due partly to lack of proper equipment. The railroads serving the Hocking Valley field have been robbed of their hopper cars and have an oversupply of huge gondola dump cars, which cannot be used in the domestic trade to advantage. Thus some orders are missed that might be filled otherwise. It is estimated that the Hocking Valley, Cambridge and Crooksville fields are now down to about 25 per cent. of normal. Pomeroy Bend is not much better off, and eastern Ohio is credited with about 30 per cent.

Prospects for the lake trade for the coming season are not as bright as in former years. This is due largely to the fact that a large tonnage will be carried over on the docks, and that ore shipments will be delayed. The opening is expected to be late.

CINCINNATI

Dullness continues to feature the entire market, consumption being largely from storage supplies or on contract deliveries. Competition for business will be keen during coming season.

The local market has not differed materially from its former status during the past week. The removal of the restrictions imposed by the zone system was greeted by the trade with considerable relief, naturally, as it opens a way for the return of business with the Middle West and more distant territories.

However, as already suggested, conditions just now are such that the return of this business cannot be immediately expected, as the same general conditions which have affected business in this immediate vicinity exist also elsewhere, and any large shipments of coal into the western markets would merely result in further complicating an already difficult situation.

Producers and agents here are preparing to go vigorously to work in their old territories, in order to secure for the future whatever business may be available to them. They understand fully the inadvisability of imparting a false stimulus to a dead market by means of drastic price-cutting, and it may be predicted that nothing of this sort will be resorted to; but every legitimate means of securing business will certainly be used in the coming month by concerns with production to dispose of, as a matter of course, and this means that the competition for 1919 contracts will be as keen as the trade has ever witnessed.

LOUISVILLE

Continued mild weather holding back domestic demand. Industries overstocked, general movement dull. Mines operating two to three days, with many small mines down.

There has been no material change in the general situation in the Kentucky coal industry during the week. Weather conditions are about the same as they have been for the past three or four months, resulting in retailers doing a light business. Industries are generally overstocked and are not buying.

Good domestic coal is in slightly better demand than other varieties, and numerous operators are getting 15c. per ton over former maximum prices for domestic. Steam coal, especially screenings, is hard to sell and is being shaded as much as 50c. a ton by many operators. It is claimed that the Southern markets are generally stronger than the Northern markets, where more price cutting is being done. South of the Ohio River the operators, retailers and jobbers are making a harder effort to maintain prices.

With the lifting of the zone regulations some operators are again able to continue shipments on old contracts, but the contracts are not of much advantage as the customers are stocked up on Fuel Administration coal.

It is claimed that a few operators have been shading contract prices slightly in order to retain good will of industrial consumers who are tied up on contracts, but as a rule an effort is being made to hold contract prices. Practically no new contracts are being made at the present time.

Eastern Kentucky operators who were practically out of the Louisville market in many instances during the past year are again making a hard drive for local business. The western Kentucky operators who had things almost their own way in Louisville are making a fight to hold their gains.

Many of the mines in both fields are down, some of the big western Kentucky mining companies only operating a part of their mines, and not full time in these. Few mines in eastern Kentucky are running more than three days a week, and any number of small mines are down indefinitely.

Railroads are practically out of the coal market, some roads even curtailing their requisitions from contract mines to 50 per cent. of the output. Under such conditions the mines without railroad contracts have no chance for rail coal business.

BIRMINGHAM

Steam trade in unsettled condition with little demand for spot coal. Government schedules being maintained as minimum prices. Strong domestic demand and short supply cause prices to advance.

Inquiries for steam coal in this market have been light for the past week and little new business has been booked. Consumers who are not tied up in contracts seem disposed to await the trend of affairs for a while at least, while producers have assumed an attitude of "watchful waiting" and are holding firmly to Government schedules in effect at the close of January. It is stated, however, that when the market again becomes active that there will be an advance in mine prices on some grades of steam fuel. Contract coal is moving normally.

The lifting of the ban on coal prices was followed by an advance of from 20 to 65c. per ton on domestic coal at the mines. The shortage in this grade of fuel, which has been in evidence since Apr. 1 last, still exists to a marked degree and there is an insistent demand for every ton obtainable.

The future of the trade is viewed optimistically by sales managers and brokers, and special attention is to be given to the establishment of markets for Alabama coal in the gulf ports and in the South American industrial centers, as announced by Adams, Rowe & Norman, Inc., Knox Conville, who for a number of years has been manager of sales for the Pratt Consolidated Coal Co., the largest producers of commercial coal in the district, and H. S. Hall, well-known in the local trade, have established a sales agency under the title of Conville & Hall, and will handle the output of the Pratt company and other mines in the district.

Coke

CONNELLSVILLE

Demurrage coke factor in spot market. No inquiry on contract. Old contracts under adjustment. Consumption and production decreasing.

While Connellsville coke operators have been endeavoring to curtail production to the continually decreasing demand, they have hardly been able to keep pace, and this has resulted in there being considerable tonnages of coke loaded on track and requiring shipping instructions to avoid payment of demurrage. Furnaces have been well supplied with coke, cars at stacks awaiting unloading and with plenty more on the way, so that it has been difficult to find a buyer for coke at any figure. There are prompt lots of furnace coke, or alleged furnace coke, offered at all the way from $4 to $5, and the usual claim is made that the lower priced material is not standard. Doubtless this is altogether true, for during the war a great deal of coke was made that was far from standard, the difference being that at that time it was shipped to furnaces billed as furnace coke at $6 and was accepted and paid for as such. For strictly first-grade coke furnace may be quoted at $5 and foundry at $6 per net ton at ovens, spot or prompt shipment. There is no contract market as there is no inquiry.

The coal outlook is that relatively high prices will continue, particularly for special grades of coal, gas and byproduct. With so many byproduct ovens completed of late there is a large excess of coking capacity, and with high prices obtainable for byproduct coal the Connellsville region is likely to ship raw coal largely, and sell what coke it can at the bare cost of coking, above the market value of the coal.

Many contracts for furnace coke requiring prices to be adjusted after the disappearance of Government control have been set at $5.50 for February deliveries. The settlement is now admitted to have been rather high, and the furnaces will probably get something in return when March prices are set. The other class of contracts, those that called for "last Government price," are not proving such an asset to the operators as the operators had expected, since it has now become rather generally recognized that some concessions will have to be made from the contract terms, otherwise the furnaces holding the contracts are likely to go out of blast and take no coke at all.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Feb. 1 at 262,644 tons, a decrease of 14,680 tons, and raw coal shipments at 171,399 tons, a decrease of 18,308 tons.

Buffalo—The coke trade is dull. Some say that all grades of it are down, but as a rule it is held that only the off grades are materially affected. Any coke that is used for fuel is hard to sell, but spot foundry is still bringing full $7 per ton for 72-hour at the best ovens. It is expected that the iron furnaces will run strong as soon as the business of the country is back to normal activity, but until it is there must be a falling off of consumption.

Middle Western

GENERAL REVIEW

Prices advance on high-grade Illinois and Indiana coals. Steam trade inactive, with little domestic moving. Eastern coal being kept out of Mid-West market.

Contrary to the general opinion of the average coal purchasing agent, coal prices, effective Feb. 1, 1919, advanced in Illinois and Indiana, rather than declined, as had been perhaps too confidently expected by the buying public. It is true that only the highest grade coals produced in the two states just mentioned are influenced by an advance, but it is a healthy sign, as it shows pretty conclusively that the operator does not intend to go back to pre-war price-cutting conditions. Generally speaking, the advance amounts to 20c. per ton on the prepared sizes. No increases have been made in mine run or screenings, although it is generally predicted that steam coals will advance perhaps 10c. or 15c. per ton, in order to keep in line with the prepared sizes.

It is a remarkable thing that the operators have been able to put this increase in effect, especially in view of the fact that the coal market is weaker than it has been in the last four or five years. It shows, among other things, that through Government control, the operators have learned to figure their costs accurately. Furthermore, they have been pretty well taught the folly of indiscriminate price cutting.

The steam trade remains inactive, with little hope for the immediate future. There are two or three reasons for this. The first is that practically all manufacturers are awaiting developments, and consequently either closing their plants or working only a fraction of the week. How long this state of affairs will continue is open to debate. The second reason for a dull market is that the big buyers of steam coal are waiting to see what sort of a deal the operators will be able to make with the railroads, as it is generally conceded that all big contracts will be patterned after railroad contracts, especially in regard to price. It is hoped that the railroads will be brought to see the light, as there is little justice in selling coal to them at cost or below, and charging the small buyers cost plus a sum large enough to maintain a fair average of profit on all sales. The third reason for a dull steam coal market is that a very substantial tonnage of coal still remains in storage. For instance, one plant in Northern Michigan, normally using 40,000 tons per year, has on the ground approximately 23,000 tons.

The domestic coal situation remains a weather proposition, and consequently, on account of the mild spring days we have had throughout the territory, but little domestic coal is moving. One surprising feature has developed, however, with the lifting of zone restrictions, and that is very little Eastern coal is moving into the Mid-West territory. The retailers have made an organized effort to keep Eastern coal out until such time as their stocks of Indiana and Illinois coals have been depleted. If the territory enjoys a three- or four-week period of cold weather, it will probably bring about an influx of high-grade Eastern coal.

CHICAGO

Prices being maintained, except on off-grade coals. High grade coal prices advanced. Plenty of anthracite available.

In Chicago, coal prices are holding firm, with the exception, of course, of the off-grade coals that have been selling at a discount since last August. The domestic trade was surprised to hear of the advance, effective Feb. 1, decided upon by the Franklin County operators. They were still more surprised to learn that other groups of operators in Southern Illinois and Indiana had followed the lead and also advanced their prices. It is pretty generally conceded that the coals affected by the advance are worth at least 20c. per ton more than the ordinary Indiana and Illinois product, worth more from both the standpoint of quality and preparation.

The mild weather in Chicago has had a big bearing on the present market, and it is felt that a continued spell of cold weather will stimulate production to at least 60 per cent. As it is now, the factories are burning much less coal than normally, and the householder is doing the same thing.

Anthracite coal has ceased to be a "news feature" in market reports, as all the hard coal wanted is easily obtainable.

MILWAUKEE

Advent of colder weather injects a little animation into a dejected market. City and country orders more encouraging. No indication of a break in prices.

A few days of near-zero weather along Lake Michigan, and colder blasts, amounting to a blizzard in some sections of the immediate interior, have served to inject a spasm of life into the coal market, which has been in the doldrums thus far this winter. Orders from both city and country are more encouraging than they have been for weeks. The future of the market depends altogether on the weather. Should another protracted mild spell ensue, it would have a demoralizing effect, as dock companies would have to count on retaining considerable holdings at the end of the coal year on Mar. 31.

At present there are no indications of a decline in prices, which would mean losses to the large dealers. As one distributor put it: "All the coal in Milwaukee was purchased at a 'peak' market. In many cases transfer to the city was made under severe difficulties, and often only through the aid of the fuel administration. The coal cannot be sold lower than existing rates." However, the future of bituminous coal prices rests with western producers, as jobbing and retail prices must be governed by what is paid at the mines. If the mine companies begin cutting there is bound to be a break in soft coal.

Dealers have been allowed a margin of $2.25 for handling each ton of coal other than Illinois. For handling Illinois coal $3.05 has been permitted, because of the greater shrinkage incurred during the process of handling the Illinois product. Illinois prepared sizes are now held at $7.90 carried in. Hocking lump and stove sell for $8.40 and splint lump and stove and Kentucky lump and smithing at $8.90, also carried in.

Anthracite prices continue without change. Chestnut is scarce, however, and commands $13 per ton in bins. Coke is also firmly held.

ST. LOUIS

A continued lagging market with warm weather and no demand of any kind. Cars plentiful and movement good. Mines working one and two days a week. Country demand light.

Warm weather continues and the market is lifeless. There is no domestic demand to speak of except in small quantities here and there, and the steam demand is almost nothing.

The larger plants that are running are using their storage supplies, and there are many plants that are running short time or not at all. There seems to be a sort of business depression in general so far as the manufacturing interests are concerned, due to the stopping of war activities. This promises, however, to be shortlived, and industrial conditions ought soon to renew their normal position. The country demand on all grades is extremely easy. What little coal is moving out is usually forced.

The Standard field still continues to sell coal for below production cost in a general way. Screenings are down to about $1.10, 2-in. lump from $1.50 to $1.75, and 6-in. lump from $1.75 up, with mine-run at about $1.65 to $1.75.

There is a little railroad coal moving out of this district, but the tonnage is small. The operators are facing critical times on account of lack of tonnage, and with growing dissatisfaction among their men. The mines are working from one to two days a week as a rule, and some mines not that much.

In the Mt. Olive field the working conditions are not much better than in the Standard field. There is a fair movement of this coal northwest, and a little railroad tonnage, but the amount of coal from this field coming into the St. Louis market is extremely light. The prices, however, are pretty well maintained, the Government maximum of $2.55 practically prevailing. Screenings are weak and selling below the Government price slightly. There is dissatisfaction here among the miners on account of insufficient work.

In the Carterville field, the Williamson and Franklin Counties, as well as the Du Quoin field, the overproduction continues to increase and the mines are idle on account of lack of orders for all sizes. The steam sizes, however, are the most troublesome. Few mines in this section are working full time.

The price here since the first of the month on the Franklin County coal has gone to $2.75 on domestic sizes. In the Williamson and Franklin County fields some of the operators, fearing Government action, are sticking to the Government price of $2.55, while a few of them have raised to the $2.75 price with the Franklin County operators.

Working time is sufficient in this field to keep the miners pretty well satisfied although the operators claim that they had to raise the price in order to cover the cost of production by the shorter working time and the increasing overhead.

There is a small tonnage of smokeless coal, perhaps from 15 to 25 cars in all, that have been ordered for St. Louis. Anthracite continues to come in in fairly good volume, but there is no local demand for any of the sizes.

There is no Arkansas moving in and coke shipments are almost at a standstill.

The market here, with the exceptions as noted above, is as follows:

	Mt. Olive and Staunton	Standard	
Franklin County:			
Prepared sizes (lump, egg, Nos. 1 and 2 nut)	$2.75	.....	.....
Williamson County:			
Prepared sizes (lump, egg, nut)	$2.55	$2.55	(As noted
Mine-run	2.20	2.20	above)
Screenings	2.05	2.05	.....

Williamson-Franklin rate to St. Louis is $1.10; other rates, 95c.

General Statistics

NORFOLK & WESTERN COAL TONNAGE

Below is given a statement of the coal tonnage from mines on the Norfolk & Western R.R. and from other railroads, for the month of December, 1918:

From	Net Tons
Pocahontas field	966,141
Tug River district	194,455
Thacker district	191,253
Kenova district	60,284
Clinch Valley district	97,433
Other Norfolk & Western fields	7,851
Total Norfolk & Western fields	1,517,417
Williamson & Pond Creek R.R.	155,335
Tug River & Kentucky R.R.	44,520
All other railroads	97,956
Grand total	1,815,228

GEOLOGICAL SURVEY'S FIGURES ON COAL COKE OUTPUT IN 1918

Bituminous coal production in 1918 was nearly 35,000,000 tons greater than that of 1917. The Geological Survey has compiled the following statement of production, by months:

Months	1917	1918
January	47,967,354	42,607,206
February	41,352,711	44,384,957
March	47,868,652	48,631,115
April	41,854,320	46,590,570
May	47,086,452	50,927,195
June	46,824,646	51,758,214
July	46,291,572	55,587,312
August	47,372,226	55,732,092
September	45,107,956	51,757,334
October	48,337,726	52,885,513
November	47,689,801	44,386,987
December	44,037,147	40,634,525
Total	551,790,563	585,883,000

Coke production in 1918 exceeded that of 1917 by slightly more than 1,000,000 tons. The following table shows production by months for the two years:

	Beehive		Byproduct	
Months	1917	1918	1917	1918
Jan.	2,923,056	2,242,362	1,787,850	1,649,819
Feb.	2,489,888	2,234,281	1,806,773	1,562,056
Mar.	3,138,977	2,630,433	1,813,435	2,051,206
Apr.	2,813,935	2,580,931	1,859,278	2,021,437
May	2,861,364	2,757,719	1,879,268	2,139,204
June	2,754,897	2,712,726	1,880,335	2,092,155
July	2,753,902	2,813,910	1,882,200	2,300,673
Aug.	2,649,755	2,657,022	1,914,450	2,387,675
Sept.	2,727,367	2,570,238	1,918,714	2,410,798
Oct.	2,780,436	2,611,885	1,898,192	2,563,183
Nov.	2,677,284	2,339,197	1,899,526	2,523,746
Dec.	2,596,687	2,255,296	1,899,259	2,562,048
Total	33,167,548	30,406,000	22,439,280	26,264,000

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations are f.o.b. cities named, unless noted otherwise.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$35.85	$37.60
Northern Basic	31.80	34.80
Southern Ohio No. 2	32.80	35.80
NEW YORK, Tidewater delivery		
Penna. 2X	36.15	39.55
Southern No. 2 (Silicon 2.25 to 2.75)	39.95	.....
BIRMINGHAM		
No. 2 Foundry	31.00	34.00
PHILADELPHIA		
Eastern Pa. 2X	36.15*	39.15*
Virginia No. 2	38.10†	40.50†
Basic	33.90*	36.90*
Grey Forge	33.90*	36.90*
Bessemer	.....	39.10*
CHICAGO		
No. 2 Foundry Local	31.00	34.50
No. 2 Foundry Southern	37.20	39.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	31.00	35.40
Basic	30.00	34.40
Bessemer	32.20	36.60

*F.o.b. furnace. †Delivered

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2.80	$4.07	$4.19½	$4.14	$4.07
Channels, 3 to 15 in.	2.80	4.07	4.19½	4.14	4.07
Angles, 3 to 6 in., ¼ in. thick.	2.80	4.07	4.19½	4.14	4.07
Tees, 3 in. and larger	2.80	4.12	4.19½	4.14	4.07
Plates	3.00	4.27	4.44½	4.14	4.27

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.70	4.04	4.85	4.20

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.37	$5.11	$4.37	$4.50	$5.40	$4.75
Cut	5.00	6.50	5.61	6.50	.....	6.75	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.70	$6.00	$4.50	$5.04	$6.15	$5.25	$5.55
Track bolts	4.90	8.90	5.50	Prem.	7.50	8.00	6.55
Standard section angle bars			4.45	Prem.	5.15		4.95

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	+7%	+9%	+15%	+30%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$6.25	$7.75	$6.50	$7.25	$8.00	$7.60
Assorted	6.40	7.75	6.50-7.00	6.40	8.25	7.85

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco
4 in.	$65.70	$70.70	$58.35	$64.80	$58.00	$80.50
6 in. and over.	62.70	67.70	55.35	61.80	55.00	77.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$55.00	$60–65	$67.00	$38.00
Standard openhearth rails	57.00	63–65	65.00	40.00
Light rails, 8 to 10 lb.	3.135 (100 lb.)	3.125*	3.135 (100 lb.)	43.50
Light rails, 12 to 14 lb.	3.09 (100 lb.)	3.125*	3.09 (100 lb.)	49.00
Light rails, 25 to 45 lb.	3.00 (100 lb.)	3.125*	3.00 (100 lb.)	30.00

*Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$18.50	$17.00	$17.00
Stove plate	14.50	17.50	16.00
No. 1 machinery cast	17.00	22.00	20.00
Machine shop turnings	10.00	8.50	7.50
Cast borings	10.50	11.50	10.50
Railroad malleable cast	14.50	16.50	17.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.13	$0.18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	13c.	15c.
Hollow	24c.	...	...

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜	47%	20½%	¾ to 1¼	36%	20%
½	51%	36½%			
¾ to 3	54%	40½%			

LAP WELD

2	47%	34½%	2	29%	15%
2½ to 6	50%	37½%	2½ to 4	31%	18%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	43%	25½%	¾ to 1½	36%	21%
½	48%	35½%			
¾ to 1½	52%	39½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	45%	33½%	2	30%	17%
2½ to 4	48%	36½%	2½ to 4	32%	20%
4½ to 6	47%	35½%	4½ to 6	31%	19%

Stocks discounts in cities named are as follows:

	New York Black	New York Galvanized	Cleveland Black	Cleveland Galvanized	Chicago Black	Chicago Malvanized
⅛ to 3 in. steel butt welded	43%	27%	43%	26%	44.9%	29.9%
3½ to 3 in. steel lap welded	38%	23%	39%	23%	40.9%	26.9%

Malleable fittings. Class B and C, from New York stock sell at list + 15%. Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+17½%
Galvanized cast steel rigging	+2½%
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	List

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
*No. 28 black	4.70	6.22	6.22	6.45	5.75	6.45	6.22	6.45
*No. 26 black	4.60	6.12	6.12	6.35	5.65	6.35	6.12	6.35
*Nos. 22 and 24 black	4.55	6.07	6.07	6.30	5.60	6.30	6.07	6.30
Nos. 18 and 20 black	4.50	6.02	6.02	6.25	5.50	6.25	6.02	6.25
No. 16 blue annealed	4.10	5.37	5.37	5.65	4.95	5.65	5.37	5.65
No. 14 blue annealed	4.00	5.27	5.27	5.55	4.85	5.55	5.27	5.55
No. 10 blue annealed	3.90	5.17	5.17	5.45	4.75	5.45	5.17	5.45
*No. 28 galvanized	6.05	7.57	7.57	7.70	7.15	7.70	7.57	7.70
*No. 26 galvanized	5.75	7.27	7.27	7.40	6.85	7.40	7.27	7.40
No. 24 galvanized	5.60	7.12	7.12	7.25	6.70	7.25	7.12	7.25

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 15c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	$0.80	$1.00	$1.25	$1.40	$0.98	$1.05
Hot pressed hexagon	80	1.00	1.05	1.20	.78	.85
Cold punched square	2.50*	1.00	.75	.75	1.00	1.00
Cold punched hexagon	2.50*	1.00	.75	.75	1.00	1.00

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	50—10%	40%
Chicago	50%	50%
Cleveland	50—10%	60%

MACHINE BOLTS—Warehouse discounts in the following cities

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	40—10%	40—10%	40%
Larger and longer up to 1 in. by 30 in.	20—5%	20—5%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York..$1.25 Cleveland..$1.25 Chicago..$1.75

For cast-iron washers the base price per 100 lb. is as follows:
New York..$6.00 Cleveland..$4.25 Chicago..$4.50

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅜ and smaller	40%	45—5%	40%
Tinned	30%	45—5%	40%

Boiler, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York..$6.60 base Cleveland..$5.15 Chicago..$5.67 Pittsburgh...$4.65

Structural, same sizes:
New York..$5.67 Cleveland..$5.25 Chicago..$5.77 Pittsburgh...$4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon.

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Raw in barrel	$1.49	$1.31	$1.65	$1.35	$1.66	$1.32
5-gal. cans	1.74	1.41	1.80	1.50	1.86	1.45

WHITE AND RED LEAD—Base price.

	Red Current Dry	Red Current In Oil	Red 1 Year Ago Dry	Red 1 Year Ago In Oil	White Current Dry and In Oil	White 1 Year Ago Dry and In Oil
100-lb. keg	13.00	14.50	12.25	12.50	13.00	12.50
25 and 50-lb. kegs	13.25	14.75	12.50	12.75	13.25	12.25
12½-lb. keg	13.50	15.00	12.75	13.00	13.50	12.50
5-lb. cans	15.00		14.25	14.00	15.00	14.50
1-lb. cans	16.00		14.25	14.50	16.00	14.50

500 lb. lots less 10% discount. 2000 lb. lots less 10–2½% discount.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$15 and 16	Birmingham	$15.00
St. Louis, salmon	12.00	Denver	12.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply C.l.	1-Ply L.C.l.	2-Ply C.l.	2-Ply L.C.l.	3-Ply C.l.	3-Ply L.C.l.
No. 1 grade	$1.35	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.45	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $2.10 per roll in carload lots and $2.35 for smaller quantities.

Shingles, red and green slate finish cost $5.75 per square in carloads, $5.75 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots N. Y.	Carload Lots Chicago	Less Than Carload Lots N. Y.	Less Than Carload Lots Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$64.00	$57.00	$65.00	$58.00
Tar pitch (in 400-lb. bbl.)	21.00	18.00	22.00	19.00
Asphalt pitch (in barrels)	36.00	36.00	41.50	41.50
Asphalt felt	67.50	67.50	72.00	72.00

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0.056	$0.11	$0.162
Cincinnati	.086	.165	.218
Seattle	.09	.175	.30
Los Angeles*	.074	.144	.181
New Orleans	.16	.20	.29

*F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$38@41	$38.00	$40.00
Birmingham	33.00	33.00	28.50
Denver	43.00	35.00	43.00
Cincinnati	43.00	42.00	37.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York		$0.29½	$0.34½		$2.40
Boston	$0.23¾	.26¼	.31¼	$0.35¾	2.65
Cincinnati	18¾	.22¼	.26¾		2.35
Kansas City	.20½	.25¾	.30¾	.38¾	2.45
New Orleans	.20¼	.26½	.31¾	.37½	2.60
Seattle		.25½	.32½		
Chicago	18¾	.22½	.30	.36	2.35
St. Paul	19	.25½	.30¼		2.45
St. Louis	19	.25¼	.30¼	.36¼	
Denver	17¾	.24	.29	.35	2.45
Dallas	.21	.25	.29	.39	
Los Angeles	.21	.28	.34		2.95

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis,	Birmingham	Denver
Cup	7	7.2	8½	14½
Fiber or sponge	8	13	9½	18
Transmission	7	13	7½	20
Axle	4½	4¾	3½	5¼
Gear	4½	7½	5½	9
Car journal	22 (gal.)	4.9	6¼	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Best grade	87.00	70.00	80.00	93.00	75.00	70.00
Commercial	42.00	40.00	21.50	22.00	15.00	25.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	80c. per ft.
Common, 2½-in.	30%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft	$0.55	$0.40	$0.30

Steam—Discounts from list
First grade.....25% Second grade.....35% Third grade.....40%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	50%
Denver	35–5%	30%
Birmingham	30%	35%
Chicago	45%	35%
Cincinnati	40–10%	30%

RAWHIDE LACING—50% for cut; 45c. per sq.ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.60
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.80
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅜-in., 8 ft.; ½-in., 6; ⅝-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅜-in. and larger, in 1200-ft. coils:

Boston	$0.24	Birmingham	$0.28
New York	.23	Denver	.22
Cincinnati	.24	Kansas City	.23½
Chicago	.21½	Seattle	.24
St. Paul	.23	St. Louis	.21½
San Francisco	.22	Los Angeles	.25

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING Pipe Size	Standard List Per Lin. Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

BLOCKS AND SHEETS Thickness	Price per Sq.Ft.
½-in.	$0.27
1 -in.	.30
1½-in.	.45
2 -in.	.60
2½-in.	.75
3 -in.	.90
3½-in.	1.05

85% magnesia high pressure ..... List

For low-pressure heating and return lines.....
4-ply..... 58% off
3-ply..... 60% off
2-ply..... 62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½ lb. rolls	48c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

No.	Denver Single Braid	Denver Double Braid	Denver Duplex	St. Louis Single Braid	St. Louis Double Braid	St. Louis Duplex	Birmingham Single Braid	Birmingham Double Braid	Birmingham Duplex
14	$15.00	$19.00	$38.40	$12.00	$16.00	$33.00	$12.50	$17.90	$36.30
10	22.65	29.05	58.25	27.20	31.00	69.00	30.30	34.30	67.60
8	31.95	39.20	78.65	38.00	42.00	78.00	42.35	46.85	
6	54.40	58.10			65.00	130.00	69.60	74.10	
4	77.50	83.00			93.00		101.75	106.55	
2	115.30	123.50			140.00		156.50	163.00	
1	150.05	161.20			182.00		201.00	209.50	
0		179.05			242.00		276.00	285.50	
00		243.35			290.00		317.00	330.00	
000		296.65			360.00		467.00	428.50	
0000		361.50			435.00		508.00	516.00	

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.30	New Orleans	$0.38½
Buffalo	17	New York	.27
Chicago	27	Philadelphia	24½
Cincinnati	23	St. Louis	24
Cleveland	17	St. Paul	49½
Denver	99	Pacific Coast (all rail)	1.25*
Kansas City	59		

Note—Add 3% transportation tax. *Minimum carload, 80,000 lb.

COAL AGE

Volume 15 New York, February 20, 1919 *Number* 8

The Coal-Mining Outlook

By Floyd W. Parsons

CONSUMERS of domestic and steam coals entered the winter with bins and yards completely filled. As a consequence many coal companies today are practically without orders. The chief question is: How soon will the industry awaken from its present torpor?

The situation today is quite similar to that which existed in the coal trade directly after war was declared. Then we passed through a period of inactivity and doubt. Now we are again marking time while the Nation is gripped by an epidemic of national indecision.

When business finally struck its gait late in 1917, the demands for fuel came so suddenly that producers were unable to satisfy the needs. Serious shortages occurred. Are we moving forward to a time when history will repeat?

Bins and stockpiles are now being depleted of fuel. The coal that has been stored will be exhausted everywhere at about the same time. Perhaps also the railroads will have reached the purchasing point at this identical moment. Should this occur fuel supplies will be insufficient and prices will soar. Another fuel famine will be ushered in and Federal control will likely have to be reinstated.

It is not wise for coal-mining men to look with complacency on present conditions. There is much to lose and nothing to gain by being damned by the public. To say "I told you so" is not sufficient. Consumers of coal have a short memory. Every possible effort must be made right now to point out the dangers that will arise from permitting coal stocks to be depleted.

The mild winter has caused a saving in coal consumption of about 5,000,000 tons. The slowing down in industries and the lessened demands on transportation are responsible for a further decrease in coal consumption of approximately 6,000,000 tons per month. The production of coal during January, compared with October, the last month of the war, showed a falling off of about 16,000,000 tons. The February decrease will be still greater. It is evident, therefore, that the falling off in output is considerably greater than the decrease in consumption. If this continues, a serious situation will arise.

Every effort should be made to get consumers to buy coal in moderation right now. If this is not done, prices are certain to go higher. The public has been misinformed. It has been told that if purchases were delayed, fuel prices would come down. Instead there has been an increase in the selling price of the higher-grade coals.

The hold-off policy of the railroads is further aggravating the situation. It is the next thing to criminal for politicians and transportation officials to set such an example at this critical time.

The sooner it is understood that coal cannot be produced unless there is a market for it, the better it will be for all concerned. Many consumers in various lines are beginning to realize what is coming and are crying aloud against the operators who have shut down their mines. These consumers forget that they do not go on manufacturing when their market disappears. And as for the newspaper editors who are demanding that coal be produced, let them consider: Do they print more papers than they can sell, and do they reduce the price of those left over?

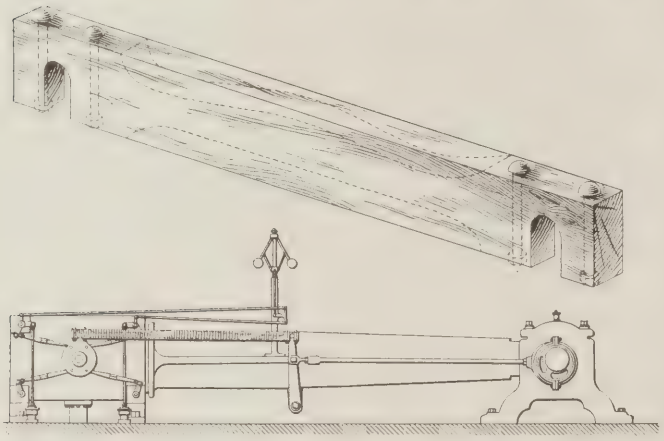
Notwithstanding the present lull in business and the mild weather, more coal is being consumed than is being mined. This does not portend lower prices and a happy situation in the months to come.

IDEAS AND SUGGESTIONS

Ingenious Engine Repair Kept Mine Plant from Shutting Down

The coal-mine mechanic must be highly resourceful. He must keep the mine machinery going whether he has anything to keep it going with or not. If an engine or pump breaks down and no spare or repair parts are to be had, he must repair it anyway and keep it running. Otherwise the mine may be compelled to shut down, either in whole or in part.

The accompanying illustration shows an emergency



EMERGENCY REPAIR TO CORLISS ENGINE

repair to a Corliss engine. The rod transmitting motion between the rocker arm and the wrist plate broke in such a way that it could not be readily repaired at the mine plant. The master mechanic was hurriedly called. In the course of a comparatively short time he had ascertained the exact distance between the rocker arm and wrist-plate pin centers, and the diameters of these pins. This distance center to center he laid out accurately on an oak plank of suitable dimensions.

About this time a carpenter that he had sent for arrived with a brace, an expansion bit, a square and a saw. First, holes of the diameter of the two pins were bored at the center points previously determined. The portion of the plank lying between these holes and one edge was then cut out, making a round-bottomed notch. The plank was then slipped over the pins on the valve gear and the engine started.

A new rod was of course immediately ordered. At the first opportunity the carpenter trimmed up the plank-valve rod substitute to the outline indicated by the dotted lines in the illustration. This rendered the plank much lighter, while leaving ample strength to work the wrist plate. Two small carriage bolts were also added at either end to prevent splitting.

This wooden rod, while it looked sufficiently ungainly to jar upon the nerves of any artistically inclined power plant man, kept the engine running and prevented a shutdown until the new rod arrived. It was then stored away carefully against a future emergency.

New Safety Detonator Does Away with Fulminate of Mercury

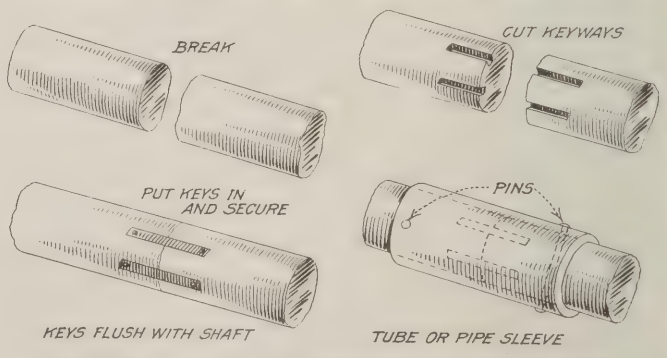
Although Germany has been in the throes of war for over four years, her chemists have been remarkably active and one of their new products is a safety detonator. This contains a cheap and effective substitute for fulminate of mercury. The latter, besides being costly, is dangerous to handle, and in the caps is unstable, a little dampness causing it to attack the copper or brass, forming a copper salt far more explosive than the fulminate itself.

The new filling is a mixture of potassium chlorate and antimony sulphide—neither an explosive substance. Held against this by a thin strip of tin is a varnish of gum lacquer, containing ground red phosphorus and a little diphenylamine; and as the primer is detonated (through concussion) ignition is produced by friction of the phosphorus against the charge.

Temporary Repairs to Broken Blower Shaft Prevented Shutdown

BY CHARLES H. WILLEY
Concord, N. H.

Because of a flaw a 2-in. blower shaft broke, as shown below. The blower was urgently needed in order to carry the peak load, and it was therefore necessary to effect temporary repairs that would at least allow the machine to run at half speed until a new shaft could be obtained or the broken one fitted with a flange coupling



REPAIR DETAILS OF BROKEN BLOWER SHAFT

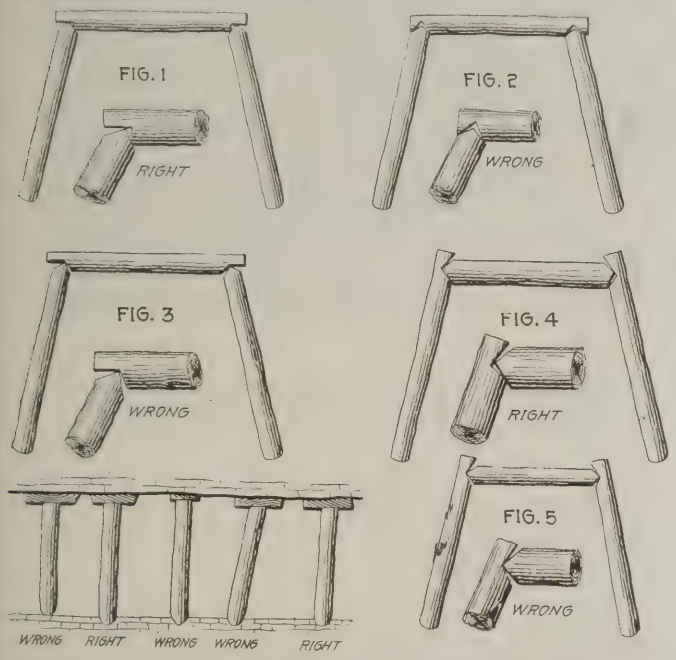
at the break. The way the difficulty was overcome is shown in the accompanying illustrations.

One drawing shows the shaft ends. Two keyways, $\frac{3}{8}$ in. deep and equally wide, were cut in each. Next the shafts were butted together and keys fitted and secured in place. Then a pipe sleeve was heated, slipped over the shaft and shrunk on over the break and the keys. This was also pinned in each piece of the shaft and the pins riveted over. The blower was run at three-fourths speed. Everything went nicely, and the job lasted until a new shaft arrived, which was about three weeks later.

Timbering in Mines Made Safe by Means of Drawings

By Joseph R. Thomas
Plymouth, Penn.

While there is no classification of employment in the mines where practical experience is more essential than in timbering, it has long been known that a large number of accidents have occurred owing to the improper methods with which mine timbers have been erected. A good scheme to adopt would be to have drawings made and posted on or near the mine entrance. These should show the right and wrong methods of setting timbers. There is no doubt that if this type of drawings was posted at the mines it would awaken the interest of the men, especially the younger ones. When it is borne in mind that the young man generally copies the methods adopted by the man with whom he works or has worked, and that having no other guide than to do his work the way the man he worked with did it, whether it was right or wrong, it is not surprising that the work continues to be done in an unsystematic, dangerous manner. If a sketch similar to the one here presented were posted at the mines I honestly believe it would prove beneficial to the whole mining industry.



FIGS. 1 TO 5. RIGHT AND WRONG METHODS OF TIMBERING

Hints to the Pulverized Coal User

A. V. Adamson, discussing a paper read by H. R. Collins before the American Institute of Mining Engineers, makes the following interesting remarks:

1. Pulverized coal is not suitable for all purposes, and the character of the fuel available is one of the factors causing the necessity for separately considering each proposed installation.

2. Honeycomb and ash on tubes, and slag on walls and furnace floor, can be controlled.

3. Flame velocity must be reduced to a minimum.

4. No continuous operating efficiency or continuous good results can be obtained with pressure air for combustion, even if only ⅜ oz. pressure is used; and the more nearly a furnace approximates a balanced-draft condition, the better the operating results.

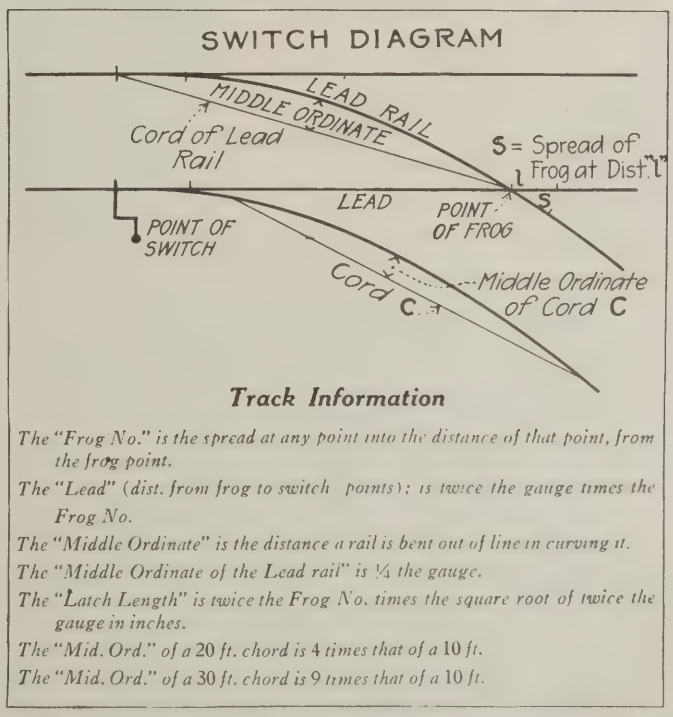
5. The incoming fuel must be mechanically mixed with the air-conveying medium to prevent a pulsating flame and the formation of coke due to lumps of pulverized coal in the feed.

6. Speaking generally, the use of coal in pulverized form, for steam generation, metallurgical and chemical work, affords fuel economy and increased production per unit. It is the one way by which the shortages of oil, gas, coal, transportation and labor can at one and the same time be met. Due consideration, however, must be given to the difficulties inherent in, and the troubles incident to, improper design and installation. In other words, an installation for the economic utilization of fuel in pulverized form is not one which can be purchased over the counter, and special experience or development is essential for each individual installation.

Common Track Difficulties and Their Solution

By Harry Goodnow
DuQuoin, Illinois

Many good articles and treatises on mine tracks and and their construction have been written and published, but unfortunately all foremen and track builders do not possess or have access to them. The data shown in the accompanying illustration may be printed on tracing cloth, blueprinted and furnished to every man in any way responsible for the construction or maintenance of tracks in the mine.



CARD GIVES VALUABLE TRACKLAYING DATA

Although the little "dope" card made up as described above can by no means be compared to some of the elaborate treatises on the subject of tracklaying, it nevertheless answers most of the questions that arise in the course of the day's work. It might well form therefore a part of each trackman's equipment.



Economical Timber-Handling Plant at an Anthracite Mine

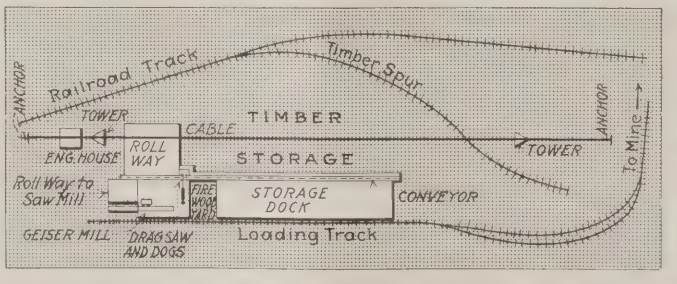
By RALPH A. SMITH
Superintendent, Kingston Coal Co., Plymouth, Penn.

THE problem of supplying the Pennsylvania anthracite mines with the amount of timber necessary to safeguard both the men and the property has become more difficult year by year; the local supply of timber being about exhausted, it must now be obtained from a distance and is shipped into the collieries on railroad cars. Mining conditions in this region require the use of a much larger amount of timber per ton of coal mined than the average bituminous mine of the country, a mine of moderate tonnage often consuming over 250,000 lineal feet of such timber in one year. Timber is often delivered in car lengths and of a diameter at times as large as 36 in., making it an expensive task to unload and prepare it for use by hand.

The Kingston Coal Co., at its mines in Edwardsville and Plymouth, Penn., has installed a modern system by which this is done with a minimum amount of hand labor. The accompanying plan shows the general layout of the scheme. A cable haulage transfer system delivers the logs from the railroad car to either the rollway or to the stock pile. A 9 x 12-in. Lambert double-drum transfer hoist, 1½-in. steel wire cable, and $\frac{9}{16}$-in. steel wire transfer and hoist ropes, make up this part of the outfit.

The towers are of wood, about 30 ft. high, with a span between them of 300 ft., giving ample storage room for stock timber. Logs placed on the rollway are delivered into an electric-driven conveyor of 6-in. pitch Keystone chain, with 3 x 5-in. hardwood carrying blocks. The conveyor is driven by a General Electric 30-hp., 250-volt, direct-current motor, with a Type A controller, manufactured by the Electric Controller and Supply Co., Cleveland, Ohio, and can be operated in either direction. The sides of this conveyor are marked in feet in both directions from the saw, so that props can be cut to length without the necessity of resorting to a tape or rule.

A No. 0 steam drag saw and a pair of steam dogs, manufactured by the Hill-Curtis Co., Kalamazoo, Mich., are so located that the props are cut without removal from the conveyor. It requires an average of 30 seconds to cut through a 24-in. hardwood log. From the saw, the cut timber still travels in the conveyor along the distributing dock, where it is stored by sizes and from which it is loaded for transportation into the mines. All these operations are accomplished with a minimum amount of hand labor. Waste ends, and also the broken timber removed from the mines, are made into firewood by a special cutoff saw and wood splitter, the wood being sold to employees at the actual cost of handling. A Geiser saw mill is connected with the plant and selected logs are turned into such sizes of lumber as are needed to serve different purposes at the colliery and shops.



PLAN OF TIMBER-HANDLING PLANT, GAYLORD COLLIERY





UPPER LEFT

Timber dock, cable transfer and drag saw

UPPER RIGHT

Sawmill and loading dock

UPPER CENTER

Timber being unloaded from cars





LOWER CENTER

Drag saw in operation

LOWER LEFT

Sawmill at the Gaylord Colliery

LOWER RIGHT

Cutting sawn logs into kindling wood





Views of the Timber-Handling Plant of the Kingston Coal Co.

Timber shipped in to the plant from a distance is unloaded by a haulage transfer system, and cut into lengths suitable for use as props. Waste ends and broken timber are made into firewood by a special cutoff saw and wood splitter

Bradford Coal Breaker and Preliminary Mechanical Cleaner

SYNOPSIS—*In coal preparation where a large percentage of screenings or slack is desired, the Bradford breaker or screen finds a legitimate field of activity. This device for breaking coal into small pieces and cleaning it of impurities is used principally in connection with coke plants and to a less extent in preparing bituminous coal for producer, stoker or special use. Its construction, operation and advantages are here noted; some interesting tests of what has been accomplished by this device at commercial plants are given.*

AT THE present time it is a common practice in some coal-mining sections to use a Bradford coal breaker as the first unit for the preparation of bituminous coal to be coked, or the sizing of run-of-mine coal for producer or stoker use. The principal function of the apparatus is to break and screen mined coal to a size suitable for further reduction by crushing, or for producer or stoker use, simultaneously discharging in a separate chute a portion of the material tougher than the pure coal. The breaker was patented in 1873 by Hezekiah Bradford, of Reading, Penn. He had in view the breaking, sizing and preliminary cleaning of anthracite coal, without causing the excessive quantity of fines produced by the toothed rolls then in general use. However, it did not accomplish, on a commercial scale, what was proposed on account of the nature of anthracite coal and intermixed impurities. Its first employment in the preparation of coking coal is recorded in 1891, when the St. Bernard Coal and Coke Co. (Earlington, Ky.), the St. Clair Coal and Coke Co. (Bradenville, Penn.) and the Loyalhanna Coal and Coke Co. (Loyalhanna, Penn.) used it for the breaking, sizing and preliminary cleaning of coal.

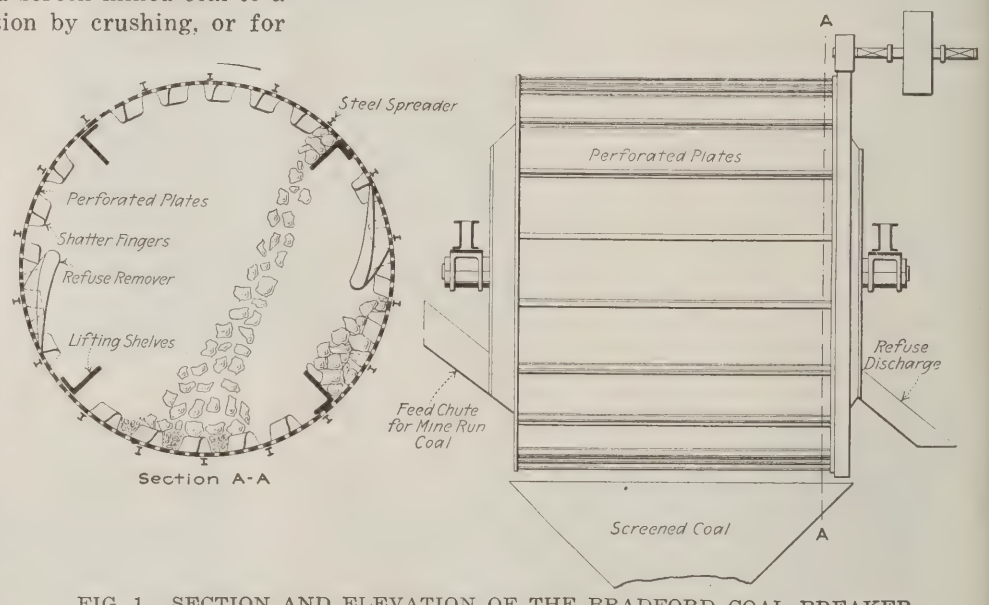


FIG. 1. SECTION AND ELEVATION OF THE BRADFORD COAL BREAKER

At this time there are approximately 300 Bradford breakers in active operation in the United States; about 75 per cent. of these are in connection with byproduct and beehive coke-oven plants, the others for preparing bituminous coal for producer, stoker and special use.

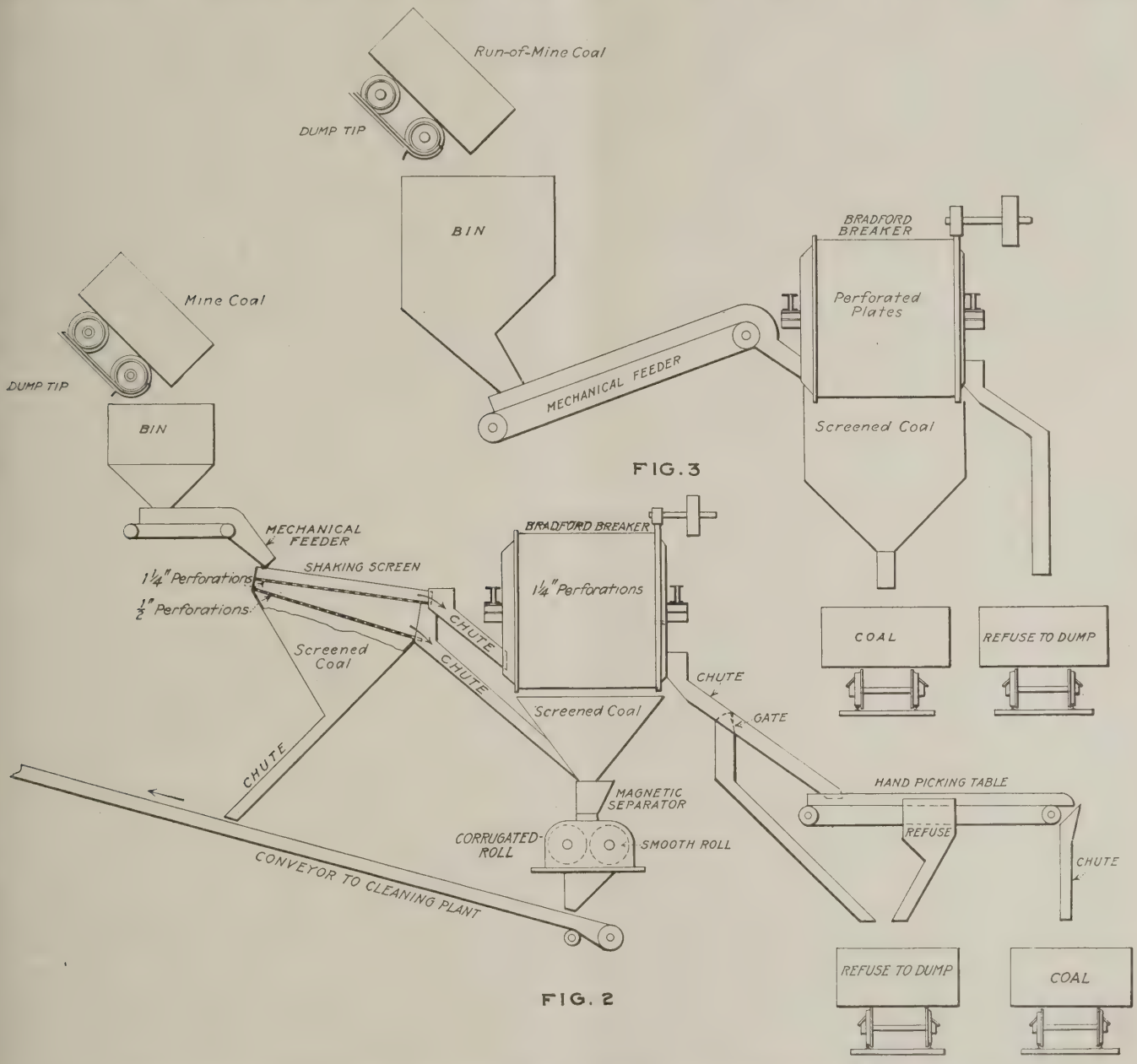
The present construction and operation of the breaker differ materially from the first installation and early practice, the improvements being important and of value; while the original machine demonstrated the merit of the principles involved, yet its mechanical operation or action was not satisfactory. The principle is to break the pure coal by concussion and screen it out through the encircling perforated plates, while the impurities, mingling with the mined coal, are generally too tough to be broken by this force of concussion and therefore pass over the perforations and out at the end of the machine to a separate chute. The breaker consists of a large diameter cylinder covered with perforated steel plates; it is intended to revolve slowly.

The machine is useful for preparing coal for further crushing and cleaning (Fig. 2); however, if the coal, after passing through the perforations of the breaker, is considered clean enough for coking, then a pulverizing mill is substituted for the rolls, so that impurities intermixed with the coal will be powdered and the whole product be of the same degree of fineness. The function of the Bradford screen is to break the pure coal to a size that will sift through the perforations, without breaking much of the bony coal, slate, rock and pyrites intermixed with the coal; further, that these impurities may be discharged separately. It also automatically discards foreign matter larger than the perforations, like car and rail irons, wooden sprags, and so on, that would be injurious later to the rolls or pulverizers. Bins are provided which act as reservoirs to insure a uniform supply of coal to the preparation plant and as storage in case of irregular delivery of coal from the mines.

The mechanical feeder not only regulates the tonnage delivered to the screens but also tends to balance the loading of elevators and conveyors handling the prepared coal. The shaking screen separates the coal into sizes suitable for further treatment; it relieves the breaker of handling coal already of the proper size for the rolls, and it also bypasses around the rolls the coal that is fine enough for use. The duty of the magnetic separator is to remove pieces of iron, like bolts, nuts, rivets and mining machine parts, that drop through the

perforations, thus preventing serious injury to the rolls or the pulverizer.

The advantages of rolls are that they break the coal so as to release more or less of the impurities of a laminated nature, without pulverization; crushing, grinding, pounding, bruising and pulverizing all tend to create powder or dust of both the coal and the impurities; this latter is quite an unfavorable condition and plants when the coal seam is quite free from impurities. Table I is a record of Bradford coal-breaker tests made at coal plants. Complete details are noted. All these tests, with the exception of Nos. 6 and 11, are taken from monthly averages, and at coal plants operating in connection with byproduct coke ovens. No material reduction in ash or sulphur content is shown with the exception of tests Nos. 5 and 11. No. 5 indicates



FIGS. 2 AND 3. TWO TYPICAL INSTALLATIONS OF BRADFORD BREAKER AND ACCESSORIES

hinders success in either a dry or wet method of coal preparation.

The hand picking table is of use when the coal seam contains bands of bony or high ash coal; the breaker is then adjusted and operated to discard as much as possible of this inferior coal, together with the other bulky impurities, as these coals inferior for coking purposes contain much fuel value for steam and domestic use; the fuel values are separated from real impurities by hand, while being conveyed on the picking table.

Fig. 3 illustrates the average installation of a breaker for preparing stoker coal or for other special use; this arrangement is also used at some beehive oven coke

an ash reduction from 13.10 per cent. to 11.15 per cent., and sulphur reduction from 3.35 per cent. to 2.90 per cent., by screening out 3 per cent. of the impurities. No 11 test indicates an ash reduction from 16.88 per cent. to 13 per cent., and sulphur reduction only from 0.86 per cent. to 0.84 per cent., by taking out 14 per cent. of the impurities. Both the run-of-mine and screened coal from this test (No 11) were not satisfactory, regarding the ash content, for coking. The screened coal, after the 14 per cent. of impurities was removed by the breaker, was washed, with the results shown in the record of No. 11 test. While the ash content was further reduced to 9.13 per cent. in the washed

coal, there was discarded as refuse a total of 26.52 per cent. of the run-of-mine coal—14 per cent. with ash, averaging 41.21 per cent. by the breaker and 12.52 per cent. with ash or 35.71 per cent. by the washer; of course, the great loss of the original run-of-mine coal to reduce the ash content in the coal to a point practical for coking use would not permit the installation of a commercial cleaning plant.

In the general operation of the Bradford breaker run-of-mine coal is automatically fed into one end of the cylinder (while revolving), is picked up by longitudinal shelves and dropped, falling on cast steel "shatter fingers" attached to the perforated plates; the coal is shattered by concussion (See Fig. 1), and the pieces that are small enough sift through the perforations; the shelves following pick up the large pieces, which are again thrown down. The coal in falling from the shelf has not only the force derived from its own gravity, but receives considerable additional force from the momentum of the cylinder. The coal does not fall upon coal in the lower part of the cylinder, but upon the shatter fingers and perforated plates, because the coal is constantly carried toward and upon the rising side and

in the making of which certain ingredients are used under fixed conditions with results always approximately the same; on the other hand, it is a natural product varying greatly in quality, often even in the same seam, and it must be admitted that any attempt to standardize a coal-preparing machine or method under these circumstances would prove an almost impossible task. Coal always contains a certain amount of inorganic matter or ash, which is intrinsically part of the coal. The question as to whether one could clean a given coal materially or not depends largely—essentially, in fact—on the way in which that inorganic matter was distributed through the coal.

The rated capacity of a breaker is the number of tons that can be broken enough to sift through certain size perforations in a given time (usually one hour), and simultaneously to discharge separately from the broken coal the impurities not broken by the action of the breaker. Breakers, now in operation, vary in capacity from 30 tons an hour—fitted with ½-in. perforations and handling tough coal—to 400 tons an hour—fitted with 3-in. perforations and handling friable coal.

The quality of work done by a breaker is shown by

TABLE I. BRADFORD COAL BREAKER TESTS MADE AT COAL PLANTS

Details of Bradford Breaker								Run-of-Mine Coal		Screened Coal				
					Power Required					Dry Basis				
No. of Test	Diameter, Ft.	Length, Ft.	Size of Perforations, Sq. In.	Periphery Speed, Ft. per Min.	Feed per Hour in Net Tons	No Load	With Load	Starting Loaded	Seam and Location	Nature	Per Cent. Ash	Per Cent. Sulphur	Per Cent. Ash	Per Cent. Sulphur	Per Cent. of Water	Per Cent. of Tailings
1	12	11	1¼	415	100	6.2	8.8	32	Pocahontas, No. 3 seam, West Virginia	Soft	4.75	0.78	4.70	0.80	2.25	0.75
2	12	11	1¼	415	100	6.2	12.6	35	Boomer, Eagle Seam, West Virginia	Hard	6.70	1.25	6.35	1.22	4.30	2.50
3	12	11	1¼	580	200	6.7	24.2	46	Pocahontas, No. 4 Seam, West Virginia	Soft	5.02	0.61	4.98	0.62	2.10	0.63
4	12	11	1¼	580	200	6.7	32.3	52	Pittsburgh Gas Coal, Pennsylvania	Hard	8.36	1.55	8.10	1.48	3.20	1.14
5	12	11	1	520	210	6.4	41.0	57	Miller B Seam, Pennsylvania	Soft	13.10	3.35	11.15	2.90	2.90	3.00
6	12	11	1½	580	120	6.5	39.0	58	Elkhorn Seam, Kentucky	Hard	4.25	1.05	4.22	1.05	2.50	10.40
7	9	11	1½	425	160	6.1	19.5	38	Kittanning B-Seam, Pennsylvania	Soft	10.80	2.45	9.50	2.00	3.05	6.00
8	9	11	1	425	120	5.2	18.0	33	Phalen Seam, Canada	Soft	9.60	3.05	8.55	2.54	3.10	4.10
9	9	11	¾	425	140	5.6	20.3	37	Miller B Seam, Pennsylvania	Soft	9.25	3.90	8.40	3.36	3.60	5.50
10	9	11	¾	425	125	5.9	18.6	36	Miller B Seam, Pennsylvania	Soft	8.80	2.95	8.25	2.75	2.25	2.15
11	9	11	½	425	60	5.8	8.2	27	Trinidad Seam, Colorado	Soft	16.88	0.86	13.00	0.84	1.00	14.00

shelf. In rolling and tumbling around in the cylinder any remaining pieces of pure coal attached to the impurities break away and sift through the perforations. The cast-steel shatter fingers not only aid in shattering the coal, but are so set on the inside of the cylinder as to form a spiral, which can be adjusted either to rapidly advance the body of coal to the opposite end or to retard its progress. Fastened in the opposite head of the cylinder from which the coal enters are refuse removers (wing-like in form) which automatically discard any impurities or other matter larger than the perforations into a chute. The coal sifting through the perforations on the revolving screen is collected underneath the cylinder and is conducted by a chute to the desired point for shipment or treatment.

The Bradford breaker is adjusted and detail parts are designed to suit the physical characteristics of the coal to be treated, the requirements of the market and the general conditions and circumstances of each individual case. The capacity and quality of work is affected by the diameter and length of the screen, the size of perforations, speed of rotation, spirality of the shatter fingers and the moisture content and physical properties of the pure coal and impurities. The difficulty with coal, of course, is that it is not a manufactured article, the quantity of pure coal broken fine enough to sift through its perforations, without at the same time breaking the impurities (that are more or less intermixed with the coal) so small as to permit of their passing through the perforations; thus these impurities may be discharged separately from the coal. When making comparisons of different installations regarding the capacity and quality of work done by breakers, it must be kept in mind that many coals which break cubical in shape (or nearly so) go through a screen quite fast, but coals which break in elongated pieces do not screen nearly as fast as the cubical coal. Also, when comparing laboratory tests with commercial results, it should be remembered that the laboratory tests show the best theoretical results attainable by working in the ways described—the laboratory results represent the ideal to be attained by commercial methods.

Structurally a Bradford breaker is a circular screen of perforated plates which are bolted to an iron framework; cast-iron spiders, or rings, carry this framework, and these rings are rigidly connected to a central longitudinal revolving shaft. The screen is inclosed by a casing which confines dust and prevents its circulation throughout the tipple; the casing protects workmen against accident and yet suitable doors are provided so

that necessary inspection of the screen and its operation can be made. All portions of the screen are constructed so as to permit of ready renewal or adjustment of parts; should the character of the coal being prepared change, or different marked conditions develop, then parts either can be replaced or adjusted without serious disturbance to the plant. The perforated screen plates are made of extra heavy steel cut to a standard size so as to fit any breaker of the same diameter. These plates can have one size perforations at one end of the screen and larger perforations at the other end; this arrangement permits of two sizes of coal being made. Suitable provision in the chute to carry off the screened coal keeps the two sizes separate.

The cast-iron lifting shelves in the screen are made of a width, length and angle proportioned to the work desired and the speed of rotation, so that the coal may slide from the shelves at the proper height to fall upon the required part of the inner side of the screen; the shelves are made interchangeable and can be replaced or their position changed without affecting other parts of the breaker. Usually four shelves are equally spaced on the inner side of the screen, although from one to six shelves may be used, depending on the coal handled.

The cast-iron refuse removers in the screen automatically discharge the impurities; generally two are used for rapid discharge. However, if a portion of the coal is more or less tough, so that it requires further tumbling to break up the coal, then only one remover is used. In selecting a breaker it will be well to confer with those familiar with the principles involved, its construction and operation; also, one should be thoroughly versed as to the nature of the coal to be handled and the separation of impurities desired. Each variety of coal requires special treatment in the breaker, which can only be accomplished by properly proportioning the parts during construction. The method of operation should be determined after a careful study of the physical properties of the coal. A knowledge of the business end of the proposition is essential, as that often makes all the difference between success and failure. It is rather remarkable that in some districts collieries which are in close proximity to each other sometimes differ in a radical manner in their treatment of the same seam of coal. In designing a plant it is not always safe to rely on a neighbor's experience, or even on one's own experience elsewhere. This uncertainty is often most puzzling and perplexing, but perhaps it is the most interesting of the various problems in connection with mining engineering.

Details of No. 11 Test—Below is given a record of five tests made with run-of-mine coking coal from five mines working the same coal seam with a Bradford coal breaker 9 ft. in diameter and 11 ft. long. Perforations ½-in. square, peripheral speed 425 ft. per min. Feed 60 net tons per hour. The coal was quite soft and dry, the rock and bony tough and the slate brittle.

RECORD OF TESTS WITH RUN-OF-MINE COKING COAL

	Run-of-Mine Coal		Screened Coal		Breaker Refuse	
Mine	Per Cent.	Per Cent. Ash	Per Cent	Per Cent. Ash in Screened Coal	Per Cent.	Per Cent. Ash in Refuse
1	100	18.70	87.71	14.10	12.29	51.30
2	100	15.45	86.43	10.84	13.57	44.65
3	100	16.25	85.81	13.00	14.19	35.70
4	100	15.80	90.17	13.30	9.83	38.40
5	100	18.22	79.85	13.72	20.15	36.00
Average,	100	16.88	86.00	13.00	14.00	41.21

The foregoing tests show that discarding 14 per cent. of the impurities in the run-of-mine coal larger than the ½-in. perforations reduced the ash content from 16.88 per cent. to 13 per cent., which was not acceptable for furnace coke. The screened coal from the five tests was washed, with the results shown below:

Kind	Per Cent. Run-of-Mine Coal	Per Cent. of Kind	Per Cent. Ash
Breaker screened coal	86.00	100.00	13.00
Washed coal	73.48	85.44	9.13
Washer refuse	12.52	14.56	35.71

The foregoing results indicate that to reduce the ash content from 16.88 per cent. in the run-of-mine coal to 9.13 per cent. in the washed coal it was necessary to discard a total of 26.52 per cent. of the run-of-mine coal as breaker and washer refuse.

Deep-Seam Working Opens Up Question of Reducing Temperature

By Mark Meredith
Liverpool, England

The time has arrived when it is believed means should be taken to deal with the detrimental effects of continuous working under conditions of high temperature in certain mines. At the Ashton Moss colliery (the deepest in Great Britain) and others, many improvements which have been made during the last 30 years would be as essential in working beds of coal at 4000 ft. as they have been within recent years in mines of one-third that depth.

Among these improvements might be mentioned a safety lamp capable of withstanding an explosive current traveling at a high velocity, the introduction of electric light, the modern fan and the mechanical under cutting of the bed (in longwall working) in straight lines. There will be a greater percentage of small coal in deeper mines, due to the crushing effect of the overlying weight, but modern experience has shown that small coal, which formerly commanded a low price, has now become a valuable asset through the development of byproduct plants. In recent years explosions have been less frequent than formerly, and it may be expected that freedom from serious accidents will continue.

In order to effect a reduction of the temperature in the deeper mines, and render them as suitable for human effort as those in beds of less depth, some modifications will be required in the systems hitherto adopted for conveying the intake air along certain roadways to the coal face and returning the vitiated air along other roads to the upcast shaft.

Information is now sought from the makers of modern refrigerating plants concerning their experience in cooling atmospheres, so that colliery officials may consider how similar systems may be utilized for reducing the temperature in deep workings.

The use of compressed air in place of steam is one means of keeping the temperature down, as is also the driving of roads for cold-storage chambers in suitable strata within a reasonable distance above the coal beds to be worked, in which large volumes of air from the downcast shaft could be cooled and dried by means of refrigerators, to a temperature suitable for men to work in.

A Study of Shoveling as Applied to Mining—II*

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SYNOPSIS—*Where the material mined must be moved over a certain distance it is advisable to employ a car. For best results this should be placed about 4 ft. from the pile to be moved. The shape of shovel used and its length of handle have a decided effect on the amount of shoveling done. The system of payment for work performed has a strong influence upon the success of any scheme for increasing the individual efficiency of miners or mine laborers.*

IN FIG. 28 is shown the number of shovels per minute thrown into a car for any length of job. In this series of tests the ore was thrown a horizontal distance of 4 ft. into a mine car 42 in. high; 4 ft. seems to be the best distance to maintain between car and ore pile, for a man to work to the best advantage. Due to the height of the car, the capacity of a shoveler is decreased, as compared to his capacity in shovels per minute, when loading into a wheelbarrow. This decrease in shoveling speed amounts to about 8 per cent. per foot of height. The best type of car for a shoveler to use holds about a ton of ore, is as low as is consistent with good design, certainly not over 45 in. in height, and is equipped with roller bearings, which should be kept in the best of condition. Cars much larger than this are too hard to tram and cars much smaller use up too much of the shovelers' time tramming back and forth.

Fig. 29 shows the effect of having to throw the ore a greater distance than 4 ft. into the car, for a given length of job, using a No. 4 D-handle shovel. For every additional foot between the car and the ore pile, the height of the car remaining constant, the decrease in shoveling speed amounts to about 3.6 per cent.

In Fig. 30, Chart A shows the time consumed in tramming, dumping, and returning with the car, over various distances. Chart B shows the average tramming speed that will be developed for any distance over which the ore has to be conveyed.

Fig. 31*A* shows the amount of rest required for various lengths of jobs under constant conditions of length of tram, and distance and height through which the ore is thrown by the shoveler. For any length of job, as the length of tram increases, the amount of rest needed is increased, as shown in Chart B. Both of these lines, however, are quite flat, for a man can get nearly enough rest as he returns each time with the empty car.

Fig. 32 shows the tonnage to be expected of a man mucking into a car and tramming a constant distance, for various lengths of jobs. It will be noticed that the economic shoveling day is between 7 and 8 hours and that the maximum average results to be expected of a mine shoveler under the given conditions have probably been reached.

Fig. 33 is made up for a uniform shoveling day of 6 hours and 12 minutes and shows the tonnage to be expected under average shoveling conditions for any distance that the ore must be thrown or trammed. The line representing the tonnage to be expected of a man with a wheelbarrow may not be entirely correct, especially as the length of tram increases. It is thought that up to 15 ft. the line is about correct but that it may slope off a little too rapidly beyond this point. On the other hand, the wheelbarrow is generally used where neither direct shoveling nor the use of a car, with its attendant track expense, etc., is feasible; consequently, the wheelbarrow is always at work under adverse conditions in a stope and no improvements over the results here tabulated are to be expected. The writer thinks that the work with a wheelbarrow in a stope has been closely approximated but that a greater efficiency could be obtained in a clear and unobstructed passage, such as a drift. The calculation of the tonnage expected when tramming either with a car or

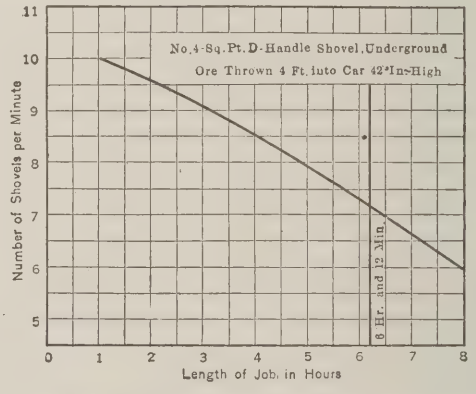


FIG. 28. EFFECT OF LENGTH OF JOB ON NUMBER OF SHOVELS PER MINUTE

wheelbarrow, for any length of job and distance trammed, is expressed in the following formulas:

Let W = Weight of load on shovel, in pounds;
N = Number of shovels per minute, Figs 24 and 28;
P = Per cent. of time actually shoveling, Figs. 26 and 31;
L = Length of job, in minutes;
T = Total tonnage shoveled;
a = Time to load one car or wheelbarrow;
b = Time to tram and dump one car or wheelbarrow, in minutes, Figs. 25 and 30;
c = Load on one car or wheelbarrow, in pounds.

*Concluding installment of a paper presented before the February meeting of the American Institute of Mining Engineers. The first part of this article appeared in *Coal Age*, Feb. 13, 1919.

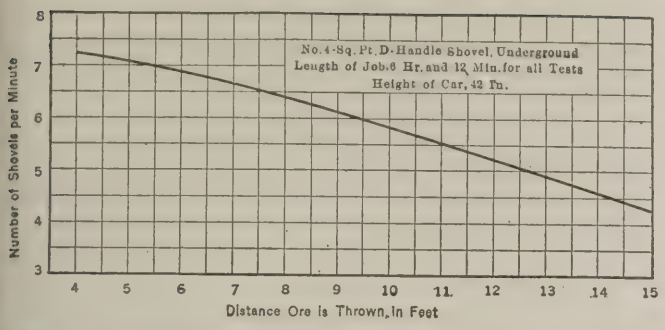


FIG. 29. EFFECT OF DISTANCE THROWN ON NUMBER OF SHOVELS PER MINUTE

Then

$$\frac{c}{W \times N} = a \qquad \frac{\left(\frac{L}{a+b}\right) \times c \times P}{2000} = T$$

Example 1.—What will be the total tonnage handled, using a 21-lb. shovel and a wheelbarrow, and tramming the ore 20 ft. for a job of 5 hours duration?

It is necessary first to find the time required to load one wheelbarrow, or

$$a = \frac{315}{21 \times 9.3} = 1.61$$

then the total tonnage handled is

$$T = \frac{\left(\frac{300}{1.61 + 0.56}\right) \times 315 \times 0.88}{2000} = 19.5$$

Example 2.—What tonnage will be handled in 6 hours and 12 minutes, using a car of 1-ton capacity and a shovel of 21-lb. capacity, tramming a distance of 100 ft.? As the time required to load one car is $\frac{2000}{21 \times 7.2} = 13.3$; the total tonnage handled is

$$T = \frac{\left(\frac{372}{13.3 + 2.43}\right) \times 2000 \times 0.73}{2000} = 17.23$$

To determine the relative wearing qualities and the cost per ton for supplying the men underground with new shovels, different places in the mines were equipped with different makes and styles of shovels and the results carefully noted. At frequent intervals, these shovels were measured to detect the wear of the blade, and checked up to see that all were being used in the proper places underground; the tonnage coming from each place and the number of shovelers employed were also noted. Table III gives the results obtained with the different classes of shovels.

The shovels made of chrome-nickel and special steel were excellent implements but the special steel shovel was considerably heavier than the other. Cracks developed along the form line of the chrome-nickel steel blade, on each side, but these did not impair the shovel's usefulness. The blades of the three other shovels bent easily with rough usage; while the blade made of extra light carbon steel wore very rapidly and the edges curled up almost immediately. The No. 2 scoop was used until its capacity had been reduced 25 per cent. and the No. 4 shovel, until its capacity had been reduced 9 per cent. The cost of shovel per ton handled includes the cost of the shovel, freight, supply-house handling, handling new shovels into mine, and disposal of worn shovels. We had hoped to be able to detect a difference in the man efficiency on account of the different styles and weights of shovels in use at this time, but owing to the constantly changing conditions in the working places selected for the trials, no conclusive evidence was available.

The wearing quality of any shovel used on an iron sheet varies from 74 per cent. to 86 per cent. of the wearing quality of the same shovel on a wooden mat, the average being 82 per cent. The wearing quality of a shovel on a rough bottom is about 90 per cent. of that on a wood mat. These figures are based on about 50 observed shovels underground.

TABLE III. SCHEDULE OF WEAR OF SHOVELS

Type of Shovel	Used on	—Tonnage Handled by Blades Made of— Chrome-nickel Steel	Secret Composition Steel	Common Carbon Steel	Extra Light Carbon Steel
No. 2 scoop	Iron sheet	1220	950	750	.....
No. 2 scoop	Rough bottom	.....	.....	.....	.....
No. 2 scoop	Wooden mat	1500	1100	900	.....
No. 4 shovel	Iron sheet	990	770	620	250
No. 4 shovel	Rough bottom	1075	870	.....	.....
No. 4 shovel	Wooden mat	1168	1000	730	340
Gage of steel in blade		15	13	14	16
Cost of shovel per ton handled, cent.		0.0015	0.0018	0.0019	0.0026

Tests were conducted with square- and round-point shovels varying in size from No. 2 to No. 6 and with standard No. 2 scoops, to determine what size of shovel was best adapted to the work. For short jobs of less than 4 hours' duration, the No. 2 scoop and the Nos. 5 and 6 shovel were slightly the best from the standpoint of tonnage handled; but for jobs requiring more than four hours for their completion, the No. 4 shovel was greatly superior, see Fig. 22. From the standpoint

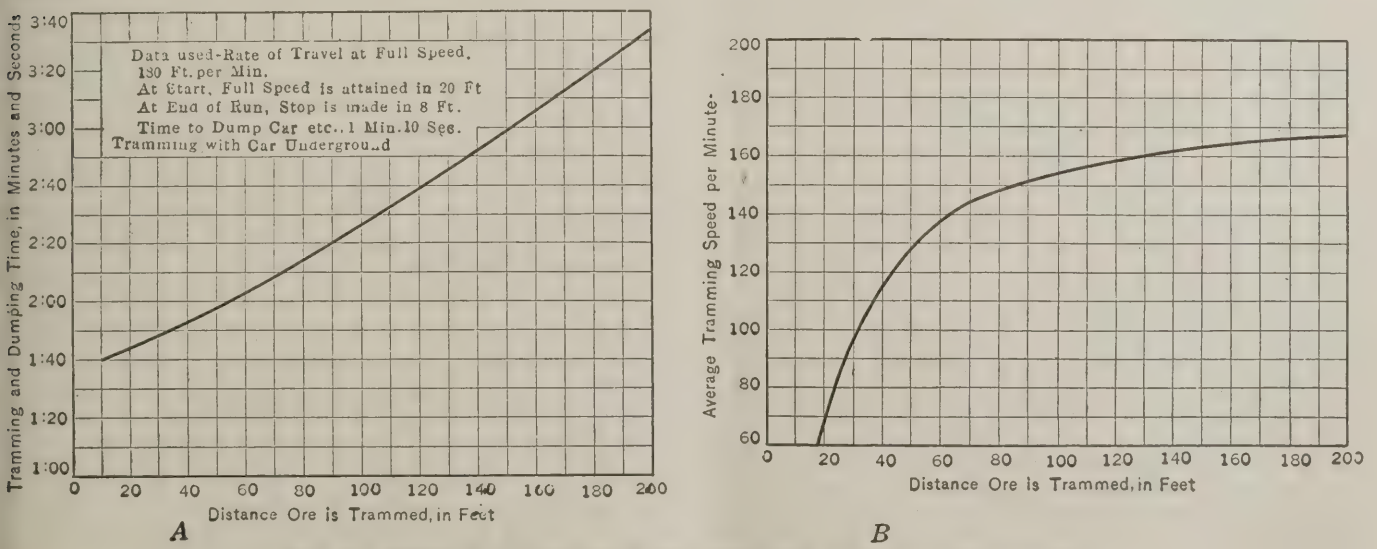


FIG. 30. EFFECT OF DISTANCE ON TIME AND SPEED OF TRAMMING

of "number of shovels per minute," work with a scoop is at all times slower than with a No. 4 shovel, see Fig. 18, and as the day progresses the percentage of time required for resting becomes greater with the scoop than with the shovel, see Fig. 20. The result is that although for short work periods, the larger capacity of the scoop brings the total tonnage handled above that of a No. 4 shovel, for long periods the increased amount of rest required when handling the heavier load serves to put the No. 4 shovel considerably in the lead as a tonnage mover. With shovels smaller than the No. 4, the number of shovels per minute was not increased, and the amount of rest required was not decreased enough to make the smaller shovel superior for any working period. It may be stated as a generalization, that for shovels smaller than the 21-lb.-load shovel, the tonnage handled per shift is approximately directly proportional to the shovel capacity; that is, if a man using a No. 4 shovel will handle 26 tons in an 8-hour shift, with a No. 3 shovel which holds 91 per cent. of the load of a No. 4 shovel, he would be expected to move about 24 tons a shift. If the increased cost of shoveling with a smaller shovel, or one that has been worn, is balanced against the cost per ton of putting a new shovel underground and discarding the old one, it will indicate the economic limit of wear of the shovels in use. We have, for the present, rather arbitrarily selected as the limit a shovel of size No. 4, which has been worn to about 12 in. in length, or roughly a 9 per cent. to 10 per cent. reduction of capacity. The lift of a shovel is important. By "lift" is meant the amount of rise in the handle just behind the blade. A handle that has not much bend in it at this point, but which goes off straight is said to have a low lift, while one that arches steeply is said to possess a high lift. To work with a shovel having a low lift the man must stoop down farther each time to take a grip on his shovel after it has penetrated the mass, and the added movement takes longer, and requires a greater effort to lift the weight of the body and the load through a greater space than with a high-lift shovel. As a result, more rest is required in the course of a day. With a very low lift, the shovel is not well balanced and there is a tendency for it to turn over in the hand, especially if it is not loaded evenly. With a high lift, the man does not have to stoop so far to grasp his shovel, the amount of rest period is decreased, and the loaded shovel is better balanced, because its center of gravity is well below the line of the handle. A lift of 8 in. is the best, as with greater lifts the awkwardness of the throwing movement is considerably enhanced. The height of the end of the handle above the floor when the shovel blade is flat on the floor is of considerable importance, too; this is the measurement that the manufacturers call the "lift." In a short-handle shovel, the end of the handle should strike just above a man's knee, a height of 23 in., to give the most effective effort in penetrating the mass. With a long-handle shovel the height should be the same at a distance back of the blade corresponding to the length of the short handle.

It is an advantage to have the weight of the shovel as low as is consistent with good material and length of life. Increasing the weight of the shovel slows up every motion involved in shoveling and increases the amount of resting required. However, it is not wise to go to extremes in the matter, as a very light shovel does not possess the strength and wearing qualities, and the cost of constant replacement is greater than the advantage gained in shoveling speed. In a personal communication, Frank B. Gilbreth says: "The 21-lb. load refers to shoveling any kind of material anywhere, above ground or below ground, and this is the live load upon the shovel and does not include the weight of the shovel. I make this statement after having asked this question of Mr. Taylor. Obviously it would have been better if the data had been obtained on the basis of having the load, live and dead, combined in one figure."

As we lacked information, we assumed that Mr. Taylor experimented, at least in part, with stock shovels, which weigh about 6 lb. in the No. 4 size. Our experiments were conducted with shovels of both regular and special design, varying in weight from 4 lb. and 10 oz. to 6 lb. and 5 oz., and we found that a shovel weighing between 5 lb. and 8 oz. and 5 lb. and 10 oz. gives the greatest per man capacity. This is a total combined live and dead weight of 26 lb. and 8 oz. to 26 lb. and 10 oz. A shovel of this weight can be made quite sturdy, the gage of blade being No. 15 of some composition steel and the handles of best selected XX second-growth northern white ash. With heavier shovels, there is a distinct falling off in capacity; while for lighter shovels, although we could detect no difference in capacity, the wearing quality was poorer, due to lack of strength.

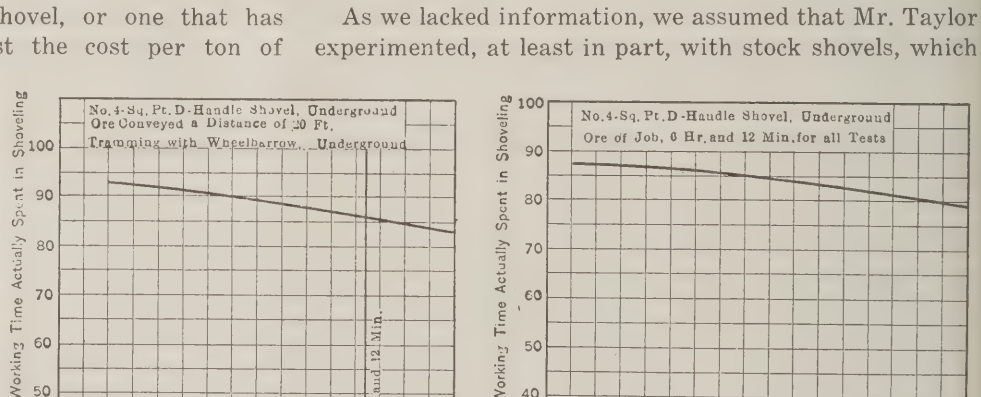


FIG. 31. REST PERIOD REQUIRED FOR VARIOUS CONDITIONS OF WORK

The use of the scoop is not advocated except where the material to be moved is so light that the scoop holds only 21 lb. Even for short jobs its use offers only a doubtful advantage, see Fig. 22. For shoveling on any sort of a mat or platform, the square-point shovel is the better; while for scraping down and working on a rough bottom, the round-point shovel should be used. Where there is plenty of room for men to work, the long-handle shovel of both square- and round-point pattern is superior to the short-handle. This is

true for all distances and heights to which the ore has to be thrown, and the farther or the higher the ore has to be thrown, the more pronounced is the superiority of the long-handle type.

D. J. Hauer says that where men are working in a free space they can do, on an average, 10 per cent. more work with a long-handle shovel than with the short-handle; that the limit of throw, taking only one step, is 12 ft. with a long-handle shovel and 9 to 10 ft. with a short-handle shovel. We have checked Hauer on these points and find his statements on the relative efficiency of the two types of shovels to be substantially correct; but we found that it is economy to throw as far as 12 ft. with a short-handle shovel and 14 ft. with a long-handle. Unfortunately, however, most working places underground are restricted in area and it is necessary to use the short-handle shovel. Where one man is shoveling in a drift, or one to each set of timber in a stope, the long-handle shovel can be used to advantage. Where men are working $2\frac{1}{2}$ to 3 ft. apart, a short-handle shovel should be used. According to D. W. Brunton and J. A. Davis, in U. S. Bureau of Mines' *Bulletin* No. 57, the minimum spacing of men working side by side in a drift should be 2.5 ft. Calling the performance of a square-point shovel on a wooden mat 100 per cent., the efficiency of a square-point shovel working on a rough bottom is only 60 per cent. while with a round-point shovel an efficiency of about 70 per cent. may be maintained.

Best Shovel for Mining Work

Fig. 34 shows the design considered best adapted to mining work. The blade should hold 21 lb. of broken ore as an average load. The approximate dimensions of blades for various ores are given in Table II; the dimensions on the illustrations are for Burro Mountain ore. Both the square- and the round-point blades should be of standard shape, of No. 15 gage at the point, and of such composition that the shovel will handle not less than 1100 tons of medium-hard ore when shoveled off a wooden mat. All blades should be of the plain back type without rivets, the back strap being welded to the blade. Only best-grade, second-growth, northern white ash should be used for the handle, which should be bent to the shape and dimensions shown. On short-handle shovels, the Dirigo, or split D, handle is preferred, as it is much stronger than the ordinary D handle.

A right-hand shoveler throws the ore from him from his right side. When using a short-handle shovel, he grasps the D handle with his left hand, the cross of the D being in the palm of the hand to obtain a good hold, and with the right hand takes a grip on the handle just back of the straps. Standing close to the material to be shoveled, with feet placed as in Fig. 35, he bends his back, shoulders and knees, and assumes a squatting position so as to remain well balanced on his feet. The left hand grasping the D handle rests against the left leg just above the knee, and the right arm below the elbow rests on the right leg. Without moving the feet, the whole body is lunged forward from this position, thrusting the shovel blade forcibly under the muck pile, and heaping it full.

To elevate the full shovel, the knees, back and shoulders are simultaneously straightened, the feet remaining motionless. To throw the ore into a car, after the shoveler has reached a nearly erect position, the shovel is raised farther by drawing up the arms, the left hand acting as a moving fulcrum, and the load is cast directly over the right shoulder without turning the body or moving the feet. To cast in a horizontal direction for any distance, the body must be turned part way around to the right and a short step made in the direction of the throw; the load is cast by a swing of the arms, first slightly backward to obtain momentum and then forcibly forward to deliver the load.

When using a long-handle shovel, a right-hand man grasps the shovel close to the end of the handle with the left hand and places the right hand just back of the straps. The feet are placed as in Fig. 36 and the body assumes a crouching position with knees bent and the right elbow resting on the right thigh just above the

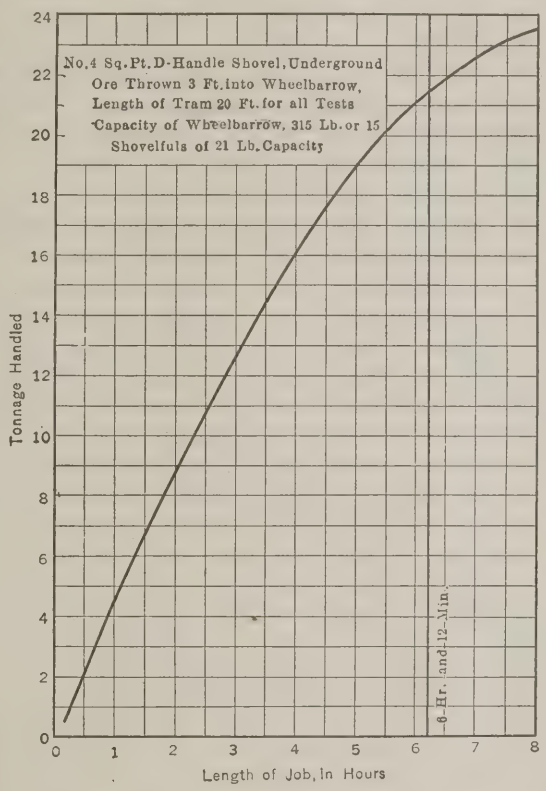


FIG. 32. SHOWING CAPACITY OF A SHOVELER USING A CAR FOR VARIOUS JOBS

knee. The handle of the shovel lies across the left thigh close to the groin and the left hand falls into position against the body near the waist. With a lunge of the body the shovel is then thrust under the mass of ore without moving the feet. To lift the mass on the loaded shovel, the back and shoulders are straightened and the load is brought up by using the left thigh as a fulcrum, over which the shovel handle works as a lever; the knees are then straightened to bring the shoveler into an erect position where the ore is cast directly over the right shoulder into a car as with the short-handle shovel. To cast the load horizontally, a turn to the right is made and a short step in the direction of the throw, exactly as with the short-handle shovel.

It is surprising what a small proportion of the men underground know how to use a shovel to the best advantage, and all sorts of tricks are resorted to in an

effort to lighten the work. Among these are: Taking less than a shovelful each time, using the foot in an effort to force the shovel into the muck pile in the manner of using a spade, skimming a thin layer of loose dust off the sides of the muck pile instead of energetically penetrating the mass to obtain a full shovel load, not holding the shovel properly, and taking two or three steps with each load.

To obtain the highest shoveling efficiency underground, every man hired as a shoveler should be in a particular stope or working place that is directly in charge of a shoveling boss. This boss should have had a large experience in shoveling, have learned correct shoveling methods, and should be able to instruct men and gain their confidence. Each man should be taught: (1) The necessity of using the correct type of shovel for any given purpose; (2) the proper way to handle a shovel; (3) the range of usefulness of wheelbarrow and car; (4) the advantage of using a platform to shovel from; when shoveling has progressed beyond the platform time should be taken to advance the boards or iron sheet and to scrape the broken ore forward on to the platform; (5) the mass of broken ore should be thoroughly loosened with a pick; it is waste of effort to try to shovel material that has become packed; (6) shoveling should be done at a good steady pace, the speed depending on the length of job; it is waste of time and energy to try to rush through the work; (7) in addition to the amount of rest inherent in the work itself—that is, the rest gained while picking down, tramming, etc.—definite rest periods should be maintained during the day. When each man has been thoroughly instructed in the methods of shoveling, he should be placed in general run-of-mine work among the more experienced shovelers, so that another new man make take his place for instruction.

Shovelers Should Work in Pairs

When possible to avoid it, a shoveler should never be made to work alone. Shovelers working in pairs produce the best results, as they set the pace for one another and compete to a large extent; besides, any laxness can be detected almost at once. Shovelers should be placed in groups of two, four, six, etc., so that the men can work in pairs. It is best not to have more than four men in any group, as with larger groups it is hard to watch the work of each man separately and they try to put the work off on one another. Best results are always obtained when the tonnage shoveled by each man, or small group of men, can be accurately measured at the end of every shift. When men are shoveling in a stope where there is room, they should be so placed that each can use a long-handle shovel; where the area is restricted, a short-handle shovel should be given to them and they should be placed so that a right-hand and a left-hand man can work together.

The ideal shoveling day is the period during which a man can rest at stated intervals and can produce the maximum tonnage by working at a steady pace for the full period, and yet not wear himself out, so that his health is impaired. It is obvious that a steady working pace for the full period is physically impossible unless the rest periods are excessive, in which case the total tonnage handled falls off; in other words, a man cannot do a good day's work and leave the job feeling as fresh as when he arrived. In all of the tests, the shovelers showed a decreasing efficiency, as the day advanced; rest periods brought up the efficiency, but after each successive rest period the efficiency did not advance to quite the same point as after the preceding period, and at the end of the shift it had reached its lowest ebb. Much work can still be done on this point, but after considering the amount of rest that is inherent in the work itself and the amount of added supervision necessary to maintain shoveling on a scientific basis, the tentative statement is made that, in addition to the lunch period, there should be two 10-min. periods of complete relaxation, one midway between the beginning of the shift and lunch time and the other midway between lunch and quitting time.

In all discussions of efficiency methods and wage payments, one fact must be recognized: unless a man feels that he is to be well paid for his work, he is going to use every subterfuge to keep those in charge from knowing just how much he is capable of doing. Almost without exception the workman will be most interested in his wage; if he can earn the same wage with less effort he will do so, and if an increase depends directly on his extra effort he will work harder. It is not the purpose to discuss wage payment and benefit work except in so far as the relation of wages to an efficiency campaign must be clearly recognized; but it is necessary that some thought be devoted to the method applying these standards so as to obtain the best results from day to day without antagonizing the men.

Fundamental Laws of Management

Three fundamental laws of management are: (1) The man must be contented with his surroundings and conditions of work; (2) he must have confidence in the desire of the men over him to be fair in their dealings; (3) the payment for the work done must be proportionate to the performance.

It must be obvious to any one that such things as accident insurance and compensation, good hospital service, old-age pensions, steady work for old and faithful employees even in times of financial stress, good housing and living facilities, improved sanitary conditions, good educational features, such as schools and libraries for both old and young, plenty of entertainment, such as a club, moving pictures, and lectures, and a sincere interest in the men by the management, tend to make the men happy and contented with their surroundings and to put them in a receptive mood for any bonus and efficiency systems that may be contemplated. Unless the men are contented, it is not possible to attempt to increase the efficiency by scientific study, as the men will at once become antagonistic to the time-study man and the efficiency engineer and will do all they can to mislead them.

No campaign for scientific management will be successful as long as the men feel that the company is trying to determine what each man can do merely to cut his wages and to make him work harder for a wage only slightly in advance of his old rate. The company should make each man understand that it hopes to determine what a fair day's work constitutes and that for a fair day's work it is ready and willing to pay a fair day's wage and to reward any ambitious and energetic man who does more than the average, by paying him

accordingly. The company must supply the best tools for the work and have the conditions such that the man can work to the best of his ability.

When first installed, a schedule of payment should always be a little too low rather than too high; then as the men fail to make a good bonus the schedule can be increased from time to time as occasion requires. A schedule should never be lowered when once it has been put into effect, as the men will immediately become suspicious of the intentions of the management. The new system should be introduced by applying it to one man at a time, picking out only those who are willing; after several of the best men are working under it, with demonstrated advantage to themselves, most of the others will volunteer to come under the new system. In general, it takes two or three years to institute a new system and to put it on a successful operating basis without making the men suspicious, and the utmost patience and tact is necessary at all times.

The Phelps-Dodge Corporation has not as yet introduced a system of payment other than the regular daily wage and, in the case of development work, the contract system, in which the shovelers share by receiving a higher wage than the men in the stopes.

Daily Wage—In the daily-wage system, the supervision is generally held at a minimum and the men have an ideal opportunity, and use it to the full extent, to do as little for their pay as possible. It is a system of payment that is by no means adapted to efficiency methods, as it puts the men into large classes and takes no account of individual effort.

Task Work—The task-work system merely designates a piece of work to be done after which the laborer may go home. In some cases the laborer gets a full day's pay for the period he works, while in others he divides with the company the amount of wage for the time he saves. In either case his only reward is shorter hours; he does not make any more by working harder, in which respect the system falls short.

Profit Sharing—The men receive a set wage for a day's work and at intervals (quarterly, half yearly or yearly) a certain proportion of the company's profits are divided among them, either according to wage rates or to length of time in the service of the company. This system has the disadvantage of not giving immediate reward to the men for the work they are supposed to do in return, and as a result their interest is not stimulated.

Piece Work—In the piece-work system, the men receive a set price per ton handled or per foot advanced, etc. The system is an ideal one when the conditions of work vary only within narrow limits, but underground it has grave drawbacks. When a piece-work price or a contract is given, often the workman will make too much

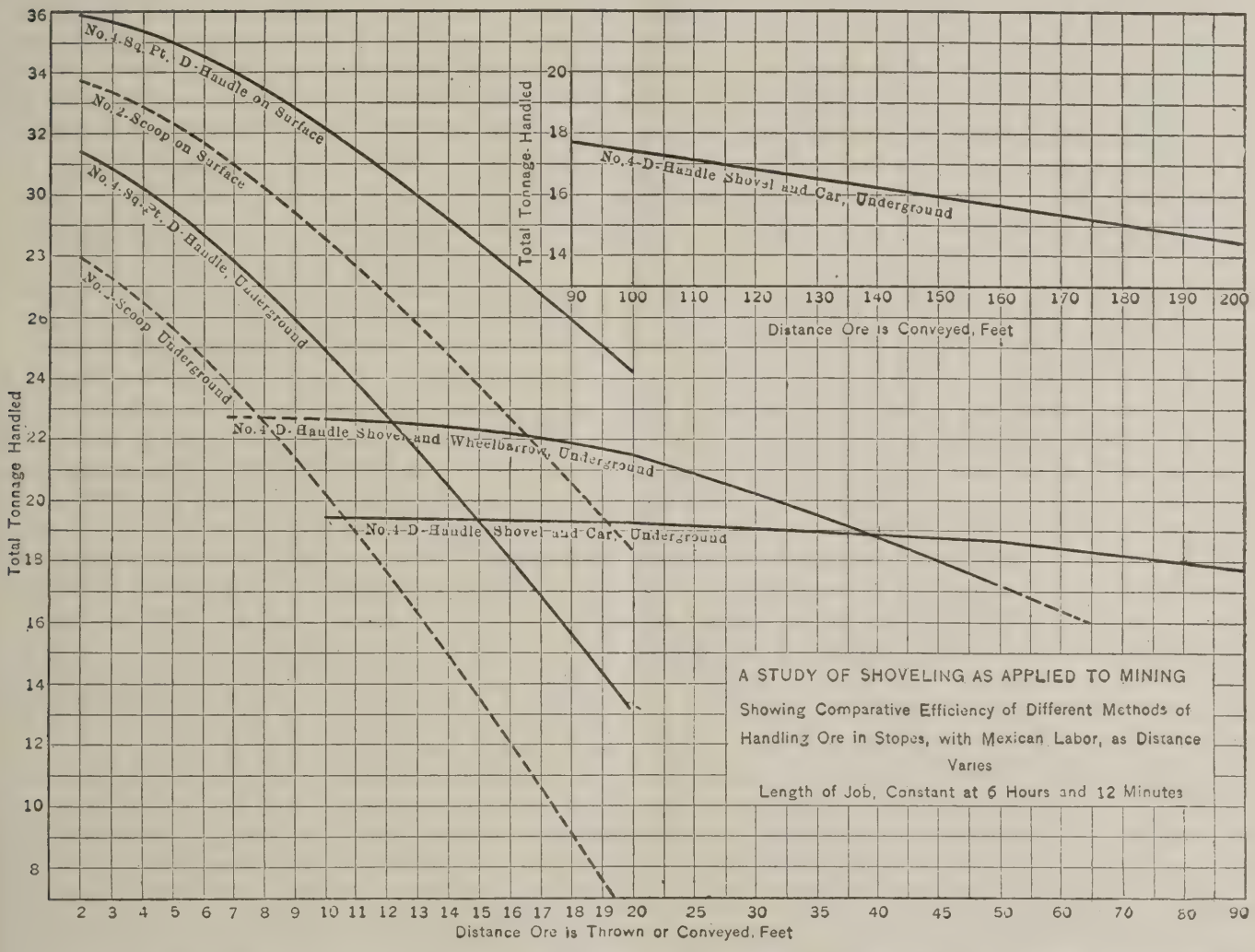


FIG. 33. COMPARATIVE EFFICIENCY OF DIFFERENT METHODS OF HANDLING ORE AT VARYING DISTANCES

money or not enough; the price set is seldom one that enables the man to make what the company thinks is fair. In the first case, the company is tempted to cut the price; in the second, it is forced to help the man out by giving him enough to live on. Many unions forbid the piece-work or contract system. The harm in cutting rates is largely caused by poor judgment on the part of the management in first setting the rates. The standards are not based on scientific data, but on the previous best records, an ordinary try out, or on the foreman's off-hand estimate of what should be done, all of which are generally from 50 to 150 per cent. too low.

Conditions underground vary to such an extent from day to day that no true contract or piece-rate system can be entirely fair, and either the man or the company is bound to suffer. Just as soon as the men in charge of such a system try to anticipate the conditions in making contracts, the men raise the cry of favoritism and become dissatisfied. Such a system presents great opportunities for evil in that the effort to equalize results actually does produce favorites and offers a field for a dishonest man to profit from the laborer.

TABLE IV. BONUS PAYMENTS TO BE APPLIED TO SHOVELERS. BASE RATE OF $3.75 PER DAY IS GUARANTEED TO MAN

Distance Ore Is Thrown or Conveyed, Ft.	Shoveling into Chute			Shoveling into Wheelbarrow			Shoveling into Car		
	Average Tonnage Expected	Payment Rate for Average	Bonus per Ton Above Average	Average Tonnage Expected	Payment Rate for Average	Bonus per Ton Above Average	Average Tonnage Expected	Payment Rate for Average	Bonus per Ton Above Average
2	31.5	$0.120	$0.130	....	....	....	....	....	....
3	31.0	.121	.131	....	....	....	....	....	....
4	30.0	.125	.135	....	....	....	....	....	....
5	29.5	.128	.138	....	....	....	....	....	....
6	29.0	.130	.140	....	....	....	....	....	....
7	28.0	.134	.144	22.7	$0.165	$0.175	....	....	....
8	27.0	.139	.149	22.7	.165	.175	....	....	....
9	26.0	.144	.154	22.7	.165	.175	....	....	....
10	25.0	.150	.160	22.6	.166	.176	19.5	$0.192	$0.202
11	24.0	.156	.166	22.6	.166	.176	19.5	.192	.202
12	23.0	.163	.173	22.6	.166	.176	19.5	.192	.202
13	22.0	.170	.180	22.5	.167	.177	19.4	.193	.203
14	20.0	.188	.198	22.4	.167	.177	19.4	.193	.203
15	19.0	.197	.207	22.3	.168	.178	19.4	.193	.203
16	18.0	.208	.218	22.1	.169	.179	19.4	.193	.203
17	17.0	.220	.230	22.0	.170	.180	19.3	.194	.204
18	16.0	.235	.245	21.8	.172	.182	19.3	.194	.204
19	14.0	.268	.278	21.6	.173	.183	19.3	.194	.204
20	13.0	.290	.300	21.5	.175	.185	19.3	.194	.204
25	....	....	....	21.0	.178	.188	19.2	.195	.205
30	....	....	....	20.3	.184	.194	19.1	.196	.206
35	....	....	....	19.6	.191	.201	19.0	.197	.207
40	....	....	....	18.8	.199	.209	18.9	.198	.208
45	....	....	....	18.0	.208	.218	18.8	.199	.209
50	....	....	....	17.3	.217	.227	18.7	.200	.210
60	....	....	....	16.4	.228	.238	18.4	.204	.214
70	....	....	....	....	....	....	18.2	.206	.216
80	....	....	....	....	....	....	18.0	.208	.218
90	....	....	....	....	....	....	17.8	.210	.220
100	....	....	....	....	....	....	17.5	.214	.224

Bonus System—The bonus system guarantees a fair wage to the man for everything that he does up to a certain standard performance and beyond that a bonus is paid for each unit of work done. In my opinion, it is an ideal system for getting around all the difficulties and uncertainties that exist in mining. To install such a system requires much preliminary study, and unremitting care during its existence, but if carefully carried out it creates a bond of sympathy and good feeling between the men and the company that is worth far more than the expense. It simply means that for any class of work the company must determine through the medium of past performance and time study what an average day's work shall consist of and must guarantee the men a fair day's wage for that amount of work. In order to keep the men interested and up to this standard, the company must say that it is ready and willing to pay for any work done in excess of the required standards.

The wage in force at the present at the Burro Mountain mines for Mexican shovelers is $3.40 a day. Assuming that this is a fair wage for this class of labor, to put the men in the proper frame of mind to take kindly to the bonus system, the wage should be raised to $3.75 a day, an increase of 10.3 per cent.; this wage will be paid to them whether they make the required tonnage or not. If any man makes the tonnage required of him, his wage may be raised to $4 for that shift, an increase of 17.6 per cent. above the $3.40 rate, although this has not been designated in Table IV. If he produces anything over the required amount, he should be paid a bonus per ton, depending on the original task allotted to him. In order to make an increase of 50 per cent. over his old $3.40 rate, a shoveler will have to produce between 25 and 30 per cent. more than his allotment. Experience has shown that when a laborer receives an advance in wages of more than about 50 to 80 per cent. above a fair wage, he tends to become shiftless and the increase does him more harm than good.

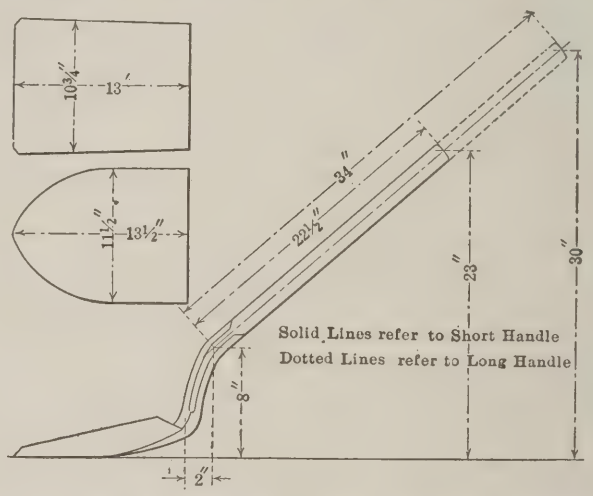


FIG. 34. DESIGN OF SHOVEL BEST ADAPTED TO MINING WORK

Fig. 33 shows that under good working conditions a laborer moving ore 20 ft. should use a wheelbarrow, and should move 21.5 tons. According to Table IV, this man will receive $3.75 a day for any work up to 21.5 tons, or at the rate of $0.175 a ton. If he reaches the required 21.5 tons, his wage will become $4, or at the rate of $0.185 a ton, and for every ton over the required amount, he will receive $0.185 a ton. In each individual case, the man setting the standard of work should make sure whether there are any interfering elements that will prevent the man making the standard tonnage, in which case he should make a fair reduction.

In 1917, in a stope with raises spaced 25 x 65 ft. from which was mined 145,000 tons, the shovelers averaged 8.5 tons a man, with wages at $3.40 a day. This shoveling cost $0.33 a ton, assuming that the men were on other work for 17.5 per cent of the day. Charts show that under the new system these men should have averaged 22.9 tons a man, for which they would have received $4 a day. This would be an average shoveling cost of $0.175 a ton, or a gross saving of $22,475 for the year. Out of this gross saving would have to come

the cost of, say, five special men, at an average salary of $160 a month, or a total of $9600 a year, to take care of this branch of the work. This sum deducted from $22,475 leaves a saving of $12,875, or a total shoveling cost of $0.239 a ton.

If, under the new system, the men consistently fail to make bonuses, it is either the company's fault or the men's fault. If it is the fault of the company, the

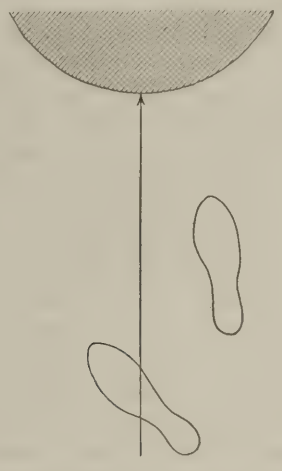


FIG. 35. POSITION OF FEET OF RIGHT-HANDED MAN USING SHORT-HANDLE SHOVEL

standard may have been set too high on account of a faulty analysis of the time-study figures. The men may not be receiving the proper shovels to work with; or the men in charge of the work may not be making fair reductions from this standard, when working conditions are poor. If the men are to blame, either they are not physically fit to be shovelers, in which case they should be tried out at some other work, or they are suspicious of the company's motives, which would lead one to suspect that the system had been introduced too hastily, or that the men have organized to force the company to raise the rate of payment or to lower its standards.

Summary and Conclusion

Shoveling ore cost so much at Tyrone during the year 1917 that it was deemed advisable to conduct tests to see where the fault lay. These tests were in the nature of time studies and extended over a period of nearly a year. No data were available on this work to supply a starting point, so it was necessary to begin in a very elementary way, to find out the capacity of the average Mexican laborer.

To obtain a basis for comparison, it was necessary to determine the capacity of various types and sizes of shovels, so as to know whether the 21-lb. load was the best load underground as well as on the surface. A list of essential factors influencing shoveling was also made out during the course of a short series of preliminary time studies, and the motions involved in shoveling were analyzed and subdivided for convenience in studying. The necessary forms and record sheets were also decided upon at this time. A second short series of tests was then conducted on the surface, so as to be able to estimate the negative effects of underground work on the shovelers, and to minimize, as far as possible, the need for studying obviously poor types and sizes of shovels under the difficult conditions to be encountered in the mine.

The test work underground consumed by far the greater proportion of the time and was divided into three series: Shoveling directly into a chute; shoveling into a wheelbarrow and tramming to a chute; and shoveling into a car and tramming to a chute. In each series the following points were determined for various lengths of time worked: Number of shovelfuls handled per minute, effect of distance thrown on shoveling speed, amount of rest required, amount of time consumed in tramming and dumping, proportion of working day occupied in shoveling, total tonnage handled during various working periods, effect of distance on tonnage handled during the day.

These tests showed that the design of the shovel has a marked effect on the shoveling efficiency and that with the proper weight and size of tool the man's efficiency will be increased in spite of himself. It was demonstrated that a man handling a total load of 26 lb. and 8 oz. did the greatest day's work, other things being equal, and that this load is divided into a live load of 21 lb. and a shovel weight of 5 lb. and 8 oz. A shovel weighing 5 lb. and 8 oz. made out of the best composition steel gives excellent service, and a lower cost per ton than a shovel having a lower first cost.

Further marked increases in shoveling efficiency are to be gained by instructing the shovelers in the proper methods of using a shovel, a thing that few laborers know in spite of the fact that they may have been shoveling for a living for years.

Probably the most important part of all efficiency work lies in the wage that is paid to the men, the manner of paying the wage, and the feeling of confidence and good will that exist between the men and the company. Various types of wage payment are briefly discussed and the conclusion is reached that the bonus system in some form, if properly handled and carefully watched with a sufficient number of specially trained men to instruct the laborers and keep them working

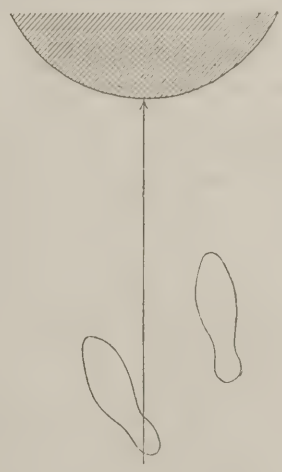


FIG. 36. POSITION OF FEET OF RIGHT-HANDED MAN USING LONG-HANDLE SHOVEL

to the best advantage, is the preferable system of payment. A bonus schedule is proposed as a starting point for the work and the benefits that will probably be derived from it are outlined, using some actual stoping experience as an example.

Scientific management systems applied to certain eastern factories have demonstrated conclusively that the efficiency of the average workman can be increased by

from 50 to 250 per cent. and that at the same time the men will receive better wages, will remain in better health, and will be happy and contented, while the company will actually produce its products at a lower cost.

F. W. Taylor, working at the Bethlehem Steel Co. plant several years ago, increased the capacity of the iron-ore shovelers from 16 to 59 tons per day per man, raised the men's wages from $1.15 to $1.88 a day, and at the same time decreased the operating cost from $0.072 to $0.033 per ton shoveled. The increase in shoveling capacity amounted to 269 per cent. Figures obtained at Tyrone indicate that the tonnage in at least one of the large stopes can be raised from 8.5 tons per man to 22.9 tons per man, an increase of 169 per cent., the wages can be raised from $3.40 a day to $4 a day, and the cost to the company reduced from $0.33 a ton to $0.24 a ton, after taking care of all extra supervision needed. In addition to this actual saving in shoveling costs, the overhead and general mining costs will be reduced per ton by mining a greater tonnage per man; and the other classes of labor such as machine miners and timber men will be able to do more work, as they will not be hampered and delayed by the shovelers to such an extent as at present.

Labor should not be given too much of an increase in wages over what is recognized as a fair living wage, as the men will at once tend to become shiftless and prosperity does them more harm than good.

The modern manager is beginning to see that the relation of standard times to the other features of organization is close and vital. The determination of the standard, or the shortest time, in which a job can be done, is the starting point for all work that has as its aim the establishing of an equitable wage system.

Charles Piez Talks to Engineers On Shipping Problems

The Engineers' Society of Northeastern Pennsylvania held its twenty-second annual banquet at the Hotel Redington, Wilkes-Barre, Penn., Feb. 5. About 390 persons were present, more than the banquet hall would accommodate. The toastmaster was Daniel R. Reese, and the guest of honor, Charles Piez, director of the Emergency Fleet Corporation and president of the Link Belt Co.

Mr. Piez made a most interesting address, completely justifying the work of the Emergency Fleet Corporation. He said that wages to ship workers had been increased to accord with the cost of living, but that it had been felt that it was questionable always whether the Macy board, which regulated the matter, would continue to be justified in making such adjustments, because there were large bodies of workingmen in the United States whose difficulties in meeting the high cost of living were not being, and could not be, so generously met. In fact these men were bearing the pressure of war conditions, whereas the shipbuilders were, by the frequent readjustments, managing to avoid feeling any of the pressure. Mr. Piez declared that the United States should write off about a billion and a half dollars as a war loss. Conditions were not favorable for economical production. Above all the wooden vessels were not really suitable for modern commerce. Such vessels could not be built to carry a deadweight of more than 3500 to 4000 tons. Such a load, when the coal supplied for going and returning was deducted, would be found inadequate for modern competitive conditions. The trouble was not that the ship was wood—a steel ship of the same size would be equally uneconomical—but being a wood ship it could not be made bigger.

He declared himself opposed to a merchant marine larger than would serve for the support of the increased navy. The figure he named was 12,000,000 deadweight tons. He declared that 25,000,000, as had been suggested, was altogether too large. He added that in order to operate the merchant marine with the wages demanded by the union and the working conditions specified by legislation it might be necessary for the nation not only to write off much of the money expended, but to guarantee that it would accept part of the losses of operation of any company which would undertake to sail the ships and provide the docking accommodations.

Con McCool, a one-time miner, delighted the audience by his witty stories and his clever impersonation of the men of divers nationalities engaged in a labor convention. The outgoing president read his report for 1918 and the placid G. F. Smith, ingoing president, delivered some extremely humorous remarks on his experiences at the Club of the Engineers' Society during his bachelor days. The Club much appreciated his dry wit.

There were at one time 43 blue stars in the service flag of the society, but three have turned to gold. They represent Lieut.-Col. Frank F. Duffy, who fell at Château-Thierry, Ensign Merritt H. Barnes and Captain Karl G. Van Sickle. Dan Hart, a Wilkes-Barre man, delivered an eloquent address in commemoration of their services, and preliminary arrangements were made for a memorial in their honor. The motion picture, "America's Answer," concluded the entertainment.

Colliery Notes

Miners often do not object to working in seams generating gas as it helps to work the coal. Another important thing in this connection is that the air is often better; the gas must be diluted by enormous volumes of air when given off in large quantities at the face.

An inside company man ran a small sliver in his finger and infection resulted because he did not have it dressed. The Bethlehem Steel Co. has an excellent rule covering such cases, which requires all the employees at its Bethlehem plant in event of any injury whatsoever to report at once to the physician in charge of such matters at the company hospital at the works.

The U. S. Bureau of Mines reports 76 men killed about coke ovens in 1917 compared with 45 in 1916, while the total number of men employed about ovens remained about the same—32,417 for 1917 and 31,603 for the preceding year. The fatality rate in 1917 was 2.14 per 1000 employees; in 1916 it was 1.32. The injury rate in 1917 was 188.59 per 1000 men employed, while in 1916 it was 153.49. The increase in accident rates is not necessarily on account of the work being more hazardous; rather it is due to the keeping of better records which more nearly represent true conditions.

Book Reviews

Where Differences Wait on Reason

REPORT OF ANTHRACITE BOARD OF CONCILIATION. Vol. VI, 363 pages; 6 x 9⅜; no illustrations. James A. Gorman, secretary, Anthracite Board of Conciliation, Hazleton, Penn. Cloth Boards.

The volume of business transacted by the Anthracite Board of Conciliation will be appreciated when this record, covering a period from Apr. 1, 1916, to Mar. 31, 1917, is scanned. In a preface we are assured, however, that it does not cover all the activities of the board. "The members of the Board of Conciliation, acting pursuant to regulations, settled," says Mr. Gorman, "a large number of grievances in their respective districts, thus making it unnecessary to bring up these matters formally for action by the entire membership. In such grievances the parties directly interested were not required to appear before the board to give testimony. Grievances settled in this way are not recorded in this compilation of the work of the Board of Conciliation as the board in these compilations makes record only of the formal grievances which were taken up and acted upon by the whole body."

The number of grievances decided and withdrawn number 175, the registration numbers running from 361 to 569. Certain grievances being at the date of record neither decided nor withdrawn, the number recorded is reduced from 209 to 175, as noted. Cases were withdrawn for various reasons, "the chief of these being, compromise by parties to grievances, settlement direct, failure of interested parties to prosecute their cases before the board, complainants quitting the employ of the company and complainants requesting withdrawal of their cases."

Among other *causes celébres* was the case of the motor runners of the Hazleton Shaft Colliery vs. the Lehigh Valley Coal Co., where the motormen wanted to receive the same wages as were paid to oil-locomotive engineers at the same colliery and to motormen at other collieries. Another case is that of the contract miners of No. 23 Tunnel, Coal Brook Colliery vs. the Delaware & Hudson Co. relative to pay for lifting the bottom impurity or rock as part of the coal seam. There is also the case relative to the subletting of contracts for the loading of machine-mined coal known as Grievance No. 384 and entitled "Certain Employees vs. Delaware, Lackawanna & Western R.R. Co., Coal Department." The volume also reports the "Topping" dispute at the Short Mountain Colliery of the Susquehanna Coal Company.

In every man's life, in the life of every industry, in the life of every nation, there are only three choices—submit, arbitrate or fight. It is creditable to the coal industry of the anthracite region that the second course, which is the best of all, has been the course accepted. The bituminous coal industry has as yet no court of final appeal that is in any degree comparable with that long established in the anthracite region. Other industries also straggle far behind along the road over which the anthracite industry has traveled with winged feet.

Burning of Comminuted Coal in Industry

POWDERED COAL AS A FUEL. By C. F. Herington, Mechanical Engineer. Pages XII + 202 + 9 index; 5¾ x 9¼; 84 illustrations. D. Van Nostrand Co., 25 Park Place, New York, Publisher. Cloth boards. Price, $3 net.

Many are the inquiries on foot to ascertain the possibilities of powdered coal. Some of the emphasized disadvantages in the use of this fuel are merely superficial. We realize from the first that it is prepared coal, and therefore more costly than slack. We overlook the fact that the drying to 1 per cent. of moisture is not a costly performance. Every ton of coal burned, no matter what the conditions of burning, is desiccated that much, either before it is put into the furnace or after it is put in.

The work of drying is doubtless more troublesome when it is a separate operation, but theoretically, at least, the loss of heat is the same. Coal must always be dried in the burning. All that we call water vapor in the coal must be eliminated sooner or later. In the powdered-coal system it is eliminated in two stages, in the grate system in only one. In either case, out of the coal the moisture must be driven, and thermal units must be consumed in its expulsion.

Then, again, the powdered-coal system is prodigal in the cost of crushing but is frugal in the cost of stoking, though, of course, not more frugal than the mechanical stoker. Perhaps few realize how far the powdered-coal plant has monopolized the cement industry. According to C. F. Herington, "fully 90 per cent. of the Portland cement made in the United States is burned in kilns in which powdered coal is the fuel." In metallurgical processes powdered coal seems to have great advantages over oil.

The book gives information about the suitability of various coals for powdering, the machinery used in coal powdering, the feeding and burning of powdered coal, the use of powdered coal in the cement industry, in reverberatories, in metallurgical furnaces and under boilers. The developments in locomotive firing follow.

Then explosions of powdered coal are treated. The author seems to carry us back to the end of the last century. He appears anxious to make us think that coal dust, while it may burn, will not explode. It would be delightful if we could believe him. He has had long experience in cement plants. Others in the nineties had worked even longer in the mines, yet still would not believe in the explosibility of coal dust. "In 1915," the book says, "Thomas A. Edison, in explanation of the so-called explosion that took place in his cement mill some years ago, said: 'The explosion was occasioned by fine coal dust catching fire and burning slowly in a pit, thus forming an explosive gas in the air. The explosion killed five men. Please let me emphasize the fact that it was not the dust itself that exploded.'"

A good bibliography concludes the volume. There is no question that such a book has long been needed, and this monograph will be welcomed by the profession.

New Organ of Corporate Good Fellowship

SOLVAY FOLK. A magazine published monthly for the benefit of the employees of the Solvay mining interests. 32-page pamphlet, 8 x 10¾ in.; well illustrated.

A new house organ has just been added to the steadily growing number of such publications. It is published by the Solvay interests, which have mines at Kingston and Westerly in Fayette County, West Virginia; at Marytown, Big Sandy, Orkney, Warwick, Harvard and Exeter in McDowell County, West Virginia; at Spington, Mercer County, West Virginia, and at Tolland, Coaldale, Henry Clay, Big Branch, Lookout and Freeburn in Pike County, Kentucky. The editor, who keeps his name hidden for some strange reason, has done spendidly. His pages make the right appeal to the eye, though a little greater uniformity in the style of his box heads and a few minor typographical changes would better satisfy the appreciative and the reasoning faculties. The pamphlet has a children's page, a household page, a page full of jokes entitled "Bug Dust," and several pages of local gossip from the various mining centers where the Solvay-process coal is mined.

The psychology of these house organs is interesting. A man is invited to make a speech. Having accepted, his first thought is to please. "To please," the idea gets into his head as an obsession. This good feeling grows mightily as he schemes how he can please his audience. What an excellent effect will the desiring to please which a house organ creates have on the persons publishing the organ.



Secretaries of Local Coal Associations to Cooperate with Geological Survey

Local coal associations throughout the country have been unanimous in their pledge to coöperate with the United States Geological Survey in the collection of coal statistics. In designating the secretaries of local associations as representatives of the Geological Survey, the following letter sent to W. E. Blucher, of the Southwest Coal Bureau, is typical of the other letters of appointment:

In accordance with the informal discussion had between you and Mr. Lesher, Geologist in charge of Mineral Fuel Statistics, I take pleasure in designating you, as Secretary of the Southwest Coal Bureau, the representative of the Geological Survey in the matter of collecting and compiling current statistics from the coal operators of Iowa, Missouri, Kansas, Arkansas, Oklahoma and Texas relating to the progress of the coal industry in those states.

I appreciate very much the spirit of coöperation on the part of yourself and the operators in your district in entering into this coöperative arrangement, and believe that the results, both immediate and ultimate, will be to the advantage of the local industry as well as to the Geological Survey and will promote a better understanding and closer sympathy between the Department of the Interior and the producers of coal.

You are authorized by this letter to use, in your correspondence on the subject of current production and distribution statistics, the letter heads bearing the caption "U. S. Geological Survey, in coöperation with the Southwest Coal Bureau" on the general form of the sample inclosed, and to use the same captions on your envelopes and report forms. Your correspondence with the operators must necessarily carry the regular postage.

Secretaries of local coal associations, which to date have been designated representatives of the United States Geological Survey to assist in the gathering of coal statistics, are as follows: Jones Waffle, Indiana Coal Trade Bureau, Terre Haute, Ind.; C. M. Roehrig, Northeast Kentucky Coal Association, Ashland, Ky.; Charles O'Neil, Central Pennsylvania Coal Operators' Association, Altoona, Penn.; James A. Fenelon, Coal Trade Bureau of Illinois, Galesburg, Ill.; J. E. McCoy, Southern Appalachian Coal Operators' Association, Knoxville, Tenn.; O. G. Scott, Central Illinois Coal Bureau, Springfield, Ill.; W. E. Blucher, Southwest Coal Bureau, Kansas City, Mo.; F. B. Reimann, Northern Pennsylvania Coal Operators' Association, Butler, Penn.; F. J. Patton, Northern West Virginia Coal Operators' Association, Fairmont, W. Va.; D. F. Hurd, Pittsburgh Vein Operators' Association of Ohio, Cleveland; W. B. McKinney, Southern Ohio Coal Exchange, Columbus, Ohio; George Beausewine, Jr., Operators' Association of Williamson Field, Williamson, W. Va.; W. E. E. Koepler, Pocahontas Operators' Association, Bluefields, W. Va.; G. D. Kilgore, Southwestern Virginia Coal Operators' Association, Norton, Va.; E. R. Clayton, Harlan County Coal Operators' Association, Harlan, Ky.; C. J. Fletcher, Knox County Coal Operators' Association, Indianapolis; H. M. Little, Southern Indiana Coal Bureau, Evansville, Ind.; P. H. Greenlaw, Fifth and Ninth District Coal Bureau, St. Louis, Mo.; C. Ostrom, Northern Illinois Coal Operators' Association, Chicago; W. B. Innes, Western Coal Producers' Association, Billings, Montana; John G. Kerr, Colorado Coal Operators' Association, Denver; J. P. Wilson, Tug River Coal Operators' Association, Bluefields, Va.

National Coal Association in Readiness to Transmit Market Information

To carry into effect its market information service, the National Coal Association is proposing to open branch offices at Pittsburgh, Chicago and other cities. Each branch office will be the head of the tributary district. Reports are to be collected each day of the preceding day's sales. From the several reports, an analysis of the market situation will be made and telegraphed to the local association's secretaries for distribution to members. The bulletin probably will give the number of cars sold, the prices obtained, the kinds and sizes of coal and the class of customer, with a distinction between spot and contract sales.

Secretary Redfield Plans Cooperative Action Between Government and Industry

The Secretary of Commerce has proposed a plan for coöperative action between the Government and industries with the idea of stabilizing prices and meeting problems of readjustment. Secretary Redfield expects to call conferences of representatives of the various industries. He states, however, that the conferences will be first with the steel, copper, cement, lumber and other industries. The conference with the representatives of the coal industry probably will be left until the last, as fuel enters into all the industries and coal questions can be discussed best after the problems of the other industries have been discussed.

Employees of the Fuel Administration on Feb. 10 entertained Cyrus Garnsey, the assistant director of the Administration, at a smoker. During the evening, Mr. Garnsey was presented with an expensive watch.

Recommend that Tidewater Shippers Need Not Be Members of the Exchange

Recommendations have been made by the Tidewater Coal Exchange that it no longer be compulsory for shippers to tidewater to be members of the Exchange; also that operators may ship directly to consumers. It also was recommended that pre-war demurrage be restored.

The meeting of the tidewater shippers was held in the National Coal Association assembly room, but the National Coal Association was in no way a party to the conference, as has been stated in some quarters. John Callahan, of the National Coal Association, did act as chairman, but for a short time only, so as to permit of the selection of a chairman to preside over the meeting. A committee was authorized on which will be representatives of shippers to each of the tidewater ports.

Railroads to Make Prompt Settlement of Coal Freight Claims

Means will be found in the near future by the railroads to make prompt settlement of freight claims on coal. This is the most definite result of the conference held in Washington between the Railroad Relations Committee of the National Coal Association and the committee consisting of fourteen of the principal claim agents. New regulations are to be drawn up for the settlement of freight claims on coal. Another matter which brought out much discussion was the matter of who is responsible for the loss of coal when there is no prima facie evidence of loss. The meeting was described as a very satisfactory one, and it is believed that much more satisfactory handling of freight claims on coal will result.

Motion Picture Reels of Mining Industry Soon Ready for Distribution

Through the coöperation of many of the large mining and metallurgical companies throughout the country, the Bureau of Mines has been able to obtain many excellent motion picture reels showing the various phases of the mining industry. In all, the Bureau of Mines has now in its possession about 250 reels, and after these have been edited and captioned it is thought that this collection will be distributed at once.

It is the intention of the Bureau to loan these reels to mining schools and other engineering institutions throughout the United States. Effort will be made to keep this collection up to date, and to obtain reels from time to time that will show the progress that is being made in the mining industries. The supervision of collecting these reels, assembling them, and the distribution of the same, has been placed in the hands of Morton F. Leopold, safety engineer of the Bureau of Mines.

No agreement has yet been reached in regard to railroad fuel purchases, although it is believed that the Railroad Administration is convinced that publicity must be given to bids. The matter of district prices and distribution of orders within districts is still under discussion.

Revival of Interest in Peat Resources of the United States

Interest in peat has been revived to some extent by the recent act authorizing the Bureau of Mines to make an investigation of that resource. There are in the United States, according to C. C. Osborne, of the United States Geological Survey, 11,000 square miles of peat bog containing more than 12,000,000,000 tons of peat fuel. A ton of machine-made peat is equivalent, for heating purposes, to 1.3 tons of wood; one-half ton of bituminous coal and six-tenths of a ton of anthracite coal. With Europe using 20,000,000 tons of peat annually, in the production of heat and power, it is believed that no insurmountable economic difficulties stand in the way of utilizing some of the peat deposits in this country. Massachusetts and Maine are at present engaged in investigations of peat deposits in those states. With increased rail rates and the scarcity of shipping, it is believed that New England peat could be used to advantage in the areas within short distances of the deposits.

E. R. Lloyd has been appointed to succeed John D. Northrop as the geologist in charge of petroleum statistics for the Geological Survey. Mr. Northrop has resigned to enter the employ of an oil company operating in Wyoming.

Branch offices of the National Coal Association will be opened in Pittsburgh and in Chicago probably by Mar. 1. J. D. A. Morrow, the secretary of the Association, has returned to Washington after completing arrangements for these branches.

Legal Department

TAXATION OF COAL IN PLACE—Coal in place, being subject to ownership apart from the surface, either by grant of the coal by deed or reservation of it in a conveyance of the surface, thereby creating a fee simple title to the same as realty, is subject to taxation as real estate. But where the actual existence of coal under a particular tract of land is purely conjectural the interest is not subject to assessment for taxation at more than a nominal valuation. (Iowa Supreme Court, In re Colby, 169 Northwestern Reporter, 443.)

ILLINOIS WORKMEN'S COMPENSATION ACT—If a motorman in an Illinois mine was killed in the course of his employment, his surviving widow was entitled to an award under the Workmen's Compensation Act of the state, although they were living apart at the time of the accident and she was not dependent upon him for support; her rights being fixed by the fact that he was under legal obligation to support her. (Illinois Supreme Court, Smith-Lohr Coal Mining Co. vs. Industrial Commission, 121 Northeastern Reporter, 231.)

WHO MAY RECOVER FOR MINER'S DEATH—If there be a reasonable expectation of pecuniary advantage from a person bearing family relationship to another, the destruction of such expectation by negligence occasioning the death of him from whom it arose will sustain recovery of damages. Within this rule the parents of an adult miner can recover damages for negligence of his employer resulting in his death, where it appears that the decedent had sent money to them and that he intended to contribute to their support. (Gosh vs. Lehigh & Wilkes-Barre Coal Co., 68 Pennsylvania Superior Court Reports, 63.)

EDITORIALS

Plans To Reduce Illiteracy

A BILL has been introduced by Senator Hoke Smith of Georgia, appropriating $12,500,000 a year for four years for the purpose of wiping out our national illiteracy. Each state receiving its part of this appropriation will have to pass laws compelling "the instruction, for not less than 200 hours per annum, of all illiterate minors, or minors unable to speak, read or write the English language, more than 16 years of age, at schools or places or by other methods of elementary instruction, until such minors have completed a course of English generally equivalent to that supplied by third-grade schools."

Each state will also have to expend an equal amount in promoting the purpose of the Federal appropriation. The money to be appropriated by the United States is to be used solely for the compensation to teachers, superintendents and directors of education engaged in the education of such illiterates.

Every state accepting the appropriation must provide all the necessary buildings and equipment without Federal assistance. The money may not be expended for any religious or privately owned and conducted school, but apparently nothing is said about the coeducation of whites and colored people. This matter will be left to the judgment and predilections of the various states, and really it seems better to allow that degree of self-determination regarding a matter that arouses the bitterest of feeling. However, it is the wish of the public to wipe out colored as well as white illiteracy. The Federal control should be properly exercised to see that the training imparted to illiterate negroes is as competent as that provided for illiterate whites, except where a difference in language makes the teaching of the whites a work requiring greater expertness in the instructor.

The training will cover not only reading, writing and speaking English, but instruction in the "fundamental principles of government and citizenship, the elements of knowledge pertaining to self-support and homemaking, and in such other work as will assist such illiterates and foreign-born persons for successful living and intelligent American citizenship."

The weakness of the bill is that it does not require state legislation to compel adult illiterates to attend school. Our laws should compel every foreigner who steps foot on our shores to study English at a properly approved private or public school during the period of his stay here, unless he has already something more than a smattering of such instruction or receives a Governmental permit. No one can be a safe citizen of our republic unless he can understand the laws and purposes of our people.

The coal-mine operators have a keen interest in this matter. Everything that makes the personnel intelligent enables the operator to put in force plans for larger production and safer operation. A mass of unintelligent workmen is likely to be not only dangerous but also so incompetent that no progress in methods is possible. The education of the American workingman is largely responsible for his superiority as a producer to all other workingmen the world over.

After all, muscle is not the main requirement. It might have been so before James Watt and Michael Faraday revolutionized the world. Daily we are learning that taking thought is as productive as taking action. We can never put any new plan into effective operation without the support of a large number of men able to understand English and to act without having every detail explained to them at laborious length by an interpreter. If the new scheme of Senator Smith is made operative, the nation will take a stride such as has not been achieved for several decades.

In the matter of American shipping it is time we got down to bedrock on the facts in the situation. We declare it is our purpose to get American ships into all the ports of the world. This can be done only if we are willing to pay for it. The ships of other nations will carry the world's freight unless American ships afford the shipper equally low rates. It is unlikely the leaders of labor in America will sanction the repeal of the Seamen's Law, permitting our shipowners to hire whom they please, treat them as they please, and pay them what they please. The only other way is for the nation to pay a sufficient subsidy to shippers to permit them to meet foreign competition. Either the industries of America must share the burden of this subsidy, or we must abandon our shipping ambitions.

Parallels of Latitude and Meridians of Longitude

BUSINESS runs from the equator toward the poles and from the poles to the equator more readily than along parallels of latitude. Because the British and French produce what we produce, we prefer not to buy from them. Because we make what they make, they do not like to buy from us. Business along the parallels of latitude is largely distasteful to peoples engaging in it. It is competitive business. Trade reaches its largest proportions in the north temperate zone because of the populousness of that portion of the globe, and because of the relative sparseness of the population near the equator; not because the exchange of products flows naturally out of the mutual needs of those by whom the exchange is made.

It is a pleasure to do business with a planter or merchant in Nigeria or Colombia. He sends us such things as we do not have and badly want. He takes from us what the natives do not and cannot make. From the equatorial zone we get rubber and elephant's

tusks, copra and tin, spices, strange fruits, tea and coffee. No one wishes to exclude these and other tropical products. Rather we worry at times because we may not get them. On the whole, we would sooner do business with savages than with our own kind. Even the art and the trinkets of India, Central Africa and Brazil appeal by their differences; and their lands are natural places for us to sell our distinctive wares. With such people we can do all the business we please, and do it with the kindliest of feelings. When we exchange goods both parties feel they are receiving a benefit. Strange to say, the equatorial countries have little coal, or believe that they have little, though we cannot determine satisfactorily why this is so. For this reason they will accept a little coal, and the northern and southern countries are able and willing to supply them. This coal, universal as it is, might readily go to the equatorial regions were there much demand; but unfortunately for us, the equator needs no domestic heating and has few manufactories.

The population of the equatorial region is small, the people are in large part Indians and negroes, and therefore uneducated; the people, of whatever color, are not as hustling as we are, owing to the excessive heat of the sun. If it were not for this all industry would travel along meridians rather than along parallels of latitude, and trade would be complementary rather than competitive. We would fill the equatorial needs and the equator would fill ours.

At a basket picnic every woman brings her contribution of good, fresh and wholesome food. She has pride in its quality and quantity. We all are bringing our baskets to the common table. Some bring as little as they can and that little is bad and useless. If we all strive to bring less than another, how shall we all fare better? Let us strive so earnestly that when we open our baskets at the public fiesta they will not be an unworthy contribution to the public necessities. Otherwise ours truly will be a miser's mess.

When Industry Stumbles

ON THE whole the mining industry is reasonably free of strikes, but there is an undercurrent of discontent which may, at any time, make trouble. The coal industry is face to face with a spirit which finds a reason for wage increases in every development.

During the war the need for coal was acute. The mine worker saw in this fact an opportunity to urge the importance of high wages. "If they are not granted," he cried, "the industry will be deserted for other war industries. The operator must pay larger wages, if not for our sake at least for his own." Now the war is over and business is slack there arises another plea. "With short time we cannot make a living. Wages must be raised so that a man may work short time and keep up his living standard."

In former days it used to be said that wages must be lowered so as to encourage business. We have changed all that. Now, when demand falls, we raise the wages of the workers. When the camel of industry stumbles he comes down low enough that we can chuck on another case. Thus the more it stumbles the more load it has to bear.

Buy, Buy, Buy

SAVING is not altogether a negative virtue. It is not all scrimping self denial. Savings are the difference between income and outgo. We can save by raising income; we can save by decreasing outgo. The first is the better means. The miserly person who knows nothing but how to do without usually dies possessed of little else but greed and cunning.

So too with the nation. It is time to spend wisely on what we need, to make such purchases as will promote economical industry. The country has to meet the Fifth Liberty Loan of about $5,000,000,000. It will meet it more readily if every one is busy in the coal mines and in the factories. If we hold off to buy till the better time we shall find it will not come.

Wages are not going to be lowered even though the new scale paid to the copper men would seem to indicate that they are. The unions will keep up their high scales and the non-union men have many of them had no increases and therefore stand to receive an advance in wage rather than a decrease. Moreover there is a further good reason for holding up wages. It seems passing strange that the reason did not seem valid to the copper industry; it is a logical reason nevertheless and should be set down.

Wherever large stocks are on hand there is need to keep wages up. Otherwise it will become necessary to sell the whole product produced by high wages at a price approximating the rate at which it can be produced by low wages. The buyer will wait till the price falls to a figure based on the low wage. Thus the producer loses heavily for he has to dispose of his large accumulations of product at a figure much below the price at which he produced it.

Had he maintained wages he could have sold it at a fair margin above the cost of production. So long as wages were maintained no one would sell far below production cost but with wages cut it would be quite the best policy for the individual, who happened not to have a stock of mineral, to run his mines and sell the product at the best margin he could obtain. By reducing the wages of the miners the copper men reduced the possibility that they would be able to "break even" on the copper produced under a high wage scale.

Many will not agree with the copper men. To them a reduction in wage seemed natural, the scale being one which was arranged to slide up and down with the price of copper. True the War Industries Board thrust the price of copper down during the continuance of hostilities and the Labor Board jammed the compensating lever that made wages follow prices. But the lever has been repaired and the principle of the sliding scale has been reëstablished, unfortunate as it is. It serves the best interests of neither capital, labor, nor industry. And it will not be followed we may be sure in other lines of business.

Only a short stretch separates us from big business and a labor shortage. Immigration has been stopped for years and we have lost many men to the war. Of these, many will never come back, and there will be a hue and cry for more men.

Why delay purchasing now when a little courage for a week or two will fully justify our faith? A little buying will turn the tide and bring a flood of prosperity.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

In the anthracite region it seems likely that there will be many button strikes to coerce new arrivals from the cities to join the union, whether they will or not. The mine workers are complaining about the closing of inefficient mines. They would have the operators of the southern fields keep these plants running at a loss. As the operators are losing money on their entire investment in the southern field at present prices, the principle "All or none" pressed to its consequences will probably be answered by the operators with the single word "None." The only way to save the efficient mines is by shutting down the inefficient; that is, providing the selling price of coal is not raised.

The New River and Winding Gulf mine workers are proposing to present unreasonable wage claims. These show a desire on the part of the miner to profiteer at the expense of workmen in other industries, who will have to buy his coal and pay him his wages. The miner has many employers—absentee-employers many of them, men whom he has never seen. Some of them live in slums and some in villages. The big corporations that use his coal make goods for these people. Coal that is used for steam raising is used, not so much for the corporation which buys the coal, as for the person who uses the product of the factory. From these persons, largely not better supplied than the miner, the increases in coal price must inevitably come. A desire for excessive wages is not a sign of superiority of character, but rather evidence that the individual seeking the big pay wants something more than his appropriate share of the world's product.

Want Steady Work or Suspension

The United Mine Workers of America in the three anthracite districts will hold an important meeting at an early date. Two problems face the coal miners of this and other fields; one is the sudden halt of the coal industry, and the other is the importation of labor from the cities into the coal fields.

The Pennsylvania Coal Co. and the interests associated with that corporation recruited men in the larger cities through advertisements in the newspapers and by means of labor scouts. These men are in most cases new to the mining game. The need for their importation has apparently ended with the changed labor conditions, and now that they are here the union proposes to have them join its ranks or quit their places.

The other matter that the miners hope to consider is a plan to shut all the mines of Pennsylvania and adjoining states for a period of two weeks, to resume later for a steady run, until the market is replenished, when another suspension would be in order. The larger operators in the anthracite field in times of poor market are in the habit of closing the less profitable mines and operating those which pay best. This is notably true in the Schuylkill region. In that field the Lehigh Valley Coal Co. often suspends its Blackwood colliery for the summer season.

The Philadelphia & Reading Coal and Iron Co. follows the same plan in its Tremont-Tower City district. Labor conditions in that vicinity are peculiar to that district. They make a suspension quite feasible without loss to the company. The men are for the most part owners of small farms and are not entirely dependent on the mines for their livelihood. In winter labor is plentiful at these collieries, by reason of the cessation of farm work.

West Virginia Will Seek Higher Wages

It is learned from a reliable source that when representatives of District No. 29 of Central West Virginia met at Beckley in the latter part of January to draw up a new wage scale they formulated plans for obtaining material advances in wages.

It is said that the terms of the new scale, as drafted by the committee of District 29, call for an increase in the wages of day men of from $1 to $1.50 a day. The increase fixed for monthly men is said to run from $25 to $75 a month above the present rate. It is also understood that a minimum wage of $200 a month has been asked for what are known as company men. The demands also stipulate that there shall be an increase of 12c. a ton in the mining rate and that all overtime shall be paid for at the rate of time and a half.

The plan of the miners expressly provides that unless some agreement for a closed shop is reached, and the union is allowed to collect by check-off all dues, assessments and initiation fees through company offices, whatever these imposts may be, no contract shall be signed. The miners in the proposed agreement have incorporated a provision that all the miners of the district included in the agreement are to be paid by weight for coal mined and on the basis of a short ton. Still another point upon which the miners lay stress is that the loading of mine cars with coal shall not be limited in any way.

As having some bearing on the question of what may be finally consummated in the way of an agreement between miners and operators of District 29, the following statement of Secretary T. L. Lewis of the New River Association may be considered significant:

"It is well known that the contract between the United Mine Workers and the operators of the New River and Winding Gulf fields ends on Apr. 1. The present agreement provides that a conference be held 60 days before Apr. 1.

"The operators of both fields have always lived up to any promises made and will no doubt arrange to comply with the provisions of the agreement in the New River and Winding Gulf Districts.

"Since the wage agreements in the New River and Winding Gulf fields have passed under the jurisdiction of the United States Fuel Administration, which has made it very clear that there will be no change in the terms of the wage agreement until the official announcement has been made that the terms of the peace treaty have been signed, there is nothing to do but comply with the wishes of the Federal Government as expressed through the United States Fuel Administration.

"The coal market had during the past month or two become demoralized. The price of coal has been declining. No one can at this time foretell what the future holds in store for the coal business, but we are anxious to continue in force the present high standard of wages in our field, and we desire to say to all those interested that we shall do all we can legitimately to maintain or secure such a price for our coal as will permit of our continuing to pay such wages."

A meeting held Feb. 1 at Charleston at which the labor representatives met with the New River and Winding Gulf operators lasted only long enough for the operators to declare their position, the character of which is well covered by T. L. Lewis, the secretary, in the statement just quoted. The public is strongly against any further increases in the mine worker's wage, hence the operators of the New River and Winding Gulf regions can be assured of national support in resisting this new imposition on industry.

Be Proud of the Town You Live In



Of all ways the best way to have a tidy town is to be careful not to litter the town you have. A man from Sciacca the other day was saying how clean the City of Palermo was. There was a rubbish picker on every block who kept the streets like a clean pin. Just as he was bragging about the chief city of his island, his eye fell on a paper box and he opened the door and threw the box into the street, to be an eyesore to everybody. If the people of Palermo are all like that man they will need a rubbish picker for every hundred houses. The way to be clean is to keep clean. On windless days burn your rubbish in the backyard and keep it off the streets.

Be Tidyman of Tidytown.

DISCUSSION BY READERS

A.-C. vs. D.-C. Current in Mines

Letter No. 1—In reading the report of the Coal Mining Institute of America, regarding the meeting of that institute at Pittsburgh, Dec. 4, which appeared in *Coal Age*, Dec. 12, p. 1081, I notice that among the several vital problems relating to coal mining, discussed at that meeting, was the question, "Is the underground use of the alternating current more hazardous than the use of the direct current?"

Allow me to say that the question of the use of either of these forms of electricity, in mines, is not one that concerns their relative hazard, but regards, rather, the efficiency and purpose of the installation. It is a question whether the supplanting of one of these forms of current by the other, in any particular instance, will prove equally efficient in operation, although the hazard, in mines, by reason of men and animals coming in contact with live wires, may be lessened.

Perhaps, this discussion may have thrown some light on the practicability of adopting one or another form of current; but, in my experience, we have never used alternating current in our mines for hauling coal with any success. Also, mining practice has proved that direct current is not as well adapted for transmission as alternating current. Each of these forms of current should, therefore, be employed for the purpose for which it is best adapted, and the conductors so arranged as to invite the least hazard.

Danger of Contact with High-Voltage Wires

The voltage being equal, in each case, it is my belief there is more danger in coming in contact with a bare or poorly insulated wire transmitting alternating current, than one carrying direct current. Coming in contact with a single wire of a three-phase alternating-current system will not blow a short. I have even observed instances where contact with two wires of that system also fails to blow a short. It would, indeed, be a rare case where one would accidentally come in contact with all three wires, especially if these are properly insulated. Contact with a high voltage live wire is liable to prove fatal, unless a short is blown or someone is at hand to render assistance.

There are a number of mines that employ alternating current for the purposes of pumping and ventilation. In most cases, it has not been found necessary to carry the wires underground any great distance. Boreholes have been sunk at points on the surface directly over the points in the mine where the motor to be operated by the current is located. By this arrangement, there is little danger of anyone coming in contact with live wires and no risk is assumed by reason of employing an alternating current. The only person in any danger is the one in charge of the machinery to be operated. Anyone else would deliberately go out of his way to encounter such danger.

There are probably some mines where motors requiring to be operated by alternating current cannot be reached by boreholes from the surface. In such cases, the dangers and hazards incident to carrying the current into the mine may be minimized by employing heavily insulated conductors. Such conductors should, moreover, be kept off main haulways and travelingways, and men should be forbidden to travel where such wires are hung or to enter places where these motors are installed.

ELECTRICIAN.

Thomas, W. Va.

Utilizing Mine Gas To Save Fuel

Letter No. 1—While I know nothing regarding the authenticity of the rumor, it is reported that one of the large operating companies in this district proposes to experiment on the question of utilizing the gas generated in its mines, by mixing the return air, charged with inflammable gas, with the air entering the fireboxes in the power plant and, possibly, adding thereto a certain percentage of elementary gas to increase the efficacy of the plant.

This report recalls the discussion that took place about a year ago, which was started by attention being drawn, in the public press, to the large loss of power resulting from the escape into the atmosphere of the great volumes of gas generated in mine workings. The idea of conserving this gas and utilizing it for the production of power was emphasized and given greater publicity through the efforts of Governor Brumbaugh, who summoned a number of engineers and coal men to a conference on the subject.

Economy Must Not Be Sought at the Sacrifice of Safety

The possibilities and dangers of the plan were freely discussed in the columns of *Coal Age* [Vol 12, p. 1029] at that time. To my mind, there is no doubt as to the economy of burning the gas that is contained in the return air of the mines and which is now wasted into the atmosphere. But, suppose the figures do show that, say a 10 per cent. saving of fuel can be effected by this means, what about the safety of injecting this gas-charged air into the firebox of a furnace?

It is a well-known fact that when pure methane is mixed with air the mixture becomes explosive, or reaches the lower explosive limit, when the proportion of gas to air is 1: 13, or the mixture contains 7.14 per cent. of gas. If dust or olefiant gas is present, the mixture is explosive when an even smaller percentage of gas is present in the air. The violence of the explosion increases with the percentage of gas present and reaches a maximum at 9.46 per cent.

How to save this great waste of gas is a difficult problem. It is one thing to suggest the possibility, but quite another thing to accomplish the fact. The piping

of methane from a strong permanent blower in a mine has been accomplished many times and the gas utilized to advantage in the development of power, but such an arrangement had no connection with the return air current, which made it safe for use. Where mining operations can be kept far enough from the source of supply of such a blower, the plan may often prove to be a paying proposition, as the pressure of the blower is not apt to be diminished by the mining of the coal.

The calculations on which the feasibility of the proposed plan to which I have referred is based are interesting. They are about as follows: Assume a forced draft of, say 1000 cu.ft. of pure air per minute is supplied to the furnaces, and compare the results with those obtained when an equal volume of return air is drawn from the Loomis Colliery, at Wilkes-Barre, Penn. A report from this colliery shows an average analysis of this return air to be: Oxygen, 20 per cent.; nitrogen, 78.93 per cent.; methane, 1 per cent.; carbon dioxide, 0.07 per cent.

Heat Generated by Combustion of Coal When Consuming 1000 Cu.Ft. of Pure Air

Let us, now, assume such a temperature and pressure that the pure air weighs 0.0765 lb. per cu.ft., which makes the weight of 1000 cu.ft. of this air, which is the assumed volume, $1000 \times 0.0765 = 76.5$ lb. Oxygen forms 23 per cent. by weight of pure air, and the weight of oxygen in this volume is therefore $76.5 \times 0.23 = 17.595$ pounds.

Again, the complete combustion of 1 lb. of carbon requires $2\frac{2}{3}$ lb. of oxygen; hence, the weight of carbon burned by the oxygen in 1000 cu.ft. of pure air is $17.595 \div 2\frac{2}{3} = 6.598$ lb. But, the heat developed by a pound of carbon burning to carbon dioxide being 14,544 B.t.u., the heat generated by the assumed supply of 1000 cu.ft. of pure air to the furnaces is $14,544 \times 6.598 = 95.961$ B.t.u.

Heat Generated When 1000 Cu.Ft. of Gas-Charged Air is Consumed in the Furnace

Now, considering 1000 cu.ft. of the return air, taken from the Loomis Colliery and containing 20 per cent. of oxygen and 1 per cent. of methane, the volume of oxygen entering the furnace is $1000 \times 0.20 = 200$ cu.ft., and that of methane $1000 \times 0.01 = 10$ cu.ft. But the specific gravity of oxygen being 1.1056 and that of methane 0.559, the weight of oxygen in 1000 cu.ft. of this return air is $200\ (1.1056 \times 0.0765) = 16.916$ lb. Likewise, the weight of methane, in the same volume of return air, is $10(0.0559 \times 0.0765) = 0.428$ pound.

But, 1 lb. of methane, in burning to carbon dioxide and water, consumes four times its weight of oxygen, which makes the weight of oxygen taken up by the methane, in this case, $4 \times 0.428 = 1.712$ lb. Therefore, this weight of oxygen must be deducted from that just found, in order to obtain the net weight of oxygen available for the consumption of the carbon in the coal, which gives $16.916 - 1.712 = 15.204$ pounds.

As before, the weight of carbon consumed by this weight of oxygen is, then, $15.204 \div 2\frac{2}{3} = 5.7015$ lb.; and the heat generated by this combustion is $5.7015 \times 14,544 = 82,923$ B.t.u. To this must be added, in this case, the heat generated by the methane burning to carbon dioxide and water, which is 23,513 B.t.u. per lb. of the gas, or a total of $0.428 \times 23,513 = 10,064$ B.t.u. The total heat generated is, therefore, $82,923 + 10,064 = 92,987$ B.t.u.

Were we to stop here, the comparison would show a loss in the total heat generated. However, it is observed that a less weight of carbon (coal) is consumed when using the gas-charged air of the return current. Hence, to complete this comparison it is necessary to estimate the heat generated, *per pound of carbon consumed in each case*, which gives the following:

Pure air, $95,961 \div 6.598 = 14,544$ B.t.u.
Return air, $92,987 \div 5.7015 = 16,309$ B.t.u.

The saving is, therefore, $16,309 - 14.544 = 1765$ B.t.u.; or, $(1765 \times 100) \div 16,309 = 10.8$ per cent.

Ferndale Explosion Caused by Gas Blower

In closing, allow me to cite an explosion that occurred when I was employed in the Ferndale colliery of South Wales, Nov. 8, 1867. The explosion was caused by the sudden breaking out of a blower that yielded a large volume of gas, which reached the furnace by which the mine was ventilated. The result was a terrible loss of life [178 lives, *Coal Age*, Vol. 9, p. 1025] and destruction of property.

The small margin between the percentage of air in the return current of a mine generating gas and the lower explosive limit of the gas appalls one with the thought of the danger of piping the return air of a mine generating gas, to the furnaces of a power plant. Any increase in the gaseous condition of the mine would undoubtedly result in a disastrous explosion that would wreck the power plant, and nothing would prevent its being carried back into the mine.

Pittston, Penn. William D. Owens.

Perils in Reconstruction

Letter No. 4—I want to voice my approval of the suggestion contained in the Foreword that appeared some time ago in *Coal Age* [Nov. 21, 1918], regarding the patriotic duties of buyers. The Foreword laid emphasis on the fact that we should not postpone purchases that are necessary, in the hope that prices would be lower in the near future. Prices will assuredly recede from the present high level, but progress in this direction will naturally be slow.

Our clearest thinkers have proven beyond a doubt that the drop in prices will be much more gradual than the rise. This opinion is based upon accurate knowledge of the situation existing in this and other countries wherever the products of American labor are transported. Truly, it behooves mine owners and managers of large industries to keep their houses in order.

Peace Problems Find Us Unprepared

We have found ourselves as unprepared for peace as we were unprepared for war, which is no discredit, but is the natural result of the sudden downfall of the enemy, following closely the vast preparation made by America to insure victory. Now, it has become necessary to throw in the reverse gears and start the work of demobilization and reconstruction in every branch of our industrial life.

While it may not be possible for every soldier to be returned to his old job, the business organization of this country is so founded that our industries will

rapidly slip back to a normal basis of production, and there will be work for all. There will, undoubtedly, be some complaining from pessimists; but real builders will give little heed to these skeptical mutterings. It is these real leaders of business—men who have devoted their lifetime to productive work on a large scale and who are clear thinkers—who achieve success in reconstruction and we must follow their lead.

Optimism of Leaders of the Coal and Steel Industries and Merchants

Speaking of the work of leaders of great industries, one can but admire such men as John Wanamaker, the merchant; Elbert Gary, the head of the steel interests; and John D. Rockefeller, Jr., representing the coal and iron industries of the West. These men stand for the highest ideals of industrial reconstruction. Without exception they have expressed themselves as being convinced that the best years of the United States lie ahead of them, and that the next five or six years will be years of unprecedented prosperity in American commerce and industry.

To be convinced of the truth of this optimism, one has but to consider the demands that will be made upon this country by reason of the devastation abroad, where rebuilding will require an enormous consumption of all materials, such as steel, cement, plaster, lumber, brick, and numerous other supplies. England and Russia will make heavy drafts on this country for years to come, which will mean a vast stimulus to our export trade and require the building and equipment, by us, of the largest merchant marine of the world.

Coal Forms the Basis of and Is Needful to All Industrial Progress

In face of these facts, it is inconceivable that industry should slacken for more than a brief period of time, which will be required for readjustment, and then every branch of manufacture and trade will regain a normal footing. Production has always been governed by the law of supply and demand—supply of coal and raw material and a market demand for the products of labor. Surely, a greater demand than the present has never existed.

Practically all production is based on coal supply. Raw materials can be worked only by the use of power, which means the consumption of enormous quantities of coal, which is the king of our natural resources. Again, the operation of mines means a large production of mine supplies, mine locomotives, cars, rails, and other requirements. While it is true these have been selling at prices prodigiously high, as have all other commodities, the present is no time to hold back on purchases of equipment and supplies that are needed for operating the mines to their fullest capacity.

There is no need, at the present time, for paying heed to the cry that "overproduction will ruin the coal business." It is my earnest conviction that there will be no overproduction of coal, in this country, for some time to come. Let us see that our plants are kept in the best possible condition that no one will be able to say the lack of coal has hindered the march of progress, which promises to give every miner steady employment for several years to come.

Philadelphia, Penn. Optimist.

Certification and Safety

Letter No. 1—In the report of the recent annual meeting of the Coal Mining Institute of America, appearing in *Coal Age*, Dec. 12, p. 1080, the fourth question discussed interested me most. It reads as follows: "Has the law permitting the employment of noncertified officials, in coal mines, been detrimental to their (the mines) efficient and safe operation?"

As might be expected, the discussion developed a strong difference of opinion among those present. The report states that while some claimed that the amended law has produced no effect, in the anthracite field, other than to cause the employment of uncertified men to fill positions formerly open only to men holding certificates, others who took part in the discussion claimed quite the contrary. In one case, a speaker stated that 28 men, holding no certificates, were employed in one inspection district that showed an increase of accidents largely due to that cause.

What appeals to me, in this connection, is that an intelligent body of men, meeting to discuss questions of vital interest to their calling, should not arrive at some definite conclusion. In this instance, as far as gaining any accurate knowledge of the situation and adopting some form of remedial resolution, the question might just as well never have been brought to the notice of the meeting. To my mind, a great boon to the mining industry would result had the discussion of members been confined to fewer subjects and each subject been dealt with more fully, whereby practical conclusions could have been reached. That is what mining men desire.

While I admit, as was remarked at the meeting, that "a certificate is not a guarantee of competency," I claim that a man without a certificate cannot be classed as competent, in respect to present-day requirements when so much depends on the technical knowledge of men holding responsible positions in coal mining.

Different Estimates of Competent Foremen

A man of practical mining experience, who possesses, besides, sufficient technical knowledge to enable him to pass an examination before the state mining board, is far more competent than one who has the same practical experience but possesses no technical knowledge. On the other hand, a man who has all the book knowledge it is possible for him to get, but possesses little practical experience in mining, is unfitted to fill any responsible position in the operation of a mine, and particularly the work underground.

Coal operators are apt to consider that the man who can get out the most coal at the least expense is the most competent man, whether or not he holds a certificate. Let me ask such operators if they are sure such a standard of competency will guarantee the future welfare of their properties. Do they realize that their mines are being worked in a haphazard manner, instead of being operated according to a scientific principle? In the former case, the responsible party sooner or later sees "the writing on the wall" and gives up his job before the results of his incompetency become too plainly evident to his employers.

The difficulties that are sure to follow and reveal a ruined mine are left for his successor to handle and

solve as he may. Many a good man, succeeding to a position in a mine that has been mismanaged, realizes as no one else does that the man before him gained his reputation for competency, at the cost of the mine.

A hard uphill struggle with high costs faces the newcomer, and it is not strange that this one is too frequently regarded by his employer as being less competent than the man before him. It does not occur to the management that the man they had formerly trusted has wrecked the mine and made it impossible for the new man to produce results. True it is, as one speaker stated, that "operators are not always competent to judge the qualifications of the foremen."

As well may it be argued that there is no need for the certification, by examination, of our state mine inspectors, as to disclaim the need of the same for men seeking the position of mine foreman. Both of these officials have the same problems to handle with respect to the safety of the mine and the men employed therein, and each has the same need of both practical and technical experience and knowledge if we are to avoid dangers of mining, secure the economical extraction of the coal and conserve our natural resources.

Brief Review of Coal-Mining Legislation

Allow me, in closing, to refer to the report of the Avondale (Penn.) disaster of Sept. 6, 1869, when an anthracite breaker, located over the mouth of a shaft, where there was but one opening, caught fire and was burned, with the result that 108 men at work in the mine were asphyxiated.

As is well known, this terrible disaster caused the Pennsylvania legislature to pass the first general law ever enacted in the United States, providing for the regulation and inspection of anthracite mines, Mar. 3, 1870. A similar law was enacted for bituminous mines, in Pennsylvania, in 1877; and, in 1885, the law was passed requiring the certification of mine foremen and assistant foremen.

In my opinion, if it was necessary, in 1885, to employ certified foremen in mines, in order to reduce the number of accidents therein, it surely must be expedient to require the same method of certification of these officials, at the present time, not only in Pennsylvania, but in every coal-producing state.

This is made more imperative by the use of electricity and compressed air for driving much complicated machinery and equipment requiring mechanical skill and technical knowledge for its operation. I hope to see this subject thoroughly discussed in *Coal Age*, whose readers are able to weigh intelligently the pros and cons and decide the necessity or otherwise of certified mine foremen. James Touhey.

Vancouver, B. C., Canada.

Hindrances to Coal Production

Letter No. 9—In the recent discussion of the many hindrances to the production of coal, mention has been made of almost every conceivable thing, as intemperance, poor or inadequate equipment, undesirable living or social conditions, etc.

It is readily granted that all of these play their part in contributing, more or less, to the minimizing of coal production. I read with interest the suggestions made for eliminating these different causes and believe that, with the right management of a mine, many of them can be counteracted.

If my memory serves me correctly, however, mention has not been made of one important hindrance to mine work. I refer to the celebration, by foreign miners, of their many holidays. To my knowledge, there has never been any stirring impulse among this class of miners to overcome this hindrance to the work. Even the war has not provided the patriotic stimulus required to induce the foreign miner to refrain from these celebrations and continue his work in the mine. It is difficult to estimate the loss in tonnage due to this cause alone during the war, and it is probable that the same will still continue to reduce the output of our mines and hamper the industry.

Plan to Compensate for Foreigners' Holidays

One plan that I have seen tried in overcoming this difficulty and avoiding a part of the loss in production is to operate the mine till midnight, preceding a foreign holiday. Where it is practicable to dump coal after nightfall, this suggestion will generally be found valuable. During the war, some of the mines adopted this plan and found that the majority of the men were willing to work through till midnight, preceding a holiday. It gave them an opportunity of making a fair day's wages, without violating the spirit of the particular feast or holiday, which they were all anxious to observe after their own method and custom.

In my own experience, I have found little or no difficulty in getting the large majority of our men to work a double shift in view of the holiday, which would give them an opportunity to rest. In my canvass of the mine, I have found that, unless this plan was adopted, nearly all of my men would be absent the following day.

Thomas, W. Va. Foreman.

[This letter will close the discussion on "Hindrances to Coal Production."—Editor.]

Perplexities of Mine Foremen

Letter No. 11—The letters relating to the problems confronting a mine foreman—the man who comes directly in touch with each individual employed in the mine—have interested me greatly and I want to draw attention to one point that, in my opinion, is one of the most difficult situations a foreman is ever compelled to face.

There is a certain class of miners who may be properly described by the term "suckers." These fellows, instead of taking their complaints directly to the foreman, have a habit of going over the foreman's head and telling their grievances to the superintendent. I am sorry to say that one will frequently find a superintendent who is silly enough to listen to such miners, instead of telling them to see their foreman. The miner who will do this trick is usually a chronic kicker, and goes to the superintendent, whom he believes is not acquainted with his ways and will give his little matters more attention than he could hope to receive from the foreman, who knows him better.

A superintendent who is wise will promptly refer all such complaints to the foreman, who is in direct charge of the men. Failure to do this not only displays a

disposition on the part of the superintendent to distrust his foreman, but is also liable to arouse feeling among the employees, who are led to think that the foreman is not the one that will give them the most satisfaction. In other words, the foreman loses prestige with the men and his influence over them is lessened.

Every good foreman must be capable of divining correctly the disposition of each individual he employs and dealing with them as individuals. Some men are much easier to handle than others. While some are interested in the welfare of the company, others seek every opportunity to enrich themselves at their employer's expense. Some men are neat and accurate in their work, while others are dilatory and wasteful, desiring to get the most pay for as little work as possible.

Foremen Require Tact in Treatment of Men

A foreman must be able to treat these different dispositions of his men with tact. He must be firm in respect to seeing that his orders are strictly obeyed. He must avoid letting his men feel that he is socially above them, and show that he is interested in their welfare. His instructions must always be along practical lines.

While it is natural for a foreman to think more of a man who shows an interest in his work, he must manifest no favoritism and have no "pets." He must listen to all complaints that are seriously made and not be hasty in pronouncing judgment before he has thoroughly investigated all claims. It is a foreman's duty to adjust a matter in the most economical way, conferring with his superintendent whenever this may be necessary, as it will show the disposition of the foreman to do what is right, and will impress both the superintendent and the miner whose claim he is trying to adjust. Such action will go far toward preventing miners from taking their grievances to the superintendent, as it will increase the confidence of the men in the ability and fairness of the boss. I. T. C.

Oliver Springs, Tenn.

Letter No. 12—It is my belief that a good mine foreman will meet with a great many perplexing problems. I fail to see how he can escape them, because they are present in all coal mines. An indifferent foreman may not meet with the same difficulties as one who is more painstaking and careful, because he does not attempt to improve conditions but allows many matters to take their own course.

Now that the war is over, the suggestion of applying martial law to enforce miners to work the full 8-hour shift, which was made by R. W. Lightburn, *Coal Age*, Dec. 5, p. 1047, does not call for consideration. Certainly, it is aggravating when a loader cannot get the cars he needs to load his coal, or having the cars finds that his coal is not cut because a driver or a machinerunner is satisfied with 4 or 5 hours' work instead of remaining at his post throughout the shift.

It appears to me that there should be an effective remedy to apply in such cases. If such independence of workers results from their knowledge of a scarcity of men to fill their places, attention should be given at once, by mine officials, to the training of more men for that work. Men often become dissatisfied with their particular work, for little or no reason.

A machinerunner may regard his work as more hazardous than that of the loader, or think that because of the dust he is entitled to work shorter time, or there may be a consciousness of his own skill and importance that gives him an overbearing and selfish disposition and leads him to disregard the interests of others and consider solely his own convenience.

Speaking of complaints, if a mine foreman took these as seriously as they are usually made to appear he would be run to death in short order. The fact that a foreman turning a deaf ear to the complaint of a miner regarding the condition of his place causes the miner to light his pipe and start for home is no proof that the foreman made a mistake in not going at once to look at the place and satisfy the miner.

Nine times out of ten the foreman knows that the miner himself is to blame and, further, that he is only seeking an excuse to get out of the mine, and there is no great loss in his going. To my mind, there is no cause for a foreman to get excited in such a case. Let him jolly the man along, remembering that more will be accomplished by tact and method than by an angry word that can only arouse hatred.

Daily Visits to Working Places Required

In West Virginia, the law requires a mine foreman or his assistant to visit every working place, at least once a day, while the miner is at work. When this is done the knowledge of the foreman as to the condition of a miner's place is equal to that of the miner himself, unless there has suddenly developed a bad slip in the roof, a fall of slate, a gas feeder, or other unexpected trouble. In any case, the foreman can remain cool and advise the miner to work in another place until he gets around. He knows that there are other matters of equal importance, which are urgent, and all must take their proper turn.

A foreman should make it a rule to anticipate most of these complaints and, if possible, prevent many of them from being made, by seeing that every working place is safe for work and has a plentiful supply of timber and tracking. Where water is liable to accumulate, attention should be given to draining the place and making it fit for work.

Good Foremen Keep Men from Going Home

A good foreman will not let any man go home when it is a possible thing to adjust his difficulty and keep him at work. It will sometimes happen that roadmen have not laid the switch necessary to enable a car to be taken into a place; or a fall may have occurred in that section, which prevents them from getting the needed cars. But, while these matters are being adjusted, there is generally something that a mine foreman can give men to employ them profitably, until they can return to their place.

In general, let me say it is not creditable to a foreman's ability to allow good men to go home because of some little delay in getting their place in readiness for them to work. If men go home, with an able foreman in charge, it is because of their unwillingness to work and their desire to get out of the mine.

Thomas, W. Va. W. H. Noone.

[This letter will close the discussion of "Perplexities of Mine Foremen."—Editor.]

INQUIRIES OF GENERAL INTEREST

Piping Mine Gas to the Surface

Kindly answer the following question: In a mine generating large quantities of gas, a fire started in No. 4 room on the second south entry, at a distance of 1000 ft. from the main shaft. The fire gained such headway that it was thought advisable to seal the mine, which was done.

When this had been done, a 3-in. hole was drilled from the surface into the room where the fire was located, the purpose being to drain off the gas, which was at its most explosive point. I want to ask if this gas was lighted at the top of the pipe would it explode the mine? Is there any record of such an occurrence?

Francisco, Ind. HARMON KELLEY.

Assuming that the gas-charged air issuing from the pipe is a firedamp mixture of explosive proportions, as stated, its ignition at the top of the pipe would be promptly followed by an explosion of the same mixture accumulated in the mine. A feeder of pure gas piped to the surface would burn quietly without explosion, as is the case in numerous instances where it is desired to drain the gas from the measures. We know of no recorded instance of a mine being exploded from this cause.

Lubricating Mine Cars

Kindly permit me to ask for an expression of opinion from mining men as to the cost of lubricating mine cars equipped with the average type of plain-bearing wheels. Can anyone answer this question by giving definite facts and figures? While some advocate the use of "blackstrap" once a day, or every time the car comes to the tipple, others claim it is necessary to oil the cars, say four times a week, and still others say that once a week is sufficient.

It is stated by some that a half-pint of oil should be squirted into a wheel of the self-oiling type of plain bearing, at one time. In many cases, a quart more or less, of oil is poured into or squirted at or on the wheel every time it is oiled. As an illustration of this, the incident recorded by a writer who observed the oiling of car wheels at an Alabama mine, *Coal Age*, Jan. 30, p. 246, is of interest.

From the best obtainable information, the average mine practice, regarding the oiling of plain-bearing car wheels, is to apply the oil every time a car comes to the tipple or to the shaft bottom, when about a half-pint of black oil is used on each wheel. Now, if that is the case, the waste of lubricating oil on such cars must amount to an enormous figure, in the course of a year.

Suppose, for example, that the average turn of cars, in mines, is about two and one-half times a day. Where this is the case, each car, perhaps, consumes about five pints of oil per day; and, counting 280 working days per year, this would amount to 175 gal. a year. The cost of black oil ranges from 12 to 15c. per gal. Estimating at the lower figure, the cost for lubricating a single car equipped with plain bearings would be $175 \times 0.12 = \$21$. Even allowing that this estimated amount is twice too large, the cost of lubricating would be $10.50 per car per year, which is no inconsiderable item on the mine cost-sheet.

Only recently, I saw it stated that cars equipped with roller bearings required to be lubricated but once in from three to six months, when only one pound of grease or less is applied to each wheel. Assuming, for sake of comparison, that these cars are lubricated every three months, 16 pounds of grease would be required, per car, per year, at a cost of 10c. per pound, making the total cost for lubricant, $1.60, per car, per year. This shows a difference in the cost of lubricant for plain-bearing, as compared with roller-bearing cars, taking the lowest estimate in each case, $10.50 — $1.60 = $8.90, per car, per year. Where a mine has 500 cars in daily use, this would represent a saving of $4450 per year.

In this comparison, the larger estimate appears to be too great, while the smaller one would seem too small in considering that 75 per cent. of the black oil applied to plain bearing cars, in the ordinary mine, leaks out or, perhaps, never reaches the bearing at all, but is wasted in its application.

The estimated costs just given is for lubricant only and does not include the labor required for its application. When plain-bearing cars are used the oiler must be constantly on hand, and the cost of labor for lubricating, say 500 cars, would amount to about $8 per day, or $2240 per year.

On the other hand, when mine cars are equipped with roller bearings their lubrication will require the labor of one man 40 days a year, at $4 per day, or a total of $160 per year, showing a saving in favor of the latter type of cars of $2080 per year. If this estimate is taken as being approximately correct the entire saving for lubrication, in the use of roller-bearing cars, is $6530 per year, in a mine where 500 such cars are in use.

As this sum represents a liberal rate of interest on a considerable amount of money, it would be of interest to hear from any who have kept an accurate account of these costs, in the lubrication of either plain-bearing or roller-bearing cars. OBSERVER.

Philadelphia, Penn.

It is to be hoped that this inquiry, regarding the cost of lubricating plain-bearing and roller-bearing cars, and the request for figures representing actual costs in practice, will be responded to by the readers of *Coal Age*, who are invited to give the results of their observations and experience. The subject is worthy of careful consideration, as is clearly shown in the estimated costs given in the inquiry.

EXAMINATION QUESTIONS

Mine Managers' Examination, Springfield, Ill., Dec. 17, 1918

(*Selected Questions*)

Ques.—Suppose that in a gassy mine the quantity of air passing is 175,000 cu.ft. per min., measured in the return airway and containing 4 per cent. of firedamp, when the barometer is 30 in. (a) What quantity of firedamp is given off in the mine? (b) What is the least decrease of the quantity of air that will render the return air explosive? (c) What increase of gas will render the return air explosive?

Ans.—In this question, the words *marsh gas* should be used in place of "firedamp," when speaking of the gas given off and which forms firedamp only when mixed with air in inflammable or explosive proportions. (a) The quantity of gas given off in this mine is 175,000 × 0.04 = 7000 cu.ft. per min. (b) Taking the lower explosive limit of marsh gas and air as reached when the proportion of gas to air is 1:13, or the gas forms 1/14 of the firedamp mixture, the total volume of air and gas, in the return current, when the explosive point is first reached is 14 × 7000 = 98,000 cu.ft. per min. Hence, the decrease in the quantity of air passing to form this condition is 175,000 — 98,000 = 77,000 cu.ft. per minute. (c) The quantity of air passing before any change is made is 175,000 — 7000 = 168,000 cu.ft. per min. The quantity of gas required to bring this volume of air to its lowest explosive limit is 168,000 ÷ 13 = 12,923 cu.ft. per min. To form this condition in the return airway would require an increase in the quantity of gas given off in the mine equal to 12,923 — 7000 = 5923 cu.ft. per minute.

Ques.—A borehole from the surface is 6 in. in diameter and enters the old workings of a mine. A mixture consisting of 50 per cent. of marsh gas (CH_4) and 50 per cent. of the air is passing up this hole, with a velocity of 130 ft. per min. (a) What is the volume of the flow in cubic feet per minute? (b) What would be its volume if sufficient air were added to bring the mixture up to the highest explosive point?

Ans.—(a) The diameter of this pipe being 6 in. (½ft.) its sectional area is $0.7854(\frac{1}{2})^2 = 0.1963$ sq.ft. For a velocity of 130 ft. per min., the volume of air passing is 130 × 0.1963 = 25.519 cu.ft. per minute.

(b) This being a 50 per cent. mixture of gas and air, the quantity of gas passing up the pipe is one-half the flow or 12.7595 cu.ft. per min. The maximum explosive point of pure marsh gas and air is reached when the mixture contains 9.46 per cent. of gas. The volume of the flow when at this point would therefore be 12.7595 ÷ 0.0946 = 134.88 cu.ft. per minute.

Ques.—How would you proceed to clear a shaft that is filled nearly to the top with carbon dioxide?

Ans.—There are several means that can be adopted to clear out this gas, depending on the equipment at hand. Probably the simplest and most effective method to employ is to bail out the gas, which is much heavier than air, and often difficult to remove in any other way, because it sinks to the shaft bottom owing to its greater density. However, the arrangement must be such at the top of the shaft that the gas will be prevented from flowing back into the shaft when emptied from the bailing bucket.

Where it is possible to utilize the current from a powerful blower or ventilating fan, the gas may be removed by blowing air into the shaft through a flexible canvas tubing, say 12 or 14 in. in diameter. The tubing should be gradually lowered into the shaft as the heavy gas is removed. Or it can be lowered at once to the shaft bottom, provided the air current is strong enough to expel the gas.

Ques.—(a) How is electric current generated before it is transmitted? (b) How is the transmitted electric power utilized?

Ans.—(a) An electric current is generated by the operation of a dynamo driven by a steam engine or other source of mechanical power. The dynamo is then called a *generator.*

(b) The transmitted electric power is utilized by passing the current through a dynamo, which is then called a *motor.*

In the first instance, the revolution of the armature of the dynamo is caused by the power applied to the crank shaft or belt-wheel of the machine. The armature, being thus revolved in the magnetic field of the dynamo, generates an electric current, which makes this machine a *generator.*

In the second instance, the electric current passing through the armature of the dynamo causes it to revolve, by reason of the reaction of the magnetic field of the dynamo on the armature, thus making the machine a *motor* capable of driving other machinery.

Ques.—There is a shaft 50 ft. deep in a hillside, and 500 ft. away is a creek, which is 100 ft. below the level of the bottom of the shaft. Is it possible to drain the water from this shaft into the creek, with a siphon? Explain how this can be done.

Ans.—The theoretical limit a siphon will lift water, or the vertical height of the crown of the siphon above the water in the sump, is 34 ft., at sea level. Allowing, however, for the friction of the flow in the pipe, this theoretical height or lift of a siphon is reduced in actual practice and will not much exceed 28 ft. at sea level, much depending on the length of the siphon, from the suction to the discharge end of the pipe.

The depth of the shaft in this case being 50 ft., it will not be possible to lift the water to the top of the shaft by means of a siphon. In order to drain the water from this shaft by a siphon, it will be necessary to tunnel into the shaft at a height not exceeding 28 ft. above the shaft bottom, assuming a sea-level location.

FOREIGN MARKETS AND EXPORT NEWS

Must Increase Imports to Become An Export Nation

If the United States ever is to rank as the leading exporting nation of the world it must become a greater importing nation than it now is. The foreign trade built up by England during the last decade shows that coal looms as a large factor. This is not so much because her coal fields are near to the European consuming markets (witness the long oversea trips made by her coal-carrying vessels to South American and other ports), but is due to the fact that an outgoing coal freighter from a British port can be considered as a vessel sailing in ballast. The return cargoes in great measure help pay the freight.

Only in extreme cases can a freighter carry coal to a certain destination and return to its home port without a cargo, and where this is done the coal is exorbitantly high in price. It is not the way in which the business is carried on as a general rule. Coal is an exceedingly bulky commodity, and the only manner in which it can be handled conveniently is in bulk. As a consequence, in order for the United States to carry on a successful export business in coal, it must be evident that we must import an equal quantity of bulky material before real economy in transport can be enjoyed.

Of course, what has been said in the foregoing is not the only consideration, though it can well be stated to be the chief one. Other elements that enter into the competitive ability of coals are the physical and chemical qualities, and the cost of placing the cargo aboard ship.

So far as production is concerned the United States easily leads the world in the actual tonnage mined, with England and Germany following. From analyses it would appear that the coals of the Northeastern field of England resemble rather closely coals from our Pennsylvania, Ohio and the Kanawha and Thacker fields of West Virginia; while the Welsh steam coals seem to prove up a little better chemically than our New River and Pocahontas coals. The Welsh anthracites are practically identical to our Pennsylvania anthracite.

In the past the drawbacks to the introduction of American coal in foreign markets were its size, its disintegrating nature and its high cost. Steam coal on reaching destination abroad should be at least 70 per cent. large lumps and pieces, but exports of American coals in recent years have not been maintaining that average. On the other hand, the maximum degradation in a cargo of English coal will not exceed 20 per cent.

Italian Coal Trade

From an authoritative source it is stated that the opposition in Italy to the proposed State monopoly for the sale of coal is growing. The idea was formed for the primary object of increasing the revenue, but it is recognized that this can only be accomplished by the State charging consumers higher prices than could be secured under the old regime. Therefore, the industries of Italy would be placed under a disadvantage compared with other importing countries in respect of the cost of coal. It is felt that the measure would restrict the export manufacturing trade of the country, and for this reason the opposition toward a State monopoly of the coal trade is growing.

Port Facilities of Vigo

Vigo is a city of about 50,000 inhabitants and is one of the most important ports of Spain for emigrant traffic. Before the war as many as 80 trans-Atlantic steamers called in a single month taking thousands of emigrants, principally to Cuba and South American ports. The present port works are insufficient to accommodate the larger vessels, which usually lie off the piers.

There are three piers at Vigo, the largest being little used at present, due to the fact it was defectively constructed. There is also a pier for passengers, which is built of stone and iron and railway cars run on it. It also has a crane with a lifting capacity of 20 tons. The wharf which is principally used, but only by small boats and lighters, is known as the "Commercial" pier, and it has a movable steam crane with a lifting capacity of five tons, besides two hand cranes.

All lighterage is done by a sociedad or combination of lighter owners. There are about 50 lighters available for regular use and they can accommodate 500 to 600 tons each. There are about 20 tugs usually employed for steamers, but their number can be increased if necessary, by hiring some of the hundred odd fishing tugs to be found there. Coal bunkering is done alongside coal hulks and from lighters in the roadstead. Three coal hulks are now available. At present only Spanish coal is procurable, and it costs $34.74 per ton. Before the war Cardiff coal was kept in deposits at Vigo, and it is probable that this will again be the case.

Stevedoring is done by natives, both men and women, who receive 7 pesetas (1 peseta equals $0.193) per eight-hour day. Overtime is paid at the rate of 1 peseta per hour if by day, or 1.50 pesetas if by night. Foremen receive double pay. The mean rate for stevedoring is 1.75 pesetas per ton or cubic meter. Steamers can be loaded or unloaded at the rate of 100 tons per hour.

Loading or discharging coal by the bridge or on the quay costs 1.25 pesetas per ton, but stowing in bunkers is paid for separately at 7 pesetas per man per eight-hour day. Loading or discharging coal from lighters or coal hulks costs 1 peseta per ton, but the price is doubled if there are no winches. As a basis for the cost of handling coal at Vigo it may be noted that the Spanish railway pays 2.25 pesetas per ton for discharging Spanish coal from railway cars onto the quay, where it is kept in deposits and then loaded on steamers as required. To this must be added the usual cost for stowing in bunkers, as stated above. Coal can be delivered at the rate of 100 to 120 tons per hour.

The Spanish press has recently been publishing articles concerning an alleged project of American financiers to build a direct railroad line from Vigo to Irun on the Franco-Spanish frontier and to run steamers from New York to Vigo. The advantage of this port arises from its geographical position which permits the distance for ocean travel between Europe and the United States to be considerably shortened. This is best shown by the following comparison of distances between New York and various European ports.

Exports of Anthracite and Bituminous Coal and Coke from the United States During the Fiscal Year Ended June 30, 1918

(Compiled by Bureau of Foreign and Domestic Commerce)

To	Anthracite Tons	Anthracite Value	Bituminous Tons	Bituminous Value	Coke Tons	Coke Value
Azores and Madeira Islands	.....	.....	315	$2,283	250	$6,194
Belgium	25	$364	.....	.....	.....	.....
Denmark	.....	.....	10	40	.....	.....
France	1,742	18,976	20,116	102,468	12,328	115,980
Gibraltar	.....	.....	800	4,800	.....	.....
Greece	.....	.....	2,894	20,258	.....	.....
Italy	352	3,411	201,220	805,779	1,231	29,595
Norway	5	75	.....	.....	120	2,040
Portugal	260	1,893	39,530	239,375	.....	.....
Spain	.....	.....	44,440	285,151	487	3,920
England	1,658	9,717	41,930	182,835	2,504	26,714
Scotland	.....	.....	4,059	16,480	.....	.....
Bermuda	1,648	16,331	31,118	157,676	.....	.....
British Honduras	.....	.....	343	1,951	5	128
Canada	4,762,635	29,287,856	16,693,062	59,529,991	941,952	6,576,991
Costa Rica	1	23	1,765	9,269	.....	.....
Guatemala	4	122	470	3,122	19	495
Honduras	.....	.....	7,307	35,429	17	251
Nicaragua	.....	.....	3,193	17,537	14	390
Panama	265	2,658	611,413	2,399,325	1,609	34,546
Salvador	3	70	.....	.....	72	2,084
Greenland	.....	.....	703	3,159	.....	.....
Mexico	3,746	36,824	158,464	799,030	284,054	2,337,561
Miquelon, Langley, etc.	128	1,348	.....	.....	.....	.....
Newfoundland and Labrador	8,346	59,825	1,523	5,035	.....	.....
Barbados	191	2,457	61,745	314,209	.....	.....
Jamaica	2	25	34,267	164,440	1	30
Trinidad and Tobago	15	173	28,989	148,275	27	640
Other British West Indies	275	1,987	42,015	224,237	4	106
Cuba	46,913	$305,569	1,094,937	$7,974,281	10,910	$131,215
Virgin Islands	33	192	23,183	127,431	6	165
Dominican Republic	4,722	30,953	24,257	127,179	57	1,365
Dutch West Indies	.....	.....	18,743	89,640	.....	.....
French West Indies	.....	.....	64,814	328,839	203	5,250
Haiti	190	2,479	2,006	9,310	5	135
Argentina	7,399	44,394	247,613	1,367,262	2,459	47,926
Bolivia	4	107	.....	.....	.....	.....
Brazil	798	6,367	625,374	3,593,276	1,422	12,254
Chile	636	8,186	324,278	1,796,269	60,494	560,663
Colombia	31	478	9,186	41,774	86	2,390
Ecuador	.....	.....	8,645	47,178	72	1,400
Falkland Islands	.....	.....	10,338	61,137	.....	.....
British Guiana	.....	.....	3,902	19,692	.....	.....
Dutch Guiana	.....	.....	1,703	8,870	.....	.....
Peru	100	1,240	25,376	151,087	16,571	245,489
Uruguay	.....	.....	109,178	629,034	42	931
Venezuela	38	570	1,896	11,547	47	1,158
Dutch East Indies	.....	.....	.....	.....	3	99
Other British Oceania	1	8	100	2,400	.....	.....
Philippine Islands	.....	.....	34	113	145	6,522
British West Africa	18	240	2,084	10,420	.....	.....
British South Africa	.....	.....	.....	.....	15	420
French Africa	.....	.....	15,014	56,536	.....	.....
Portuguese Africa	3	29	7,827	54,789	.....	.....
Totals	4,842,187	29,844,947	21,051,979	81,980,218	1,337,321	10,155,047

	Miles
New York to Havre, France	3,300
New York to Bordeaux, France	3,154
New York to Cherbourg, France	3,096
New York to Lisbon, Portugal	2,927
New York to Vigo, Spain	2,883

England's Coal Trade in 1918

In taking a general survey of the coal trade in the United Kingdom during the year that has just come to an end, says the *Colliery Guardian*, Jan. 3, 1919, it is necessary to keep in view the fact that the year 1918 has been one of the most critical epochs of British history.

Production, of course, has suffered, and the output for the year, when the full figures are available, will show a considerable deficiency, even when compared with the reduced production of 1917. From the figures published by the Coal Controller for the 10 months ending Oct. 12 last, the total deficiency up to that date was 16,490,500 tons, or about 8.4 per cent. The cause of this decline in output is mainly to be attributed to the steady depletion of manpower brought about by the combing-out of the younger miners, in consequence of the urgent demand for men. The withdrawal from the mines of 50,000 of the best workers could not have resulted in anything else but a loss of approximately 1,000,000 tons of coal per month. But other causes have also contributed their share of the deficiency, and among them perhaps one of the most potent has been the irregular supply of tonnage, which in some cases, particularly in South Wales, was responsible at times for irregular working at the collieries. In the early part of the year this irregularity was the subject of a special inquiry by the Coal Controller, when serious efforts were made to find a remedy. The most favored suggestion, at the time, was a scheme for a more uniform distribution of the available business by apportioning orders, through the medium of the local coal committees, among the collieries in a position to execute them.

Such a scheme, however, would scarcely alleviate all the difficulties surrounding the transport question. Not only has the tonnage shortage aggravated the position in the exporting districts, but even in the case of inland trade the movement of coal has been attended with difficulty. The Coal Controller's scheme for inland distribution was not an unqualified success, and has caused a certain amount of dissatisfaction in some districts. Neither have coal owners been altogether satisfied with the pooling arrangements for cars, for, upon the whole, it is questioned whether the mobility of the car supply has been sensibly increased by this means. With regard to tonnage deficiency, the effect has been unequal. Thus while shipments from Glasgow and the western ports were only a little below prewar figures, those from Fife and the Forth have been seriously reduced, partly because less tonnage was available on the east coast, and partly because the ports of Bolness, Grangemouth, Granton and Burntisland have been largely taken over by the Admiralty.

The difficulties of coal distribution have been materially simplified since the armistice, and the Coal Controller has been able to issue fresh instructions to collieries and dealers, with a view to improving the supply of house coals, of which the delivery, except, perhaps, in the London area, has threatened to be rather short. To this end, collieries have been told to send, for household purposes, both manufacturing and steam coals as an emergency measure, which is rendered posible by the reduced demand for munition purposes. It is doubtful, however, whether such a diversion of manufacturing fuel can be effected without endangering the reserves at work. Some industries have not been any too well supplied all the year. Thus, the pottery trade was rationed to 75 per cent. of the 1916 supply, but has not been able to secure even this reduced amount. Similar restrictions in fuel supply have been felt in other industries, especially those not directly concerned with munitions; and it is clear that the country has been very near to a coal crisis, the escape from which may be fairly attributed to the skill with which Sir Guy Calthrop has dealt with a very delicate situation. Naturally, his methods have been severely criticized, but the fact remains that thus far the deficiency of output has been so manipulated that nobody can yet very seriously complain.

As far as prices are concerned, these have maintained a high level, at which they seem likely to remain for some considerable time. War-wage increases have been followed by successive rises in the limitation price of coal. The exporting collieries, also, have had their particular grievance removed by the abolition of the unequal treatment of export coal to France and Italy. Any advantage, however, which might have accrued to the coal owners from these increases has been checked by the terms of the Coal Mines Control Agreement (Confirmation) Act, which passed through Parliament in the early part of the year. Under this Act the colliery owners have to surrender 95 per cent. of any excess profits, 15 per cent. of which goes to the Controller's guarantee fund. Possibly a more serious result of this Act, however, is the restriction which it has entailed upon the internal economy of coal mine management. It is true that the effect has lately been somewhat relaxed, but it has operated as a check upon development.

Details of the coal export trade of the United Kingdom for the 11-month periods ending Nov. 30, 1917 and 1918, as supplied by Consul General Skinner, appear in the following table:

To	1917 Tons	1917 Value	1918 Tons	1918 Value
Sweden	553,082	3,775,171	997,945	9,078,747
Norway	967,395	6,435,357	1,187,510	11,319,761
Denmark	778,816	5,155,302	973,940	8,812,020
France	16,495,565	102,579,504	15,314,128	106,848,451
Italy	3,789,909	24,427,441	3,778,930	26,287,315
Gibraltar	1,102,886	7,248,803	1,508,654	10,962,599
Malta	1,601,425	11,406,600	1,112,919	8,097,598
Egypt	1,448,459	9,707,153	1,620,524	11,679,960
Totals	32,801,977	$211,503,367	29,660,615	$216,815,982

Coal Situation in Canada

The unusually mild weather this winter has saved the coal situation in Canada. Fuel conditions are now easier there than they have been for months past, owing to the absence of severe weather. The mild weather prevalent in the United States has also reached Canada, and as a result coal has been going across the border in steady quantities.

Bunker Coal Shipments from United Kingdom in December

The quantity of bunker coals shipped on vessels engaged in the coastwise trade during December last from the United Kingdom amounted to 84,602 tons. Of this total only 7398 tons were bunkered at Bristol Channel ports, while 31,176 tons were shipped at the Northwestern ports, 15,744 at the Northeastern ports, and 14,208 tons from the West Coast of Scotland. The coastwise trade in coal for the same month totaled 730,359 tons, of which 104,625 tons were shipped from the Bristol Channel ports, 159,687 tons from the West Coast of Scotland, 103,553 tons from the Northwestern ports, and 314,300 tons from the Northeast Coast.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Feb. 17:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum) — Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates). On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Range, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net to Rio or Santos, $18.50 net to Buenos Aires and $19.50 net to Montevideo.

Leading exporters of American coal have established committees through the National Coal Association to appeal to the Shipping Board to increase tonnage available for carrying coal to Central and South America.

Hampton Roads Coal Exports

			Cargo	Bunkers
NORFOLK				
Lamberts Point				
Feb. 1	Nor. S.S. Johan Ludw. Mowinckel	Rio de Janeiro, Brazil	3,584	968
Feb. 1	Am. S.S. Point Loma	Pearl Harbor, Hawaii	2,149	480
Feb. 1	Nor. Bk. Abyssinia	Montevideo, Uruguay	1,630	....
Feb. 1	Am. S.S. Caoba	Vera Cruz, Mexico....Coke	702	....
Feb. 1	Am. S.S. Bellatrix	Rio de Janeiro, Brazil	4,198	1,328
Feb. 1	Am. S.S. Lake Callicoon	Barbados, B.W.I.	2,985	452
Feb. 3	Am. S.S. Lake Otsquago	Barbados, B.W.I.	2,815	319
Feb. 3	Am. S.S. Dalana	Mollendo, Peru	2,755	599
Feb. 3	It. Bk. Ascensione	Bagnoli, Italy	2,326	....
Feb. 5	Dan. S.S. Kentucky	Santos, Brazil	3,371	1,182
Feb. 5	Dan. S.S. H. Pontoppidan	Caldera, Chile	3,361	614
Feb. 5	Am. S.S. Larenberg	Rio de Janeiro, Brazil	3,895	1,009
Feb. 6	Am. S.S. Biran	Rio de Janeiro, Brazil	3,033	1,221
Feb. 6	Am. S.S. Procyon	Montevideo, Uruguay	4,066	1,615
Feb. 6	Dan. Bk. Holdana	Buenos Aires, A. R.	1,299	....
Feb. 7	Am. S.S. Point Lobos	Honolulu, Hawaii	2,973	....
Feb. 7	Am. S.S. Columbia	Iquique, Chile	2,009	....
Feb. 8	Am. S.S. Point Judith	Rio de Janeiro, Brazil	3,112	....
Sewalls Point				
Feb. 1	Am. S.S. Lake Ormoc	Havana, Cuba	2,820	349
Feb. 4	Am. S.S. Ulysses	Cristobal, C. Z.	12,022	1,191
Feb. 6	Am. S.S. Achilles	Cristobal, C. Z.	12,041	1,185
Feb. 6	Am. S.S. Bayview	Havana, Cuba	1,991	204
NEWPORT NEWS				
Feb. 1	Nor S.S. Ottar	San Juan, P. R.	1,963	249
Feb. 1	Nor. Bk. Vik	Rio de Janeiro, Brazil	3,105	....
Feb. 1	Am. S.S. Lake Charles	Neuvitas, Cuba	2,300	348
Feb. 1	Nor. Bk. Sirdal	Rio de Janeiro, Brazil	1,772	....
Feb. 1	Am. Sc. Rose E. Murphy	San Juan, P. R.	920	....
Feb. 3	Am. S.S. Corsicana	Antilla, Cuba	2,710	283
Feb. 4	Am. S.S. Randwijk	Pernambuco, Brazil	3,225	583
Feb. 4	Am. Sc. Gracie D. Chambers	Santo Domingo City, D. R.	486	....
Feb. 5	Am. S.S. Saccarappa	Rio de Janeiro, Brazil	6,510	....
Feb. 5	Am. S.S. Lake Gormannia	Trinidad, B. W. I.	3,064	639
Feb. 6	Am. Sc. Ed R. Smith	Ponce, P. R.	792	....
Feb. 7	Am. Sc. Wm. H. Draper	Santo Domingo, D. R.	453	....
Feb. 7	Dan. S.S. Henry Tegner	Neuvitas, Cuba	2,028	192
Feb. 7	Dan. S.S. Erik II	Antilla, Cuba	2,692	184

COAL AND COKE NEWS

Harrisburg, Penn.

A bill introduced into the House by Representative Sinclair of Fayette County, provides that it shall be lawful for all incorporated or unincorporated churches, cemetery companies and burial associations now prevented by charter restrictions or otherwise from leasing or selling coal or other minerals owned by them, to sell, lease or convey the mineral, subject to such conditions as will insure the support of the overlying surface and subject also to the requirements that at least 50 per cent. of the coal and other minerals be left in place, properly distributed to support the surface, and that no mining be done or permitted closer to the surface than 200 ft. The bill further provides that the funds derived from the sale of the coal be used for the purchase of additional land, or for the improvement, beautifying, endowment and maintenance of the properties.

Deputy Attorney General Swoope has rendered an opinion arising in the Game and Fisheries Department, in which he informs the Commissioner of Fisheries that he should first notify mining companies charged with the polluting of streams to stop, and if they refuse evidence should be secured for prosecution.

A State Commission to investigate the possibility of making the Susquehanna River navigable is provided by a bill introduced into the House by Representative Hess, who for many years has been Chairman of the House Committee on Mines. The Commission is to be allowed $5000 for expenses, but the members are to receive no compensation. A consulting engineer is to be named. The bill attracted much attention among legislators as there has been much discussion of the project, as it is contended that the making of the river navigable would reduce the cost of coal, as the river runs through the heart of the anthracite region and through part of the bituminous coal fields.

Uniontown, Penn.

Within the past three weeks the Connellsville coke region has undergone a rapid and orderly readjustment to comply with immediate post-war requirements that is considered no less remarkable than was its quick mobilization for war under the regional fuel administration. From an industry brought together under indirect control and keyed to the highest point of maximum efficiency, the Connellsville coke region has been returned to its own resources and is now proceeding at a rather leisurely gait in order to get its breath for the boom believed assured when the iron and steel reconstruction period gets under way.

When Government restrictions were lifted Feb. 1 the average weekly production was 650,000 tons (coal). It has steadily declined at the rate of 40,000 tons (coal) weekly by an effective curtailment policy made necessary by the closing down of a number of blast-furnace operations. There is every indication that production in the immediate future will anchor around 525,000 tons (coal) weekly, with coke at 225,000 tons. Close observers believe that the bottom in curtailment was reached this week and that until there are more encouraging developments in the industry it will become stabilized at 525,000 tons (coal) weekly.

Limited employment for everybody and no reduction in shifts is the policy adopted by operators to prevent an unemployment problem in the coke region. All plants generally are working on a four- and five-day basis, the H. C. Frick Coke Co. this week suspending operations for a day at a number of plants. Heretofore the corporation plants had been working six days but had eliminated extra shifts, but independent operators have been observing lay-off days for a month or more. There has been no general revision of present high wage scales and none is contemplated. One small operation, the Harah Coal and Coke Co., this week gave its men the choice of accepting a 30 per cent. wage reduction or closing down the plant. They accepted the reduction.

Pittsburgh, Penn.

It is being persistently rumored in and around Pittsburgh that plans are under way for a merger of the Hecla Coal and Coke Co. and the United Coal Corporation, both Pittsburgh concerns and in both of which J. H. Hillman, Jr., of Pittsburgh, is the majority stockholder, being president of the former and a director in the latter.

The Hecla Coal and Coke Co. operates several mines and coke-oven plants in Fayette County, in the Connellsville coke region. The United Coal Corporation operates mines in Allegheny, Westmoreland, Fayette and Somerset Counties, and through its subsidiary, the Merchants Coal Corporation, the Tunnelton mine at Tunnelton, Preston County, West Virginia.

Rumor also has it that part of the official family of the new corporation will be constituted as follows: J. H. Hillman, Jr., president of the Hecla Coal and Coke Co., to be chairman of the board; Tracy W. Guthier, president of the United Coal Corporation, to be president; William L. Affelder, general manager of the Hecla Coal and Coke Co., to be general manager; and Harrison T. Booker, general superintendent of the United Coal Corporation, to be general superintendent.

The Hecla Coal and Coke Co. was organized a couple of years ago by a merger of the Bessemer Coke Co., the Isabella Connellsville Coal and Coke Co. (at one time a subsidiary of the United Coal Co. and acquired during the United receivership by the Hillman interests) and other smaller Hillman interests.

The United Coal Corporation was founded July 1, 1916, by the reorganization of the United Coal Co. and its subsidiaries, the Naomi Coal Co., the Pittsburgh & Baltimore Coal Co. and the Jenner Quemahoning Coal Co., which had been in receivers' hands since 1913. On July 1, 1917, it acquired a majority of the bonds of the Merchants Coal Co., another subsidiary of the old United, and took those properties over from the receivers and organized the Merchants Coal Corporation, since operated as a subsidiary company.

Charleston, W. Va.

Much idleness among miners prevails in the Fairmont district as a result of numerous suspensions of operations following a slump in the market, the number of idle miners on one division of the Baltimore & Ohio being between 150 and 175. This is due not solely to a lifeless market but to the policy of railroads not to purchase coal except at excessively low prices. The same conditions prevail through the district. The car supply for the Fairmont region is far in excess of the loading and shipment of such cars. An average of 3000 cars a day is still being supplied to the mines. Loadings average anywhere from 500 to 800 cars a day, with a small percentage of such cars moving westward. Since Feb. 1 some of the larger companies in the district have suspended operations until general conditions show improvement.

General apathy featured conditions in the Kanawha district during the week ending Feb. 8, there being a smaller output in that period than during the earlier weeks of the year, production for the week ending Feb. 1 being only 81,000 tons. Definite figures are lacking as to production owing to the discontinuance of reports to some district associations and district fuel officers, but general conditions are a sufficient index. As production at times reached 220,000 tons a week during the war, it will be seen just how materially curtailed the output has been. Prices are still holding up well despite the general apathy.

Idleness among the mines also haunts the New River and Winding Gulf fields, where the general slackening of demand and lack of orders has caused many companies to cease operations for the time being, being unable to dispose of their product, with railroad embargoes in addition holding up shipments, notwithstanding the fact that some of the old market areas of both the New River and Winding Gulf districts have been restored. However, there is little need for coal there at this time, and consequently the enlarged territory is not affording much additional outlet. However, the smokeless product of the New River district will make it possible to recover from the present slump before some other districts. The advance in price after Feb. 1 would indicate that. However, labor trouble may affect the mines of the district later on.

In the Pocahontas and New River districts the total output last week was 385,277 tons, which is considered a fairly good output in view of all conditions, indicating a fairly good demand for Pocahontas coal despite the general stagnation. Production of coke declined from 52,000 tons to 44,677 tons.

In common with other districts there were heavy production losses in the Guyan or Logan mining district, the output running less than half the usual full time production. Indeed, the Logan mining district has been affected to the same extent as the Kanawha district by present market conditions, since most of the product of the mines of the district is shipped to the West. Coal will continue to be shipped through a forwarding bureau at Russell, Ky.

New York, N. Y.

The award of the contract for supplying about 300,000 tons of bituminous coal for the transport service, New York harbor delivery, is expected to be made the latter part of this week. The bids, which called for a tonnage to be called for at the rate of about 60,000 tons a month for five months beginning Feb. 1, were opened in the Army offices, 104 Broad St., on Feb. 10. Altogether twenty coal concerns submitted proposals, the prices being for net tons, f.o.b. New York harbor loading ports, and are exclusive of war freight tax except where specified. The bids follow:

	Per Ton
W. A. Marshall & Co., Pools 1, 9, 10 and 71	$4.82
Stineman Coal & Coke Co., Pools 1, 9, 10 and 71, for April, May and June.	4.87
American Fuel and Shipping Co., Pools 1, 9, 10 and 71	4.47
E. I. du Pont de Nemours & Co., Pools 1, 9, 10 and 71, for February and March	4.87
Whitney Coal Mining Co., Pools 1, 9 and 10	4.54
Rockhill Iron and Coal Co., Pool 1	5.09
Rockhill Iron and Coal Co., Pool 10	4.49
George D. Harris & Co., Pool 10	4.77
Alden Coal Mining Co., Pools 1, 9, 10 and 71 (Two delivery periods)	4.36 and 4.49
Coale & Co., Pools 9 and 71	4.62
Maryland Coal and Coke Co., Pool 9	4.88
Berwind-White Coal Mining Co., Pool 1	5.60
Emerson & Morgan, three bids, Pools 10, including war tax	4.65, 4.65 and 4.85
Pennsylvania Coal and Coke Corporation, Pools 1, 9 and 71	5.02
Pennsylvania Coal and Coke Corporation, Pool 10	4.87
Thorne, Neale & Co., Pool 10	4.92
Mountain Coal Co., Pool 1	5.42
Consolidation Coal Co., Pools 9 and 71	4.87
Campbell, Peacock & Kinzer, Pools 9, 10 and 71	5.00
N. B. Nicoll & Co., Pools 10 and 71	5.35
Knickerbocker Fuel Co., Pool 9	4.66
Knickerbocker Fuel Co., Pool 10	4.41
Davis Coal and Coke Co., Pools 9 and 71	4.80

Victoria, B. C.

The total amount of coal produced by the collieries of Vancouver Island for the month of January, 1919, was 158,327 tons. This is 18,040 tons more than was produced during December, 1918, and 55,632 tons more than the production of November, 1918. The total of 158,327 tons only lacks 2831 tons of being equal to what was produced by all the coal mines of the Province in November, 1918, and is 10,000 tons in excess of the largest production in the history of the Vancouver Island collieries.

The Canadian Collieries (D), Ltd., leads in production with a total of 80,696 tons from its different collieries, with the Canadian Western Fuel Co. second with a

production of 64,404 tons from its Nanaimo colliery.

The new No. 5 mine opened by the Canadian Collieries (D), Ltd., at South Wellington has an output of 7813 tons for January. The Granby Co.'s new mine at Cassidy, V. I., produced 2446 tons. Both of these mines should now rapidly increase their production.

The Canadian Western Fuel Co.'s new Wakesiah mine is now nearing the time when it will become an active producer, which should augment that company's tonnage in the near future. Both shafts are now down to coal and connected, and arrangements are under way laying out the shaft bottom arrangements.

These three new mines should give a good account of themselves during 1919, and considerably increase the tonnage produced from the Vancouver Island mines.

PENNSYLVANIA

Anthracite

Scranton—When the Continental colliery of the Delaware, Lackawanna and Western Railroad Co. closed recently, Thomas McGraw had been employed for fifty-one years at the colliery.

Upper Lehigh—Employees of the J. S. Wentz Co. are being sent to Raven Run, Schuylkill County, where the firm is opening a new operation. On account of the slack time at the mines the Lehigh Valley R. R. has laid off 20 firemen and trainmen on the Mahanoy division who formerly were members of coal crews.

Hanover—George Lazarus and others, lessors of coal land, have brought proceedings in equity against the Lehigh and Wilkes-Barre Coal Co. and ask pay for all coal lost by reason of excess of waste by modern methods of mining and preparation since the execution of a lease, and also pay for culm and coal taken from the land. The suit involves thousands of dollars.

Exeter—The closing down of the Stevens colliery of the Lehigh Valley Coal Co. will not materially affect the 200 or more employees as the company has arranged for their employment at the Exeter colliery. The superintendent, David W. Evans, will also go along with the men. He will have charge of the Checker and Pittston veins. The officials of the company state that the closing down of the colliery is for economy and concentration.

Summit Hill—A number of men employed in the industrial plants throughout the Panther Creek and Lehigh Valleys are being employed by the Lehigh Coal and Navigation Co. The lack of man power is no longer felt to any considerable extent. There are evidences to show that the company intends to reduce wages of its employees, but the mine workers say they will not stand for any decrease, especially at this time.

Throop—A serious squeeze has caused considerable damage to the workings of the Pancoast colliery, controlled by the firm of Dickson & Eddy, of New York. Fortunately the cave started on the evening of Feb. 8, when no men were in the mines, but the officials were able to rescue all the mules. It is said that the squeeze is affecting the main shaft, which has started to bulge, and may ruin the mine. In 1911 seventy-three men lost their lives at this plant due to a mine fire.

Hazleton—The Spring Brook and Spring Mountain collieries of the Lehigh Valley Coal Co. suspended operations indefinitely on Feb. 10. Foremen are manning the pumps. A total of 680 men are idle. Work on a proposed slope at Spring Mountain and a 500-ft. haulage tunnel planned to connect the two collieries has been stopped by the order to suspend. "Independents," with the exception of G. B. Markle Co., are working from one to three days a week. Lehigh Valley collieries are working from six to seven hours a day when ordered to operate.

Bituminous

Waynesburg—John Lantz, of Gilmore township, has sold a one-half interest in a tract of coal containing 80 acres to J. B. Fordyce.

Morgan—The White mines of the H. C. Frick Coke Co. shipped their last car of coal Feb. 7. They have been abandoned by the company and conclude this company's activity in this valley. The company recently abandoned the Valley mine.

Youngwood—The Pennsylvania R. R. has completed more plans for the improvement and extension of the Youngwood Yards. A new sectional roundhouse will be erected and a new turntable installed. During the past year many improvements have been made in the yards to care for the increased traffic in this territory.

Point Marion—The Locust Hill Coal Co. secured a temporary court injunction restraining P. J. Joyce from acting as general manager or interfering with the performance of the duties of the office, which is now held by W. J. Lester, his successor. Mr. Joyce was elected some time ago at a salary of $5000 per year.

Star Junction—Fire destroyed one of the new houses being erected here by the Washington Coal and Coke Co. Several of the houses were in process of erection at the time and it is thought to have been caused by a fire started in a small stove by the carpenters during the day time. The fire was confined to one house.

Pittsburgh—Thomas S. Lowther, of Indiana, Penn., secretary of the Bituminous Mine Inspectors' Association, has called a meeting of all the examining boards of the thirty bituminous districts for Mar. 7 at the Seventh Avenue Hotel. The purpose is to set dates for the annual mine foremen's and firebosses' examination and to discuss the form of questions to be included in the examination.

Uniontown—The river tipple and trestle of the Hecla Coal and Coke Co. located at Isabella, Fayette County, on the Monongahela River and the Pittsburgh & Lake Erie R.R., was completely destroyed by fire on Feb. 7. The fire was caused by a short circuit in the conduit wiring which was located at the river end of the tipple. The tipple was a frame structure and was built about a year and a half ago. The loss will not affect the producing and shipping facilities as the greater bulk of the coal and coke was shipped by railroad. Through the heroic efforts of the officials of the company the railroad tipple was saved. The loss is estimated at about $30,000, which includes the conveyor belt, valued at $5500. The tipple will be rebuilt. J. H. Hillman, Jr., of Pittsburgh, is president of the Hecla Coal and Coke Co., and W. L. Affelder, of Pittsburgh, is general manager.

Brownsville—The Banning-Connellsville Coke Co., on the Baltimore & Ohio R.R. between McKeesport and Connellsville on the Youghiogheny River, has indefinitely suspended operation of its plant at Banning, consisting of a large mine and 76 coke ovens, on account of slack business conditions. The company ships both coal and coke. The H. C. Frick Coke Co. has also closed its White mine near Morgan, Fayette County. It is reported that the employees of the Harah Coal and Coke Co. have accepted a wage reduction of 25 to 30 per cent. to keep running.

The Alicia mine and 400 coke ovens of W. Harry Brown, just above Brownsville on the Monongahela River, were closed down on Feb. 11 for an indefinite period, on account of lack of business. Most other operations in the Connellsville coke region are being greatly curtailed. The same is also true of the mines in the Pittsburgh district.

WEST VIRGINIA

Minden—Without orders for their product an unusually large number of mines in both the New River and Kanawha fields have suspended operations. One of the largest companies affected is the New River Consolidated Coal Co. whose mines at this place were shut down about Feb. 1 for an indefinite period, employees being told that it would be wise to look elsewhere for employment. As many as one thousand men are left without employment as a result of this shutdown. Heretofore the Minden mines have been operated regularly.

Morgantown—Damage to the extent of approximately $5000 or $6000 was done by a runaway trip of forty mine cars which demolished the tipple of the No. 5 mine of the Elkins Coal and Coke Co. on Deckers Creek, Wednesday, Feb. 5. There is a heavy grade from the mouth of the mine to the tipple below. When the string of cars got beyond control men in the tipple below, warned by the roar of the cars, fled in every direction. There was no one to manipulate the derailing switch and the cars crashed into the tipple, crumpling it up as if it had been so much paper.

OHIO

Canton—The Stark County Coal & Limestone Co., recently formed, will soon start a stripping operation about seven miles southwest of Canton. A steam shovel will be installed. It is proposed also to mine limestone, which is found in the same locality.

Corning—The Essex Coal Co., of Columbus, has opened a new mine on the Sunday Creek side of the Hocking Valley, near Corning. The mine has a shaft 130 ft. deep located in the center of the 500-acre tract, which contains a seam approximately 12 ft. thick. The capacity is 2000 tons daily. The Toledo & Ohio Central R.R. serves the property. It is operated by a subsidiary company known as the Ohio Mining Company.

INDIANA

Clinton—A gas explosion at Jackson Hill No. 5 mine recently caused the death of three men, one being Robert Laird, assistant mine boss, and the other two laborers. The explosion occurred at seven o'clock in the morning when only a few of the men were working. These men reported the accident and organized a rescue party.

Bicknell—The American mine at Bicknell has been called the "one million ton mine," because of its feat of sending to market last year more than one million tons of coal, which is one-twenty-ninth of all the coal mined by the 400 mines of Indiana last year. A second mine has been sunk by the American company at Bicknell, and a third one is to be sunk soon, each of these to be larger than the present holder of the world's record.

Belleville—Seven men were trapped in the Little Oak mine recently when a fire started in the motor barn underground. Two of the seven men made a detour of three miles to get to an oulet, where they were stopped from ascending by dense smoke. They were compelled to make another detour of two miles before they were able to make their exit through an old air hole. Twelve men were in the mine at the time the blaze started but only seven were trapped. The fire started from a torch used by men making repairs on motors. Five tanks containing 30 gal. of gasoline each were hurriedly removed to a place of safety. About 300 men will be thrown out of work until repairs are made.

ILLINOIS

Carlinville—The Chicago & Alton Railway Co. has notified Mulville Brothers to commence as soon as possible the work of putting in double track from Nilwood, Ill., to Carlinville. This new work will mean double track all the way from Chicago to Carlinville and will enable the movement of an increase tonnage to and from the mines of the Standard Oil Co. at Carlinville and Schoper.

Murphysboro—The Murphysboro Mining Co., with headquarters in St. Louis, Mo., is prospecting for coal on land along the Groves and Sand Ridge branch of the Illinois Central. Options have been secured on more than 2000 acres of land in Ora township, and testing has been finished on part of it. Drilling is under way now and has been for the past two weeks or more. Numerous mines have been opened in Ora township during recent years.

De Soto—The Benton-Big Muddy Coal Co. is sinking a mine north of De Soto. The Union Colliery Co., which is now operating the largest soft coal mine in the world north of Elkville, at Dowell, known as the Kathleen mine, is preparing to open another mine east of Elkville, probably equally as large as the Kathleen mine. Canalization of the Big Muddy River from these coal fields may take place at some future date, as it would furnish a water freight transport from the coal fields to St. Louis and Chicago, with an extension of a canal from the Big Muddy at Sand Ridge to the Mississippi River and a lock dam at Sand Ridge.

KENTUCKY

Cary—The Federal Coal Co. at this place, lost a commissary by fire on Feb. 10, loss being estimated at $25,000, with insurance of $10,000. Incendiary origin appears to be proven, as the building was found on fire at three points.

Straight Creek—The Liberty Coal and Coke Co. has secured fresh contracts, which it states will insure fair operation for some weeks to come. The mines had been operating less than half time for several weeks, but expect to go to a full-time basis.

OKLAHOMA

Muskogee—The office of United Mine Workers of District 21 at this place has been advised that the Choctaw Coal Mining Co. has closed down its mine at Coalgate, thereby throwing 260 men out of employment. It is officially announced that more than 600 men were affected by the curtailment of mining operations at Lehigh, Okla. The operators assign the mild winter and the fact that the vast majority of domestic consumers were induced to lay in their winter's supply of coal last summer, thereby decreasing the immediate demand, as the cause for the curtailment of coal-mining operations. All wholesale and retail coal dealers in Oklahoma and Texas, who normally depend on the Oklahoma fields, report large stocks of coal on hand with small demand.

Marshall—Lignite in large quantities has been found near here. A movement is on foot for the organization of a company to mine the fuel, which is said to be of exceptionally good quality.

Howe—The Texas Steel Co. of Beaumont, Texas, through its president Col. L. P. Featherstone and its secretary, W. A. Brown, has purchased 51 per cent. of the capital stock of the Howe-McCurtain Coal and Coke Co., of Howe, Okla. It is planned to operate the coal mines and 100 coke ovens of this company located at this place to full capacity and to ship the coke to the furnaces of the Texas Steel Co. at Rusk, Tex., to be used in reducing the brown iron ores of East Texas to pig iron. Later it is planned to ship the coke to Beaumont for operation of the furnaces of the Texas Steel Co. now being built there. It is declared that the iron reduction business will be revolutionized, as there is an unlimited quantity of iron ore in East Texas and the low sulphur content coke from the Howe ovens will make possible the reduction of this ore at a cost from $5 to $6 a ton less than it is possible to reduce the ores in the Pennsylvania iron belt. The Howe ovens will have a capacity of 600 tons a day, and it is planned to ship this entire output to Texas.

MONTANA

Roundup—The Republic Coal Co., with fifty less men employed and twelve less operating hours last year exceeded the highest previous twelve months' production record, made in 1916, by 45,575 tons, according to Superintendent William Redshaw. The 1916 tonnage was 615,000 tons as compared to 659,575 tons for 1918.

WASHINGTON

Cokedale—Satisfactory settlement of a strike declared by the new union of coal miners here has been announced. A new agreement between the men and the Cokedale Coal Co. has been drawn up.

Colville—The Colville Valley Coal Co. has now driven its shaft a distance of 197 ft., where it encountered a coal seam 7 ft 9 in. thick and lying between well defined walls. The shaft is being sunk on an incline of 31 degrees.

Personals

John Kaiser, of Columbus, Ohio, formerly with the General Hocking Fuel Co., has accepted a position to cover Ohio for the Elk River Coal and Lumber Co.

H. R. Blackford, recently chief engineer for the Consolidated Coke Co., Grays Landing, Penn., has been made general superintendent of all the mines of the company.

D. S. Hanley has been appointed general sales manager of the Pacific Coast Coal Company, of Seattle, Wash., with headquarters at 563 Railroad Ave., South, Seattle.

C. M. Snyder has been appointed mine inspector for the United Coal Corporation of Pittsburgh, Penn. He has been superintendent for one of the Pittsburgh Coal Co. mines.

Wilmot Jones, lately with the United States aviation service, has been discharged and has been appointed superintendent of the new Raven Run Coal Co. colliery at Raven Run, Penn.

Theodore R. Hermanson, formerly of the Harrison Works of the Worthington Machinery Corporation, has become associated with the Epping-Carpenter Pump Co., of Pittsburgh, Penn., as works manager.

Edward J. McKernan, chief clerk at the Lehigh Coal and Navigation Co.'s colliery at New Philadelphia, has been appointed sales manager for the subsidiary companies of the Lehigh Coal and Navigation Co.

Albert Dalley, Knightsville, Ind., has been appointed assistant state mine inspector by the state industrial board of Indiana. Mr. Dally succeeds William Moore, of Terre Haute, Ind., who resigned recently.

C. C. Slater, who has been manager of a mine in the Monongehela Valley, Pennsylvania, has been made manager of the Columbus Railway, Power and Light Co., of Columbus, Ohio. He has resigned his position at the mine.

George H. Ruppert who, before his entry into the chemical warfare branch of the service had charge of a sodium-ferro cyanide department of the Semet-Solvay Co., has accepted a position as advisory engineer with the Powdered Coal Engineering and Equipment Co., of Chicago, Ill.

Willis B. Clemmitt has joined the engineering staff of the Powdered Coal Engineering and Equipment Co., of Chicago, Ill., in the capacity of advisory engineer. Mr. Clemmitt was formerly assistant superintendent of the open-hearth department of the Central Iron and Steel Co. at Harrisburg, Penn.

J. H. McMillan, Provincial District Inspector of Mines for the Prince Rupert (B. C.) District, has resigned in order to take the position of general manager of the Jasper Park Collieries, Ltd., operating in the Province of Alberta. Mr. McMillan's headquarters will be at Pocahontas, where the company's largest colliery is situated.

R. B. Hullhorst, formerly Northwestern sales manager, with an office in Minneapolis, for the Old Ben Coal Corporation, has resigned from that concern and made a connection with C. M. Moderwell & Co., of Chicago. It is understood that Mr. Hullhorst is financially interested in Moderwell & Co., and will represent them in the Northwest, having his headquarters in Minneapolis.

Ainslie A. Gray, who served the United States as major during the war period, has received his honorable discharge and has opened offices at 1547 Marquette Building, Chicago, Ill., under the firm name of A. A. Gray & Co. The organization will help solve manufacturers' problems in production, advertising and selling. It will handle accounts in trade, technical and national mediums.

Brigadier General Richard Coulter, of Greensburg, Penn., president of the Keystone Coal and Coke Co., one of the large operating companies in Uniontown, Penn., was chosen at a recent meeting of the Pennsylvania Democratic State Committee as the party's candidate for Congress from the Westmoreland-Butler district, to succeed the late Congressman E. E. Robbins. The election will be held Mar. 4.

T. W. Armstrong, widely known in petroleum circles, has been appointed second vice-president of the Hulburt Oil and Grease Co., Inc., manufacturers of petroleum products at Philadelphia, Penn. Mr Armstrong will have direct charge of the Pittsburgh office and under his supervision will be the mining division of the company, specializing in the lubrication of mine equipment. Mr. Armstrong was formerly with the Keystone and Pennsylvania lubricating companies and is known throughout the state as a most efficient lubricant engineer.

Coming Meetings

New England Coal Dealers' Association will hold its annual meeting March 19 and 20 at Worcester, Mass. Secretary, C. R. Elder, Boston, Mass.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Canadian Mining Institute will hold its annual meeting March 5-7 at the Windsor Hotel, Montreal, Canada. Secretary, H. Mortimer-Lamb, Drummond Building, Montreal, Canada.

New York State Coal Merchants' Association will meet Thursday, Feb. 27, at the new Pennsylvania Hotel, New York City. Two sessions are to be held, followed by a dinner at which addresses are to be made by prominent speakers. Secretary, L. V. Shepard, Elmira, N. Y.

Industrial News

Pikeville, Ohio—The Kentenia Coal Sales Co. has filed a petition in voluntary bankruptcy in the United States Court at Cincinnati, showing liabilities of $14,733.48 more than its assets.

Wellston, Ohio—The Morrow Manufacturing Co. has established a branch-selling office at Knoxville, Tenn., and in future all business intended for the Southern territory should be addressed to the Tri-States Machinery Co., Knoxville, Tenn.

Charleston, W. Va.—The Paint Creek Coal Mining Co. has renamed some of its coal-mining towns on Paint Creek. The town of Old Detroit has been changed to Glen Buddy. Collinsdale is the new name for Hickory Camp, and Greencastle is now Ireland.

Bloomington, Ill.—The Chicago & Alton is storing 50,000 tons of coal at North Springfield and is also storing coal in Rogers ballast cars at Normal, Ill. The company is also storing 8000 tons of coal for the Chicago, Peoria & St. Louis at Ridgely, Ill.

Norfolk, Va.—The Virginian Ry. new car dumper at Sewalls Point is now in operation. U. S. Navy Collier "Orion" was loaded at the Virginian Pier at Sewalls Point on Feb. 13 in six hours and twenty minutes, taking 9622 gross tons of cargo and bunkers. This excellent dispatch is due to the efficiency of the new car dumper.

St. Louis, Mo.—The Mancha Storage Battery Locomotive Co. announces that Carson W. Smith, who formerly represented the company in Denver, Colo., has been elected secretary of the concern. This leaves the Mancha company without a Denver representative at present, but arrangements are being made and the name of the new representative will be announced shortly.

Urbana, Ill.—The Student Branch of the American Institute of Mining Engineers was reorganized by students of mining engineering of the University of Illinois under the leadership of Prof. H. H. Stoek, head of the department of mining engineering. This work was laid aside during the period of the war, but the mining engineering students state that they expect to formulate plans which will make the Urbana Student Branch of the American Institute of Mining Engineers one of the most active and profitable in the country.

San Francisco, Cal.—Coal received from all sources in San Francisco during the twelve months of 1918 amounted to 224,638 tons, according to the figures compiled by the marine department of the Chamber of Commerce. These receipts were divided as follows: From British Columbia, 82,581 tons; from Washington, 12,352 tons; from domestic rail, 129,705 tons. During the year there were no cargoes from Australia, Great Britain, the European Continent or Japan. There was brought by rail during the year 4690 tons of coke. The following are the coal receipts for the past eight years: 1917, 477,127 tons; 1916, 395,864 tons; 1915, 407,887 tons; 1914, 372,105 tons; 1913, 452,310 tons; 1912, 463,041 tons; 1911, 583,034 tons; 1910, 534,258 tons.

Seattle, Wash.—Vice President and General Manager N. D. Moore, of the Pacific Coast Coal Co., has added to the personnel of the firm by the appointment of S. H. Green as assistant to the vice president and the appointment of W. J. Santmyer as advisory engineer with full jurisdiction over its powdered coal department. Mr. Santmyer was formerly superintendent of the steam department for the Puget Sound Traction, Light and Power Co. He was electric engineer for the E. P. Allis Co., predecessor to the Allis-Chalmers Co., and was chief engineer for the Baltimore & Ohio Ry. power plant at the time of the electrification of the Baltimore belt line tunnel, the first important electrification of the kind in the country.

Charleston, W. Va.—Though unfavorably reported by the Committee on Mines and Mining of the West Virginia Legislature, the Blizzard bill requiring all companies to install scales and to pay all miners by actual weight was not rejected when reported to the House. When the question of rejection came up for consideration, Delegate Blizzard made a motion that the bill be placed on first reading instead of being rejected, so that the Legislature might consider the bill on its merits. On the other hand, Delegate J. S. Thurmond of Greenbrier, urging rejection of the measure, argued that there was no demand for such a law as was proposed from sections where there were no scales and that the proposed law would only impose unnecessary burdens on operators at a time when such operators were least able to bear them. However, the House by a vote of 58 to 16 placed the bill on the calendar instead of rejecting it.

Greensburg, Penn.—Approximately 15,000 tons of coal were mined and 1,000,000 tons of coke manufactured and shipped from Westmoreland County during 1918, according to statistics which have recently been completed. While the output of the larger concerns was slightly less than during 1917, this was due in a general way to the labor shortage. This deficit in tonnage of the larger companies was more than made up by the establishment in this county during the latter part of 1917 and early in 1918 of more than 200 small operations. Wages of coal miners during 1918 were the highest ever paid. Statistics show that miners generally averaged at least $6 per day during the year. This is an increase over the previous year of approximately $1.75 a day. The average yearly earnings of miners for 1918 were $1800, while the amount earned by many thrifty miners was more than $2500 to $3000 for the year, or $250 per month. While $150 was the average monthly wage, many miners drew as high as $400.

MARKET DEPARTMENT

Weekly Review

Lowered Output of Both Hard and Soft Coal, Due to Lack of Demand — High-Grade Soft Coal Maintaining Price Level—Anthracite Inquiry Slumps Because of Mild Weather—Increase Expected in Prices of Hard Coal

THE output of both anthracite and bituminous coal from week to week continues to reflect the stagnant condition of the coal market. Not a mine in the country is working at full-time capacity. Furthermore, hardly a day passes that does not see an addition to the already long list of operations forced to shut down because of the surprising lack of demand for coal.

The production of soft coal for the week ended Feb. 8 (the latest statistics available) amounted to only a little more than eight million net tons. This is a drop of more than two and one-half million net tons when compared to the output of the similar week of 1918, and a decrease of over six million net tons when set against the high peak reached during the week ended July 13, 1918.

Certain grades of bituminous coal are still reported as being sold at concessions from the Government maximum, though the high-grade coals are being sold at from 15c. to 45c. above the maximum prices, with perfect satisfaction to the consumer. Operators are adhering to their policy of shutting down rather than sell at a loss. Having virtually done a winter business during the summer, most operators are content to do a summer business this winter, biding their time until demand again becomes active. Little contracting is reported, most large consumers awaiting the outcome of the railroad fuel controversy.

Owing to the continuance of moderate temperatures in the anthracite-consuming sections, consumption of hard coal has failed to meet expectations. Many collieries have curtailed operation, a number of them taking advantage of the lull to make much-needed repairs and extensions to their plants.

The output of the hard coal mines during the week ended Feb. 8 is estimated at 1,144,000 net tons, which is the lowest production recorded in the past few years. It would not be much of a surprise in some quarters to see an increase in the price of certain sizes of anthracite in the future. Predictions are freely made that this increase will go into effect by Apr. 1, if not sooner.

WEEKLY COAL PRODUCTION

Bituminous—Estimates place production of bituminous coal during the week ended Feb. 8 at 8,040,000 net tons, which falls 291,000 net tons below the production of the week of Feb. 1 and 2,521,000 net tons below the corresponding week of 1918. The average production per working day during the current week is estimated at 1,340,000 net tons, as compared with 1,860,000 net tons for the coal year to date and 1,744,000 net tons for a similar period of last year. The production for the coal year to date, now estimated at 502,107,000 net tons, exceeds the production of last year for the same period by 31,129,000 net tons. A continuation of the low production recorded during the past few weeks for the balance of the coal year will cut this excess down approximately one-half, and production for the coal year ended Mar. 31, 1919, will not exceed 565,000,000 net tons.

Anthracite—A considerably greater decrease than in bituminous production occurred in the anthracite output for the week ended Feb. 8, this decrease amounting to 377,000 net tons, or approximately 20 per cent. below the output of the week of Feb. 1. The production during the week of Feb. 8 is estimated at 1,444,000 net tons, and is the lowest production, with the exception of Christmas week, 1918, recorded during the past few years. The average production per working day during the current week is estimated at 241,000 net tons, as compared with the daily average for the coal year to date of 310,000 net tons, and as against the daily average of the coal year to date of 1918, of 317,000 net tons. The total production for the coal year to date now amounts to 83,807,000 net tons, as compared with 85,528,000 net tons during a similar period of the 1917-18 coal year.

Car Loading—Carriers' reports for the week ended Feb. 8 show that car loading decreased in all districts during the week with the exception of Ohio, southwestern Virginia and the district including Illinois, Indiana and western Kentucky. In Ohio the increase in cars loaded amounted to 760, in southwestern Virginia to but 112, and in the Illinois, Indiana and western Kentucky District to 2467. The greatest decreases occurred in the central Pennsylvania and southern West Virginia fields. In the former district the decrease amounted to 4511 cars and in the latter district to 1125 cars.

New England Shipments—Shipments of bituminous coal to New England during the week ended Feb. 8 are estimated at 283,217 net tons, and are 5.3 per cent. below the shipments of the week preceding. This decrease is entirely attributed to shipments by rail, which amounted to 106,848 net tons, and fell 25.3 per cent. Tidewater shipments, amounting to 176,369 net tons, increased over the week preceding by 13 per cent., all harbors reporting improvement. Total shipments to New England for the coal year to date now amount to 22,617,592 net tons, of which total rail shipments amount to 8,595,567 net tons, and tidewater shipments to 14,022,025 net tons.

Tidewater Shipments—Tidewater shipments from the North Atlantic ports and Hampton Roads, during the week ended Feb. 8, amounted to 670,445 net tons, exceeding shipments of the week preceding by but one-half of one per cent. Shipments from Baltimore increased 8 per cent. and from Hampton Roads 8.8 per cent., while New York and Philadelphia shipments decreased 8.5 per cent. For the coal year to date shipments by tidewater now amount to 37,434,908 net tons, which total comprises shipments from New York and Philadelphia of 18,105,978 net tons, from Baltimore 3,292,220 net tons, and from Hampton Roads 16,125,710 net tons. Carloads of bituminous coal on hand at all harbors, on Saturday morning, Feb. 8, amounted to 12,765.

Beehive Coke—The production of beehive coke in the United States during the week ended Feb. 8 is estimated at 504,000 net tons, and is a decrease of 29,000 net tons, compared with the week of Feb. 1, and a decrease of 13,000 net tons, in comparison with the corresponding week of 1918. The average production per working day, during the current week, is estimated at 84,000 net tons, as against 89,000 net tons during the preceding week, and 86,000 net tons during the week of Feb. 8 of last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running a little less than for the same period of 1918. Road sales for at-once delivery are slightly ahead. Merchants are placing liberal orders for handkerchiefs, delivery to be made in the fall. Retail business continues excellent. Collections are continuing good.

Bradstreet's—Trade advices are a shade more cheerful, the movement of peace-time industries outside of textile lines is a trifle faster, and collections are a bit better. These statements, of course, must be taken with knowledge of the fact that buying, especially of wearing apparel at wholesale, is conservative and not equal to that of a year ago; that rain or snow the country over has checked country trade and marketing of products, especially of corn and hogs at the West; that lower cotton prices discourage southern buying and promote talk of crop area reduction; that a great many textile-mill hands are striking or otherwise idle, pending the settlement of the shorter week issue, and that the number of unemployed is larger, owing mainly to the continued releases of men from the army.

The Iron Age—Further cutting of prices is now being admitted by producers as necessary to kindle the interest of buyers. The conclusion reached is that lack of important inquiry in the past nine weeks or open market conditions is in part due to maintaining a level of prices too high to encourage barter. How to get labor to recognize its part in the adjustment is the problem. A sale of 4000 tons of pig iron is noted for export and Cleveland reports an inquiry for 5000 tons for China. On 300 tons a cut of $1.80 from $31 per ton was made by an Eastern furnace, but 3000 tons for Italy was withdrawn on the price account. The demand of the automobile trade is the outstanding feature of the domestic market. Sheet mills are running at 75 per cent. of capacity and mostly for motor cars and trucks.

Dry Goods Economist—The impression seems to be gaining ground that large quantities of cotton are being held in the South and that this cotton will soon be forced on to the market through the banks calling in their loans. Evidence that this view is well founded is presented by the continued decline in price. March options were quoted on Thursday at 22.22 cents as against a fraction below 24 cents a week ago. Mills and dealers continue to show unwillingness to buy wool at the upset prices below which the Government will not dispose of its holdings. This attitude was clearly evinced at last week's auctions in Boston, when a large proportion of the offerings had to be withdrawn. Further reductions have been made by jobbers in prices of ginghams, prints and percales. Some of the drops are as great as 40 per cent.

American Wool and Cotton Reporter—In the Boston wool market there is an undercurrent of strength and considerable anti-

mism is expressed by a number in the trade. The labor difficulties have not been universal as the woolen mills have not been affected. These mills are scattered all over the country and are better situated in this respect. The technical position of the cotton market is bullish. The South is holding strong in spite of labor conditions and the decline. Cotton owners in the South are selling their low grade cotton first, if possible, and holding the higher grades for more advanced prices. Two factors at least tend to maintain strength in the cotton market. One is that jobbers are bound to get rid of all surplus high priced goods in filling their orders and another is that as soon as the peace treaty is signed, it is expected that Europe will buy a large amount of low grade stocks.

Dun's—More than any other single factor, and with increasing force, the price question dominates the economic situation. Response has come quickly in the isolated cases where recent readjustments have largely met buyers' anticipations, but price deflation has not yet gone far enough to induce general and vigorous operations, and the hoped-for trade revival still waits. Purchasing only for immediate and well-defined necessities, continuing the rule for many weeks in most leading branches, has brought a sharp industrial reversal, and strikes have been but a contributing cause of the steadily diminishing activities and lessening employment of labor. While manufacturing is not on a uniform basis, plants in the West being relatively busier than those in the East, and some lines doing better than others, hesitation remains a conspicuous feature in all directions and not a little machinery is standing idle solely through lack of orders.

Atlantic Seaboard

BOSTON

Market shows no change. Water-borne coal practically at a standstill. Steam-users with tidewater facilities alarmed over inaction on shipping situation. Other difficulties. Railroads take only small tonnages. Large number of shippers, both rail and water, without effective orders. Dullness at Hampton Roads and New York reflected here. Slight scattering demand all-rail, but confined to small users. Several textile plants shut down because of wage differences. Georges Creek offered for smithing. Anthracite price program rumored. Will the market stand it? Inequalities as to rates of freight need correction. Dearth of inquiry except for hand-to-mouth use. Mild weather and light retail demand.

Bituminous—The extreme dullness that has settled down over the market like a wet blanket continues without any special development. Factors in the trade have about given up making any serious effort to get business for the present, so entirely discouraging is the current situation. Orders are scarce and prices on distress coal are at a low ebb. Mines, steamers and rehandling plants, in all of which New England shippers are interested, are many of them without a wheel turning. There is no reasonable hope of improvement until well into the spring, if then. There are large stocks to be worked off in every direction, and who would buy water coal today unless he were under obligation to accept deliveries on contracts made dring the stringency? There is nothing for the trade to do but mark time and wait for better things.

Not in years has there been a time when so little steam coal has moved by water. No shipper is hardy enough to venture cargoes on the market for disposition on arrival at this end, and even those who have rehandling plants are moving so little to their inland trade that there is no storage available for any greater volume of coal than is now coming forward. Some of the smaller rehandlers are even taking small supplies all-rail rather than take the chance of lower prices by water. There is no confidence in present price levels on the smokeless grades from Hampton Roads and there are still enough cargoes afloat that were shipped on old contracts to consignees now unable to take them to depress the spot market for a long time to come. There are cases where barge transportation was chartered last spring and summer in the broadcast fashion that then prevailed, but now that tows are moving regularly and loading dispatch is almost instantaneous the barges are making trips must faster than the coal can be used or stored. The result is an accumulation of barges at points like Providence with some very heavy bills for somebody to pay. As previously reported, the best obtainable price on some of this distress coal is a figure less than the f. o. b. level at Hampton Roads, wiping out the $3 or more freight which the barge owners collect. There are likely to be still heavier losses if shippers continue to load transportation that consignees are not in position to receive.

The railroads are taking only small tonnages of supply coal. Aside from a limited movement in railroad-owned barges from Port Reading, N. J., most of the railroad fuel now coming forward is shipped all-rail with almost no new purchases. Operators are doing their best to encourage buying by the railroads, some very lower prices having been rumored. It is said that $1.70 per net ton has been quoted by producers in central Pennsylvania, but no one believes any comprehensive tonnage has been placed even at that low figure.

The number of operations closing down seems to increase each week. This is true in West Virginia, in central Pennsylvania, and in the Pittsburgh districts as well. Operators represented in this market report that they have enough contract business on their books but that the consignees are still unable to accept deliveries because of large stocks and poor business. The large mills of the American Writing Paper Co., at Holyoke, Mass., are running on about a 25 per cent. basis, so little demand is there for their output. Certainly there has seldom been a season when coal conditions were so absolutely dull at Hampton Roads and at New York, where there have been practically no sales of certain grades for weeks at a time. And there is not likely to be inquiry from this territory until buyers are given some assurance that shipping and other difficulties will be straightened out.

All-rail there is a little better demand for spot coal, but it is partly induced by low prices. In any case the improvement is very slight, and is confined to scattering sales to small consumers whose storage was too small last year to load up to the extent that was true of others.

One of the results of the removal of zone restrictions is the reappearance of Georges Creek in this market. The price, $3.50 f.o.b. mines per net ton, is so high, however, that it is being bought only in car lots for forge purposes.

Anthracite—It is now intimated that the program is to make no reduction this year on domestic sizes. In other words, instead of the usual 50c. drop Apr. 1, the plan is to continue the present price basis until May 1, when the price will begin advancing 10c. per month until the maximum is reached in September. The advertisements last week throughout this part of the country were understood to be part of a campaign to prepare the public for such an advance, the farewell address of the U. S. Fuel Administrator being liberally quoted in support of the operators' views. There is a distinct feeling among the trade that prices are too high and cannot be made to prevail without widespread criticism. There is a feeling also that too much reliance has been placed in cost estimates submitted by small independent operators who in normal years have not been able to put coal on the market in competition with interests in better position to produce coal at medium cost. In other words, there has seemed to be a disposition to lift the price so that any operator could mine coal at a profit whether his particular output was necessary to the market or not.

Inquiry for anthracite is very light. The mild weather has affected retail demand, and householders will buy only from hand-to-mouth, there is much faith that prices are bound to be lower. Straight cargoes of stove or chestnut are now easily to be had and practically every shipper is hard at work soliciting orders, although with very little success.

NEW YORK

Local situation dull and buying is restricted to actual needs. Conditions are unequaled. Coal in oversupply at time of heaviest consumption. Trade looks for change in prices either up or down. Anthracite may be pooled. Bituminous situation quiet. Plenty of coal and many loaded boats in the harbor. Concessions heard of. Operators urge shippers to sell stocks.

Anthracite—The situation here is without an outstanding feature. Buying is restricted to actual needs and as a result there is an over-abundance of coal of all sizes to be had. Conditions have never been equaled. During what is generally the best month of coal consumption there is an oversupply, very little movement and many mines either closed down or their operations curtailed. The suspension of operations is not confined entirely to the Independents, but many of the collieries of the larger operators are also affected.

Reports from the coal regions indicate an increasing amount of dissatisfaction due to the lack of work, many workers grumbling because of the reduced earnings and the H. C. of L. Replying to this complaint the operators only have to point to the lack of demand and the present supply of coal.

There is no such thing as the 75c. differential between Company and Individual coals. Shippers of the latter product are willing to dispose of their holdings at the Company schedule, but even at that they find their work cut out for them. It was reported that sales of domestic sizes have been made at 20c. per ton below the Company schedule.

The trade was interested in the publication, as an advertisement in the daily newspapers last week, of Dr. Garfield's statement made at the time he issued his order removing the restrictions over the coal industry. It felt that it meant an increase in prices, and while no announcement has come from the operators, it is the belief among the trade that the present schedule will remain in effect until Apr. 1, and that the usual monthly increase of 10c. per ton per month for five months will follow.

There are some coalmen, however, who frown upon any intimation of an advance, claiming that the present is no opportune time to increase the price of coal to the public. They say that many things can happen between now and Apr. 1 and that the situation will be governed entirely by the law of supply and demand.

The sentiment for the formation of a pooling arrangement for anthracite similar to that for the pooling of bituminous is said to be growing. Many wholesalers believe that some such arrangement must be made to avoid the heavy demurrage charges which have and will continue to accrue.

Consumers are not expected to buy heavily under present conditions. Most all have enough coal to last them from six to eight weeks, and as they expect the usual spring discount are not placing any new orders. Local dealers have more coal in their yards than at any other period during the past year, and instead of accepting deliveries are cancelling orders.

There is no improvement in the steam-coal sitaution. The cut in production has naturally reduced the output and the docks are not as well stocked as they were a couple of weeks back. Considerable variation of quotations for the three sizes has been heard, much depending upon the quality of the coal. The better grades of buckwheat have been held at from $2.50 to $2.70 at the mine, and the cheaper coals from 20c. to 30c. less. Quotations on rice coal are generally about 50c. lower than those on buckwheat.

The dullness of the market is reflected in the dumpings of anthracite reported for the week ended Feb. 14, when 3429 cars were dumped as against 5014 cars the week previous, a decrease of 1785 cars.

The retail situation is quiet. Many dealers having a family trade almost exclusively have hardly anything to do and their drivers are consequently idle. Many of the dealers in Brooklyn are circularizing their customers, offering to deliver to them the balance of their undelivered order placed with the Fuel Administration last spring.

Bituminous—The situation is quiet. Inquiries have fallen off and shippers with coal coming forward are wondering what is to become of it. There is practically no demand and buyers are generally able to receive quotations considerably below what they paid for coal a couple of months back.

Conditions are such that local concerns are being urged by operators to dispose of coal either here or on its way. Market conditions have not been satisfactory for some weeks, and it is as difficult now to dispose of coal as at any previous time. Buying stopped suddenly and the market was caught unprepared. There was more than enough coal here to take care of current needs, to say nothing of the quantity on its way from the mines. Wholesalers found themselves overburdened with supplies and no place to put the coal.

In addition economic conditions had intervened and factories using thousands of tons began to reduce their working hours, consequently deliveries were reduced with the result that where these factories a couple of months ago had from two to three months' coal supply on hand they now have from four to five months.

There is no market, and with the coal piling up at the piers dealers have had to force the coal on the market at reduced prices in order to save demurrage charges. The harbor is filled with loaded boats, and these cargoes have been let go at heavy concessions, according to report.

Wholesale dealers do not look for a brisk water trade for the next couple of months, or at least until there is a settlement of the labor troubles between the boat-owners and their employees. Should the latter secure a wage increase and a reduction of working hours it will naturally result in

an advance in boat rates, which will cause many dealers who can do so to order their coal sent by rail.

The local ports have been under embargo at one time or another, for the past month. Dumpings for the week ended Feb. 14 show that 5624 cars of bituminous coal were dumped as compared with 6779 cars the previous week, a decrease of 1155 cars.

There are many inquiries regarding contracts, but so far nothing definite has been done regarding price although it is said some quotations indicate prices around $3.50 for the high grade coals.

A continued curtailing of production for the next several weeks is expected to rid the market of much of the surplus coal now on hand, and it is hoped the situation will be healthy with better prices.

Quotations on high-grade coals ranged during the week from $2.50 to $2.75 at the mines, with the cheaper grades from 50c. to 75c. lower.

PHILADELPHIA

Anthracite market dull and unsatisfactory. Production is curtailed and efforts being made to prevent market from becoming overstocked. Mine workers want more work, but realize there is no demand. No immediate change expected in prices. Bituminous situation quiet. Operators curtail production and prevent heavy cuts in prices. Contract making being considered.

Anthracite—Conditions here are serious. Demand has tumbled, and there is more than enough coal on hand to meet all requirements for several weeks to come. To meet this depression the operators have placed most of the mines on a three-day-a-week basis, and it is said many of the smaller operations are not doing as well as that.

Reports from the coal regions are disquieting. Many of the workers believe there is no necessity for the present suspension of operations, and with their present earnings they find it difficult to maintain their families. However, everyone knows that the market is overstocked and that the only solution of the difficulty is a cut in mining.

Wholesale dealers have received many cancellations of orders as a result of present conditions. There has been a disappearance of the 75c. differential between Company and so-called Independent coals, but even this does not help to reduce the stocks. Retail dealers report a heavy depression with no prospects of better business ahead for several weeks to come.

Opinion regarding future prices is divided. There are many who look for no change until May 1, when they believe there will be an advance of 10c. per ton per month for five months, while there are others who expect the usual spring discount of 50c. per ton on Apr. 1. This latter report is also current in the mining fields.

The supply of steam sizes does not increase owing to the cut in production, but there is an abundant supply and quotations are easy.

Bituminous—The local situation is far from satisfactory. The market is not overstocked as is the case in other localities, but there is more than sufficient coal to meet all current requirements. While there are many reports of coal being sold at prices that will not pay the cost of production, they have not been verified and, if true, are few and far between. Operators realize that to do so would be a losing venture and one that would not pay.

There has not been a heavy cut in prices here, the trade preferring to keep the coal at the mines rather than have it sent to this market to await buyers. This procedure is likely to be followed until the market strengthens and there is a better demand. This is not expected to happen, however, for a couple of months, as most of the factories dependent upon this market have filled bins, large heaps of coal in their yards.

The matter of contract making for the next coal year is being given some attention. There have been many inquiries but little if any signing up to this time. Operators are not inclined to be hasty in closing deals for their output with the market in its present unsteady condition, while consumers believe they will be able to do better by waiting than to close up at the suggested prices. While no definite announcement has been made it is understood that the prevailing quotation on contracts is around $3.50 for the high-grade coals.

Reports from inland are to the effect that there is an abundance of coals in the various factory yards, most of it having been bought at the full Government price. As in other sections, some of this coal is being transferred to factories not so well supplied but which are under the same ownership. Until this high-priced coal is consumed salesmen fail to see much opportunity for further business.

C. H. Markham, Regional Director for the Allegheny Region, in his report for 1918 to W. G. McAdoo, Director General of Railroads, states that during December of last year anthracite coal loading increased 1456 cars, or 2.9 per cent.; bituminous loading increased 35,944 cars, or 17.7 per cent.; and all coal loading increased 37,400 cars, or 14.8 per cent., as compared with December of 1917.

Mr. Markham's jurisdiction includes the terminals on the New Jersey side of the North River, as well as the lower ports supplying the New York market. His headquarters is in Philadelphia.

Continuing his report Mr. Markham says that during December of last year tidewater coal dumped was 2,158,490 tons, an increase of 471,117 tons, or 21.8 per cent., as compared with the previous December.

BALTIMORE

Soft coal market still overstocked. Government control still remains, and brings Tidewater Exchange problems. Hard coal offered by mines on company mine-price basis.

Bituminous—Every pier approach, every line siding and all approaches generally by rail to the city show a big run of soft coal for this section. That the market is overstocked is undoubted. Prices in many cases have been still further cut. Some handlers say that they are getting some business but could handle much more; others say frankly that things are bad and that it is not now so much a question of price as it is to get someone to absorb the fuel that is here or urgently offering from producing points where the upkeep of organization at mines is essential.

The Shipping Board has recently found itself hampered by a great amount of coal that it could not handily absorb, and the ordinary shippers' business at the piers was further blocked by this Government department insisting that some incoming ships which might have taken outside fuel receive only the Government owned coals aboard.

The trade just now is discussing rather warmly the question of the Government dropping the last vestiges of control over the fuel industry. In this connection interest will be centered for a time in any possible action to follow the meeting in Washington recently of the Government Tidewater Exchange officials and prominent shippers of coal. Some warm opinions are understood to have been expressed in Washington during the meeting. The Lakes are said to be especially hot over some alleged inequalities, and at this point, while some shippers express satisfaction with demurrage apportionment, there are handlers of coal who have some kicks to register. It may be stated that with the recent congestion here a number of shippers are uneasy over the prospective size of demurrage bills with the coming month.

Anthracite—The hard coal trade here is still purchasing cautiously. Prices have not been cut here as in Philadelphia and Boston. Dealers here have always claimed that the margin of profit was too small under Government dictation. Meanwhile mines, irrespective of whether they are company owned or independent, are offering coal at the company schedule. There is more than enough coal running already than is called for by consumers. Only by forcing deliveries to the utmost through telephone call urgings, etc., is the trade prevented from accumulating a dangerous surplus in these times of high-priced coal.

Lake Markets

PITTSBURGH

Production below 30 per cent. capacity. Fairly steady market on regular lots, with demurrage coal at great sacrifices.

The Pittsburgh district coal market is almost absolutely dead. Demand is of almost negligible proportions, as to new buying, while nearly all contract shipments are greatly reduced, partly because consumers require less coal than formerly and partly because they are using up stocks. Production in the Pittsburgh district, which dropped to about 30 per cent. of capacity two or three weeks ago, is now at a somewhat lower rate still. Many mines are closed entirely while practically none are operating at capacity.

Leading operators are making a strong effort to maintain prices, but there are many producers who would cut prices if it were possible thereby to obtain an efficient operation; so little tonnage is to be sold by cutting prices, however, that there is no general disposition to do so. The really low prices that are made in the market are on coal that by one mischance or another is loaded and must be moved to avoid demurrage. Such coal has been dumped on the market at $1.50 or possibly less. Apart from such coal the market is fairly well maintained. On high grade gas and by-product coal prices are relatively stiff at about the old Government level of $2.35 for mine-run. An effort is made to maintain circular prices on contracts, circular prices being based on $2.50 for mine-run, but hardly any business has been done on this basis. A few contracts have been put through for high grade ¾-in. gas coal for the twelvemonth beginning Apr. 1 at $2.60. Apart from low prices done on emergency sales of coal loaded on track the market is quotable at $2.20@2.35 for mine-run and $2.35@2.60 for ¾-in. gas, per net ton at mine, Pittsburgh district.

There is much unrest among miners, and it is recognized that any effort to reduce wages would probably precipitate a great deal of trouble. At the moment miners are relatively contented to be idle, but their funds are not large and there may be discontent on the score of idleness. The union is rich, but it is very doubtful whether any funds would be used to support miners in idleness, unless resulting from a regular strike.

BUFFALO

Still a coal surplus. Anthracite about as much in excess as bituminous. No spring contracts in sight.

Bituminous—The coal situation does not change materially. Shippers say that the surplus is as evident a ever, and they see no return yet of the looked-for increase in consumption that is to reduce the supply and bring about an active market. Till that takes place there is not much use of looking for relief. All that can be done is to sell as much coal as possible, and when the consumer will buy no more the mines must close.

It is coming pretty close to spring, but there is little said of the usual contract period. Nobody knows what to do about it. When there was talk of advertising for waterworks coal, the largest city contract, it was said that shippers would not dare to make figures lower than the going price. Maybe that is why no bids have been asked for.

Anthracite—The trade is not going to pick up till the weather is colder, for the season is so far advanced that it is a strictly weather market from now on. From all sides come reports of more coal than is needed. Anthracite is on demurrage in Montreal, and the upper lakes are expected to be obliged to carry over a large amount of last summer's lake shipments.

Buffalo is said not to have much of a supply on hand, but that is only because nobody feels uneasy over the situation. All that the consumer is anxious about now is whether the operators are going to be allowed to advance the price. Anthracite at $10 a ton and bituminous about half that price seems out of proportion, the consumers think.

CLEVELAND

Bituminous is moving into this district at about 30 per cent. of normal. This is by design and represents the efforts of operators to keep production apace with demand. The last Government maximum prices continue to rule on all standard grades. Anthracite supplies now are in excess of the demand. Some Pocahontas is beginning to come in.

Bituminous—Southern and eastern Ohio mines are now being operated on approximately a 40 per cent. schedule, while receipts in Cleveland and the northern Ohio industrial district are about 30 per cent. of normal. This briefly tells the story of bituminous here, and gives evidence of what success operators have had in restraining efforts to force a situation that apparently cannot be forced. Operators are adhering to their platform that they will close rather than operate a a loss. While coal to the west has been advanced, $2.35 continues the mine-run quotation here. As operations at the mines grow smaller, car-service coal becomes scarcer, and concessions from the $2.35 price fewer.

The situation at Ohio mines is reported fast approaching a serious state. John Moore, president of the Ohio Mine Workers is authority for the statement that 15,000 coal miners in Ohio have not worked one day since New Year, while 30,000 have worked less than half of the time.

The retail market, like the steam-coal one, seems past all human help. One cold day is succeeded by three warm ones. Pocahontas is beginning to dribble in, but no insistent demand for it has come to the surface. Retail dealers are resigned to a summer business the remainder of this winter and all of next summer.

Anthracite—The present supply is more than ample to meet all needs, and competition for business is sharp. Stove and furnace grades are now equally plentiful.

Lake Trade—Lake coal shippers and the upper lake dock interests must make a strenuous fight to convince the Railroad Administration of the necessity of relaxing upon demurrage regulations in order to make possible abandonment of the Great Lakes coal pool, it now becomes apparent. A conference with the railroad officials at New York proved unsatisfactory, and a further meeting is to be held soon at Washington. The pool is much to the liking of the railroads, from an operating standpoint, and all of the decisions of the coal interests to resume individual shipping will be of no avail unless the administration eases up on its demurrage rules.

Early cargoes will not be in demand in the spring, as the docks at the head of the lakes still carry unusually large piles. In January only 20,430 carloads were moved off the Duluth-Superior docks, as against 30,123 in January, 1918, and 30,707 in January, 1917. Some shippers are figuring on early cargoes, though price will not be generally talked until after Apr. 1. One of the loading machines at Ashtabula, Ohio, is being put in shape and will be ready next week.

DETROIT

Little stimulus appears to have been imparted to the Detroit market for bituminous by removal of the Federal zone and price restrictions.

Bituminous—No marked improvement in the market for bituminous coal in Detroit is reported to have followed the termination of Fuel Administration zone regulations and price control. The reason, according to jobbers, is that the local situation is abnormal, due to the magnitude of stocks of coal in yards of retail dealers and in storage piles of the steam plants. Reduction of these excessive stocks proceeds slowly in the case of both classes of buyers.

Besides having their yards crowded with bituminous coal, a great deal of which is of low quality and in a form their customers don't want, the retailers are finding their business is curtailed by the competition of a better grade of stock now reaching the market, and the attempt of household consumers to end the use of bituminous as speedily as possible, since Government regulations no longer compel their acceptance of a fuel that they find undesirable in heating plants designed for use of anthracite.

Anthracite—Slight improvement in supply of anthracite is reported by some of the dealers. Because of the continuance of moderate temperatures consumption has fallen short of expectations and quite a large proportion of the retailers appear to have stocks of anthracite. Several are advertising ability to supply all domestic requirements in any size of anthracite. The plentiful coke supply also is a factor in easing strain on anthracite. There are indications of higher prices on some sizes.

COLUMBUS

The coal trade in Ohio continues quiet in every respect. Warm weather has curtailed domestic demand. Steam trade is small, as surplus stocks are still heavy. Prices are fairly well maintained.

Quietude characterizes the coal trade in Ohio territory. Owing to the continued warm weather there is little demand for domestic grades. Retail stocks are sufficient to take care of current needs, and dealers have not been forced to replenish their stocks to any extent. There is still a limited demand for Pocahontas and other fancy grades, but since the raising of the zone regulations those grades are moving without hindrance. The tone of the market is not good and there is no immediate prospect for betterment according to producers and shippers.

In the steam trade more inquiries have been received, indicating a more optimistic feeling generally. Some of these inquiries have developed into orders, but the movement is rather restricted. A canvass of the situation shows that large consumers still have heavy surplus stocks and it is their policy to consume the greater part of these surpluses before ordering more. Manufacturers are slow in getting on a peace basis and thus their fuel requirements are not large. Railroads are not buying to any extent although their orders are larger than was the case several weeks ago. Railroads are still trying to buy below the Government levels and some tonnage is moving at reduced prices. But generally speaking the larger operators are holding up on price and the market is not demoralized.

Domestic stocks are large. Householders who put in their fuel stocks last summer and fall will in many instances carry over some into next winter. This is one of the bad features as it indicates a rather slow domestic demand during the summer months. Retail prices are fairly well maintained as the larger producers and distributors are not cutting. It is realized that lower prices would not stimulate trade and there is not much desire to do business at a loss.

CINCINNATI

Colder weather is drawing upon retailers' and consumers' stocks and making room for further deliveries. Prospects for Western business improving in consequence.

The heaviest snowfall of the winter in this section occurred last week, accompanied by colder weather than has prevailed for some time. This combination has materially stimulated consumption. Retailers report a better demand for coal, especially in one- and two-ton lots, and it is believed that a continuance of cold weather will go far toward reducing the accumulated stocks in the hands of dealers and consumers.

Aside from the local situation the interest of the trade is turned toward the West, where efforts are to be renewed for the sale of coal for the coming season. An unusual indication of the extent to which the general distribution of coal along highly competitive lines is to be the rule was a large advertisement appearing in local papers last week on behalf of anthracite coal. The advertisement recounted briefly the effect of Fuel Administration action upon the distribution of anthracite, and stated that hard coal is now available for general distribution everywhere, at reasonable prices. As this fuel has never had more than an insignificant sale in Cincinnati, not to mention the rest of the Middle West, aggressive sales efforts on its behalf may afford some evidence of the way operators are going after business, especially where they are accustomed to handling it.

LOUISVILLE

Colder weather and snow improve feeling somewhat. Fair demand for domestic continues at high levels. Steam coals draggy and hard to dispose of.

More nearly winter weather during the past few days has encouraged the trade somewhat, but retail movement continues dull, with the trade buying from hand to mouth and carrying little domestic stock on hand as deliveries can be secured quickly and the average retailer is playing safe on the market.

A few retailers have been running a little low and have been rushing in orders for a few cars here and there, but the demand is not heavy. Domestic is generally keeping the operators busy on a two- to three-day running basis, but even on this small time they are having trouble in disposing of resulting fine screenings, nut and slack, etc. Prices for domestic are running 15c. to 40c. a ton higher than when regulations were lifted, while nut and slack are off 15c. to 20c. a ton average, and much more in some instances. Egg and 4-in. mine-run are in fair demand.

Many operators believe that there will be a good demand for steam within a short time as some of the overstocked industries will shortly begin running low, and rail buying should start again, while the export situation looks better. However, with an increased demand for all grades of steam, operators in many instances are figuring on a hard time in disposing of domestic coal, as not much early stocking is expected.

Retailers are generally well fixed financially this year, due to short-time credits and a preponderance of cash business. Some retailers have little money out on 1918 coal deliveries, and are in position to take discounts. However, collections are nothing like as good as they were, due to a general fight for business, resulting in bars being lifted. The operators are no longer shipping any volume of coal on a sight draft basis, as there are too many who are willing to ship on almost any kind of basis, with the result that collections have dropped off materially.

BIRMINGHAM

Steam market sluggish, with little spot business offered. Some accumulation of low and unprepared grades. Domestic demand good, there being a shortage in supply. Larger mines operating full time, while operations at the smaller ones is rather unsteady.

There is a decided weakness in the local steam coal market and the volume of spot trade is small, buying being confined to the better grades of fuel and to current requirements of consumers. There is some accumulation of Big Seam and similar grades, though not sufficient tonnage to have any weight on market conditions, as operators as a whole are holding their output to the approximate requirements of the trade. Contract users are in most cases taking the minimum tonnage stipulated in their agreements with the mines, while there are some cancellations and hold-ups on open business. However, there is no voicing of pessimism in coal circles and the future of the trade is viewed with calmness and confidence. Price schedules closely approximate the Government figures as of Jan. 31 and are firm, quotations being as follows f.o.b. mines:

	Mine-Run	Prepared Sizes	Slack and Screenings
Big Seam	$2.45	$2.75	$2.40
Black Creek and Cahaba	3.45	3.75	3.05
Pratt, Corona, Jagger	2.85	3.05	2.45

The domestic trade is strong and receipts considerably below requirements, all the better grades showing an advance since Feb. 1. Quotations are as follows:

	Lump and Nut
Black Creek	$4.50
Corona	3.65@3.75
Jagger	3.50
Montevallo	5.00
Cahaba	4.50

The mines of furnace producing companies are operating steadily, as are also most of the commercial mines, there being some loss of time at small operations depending almost entirely on the demands of the spot trade.

Coke

CONNELLSVILLE

Market soft. Further contract readjustment. Continually decreasing production.

The coke market is very soft. Operators have been making an effort in the past few weeks to curtail production in keeping with decreasing requirements of blast furnaces, but have been uniformly a lap or two behind, so that limited tonnages of coke have had to be dumped on the market, having been loaded without a destination. Such coke has been available down to $4.50 and $4.25, and some of the $4.50 coke is probably of altogether standard quality. On the other hand operators would hardly sell coke still to be made at less than $5 for furnace grade. Standard brands of foundry coke are held at $6 and some sales are being made at this figure. Generally speaking the spot and prompt market may be quoted at $4.50@5 for furnace and $6 for foundry, per net ton at ovens.

As already reported, the majority of contracts that called for negotiation as to price in the event of Government control coming off have been adjusted so that February shipments are billed at $5.50. Some adjustments, it appears, were made at close to $5. As to contracts that called for "last Government price," the pressure of furnacemen has been such that the operators quite generally have revised such contracts, to a level of about $5, this adjustment to be not specifically for the month of February but rather to stand until conditions change further. From the present outlook it is quite possible that further downward readjustments may eventually be made.

The outlook for Connellsville coke is that it will sell at no more than the cost of coking, after the coal has been priced at the market value, profit to operators being entirely on the coal. Byproduct ovens will naturally run full as they can convert the coal at less cost than the beehive ovens. Standard grades of byproduct coal are worth about $2.35 at present, which on a two-thirds yield makes about $3.50 for the value of coal used in making a ton of Connellsville coke. The coking operation, without overhead, will run considerably under $1, so that eventually the coke market is likely to be $4.50 or less, and considerably less in case the value of coal declines.

Buffalo—The trade sympathizes with coal, though the prices of the higher grades have not suffered much. The chief difficulty is that the furnaces are not buying at all liberally, as they have a big supply ahead of them. The byproduct ovens here are pretty busy, though they are not able to dispose of all their off grades and breeze, and are obliged to stock some of it. The furnaces insist on what was Government price for what they sell, which is $9.60 for 72-hour foundry, f.o.b here.

Middle Western

GENERAL REVIEW

Market conditions still inactive. High grade coals maintain price. Railroad fuel question still unsettled. No improvement in market expected until peace is signed and industry resumes full operation.

The coal markets of the Middle West continue inactive, with little coal produced and less sold. The market has had an opportunity to adjust itself to conditions brought about by the abolishing of the zones, and it is surprising to note how well prices are being maintained. All of the high-class coals from Illinois and Indiana are selling at the previous Government prices or higher. The poorer grade coals continue to be sold at a discount, which is no more than just.

The question of railroad fuel continues to drag, greatly to the dissatisfaction of the operators. It is the general opinion in coal-mining circles that the railroads and the politicians are getting together to beat down the price of coal. In view of the fact that the coal industry made an enviable record during the war, and by considerable sacrifice contributed in no small way to the successful culmination of the war, the operators almost as a unit feel that they are being ill used. They have no desire to become the pawns in a political game of chess, in spite of the best efforts of certain altruistic gentlemen in Washington.

All demand for steam coal is at a full stop, not so much because storage piles are being used, but because manufacturing of all kinds is practically at a standstill in the Middle West. Factories are closing down daily, with prospects of more inactivity in the near future. Coal men are looking for no radical change in this general condition until peace is signed and the authorities at Washington indicate to the nation what to expect.

Two large steam-coal contracts have been awarded in this territory in the last week. Both contracts were for military camps, and the combined tonnage was possibly 75,000 to 100,000 tons. It is said that some of the bids were below the last Government figures, and that the parties awarded the business cut the price. This, perhaps, is another indication that the Government is interested in price rather than quality.

The domestic situation is a little better than heretofore, except in Chicago. Throughout Illinois, Indiana, Wisconsin, Iowa and Michigan reports have come in that the retailers are once more buying. They are very careful, however, to purchase only the best to be had. The increase in price, affecting all high-grade coal from West Virginia, Indiana and Illinois, is making little difference to the trade. The dealers who are accustomed to furnishing their trade with the best are paying the price, while the others are continuing to purchase any off-grade bargain that is offered at a cut price. It is a gratifying fact, however, that the demand for good coals at a fair price, is far in excess of the demand for poor coal at a cut price.

CHICAGO

Little domestic demand owing to mild weather. Owners of storage piles anxious to get rid of them. Steam-coal demand inactive.

Chicago has been enjoying its usual bracing spring weather. One domestic dealer on the North Side reports an adventurous dandelion growing in his coal yard. This will serve to convey to the reader that there is little domestic coal moving in Chicago.

An unfortunate situation has arisen as an aftermath to the Fuel Administration's reign. There are many yards in the city that have on hand huge piles of Illinois and Indiana lump and mine-run. This coal has been in storage since last spring, or since last summer, and as a consequence is deteriorating very rapidly. As a result, the owners of this coal have been doing everything possible toward moving this storage; in fact, it was reported that some quotations on storage coal were made on a basis of $2.50 on mine-run delivered. This represents a loss of at least $3 per ton to the dealer, and it shows how anxious those who have stock piles are to get rid of them.

The steam-coal market continues inactive in the extreme, as the general lax manufacturing situation is as true of Chicago as of the surrounding territory.

MILWAUKEE

Coal trade continues lifeless. Little demand from city or country. Prices are maintained. Pocahontas mine-run reappears.

The coal trade at Milwaukee continues lifeless and discouraging to those having large stocks on hand. The month of February is usually a fuel-eater, but it is half gone and the cold wave flag has not been displayed as yet. The demand from local consumers is very light, and there are practically no calls from the country. More Illinois coal than usual was sent to the interior of Wisconsin during the past summer, and much of these stocks still remain. This lets lake dock men out of the game at present. The same conditions exist at Manitowoc and Sheboygan. Prices are maintained, however. One yard is advertising anthracite received by rail at the same price as lake coal. Bituminous egg and nut is held by the same yard at $7, with a charge of 50c. per ton for carrying in. This is a little under what other yards are charging for Eastern soft coal. Pocahontas mine-run has appeared in the market. It is held at $8.15. No other grades of the coal are offered, however. Leading dealers hold that there will be no cut in prices because of the present situation, and even intimate that an advance in anthracite might yet be necessary. Everything is being done to stiffen the morale of the trade, upon which the future of the remainder of the season's stock piles seemingly rests.

ST. LOUIS

Market continues quiet and sluggish. Coal selling below cost under forced conditions. Cars plentiful, movement good and much dissatisfaction at the mines on account of no work.

In the Standard field some mines have had screenings on hand for over a month, and several mines have not worked for over two weeks on account of the surplus of steam sizes. This condition is almost general throughout the Standard district and to some extent is also affecting the Mt. Olive district. Lump is moving fairly well because the tonnage of coal produced decreases gradually, but even at that there is no ready market for all the lump coal that is mined daily.

There is much dissatisfaction in the Standard field among the miners, who contend that they cannot exist under the present conditions. They do not understand why the operator should cut his price to the public when the cutting of the price does not sell any more coal; and if anything is to be given away, they figure that the miners should get more for the coal on account of their shorter working time and that coal should sell on the market for the Government maximum.

In the Mt. Olive field conditions are somewhat better, but also very unsatisfactory. The prices are holding up pretty well, but the coal is not moving and there is no market for it.

The tonnage in the St. Louis market is small. A fairly good tonnage continues to move north and the railroads are still taking some coal from this field.

In the Williamson and Franklin County district the mines are idle, as usual, on account of steam sizes; and some of them have not enough orders to keep them going on domestic sizes. The Franklin County field is solidly tied up on the $2.75 price for domestic sizes and operators feel that if they cannot get that they are going to stay idle.

In the Williamson County field just a few operators are asking the $2.75 price. The result is that the Franklin County operators are not working as steadily as the Williamson County independent operators, who are quoting from $2.35 to $2.55 for lump, egg and nut, with screenings as low as $1.70 to $1.80 and mine-run at $2. The independents seem to get pretty nearly full working time, but even at that every night shows their tracks occupied with cars of unbilled coal of all sizes.

The Du Quoin field is somewhat similar to the Williamson County field. Some of the operators are asking the $2.75 price, and others $2.55 and less, with no demand for the product.

The general condition throughout the St. Louis territory is not satisfactory on account of the Standard condition. If the Standard market was in better shape it would have a more wholesome effect on the whole situation.

Throughout the West it is expected that the tonnage of egg and grate will perhaps be decreased by one-half of what it formerly was the coming season, while the demand for stove and chestnut will pretty nearly measure up to past requirements.

There is everything to indicate that the price on coal in the West will have to be increased. One coal-carrying road spends $1.02 for every dollar that it takes in. There must be an increase in rates and coal will come first.

The anthracite operators have been advertising their predicament in the Western daily papers in such a way as to indicate that they must get more money on and after Apr. 1.

The present prevailing prices on retail coal in St. Louis are: Anthracite—grate and egg, $12.34; stove and chestnut, $12.60. Coke—Gashouse, $11.25; byproduct, $12.35. Bituminous—Carterville lump, egg and nut, $6; Mt. Olive lump, $5.25; Standard lump, $5.

The market here, with the exceptions as noted above, is as follows:

		Mt. Olive and Staunton	Standard
Franklin County:			
Prepared sizes (lump, egg, Nos. 1 and 2 nut)	$2.75	....	.....
Williamson County:			
Prepared sizes (lump, egg, nut)	$2.55	$2.55	(As noted
Mine-run	2.20	2.20	above)
Screenings	2.05	2.05	.....

Williamson-Franklin rate to St. Louis is $1.10; other rates, 95c.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Feb. 17, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	145	146
Burns Brothers, Pfd	(BB)	110	115½
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	36⅜	37
Colorado Fuel & Iron, Pfd	(CF)	99	....
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	25	30
Elk Horn Coal, Pfd	(EH)	39	47
Island Creek Coal, Com	(ICR)	39	47
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	46	46½
Pittsburgh Coal, Pfd	(PC)	85	86
Pond Creek Coal	(PD)	12½	13¾
Virginia Iron, Coal & Coke	(VK)	55	60

*Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd., 6s, 1922	90	....
Clearfield Bituminous Coal, 1st 4s, Ser. A., 1940	75	....
Colorado Fuel & Iron, Gen. 5s, 1943	90	91
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74	75
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87⅛	92
Grand River Coal & Coke, 1st 6s, 1919	....	....
Jefferson & Clearfield Coal & Iron, 2d Mtg. 5s, 1926	96	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	98	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s. Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	86½	89
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	87¼	90
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	81½	83
Tenn. Coal, Iron & R.R., gen. 5s, 1951	91	95½
Utah Fuel, 1st Sinking Fund, 5s, 1931	86¼	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	65	70
Virginia Iron, Coal & Coke 1st 5s, 1949	87	88½

COAL AGE

Volume 15 New York, February 27, 1919 Number 9

The Future of Coal Prices

By Floyd W. Parsons

IT IS foolish to anticipate that there will be any real lack of coal in the United States during the lives of people living today. But there is another side of the question that yearly becomes more important, and that is the growing scarcity of certain grades of coal that have been most in demand. It is a fact that in all lines of production initial output is obtained from the highest grade and most easily accessible sources of supply. So it is in coal mining. The best coals are fast disappearing, and lower grade fuels with higher mining costs are now being attacked.

Anthracite coal, which especially interests domestic consumers in the eastern part of the country, comprises only one-fifteenth of our total coal resources. It is hopeless to expect that any new deposits of anthracite will be found. Since 1807, when the Pennsylvania anthracite was first discovered, the producers of this kind of coal have mined approximately 3,000,000,000 tons. Although this large output of hard coal amounts to only one-sixth of the total deposits, the fact remains that the best seams of anthracite have been largely depleted, and operations are now in beds that are thinner and deeper.

Whereas it required 112 years to produce 3,000,000,000 tons of anthracite, we may figure that at the present rate of growth that same tonnage will be mined in less than 20 years. Furthermore, in getting 3,000,000,000 tons of coal out of the mine and into the hands of the consumer it is likely we destroy a couple of billion tons in the ground and elsewhere—a loss that is unavoidable. All this leads to a single conclusion — anthracite will never be cheaper and must of necessity be more expensive as time passes. There will be advances in the art of mining, and these improvements in methods and machinery will undoubtedly reduce costs; but all such savings will be more than counterbalanced by increases in wages, higher prices for supplies and greater mining charges due to working less favorable seams.

Let us therefore, dismiss anthracite from our calculations and devote attention to bituminous coal.

Geologists tell us that in the United States we have about thirteen hundred and fifty billion tons of bituminous and semi-bituminous coal; of these huge reserves we have mined about thirteen billion tons and wasted at last 50 per cent. as much. In the face of such large resources this total exhaustion of less than twenty billion tons seems hardly worth noticing, but here is the trouble: Of our total bituminous deposits less than 5 per cent. contain coals that are today regarded as high-class fuel, and it is this better grade coal we have been mining.

Already in many parts of the United States there is an apparent scarcity of high-grade fuel. As time passes this shortage in special coals will become more acute, and will be felt in fullest force in the middle and northern Atlantic States. A great many people overlook the fact that 45 per cent. of our population inhabits 11 per cent. of our area. In New England, New York, New Jersey and Pennsylvania there are eleven times as many people on each square mile as there are in the West. In this congested eastern region, there are 700 people for every mile of railroad, while in the West there are only 252. Of all the manufactured goods produced in the United States nearly 70 per cent. originates in this small eastern area.

The industrial development of America is far from being uniform. The result is that we have a small eastern territory buzzing with business activity and entirely lacking in any native supply of coal. Furthermore, this congested region has no oil or natural gas and possesses only limited water-power.

The great cry on the part of coal consumers is for the best obtainable fuel, since it is well known that high-grade coals purchased at a reasonable price are most economical. Furthermore, various plants such as those serving utility corporations and gas companies have been built and adjusted to the use of only the best grades of coal. In order to burn lower-grade fuels many such plants must undergo modifications.

Very few districts producing high-class coal are close enough to be of use to consumers in the overcrowded middle and north Atlantic States. Even what coal is available is held in large part by great corporations. Slowly but surely the small consumer is commencing to grasp the situation. He has found that although Kentucky and southern West Virginia contain large supplies of the kind of coal he desires, the freight rates on tonnage from these southern fields are so high that the coals cannot be brought in by rail.

Practically the only available deposits of high-grade steam coal lying within reach of the Philadelphia and New York markets are in Cambria, Indiana and Somerset counties in Pennsylvania. Even in these few districts the undeveloped tracts are limited in area and will be rather difficult to develop, due to the thinness and depth of most of the seams. The situation in regard to gas and byproduct coals is even less favorable so far as the large eastern markets are concerned. West Virginia contains a large supply of these coals, but freight rates again render these southern fields quite inaccessible. Only a few small areas of gas and byproduct coals are available to the New York and Philadelphia markets, and these lie in Pennsylvania.

Each year now witnesses the exhaustion of a number of high-grade coal areas. Far more mines producing better grade coals are being worked out than there are new mines commencing to produce. Many investigators have reached the conclusion that the tonnage of high-grade coal shipped from the low

freight-rate territory into the Atlantic seaboard markets will not be increased beyond its present volume. These authorities expect a decrease in the shipments of such coal and anticipate that the markets will have to be satisfied with a substitute in the way of lower-grade fuel. The only other solution is that consumers will have to pay higher freight rates, thereby bringing in coal from more distant fields.

The coal industry, like every other great business, has developed through a series of stages. Only a few years have passed since there was practically no market for the low-grade coals. Up until recently there has always been an overabundance of fuel. The industry has been the field of bitter competition, with the result that prices have averaged low and profits nil. Furthermore, the consumption of coal in tons per capita has increased much more rapidly than has population. In 1850 the average consumption of soft coal for each person in the United States was only 0.12 ton. In 1880 the consumption had risen to 0.85 ton, while in 1900 it was 2.8 tons per capita. In 1910 the consumption had grown to 4.56 tons, while last year it had increased to 5.61 tons for each inhabitant.

It has only been a few years since the great markets in the vicinity of New York and Philadelphia were supplied with a splendid quality of coal which came from the Moshannon seam in Clearfield County, Pennsylvania. Now this famous bed is practically exhausted. A similar fate awaits the "Big Vein" in the Georges Creek region of Maryland. Forty per cent. of the original Connellsville Basin has been worked out. The well-known Irwin gas-coal field is about 70 per cent. gone. The same story may be told of other famous districts. All of this accounts for the fact that the prices of coal lands in all of the eastern fields have increased from two to four-fold during the last 15 years. In 1900 it was possible to lease a tract of high-grade coal by agreeing to pay a royalty of 10c. per ton. The same lease today would carry with it a royalty of from 20 to 40c. a ton.

Foreign Consumers Demand the Best

A further factor of great importance is the matter of enlarged coal exports. Combinations of strong interests are planning to materially increase our overseas shipments. The coals that will be included in such exports will come from our high-grade seams, for the cost of shipping a ton of coal averaging 12,000 B.t.u. is no less than the cost of shipping a coal running 14,000 or 15,000 B.t.u. Foreign consumers will demand the best we can give them, and this additional business is certain to further increase the scarcity of our best steam and gas coals. Another competitor of the domestic steam-coal consumer will be our enlarged mercantile marine.

Prior to the war Pennsylvania producers complained bitterly of the competition in New England of West Virginia operators. Such complaints have practically ceased. One of the dangers today is that freight rates from Virginia on water shipments are likely to be so high for the next few years that it will be necessary for consumers in New England to try and draw some of the high-grade coal they require from the limited Pennsylvania output.

In the matter of coal control the situation is far more stable than ever before. Only a few years ago there were from ten to fifty independent companies operating in each important coal district. Today the bulk of all the available steam coal in the East is in the hands of eleven companies. Four-fifths of the production of gas and coking coals is likewise controlled by fourteen large corporations. As for coke itself, 60 per cent. of the output in 1918 was produced by steel companies for their own use.

This centralization of ownership and control of our high-grade coal seams will not tend to reduce fuel prices. This fact alone is a boon to the industry and to the Nation, for although it may mean that consumers will pay slightly more to satisfy their fuel requirements, it also insures that mining will be conducted on a less hazardous basis through the installation of safety precautions and less coal will be wasted in the process of mining and marketing the product. In other words, centralization will do away with demoralization, and eventually the benefit will extend to the man who purchases the coal. Centralization has held down the price of anthracite coal and the same will be true in the bituminous situation.

Only One-Eighth of Shipments High Grade

The immense demand for coal during the period of the war brought on investigations that were sadly needed. For the first time in history coal men were obliged to carefully estimate their costs of production. Federal officials acting for the U. S. Fuel Administration made surveys of each and every producing field. This enabled them to classify all of our mines, grouping them according to the grade of coal they produced. These investigations showed more clearly than ever the scarcity of so-called steam and gas coals. In some pools less than 12 per cent. of the total shipments were of high-grade coal.

Coal mining differs from practically all of our other great industries. In farming the producer may bring science to his aid and replenish the fertility of his soil, insuring a continuation of good crops. Even in the matter of lumber it is possible for those engaged in the business to reforest worked-over areas. The coal producer has no such recourse and must be content to see his coal seam disappear for good and all. He must figure that his mine has a life of only 20 or 30 years, and during this time he must secure not only his profit, but regain his initial investment.

During the last twenty years the population of the United States has increased about 42 per cent. While this growth has taken place the output of coal has increased 172 per cent. The reason is that as civilization advances and mechanical means for doing things increases, the individual citizen has found more and still more uses for fuel. If the same comparative growth continues for 20 more years, the United States will have a population of 139,000,000 people, and the consumption of coal per capita will be approximately 10 tons yearly.

The outcome is plain and inevitable. Irrespective of temporary fluctuations, fuel prices will advance from year to year. What are known now as high-grade coals will disappear entirely. Seams that are now considered unminable will become valuable. Purchasers will buy coal exclusively on the basis of its heat values, and everyone will then understand that coal is not just coal, but that there is a wide difference in the varieties that are produced. Even today coals from West Virginia and Pennsylvania can be hauled by rail to Lake Erie, then shipped by vessel to Duluth and afterward hauled 500 miles inland and be sold successfully in direct competition with coals and lignites produced in the vicinity.

The coal industry is entering a new era, and those who are wise will not mistake the course of events.

Water Supply at Coal Mines

By CARL SCHOLZ
Chicago, Ill.

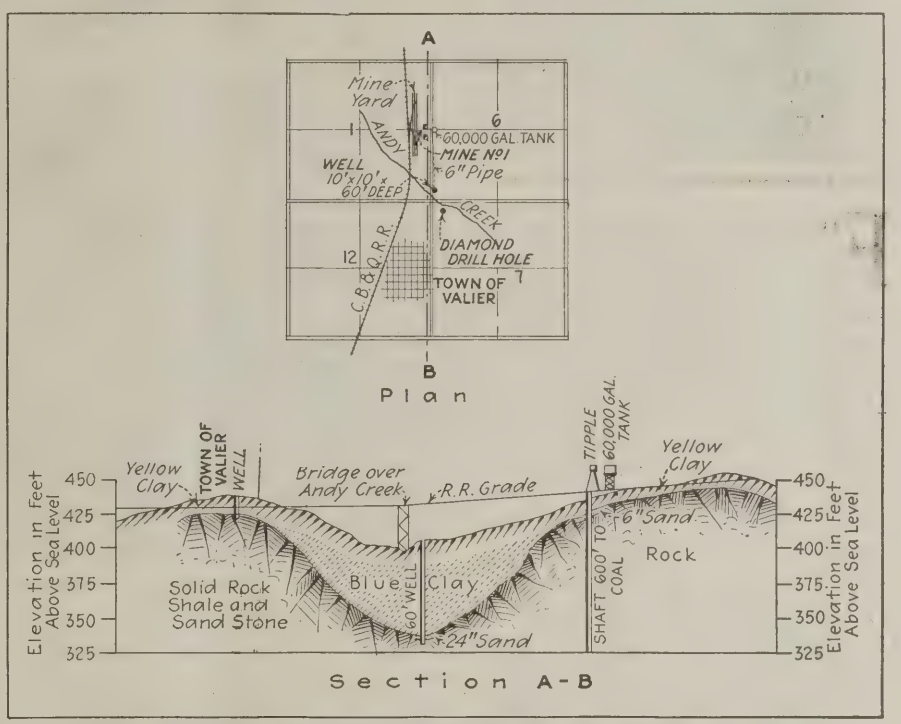
THE question of water supply at coal mines is an important one. Usually the water found in mines is not suitable for boiler or drinking purposes, and a supply for the operation of steam plants, for the washing of coal, and use in the wash- and changehouse must be obtained from some outside source.

In southern Illinois the water problem is unusually complicated because there are few springs, and the smaller streams cannot be depended upon for a constant supply. Surface reservoirs are subject to many difficulties, principally filling up by silt due to the heavy rains that carry sediment into them. The rate of evaporation, because of the climatic conditions, is high, and unless the watershed supplying the reservoir is properly cleaned and controlled by the coal company, the water becomes badly contaminated and is unfit for boiler purposes. The dams are subject to difficulties from muskrats, and usually a large expenditure is required for the purchase of the necessary land and pipe lines to carry the water to the required point. It has often become necessary for some of the railroads to haul five or six water trains per day during the dry season in order to keep the mines in operation.

In the case of the Valier Coal Co., the water question was carefully studied, even though the plant is operated by purchased electric power. Two sources were considered: First, the usual surface reservoir, a satisfactory site for which was found within a half mile of the mine; the second, a supply from quicksand beds which from the prospect drill holes were known to exist in the near vicinity. The estimates on the surface reservoir indicated an expense of some $30,000 for land, watershed and pipe lines, but to obviate this expense a test drill hole was put down a half mile from the mine where an old drill hole indicated several layers of quicksand about 60 ft. below the surface. In the accompanying illustration the mine is shown in the center of Section 1, the drill hole one-half mile south, and the town of Valier one mile south of the mine. Cross-section *A-B* shows the surface as well as the rock measures, as indicated from the drill hole in the northwest corner of Section 17 and the wells in town, and the shaft record. This shows that in days gone by Andy's Creek, which is now a small stream, eroded a valley nearly a mile wide and 100 ft. deep.

A 6-in. hole was drilled to the 24-in. layer of sand, and upon test this well produced 7 gal. of water per minute. It was estimated that if the size of the hole could be increased the flow would correspondingly become larger; this was proved by sinking a well 10 ft. square from which a supply of over 500,000 gal. of water per day can be obtained without lowering the water more than 50 ft. below the surface. While the well was quite dry until the 24-in. sand was struck, it filled up rapidly, and the water now rises nearly to the surface, indicating that the source of the water must be about as high as the surface is at the well location.

A deep well pump is now being installed so as to pump the water from the bottom of the well. A pressure tank has been erected at the mine on a 75-ft. substructure and a 6-in. cast-iron pipe laid from the well to the tank to insure an ample supply for fire protection and the needs of the washhouse. The maximum requirements of the coal company are about 50,000 gal. per day and the motor-driven pump controlled by a float switch insures the tank being filled to the top at all times.



LOCATION OF MINE, WELL, PIPE LINE AND TOWN OF VALIER

This pressure tank is high enough to also furnish the required head for fire protection to the town of Valier, and it is contemplated to extend the pipe line to the town for the convenience of employees and for fire protection. The pressure tank is connected with the discharge line of the mine pump so that by closing one valve and opening another, water under a 600 ft. head (approximately 250 lb. pressure per square inch) can be supplied to the mine pipe-line system, should it be needed in case of fire.

This simple solution of a vexing problem has suggested this article, which has been written with the hope that it may benefit others as it has this company.

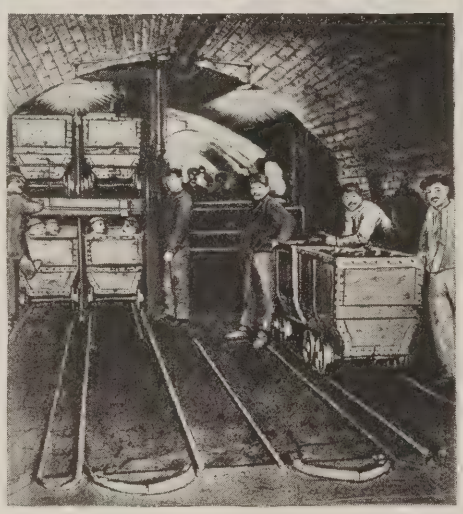
LENS

The Coal Field of France*

By Frank Haas—Consulting Engineer, Consolidation Coal Co. Fairmont, W.Va.







FRANCE is a proud and thrifty nation. It was her pride, her thrift and her national policy of defense that made her try to develop an independent source of fuel. Unfortunately, her resources in this respect were meager. What coal she had was in small areas widely separated, and these areas were shattered by faults and folds. The struggling industry, when finally established, was besieged by the producers of Germany, Great Britain and the United States. The Germans, on the east, produced the cheaper and perhaps better Westphalian coals. To the north, England (within what is now but a cannon shot of the shores of France) mined and marketed a great variety of coal. On the south, at the doors opening on the Mediterannean coast, the United States was presently knocking. But still the industry thrived, and it was of some magnitude when the war came and all but destroyed it.

One of the principal coal fields is in the Department of Pas de Calais, in northern France. The center of this field is Lens, which was recovered from the Germans during the last months of the war. At that time the newspapers made the public believe that the recovery of this coal field would be a great victory. I anticipated the disappointment when the truth would be learned. Knowing the great constructive skill of the Germans, I could not but imagine that their destructive skill was even greater; and to place such a vulnerable thing as a coal mine in their path meant that destruction would be complete.

Since the recovery engineers have examined these mines and reports have been made. From these we learn that the mines can be unwatered in two years and that normal production can be achieved in five years. These engineers admit that they have seen only the surface devastation, but with deep shafts (some of them through quicksand), with gaseous workings and all main headings driven through solid rock, with thin seams and treacherous roofs, too many opportunities presented themselves to enemies bent on villainous destruction; and in my opinion it will be many more years, perhaps several times five, before Lens and the surrounding basin will again give France its former output of eighteen million tons of coal a year.

Lens is only a small town, having a population of about 30,000, but it is situated in an important center for iron and steel foundries, engineering works and factories. There is nothing in the town to attract tourists, and outside of the manufacturing and mining activities it is much like many other towns of northern France. The neatness of the cottages and multitude of individual gardens attract particular attention.

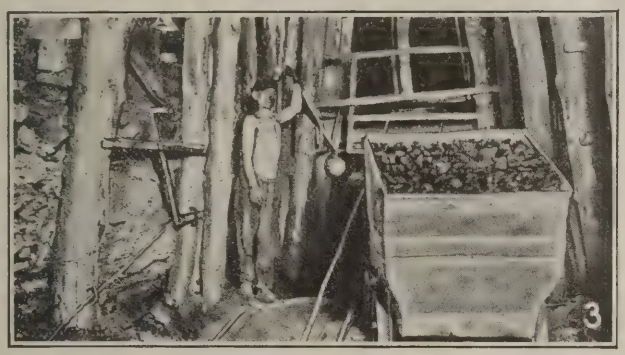
The inhabitants have their peculiar habits and apparently follow traditions in the pursuit of their occupations. Labor appears fixed, there being neither influx nor efflux of the population. Evidently "once a miner always a miner," and the son follows the father into the mines. If you flatter yourself that you know some French, don't depend on it in Lens; for you are likely to find that any conversation overheard will be in Flemish and not in French.

Within a few miles of Lens is Liévin, also a mining town, and the location of the experimental station of

*Reprinted from the *Mutual Monthly Magazine*, published by the Consolidation Coal Co. for its employees.







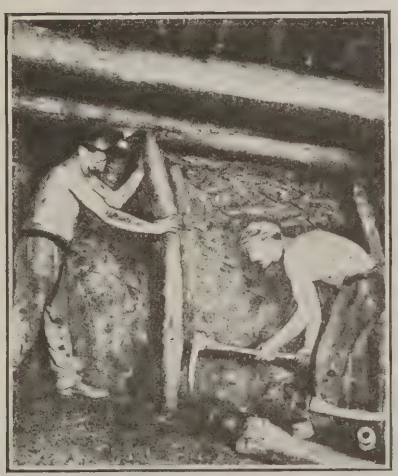












How French Coal Mining at Lens was Conducted Before the German Invasion

Fig. 1—Not much clothes are worn as a temperature of 90 deg. is not unusual. Fig. 2—Coal seams in the Lens region are comparatively thin, 12-in. seams being not at all uncommon. Fig. 3—Mechanical haulage, if any, is by rope usually of endless type with rope running over car. Fig. 4—The seams are nearly all worked longwall, the pitch being heavy and the roof bad; roadways are about 40 ft. apart and the coal is handled several times before it reaches the car. Fig. 5—There are no tracks on the tipple; instead there are iron plates and the cars are shoved around to the various screens and back to the cages, the work being done mostly by women. Fig. 6—Mine entries are usually driven in rock. Fig. 7—Coal from upper seams or heavy pitches is transferred to lower levels by chutes. Fig. 8—Breakfast in the air course at ten in the morning. Fig. 9—French miners are expert timbermen, both from necessity and practice.

that which in France corresponds to our Bureau of Mines. It was here that M. Taffanel worked out scientifically and experimentally most of what we know about coal-dust explosions. This station was built and the force organized shortly after the Courrières mine explosion, in which 1200 miners lost their lives. Previous to this explosion France had a particularly good record for safety, and Lens was for a long time a point of interest to English, German and French mining engineers who went there to investigate French methods.

It was here that the system of "minimum timber" was worked out which was eventually adopted by most of the European countries. This system is a method of cross timbering and is supposed to be carried out in all mine workings whether the conditions require it or not. Additional timber can be added as occasion requires, but the minimum must always be in place. Since the roof conditions in the Lens field are, without exception, bad, some such system is well suited to that region; but it has never been practicable to adopt it here, nor has it ever been so much as recommended in this country.

The average output per man per year underground in the Lens field is about 250 tons, while with us it is more nearly a thousand. The average earnings of a French miner at that time were about $0.90 per day. To describe the mining methods would be a story in itself; but briefly, "longwall" is worked is every conceivable manner, depending on the local conditions.

Courrières mines are within sight of Liévin. This group of mines, about 13 in number, is operated under a concession or lease from the French Government. The mines cover an area of about 13,000 acres, which is more or less completely underlaid by 40 seams of coal of various thicknesses. These vary from semi-anthracite to bituminous coal.

The mining of these various seams was conducted to a depth of about 1200 ft. The shafts are all connected underground, most of them being hoisting shafts. Their total output was about 2½ million tons annually.

The mines were opened in 1850 and the company had a very successful career up to the time of the disaster. Firedamp was not particularly troublesome, and open lights were used almost exclusively. When the mine explosion occurred it was the first large coal mine disaster in France, and as a result there was a lack of organization and of facilities for reëntering the mine after the explosion. Many lives, which prompt and efficient effort might have saved, were lost apparently by suffocation and even by starvation.

France has a normal coal production of about forty million tons and a consumption of about sixty million tons a year. Seventy per cent., or 28 million tons, was produced in the northern part of France forming a part of the area captured by the Germans. The mines in part of this area have, we know, been destroyed. Twenty million tons more coal was consumed than France produced, and the balance was adjusted by coal from England and Germany.

The terms of the peace and more particularly those defining the territory to be returned to France will have a large influence on the available quantity of coal that France will possess after the war. If Alsace and Lorraine go back to France, she will acquire a large active coal territory which is probably undisturbed and a large new and undeveloped territory in Lorraine which has been proved to contain workable coal; but some of it is at a depth of 4000 ft., and it is yet to be determined whether it is possible to mine coal at such a depth.

In spite of this France will face a shortage amounting to thirty or forty million tons of coal for the next ten years. In my opinion the coal industry of France will never entirely recover. It is reasonable to suppose that France will at once enter into an intensive reconstruction period requiring large quantities of coal. This naturally will be largely imported. Certain trade channels for coal will be opened and in time become so thoroughly fortified that it is doubtful whether the domestic supply will be able to replace it.

Outside of man power, coal will be the greatest need of France for the next few years, and on the ability of France to obtain that coal will depend her immediate future progress and recovery. Perhaps the United States can come to her aid. An addition of forty million tons to our annual output is only a trifling matter, and with the large ocean transportation facilities which we have, France may not plead in vain.



Photo copyrighted by Underwood & Underwood

The scarcity of coal was so great in and around Paris during the war that the children, as soon as they got out of school, ran to the coal depots and escorted the carts, anxiously waiting for a lump of coal to roll down from the wagon. They would walk for miles in this manner in order to obtain fuel to feed the kitchen range.

Regarding Longwall

By F. A. POCOCK
Philadelphia, Penn.

SYNOPSIS—*A five-entry system of mining is here proposed, employing longwall faces both advancing and retreating. Longwall conveyors will also be employed. It is the intention in this layout that ten tons of coal shall be produced per man employed. Discussion of the general scheme is invited.*

IN CONSIDERING any method of mine development it is well to observe the worst conditions that may be met. I have concluded therefore to consider the beds of the Freeport and Kittanning series. These are generally under light cover; not over 80 ft. on the average to the surface. They have between them from 30 to 45 ft. of shale, shaly sandstone, and the like—not very strong rock. We may therefore conclude that any longwall system operated in the upper bed, no matter which of these measures happens to be that bed, will force the breaking of the roof rock to the surface and will let the water into the workings.

The rocks in question will not support themselves over any considerable area of worked-out territory. We must therefore look for a system of mining that does not entail the maintenance of expensive packwalls, in order to keep a haulage road open between them. Next there is the fireclay floor which underlies all coal beds of this series, and will cause all kinds of trouble as soon as the water strikes it and the pressure comes on. This will heave and squeeze wherever given an opportunity. Nature objects to voids and fills them as soon as she can. Consequently the best method to pursue is to assist the lady if possible.

With the foregoing facts in view I have designed the accompanying mine plan. Because there are a number of periods in the development of any such extended operation, I have broken this plan up into periods of about six months each, the first break being at the end of the first six months and each succeeding break being six months later. This will save considerable explanation.

Taking up such a development, we will have to start with some basis and see how the whole plan will correlate therewith. In the present case we will make this the cutting capacity, without any reference to haulage or loading. Thus the first limitation will be the cutting speed, "A" in opening the mine, and "B" in producing tonnage to maintain an output for a sufficient time to warrant the cost of equipment. If we are to continue to operate the thin coal beds at a profit despite the increased cost of labor, machinery must take the place of men; and to use machinery we shall have to change some existing methods.

Referring to the accompanying plan a five-entry heading system has been adopted for the main headings. These entries are, say, 20 ft. wide with a 100 ft. pillar between. Let us acknowledge to ourselves that it is wrong, but see if the results will not warrant the radical departure from past and present practice. We will protect these main headings with a pillar of solid coal 300 ft. thick on each side and drive as few connecting stalls as possible, say every 150 ft., as shown.

It is to be remembered that the center entry is the main airway; it may be necessary to use two or three entries as haulage roads, depending on the desired output, while the others are the returns. We must play safe and start right, for 6,700,000 tons of coal must come over these roads during a period of ten years, if we maintain an average output of 3000 tons per day. We propose to recover over 90 per cent. of the total available coal.

Branch headings will be started as shown. Following the five-heading system, but having their cross

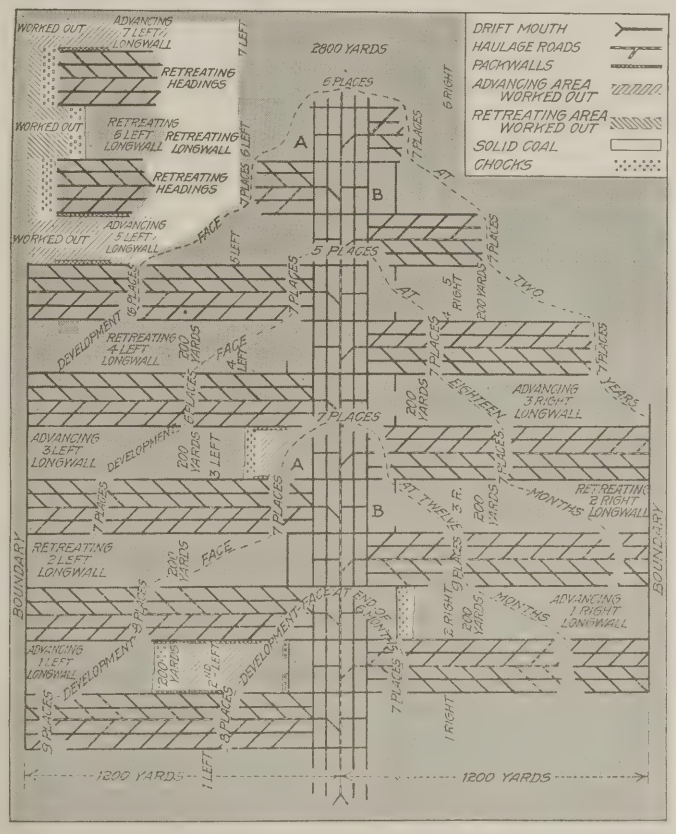


DIAGRAM SHOWING METHOD OF WORKING

headings driven at 45 deg., they will each cover 6600 ft. in width and will be staggered, first to the left and then to the right. There will be a pillar of coal 600 ft. wide left between each of these branch headings; these will be alternately worked as advancing longwall and as retreating longwall faces.

The 1st left longwall advancing will be opened as soon as the outby heading of the 2d left heading has reached the 300-ft. depth of the retaining pillar. Since it is being driven outby, it will be met by a face driven inby from the inby heading of the 1st left headings; when these meet the 1st left advancing longwall face will be in operation. In the same manner the 1st longwall face to the right will later be opened.

The pillar of coal between the 2d and 3d branch head-

ings, both to the left and right, will not be mined until after the advancing longwall panel between the 3d and 4th branch headings has reached the boundary. This alternate system of mining should be persisted in. None of the retreating longwall will be carried into the pillars *A* and *B*, which will be left to protect the main headings until the end of the mining. Now is it possible to get 3000 tons of output per day by any such system, from a 3-ft. seam?

The cutting basis will consist of three items, as follows:

1. That in the main headings. Using an arcwall machine with a 10-ft. cutter bar in five headings, each 20 ft. wide, we have $20 \times 10 \times 3 \times 5 = 3000$ cu.ft., or 110 cu.yd. Allowing a cubic yard to equal one long ton, this will mean 110 tons; and working three shifts per day, this amounts to 330 tons per day. The main headings will thus advance 30 ft. per day or 600 ft. per month of 20 days.

2. That in the branch headings. Here we have an average of eight places, with 20-ft. laterals, so we shall get $20 \times 10 \times 3 \times 8 \times 3 = 13{,}000$ cu.ft. or, roughly, 500 tons per day with an advance of 30 ft. per day.

3. That in the longwall faces. These being 600 ft. long, one cut will give $600 \times 10 \times 3 = 18{,}000$ cu.ft., or 666 tons.

As soon as the longwall advancing faces are opened up it will be advisable to work the cutter one shift in the longwall and two shifts in the branch headings. The first longwall should be opened during the fourth month and the second longwall, that to the right, during the fifth month. The cutting capacity at this time should be about as follows:

	Tons
Main headings	330
1st left branch headings	330
1st right branch headings	330
2d left branch headings	500
2d right branch headings	500
1st left longwall	666
1st right longwall	666
Total	3,322

Thus, by the sixth month we should secure the output aimed at. The 1st left branch headings should reach the boundary at about 18 months, the 2d left headings during the 23d month. The 1st right should reach this limit during the 21st month, and the 2d right about the 25th month. The longwall faces between these could reach the boundary about 30 days later. At this time the 1st left and 1st right branch headings can be opened as retreating longwall faces and be worked back to the pillars *A* and *B*.

From this section we would have taken 800,000 tons of coal. In the meantime the development work of the main and further inby branch headings will have progressed as indicated in the plan, and at a rate that will easily maintain the output at 3000 tons per day.

When, as an illustration, the advancing longwall between the 3d and 4th left has reached the boundary, of course the face between the 1st and 2d left will have been worked out and we can at once begin the retreating work, as shown in the upper left corner of the plan. We have then three faces. There will be about 550 tons per day from each of the headings and 666 tons from the longwall face, making a total of 1766 tons per day, which will be quite cheaply handled.

It will be seen that three-fourths of the branch heading and longwall may be worked retreating, as well as the coal left in the main headings and pillars *A* and *B*, from which 92,000 tons were taken in development work and in which 1,000,000 tons were left.

Packwalls, as shown, are only built on each side of the advancing longwall panels. They are to protect the loading road for a short period and the outlying pillar of each of the branch headings, so that they will not be crushed too much. But as the face of the advancing longwall opens the next lateral to the hauling road, the roof over the worked-out section will be shot down and allowed to pack, so that its weight will be taken off the packwalls to a considerable extent.

The total packwall work for this 6,700,000 tons will only amount to 12,000 lineal yards. Allowing that the walls are 18 ft. wide and 3 ft. high, this will amount to 72,000 cu.yd. Thus the cost for each cubic yard may be charged to 93 tons of coal.

The longwall face and the retreating headings will of course have to be followed up by the usual chock system, to prevent the roof from falling too close to the face. The amount of this chocking will vary in all localities.

The dimensions given in the accompanying diagram are due to the following reasons: (1) The five-heading system, giving an average of eight working places, can be easily cut in 8 hours. (2) The longwall face of 600 ft. both advancing and retreating can be cut across in the same time. (3) By having two conveyors on the longwall and the retreating heading face, each 300 ft. long, which is now possible, the loading of the coal can be reduced to the least possible manpower; and as the men will only have to shovel onto the conveyor, they should easily load 333 tons in 10 hours. Again, this will allow of the longwall coal being handled by two hauling roads at the same time, thus making the handling of the cars easier. In the retreating headings the conveyors will bring the coal to the central haulage road.

The advance of the track along the longwall end can be handled during the time the machine is cutting, and the tracks be ready for the loading; also, the conveyors can be moved up to the broken-down coal as the cutter advances. The haulage is simple, as any one can see, and may be either by locomotives or by rope haulage. The average distance will be 1.6 miles and the longest haul 2.25 miles.

With rope haulage it would mean 100 trips of 30 cars each per day, and as the empties will go in against the loads coming out, a rope speed of 15 miles per hour will suffice. There is ample room on the laterals for this length of trip for the longwall work. The lateral being the siding, the locomotive can bring its empty trip onto this siding, leave it and get the loaded trip from the longwall road, bring it to the siding and back the empties up to the longwall road.

The siding being between the airway and the return, doors at either end will control the ventilation and form the necessary lock for the air. The labor will vary, even in the same thickness of seam, because of varying roof and floor conditions in different localities; but after the longwall faces are opened, the system in my opinion will increase the output to at least 10 tons per man per day, for all men employed where run-off mine is shipped.

I trust that this plan of mining will merit the serious consideration of mining men and that its shortcomings will be discussed in the columns of *Coal Age*.

Annual Meeting of the Southern Appalachian Coal Operators' Association

SPECIAL CORRESPONDENCE

THE Seelbach Hotel, Louisville, Ky., was a veritable beehive of coal men on Feb. 14. About 200 or more operators were gathered there from the various fields of Kentucky, West Virginia, Virginia and Tennessee to attend the annual meeting of the Southern Appalachian Coal Operators' Association and the various group meetings of district organizations. Things were kept lively, owing in part to the fact that the coal operators practically all came from dry territory and struck an oasis in Louisville.

The group meetings were in reality merely get-together or monthly meetings, at which general conditions in the fields, marketing problems, etc., were discussed. About the only business meeting of importance was that of the Southern Appalachian Coal Operators' Association, which held its annual meeting at 11 o'clock, in the Red Room of the Seelbach, there being about 60 or more members present.

Election of officers for the Appalachian operators resulted as follows: President, John L. Boyd, Knoxville; first vice president, W. P. Davis, Knoxville; second vice president, John E. Patton, Chattanooga; third vice president, M. S. Barker, Louisville. J. E. McCoy, secretary-treasurer since the organization was formed in 1909, was renamed by the executive committee, which was composed of the following: E. C. Mahan, Knoxville; C. S. McManus, Fork Ridge, Tenn.; Alex Bonnyman, Knoxville; L. C. Crew, LaFollete; R. L. Stearns, Stearns, Ky.; Lucian Clarke, Nashville; W. P. Young, Nashville; C. W. Henderson, Knoxville. The nominating committee was composed of George M. Camp, Knoxville; C. M. Moore, Careyville, Tenn.; F. F. Floyd, Knoxville; and C. S. McManus, Fork Ridge, Tenn. One of the principal actions taken at the morning session was in connection with the announcement of plans for affiliating with the recently organized Central Coal Association, with headquarters at Cincinnati, a live young organization that intends to compile much excellent statistical information and promises to be of great assistance to the operators south of the Ohio River. Recognizing the fact that under the operation of the existing anti-trust laws the coal operators are greatly hindered in the proper marketing and production of their product, as well as being handicapped in the creation of stable markets for their output, the organization adopted resolutions calling on Congress to investigate the present regulations and to so change the laws as to bring about economic relief. These resolutions were as follows:



PROMINENT COAL MEN AT THE CONFERENCE
From left to right—J. E. McCoy, Knoxville; R. C. Tway, Louisville; G. D. Kilgore, Norton; E. R. Clayton, Harlan

Whereas, the exigencies of the war have made apparent the uneconomic provisions of the Sherman anti-trust law and the Clayton Act; and

Whereas, the said acts limit the right of collective economic action in business transactions, and we believe are a detriment to business development and progress, rather than a benefit to the economic well being of the nation, and

Whereas, the Government in many instances, for the reason of expediency has suspended certain provisions of the said acts, during the war, therefore, be it

Resolved, that the Southern Appalachian Coal Operators' Association, in convention assembled, respectfully recommends that Congress make a thorough investigation of the working of the said acts with respect to their economic effect upon industry and commerce, and that such necessary legislation be enacted as will meet the changing conditions of the business world while providing against the abuses sought to be remedied without working injustice and hardship upon legitimate business development.

Secretary McCoy made one of the best reports ever delivered at any coal meeting in the district, covering the activities of the association during the year. The report showed that the organization today represents about 95 per cent. of the productive capacity in its district, and an enrollment of approximately 85 per cent. of the operators. During the year it secured 46 new members, losing but 13—two by failure, two by resignation and nine by expulsion for failure to pay dues and assessments.

The financial report showed receipts of $25,481.49 during the year, plus a balance of $9732.65 as of Jan. 31, 1918, or a total fund of $35,214.14, against which were disbursements of $26,261.11, leaving a cash balance of $8953.03 as of Jan. 31, 1919. Estimated operation costs for the coming year, including salaries of $8500, amount to $20,319, excess resources being figured at somewhat more than $13,000. During the year the organization secured membership in the United States Chamber of Commerce. Monthly meetings were held by the executive committee, at which traffic matters, labor problems, appointment of district fuel administration representatives, etc., were taken up. Quarterly meetings were held by the organization throughout the year, at which various matters were attended to, including appointment of directors for the various sections to work with the National Coal Association. At a session on July 26 the organization opposed the open saloon during the war, and sent in resolutions to President Wilson and the National Coal Association reflecting its attitude.

Receipts for the year as compared with previous years showed a decline of approximately $15,000, due to there being no special assessments and less special work in connection with credit information, which was

not necessary under Government regulation of prices and shipment of coal on a sight-draft basis. This work will again be resumed, as will also an interchange of information or market data. Today the organization is making daily clearings for producers with an annual output of approximately 5,000,000 tons. Members were called upon to submit their production costs in order that costs for the various fields may be worked out, and it was also recommended that a good accountant be secured to represent a joint committee of leading associations in the district, to handle tax matters. The remainder of the session was given over to routine matters, there being nothing of special interest brought out. At the joint session held in the afternoon approximately 200 operators were present, the room being crowded. It was stated that the men present represented organizations controlling between 50,000,000 and 60,000,000 tons of annual production. At this session an interesting talk was delivered by J. D. A. Morrow, general secretary of the National Coal Association, who discussed the general work of the organization during the year, legislative matters, marketing and labor conditions, and the general situation.



L. F. PRATT

Mr. Morrow mentioned the new tax laws and the fact that coal operators are being unjustly taxed out of proportion to other lines. He referred to the coöperation of the coal operators during the war, and the assistance which they gave in bringing the war to a close, and emphasized the coöperation of the United States Railroad Administration with the operators and the Fuel Administration, and the willingness of Director General Hines to assist in bringing the coal trade back to a peace-time basis. Mr. Morrow urged a continuation of the direct shipment of coal, indorsing the stand taken by the Fuel and Railroad Administrations in enforcing this plan. Banishment of cut-throat competition and substitution of open competition was advocated, to replace the type of competition met with before the war.

At 7 o'clock in the evening a joint banquet was held in the Seelbach auditorium, on the tenth floor of the hotel, more than 200 guests being present. Incidentally, the gathering was in a more happy frame of mind, as the weather had turned raw and cold, with a wet driving snow, which encouraged the operators in the belief that there may be some winter weather before the close of the 1918-19 season.

Judge H. B. Lindsay was toastmaster at the banquet, while the principal speaker of the evening was Ex-Governor John Franklin Fort, of New Jersey. Governor Fort discussed the export coal outlook, the conditions abroad and the possibilities in foreign coal markets for American coal. He also referred to the anti-trust laws and the need for changing these laws in order to aid coöperation, better organization of large interests, and better marketing and lower production costs. His talk in part was as follows:



H. B. LINDSAY

It is generally recognized that coal will become one of the most vital factors in determining industrial expansion and the growth of international trade from now on. The coal resources of all the leading coal producing countries of the world, with the exception of the United States, have suffered immeasurable damage during the war. While virtually all the leading coal producing countries of the world show a steady loss in coal output since the beginning of the war, the production of coal in the United States has increased on a large scale. This rapid expansion of the coal producing facilities of the United States, together with the fact that the United States contains the largest known resources of good coal in the world makes this country the logical future source of supply for a large part of the world's coal export trade.

The war has produced a universal dearth of coal for industrial purposes in foreign countries. Conditions surrounding the coal situation in Great Britain and Germany at the present time do not permit of a large exportation of coal. It is quite likely, too, that the coal industries in those countries, which next to the United States were the chief coal-exporting countries of the world, will have enough to do to relieve the domestic coal shortage, and to supply the needs of their domestic industries during the reconstruction period.

That leaves a market of millions of tons of coal which have to be supplied to meet the needs of coal-consuming countries which have insufficient or no domestic coal resources. In 1912 the total coal exports of the chief coal fields of the world amounted to about 180,000,000 tons, including shipments by rail and sea. The world's sea-borne foreign coal trade amounted to approximately 95,000,000 tons in 1912.

Although the United States is by far the largest coal-producing country in the world, we ranked third, before the war, among the leading coal-exporting countries. In 1913 our coal export amounted to 23,007,229 tons, of which Canada alone took over two-thirds.

Since the beginning of the war a great change has taken place in our coal-export situation. The supply of the world's coal markets has shifted. Our exports of bituminous coal to Latin American countries have increased from 441,368 tons in 1913 to 3,152,107 tons in 1918. Our exports of coal to other parts of the world have increased also.

Provided the problem of shipping and of oversea freight will be settled satisfactorily, so that our American coal can be shipped at freight rates which will allow the American exports to compete in foreign markets, a promising future appears to be in store for the coal-export trade of our country. We have a bountiful supply to furnish, the foreign demand for it is constantly increasing, and with our newly established banking and credit facilities in foreign countries, aided by the Webb law and the facilities of our newly created merchant marine, the future position of the United States in the oversea coal markets seems assured.

Our export trade of coke shows a similar steady increase in volume. It has grown from 900,672 tons in 1913 to 1,413,886 tons for the first eleven months of 1918, an increase of a half million tons, and this in spite of the fact that there was a growing demand at home and that avail-

able ship tonnage was restricted and freight rates abnormally high.

There is a strong tendency among business men to remove restrictions against coöperation. The Sherman law of 1890 cannot be claimed to have been a business success. It was and is an innovation in business. Many of the originators and its later sponsors do not now claim it to have been a success. The courts have been compelled to interpolate into the written statute a court construction as to the "rule of reason" to make it workable with any degree of fairness. It has not helped the cause of the capitalist, laborer, dealer or consumer to any discernible extent. Nobody is entirely satisfied either with the act or its effect in operation. It has never restrained a capitalist, nor has it ever helped a laborer, nor benefited any customer in any commodity sold to him.

During the war it has been practically inoperative. If this law had been enforced in its letter, it is doubtful if the war could have been as effectively fought, which the neglect to enforce it permitted to be done.

Shall this country in its business relations permit that act to remain on the statute book as it is and go back to its strict enforcement in all its conditions? Is it not time for Congress to reconsider this whole question of anti-trust legislation? The total disregard of individual needs and of joint individual interests should not be continued.

That combination should be regulated in the public interest is clear. But the control should not be entirely governmental. It should be under mutual arrangements by joint official and individual action. The business men should have the right to confer with the official to see if the two acting jointly cannot agree on the fair thing. No man should be in a position of being a lawbreaker and told he is one, as the first information that he gets as to an error in his way of conducting his business.

Coal Mining in India in 1917

The annual report of G. F. Adams, Chief Inspector of Mines of India, contains statistics and other information of interest about the mines of India for 1917. During the year covered by this report the average number of persons working in and about all the mines of India was 211,881, of whom 133,042 worked underground and 78,839 on the surface. Of this force 131,672 were adult males, 72,770 were adult females and 7,439 were children under 12 years of age. Those employed in coal mines numbered 153,683, which is an increase of 10,224 over the number employed in 1916.

The output of coal was 17,326,384 tons, an increase of 907,302 tons over that of 1916; the average increase during the previous ten years was 730,641 tons. The amount consumed at the mines—1,835,510 tons—was about 10½ per cent. of the total tonnage, comparing closely with conditions existing about the Pennsylvania anthracite mines in this respect. All the better grades of coal were requisitioned by the government for military purposes at definite prices and were given priority as regards transportation. This arrangement gave the inferior grades of coal an unusual advantage, causing such a demand for fuel that mines started up which had not been in operation for years. The output per underground employee for the year was 182 tons, while 113 tons was the individual average output for all employees.

The question of labor was the controlling factor in the production situation in India; with an adequate supply of labor the tonnage could have been materially increased. There was also difficulty in obtaining machinery and supplies, which handicapped development and increased the burdens of the big plants, especially those mining at a great depth. In 1917 there were 175 fatal accidents in all the mines of India; this was an increase of 25 over the record for the previous year. As a result of these accidents, 201 deaths of employees occurred. However, there was no single accident in which a large number of employees lost their lives. Of these accidents 91 were supposed to be nonpreventable and 46 due to the fault of the person killed. The largest increase was owing to falls of rock or coal; such fatalities amounted to 92, which is quite an increase over those of the previous year. Next to falls of roof, haulage accidents (19) caused the largest increase; this compares with 12 from this cause in 1916.

The death rate per 1000 persons employed was 1.06; per million tons of coal hoisted was 9.41—a slight decrease over the average of the preceding five years. Of the 201 persons noted above as killed in all mines, 163 occurred in coal mines; of this number 61 persons were killed by falls of roof, 50 by falls of rib, 16 in shafts and 20 by haulage.

Obviating the Fire Hazard by Building New Structure Around Old One

In the accompanying view is shown the engine house and substation at the Cranberry mine of the Cranberry Fuel Co., McDonald, W. Va. The structure is built of native stone and is thoroughly fireproof, measuring 80 x 43 ft. It is 30 ft. high from the water table. The inside is plastered with lime and cement mortar. Three sides of the new structure came inside of the



VIEW OF NEW FIREPROOF STRUCTURE

old building which occupied the site, while the remaining wall was outside. Due to this the erection of the new building was quite a difficult piece of work. However, at no time during the progress of the work was it necessary to stop hoisting coal, and the power supply was never interrupted. Steel trusses and roof frame now replace the old wooden roof. Part of the old building can be seen in the illustration; but this will be removed in the near future. For many years the old building was a potential fire hazard, but the new structure has largely eliminated the danger from conflagration. T. L. Yon & Co., of Huntington, W. Va., were the contractors and builders.

A REAL OPPORTUNITY for research is offered in connection with pulverized fuel. Ash, slag and clinker are a live problem; to prevent their formation on tubes, checker work and furnace walls is absolutely essential. Methods of combustion and furnace design are of real importance. Scientific analysis of the difference in heat transmission due to radiant fuel and ash in suspension has furnished an opportunity for investigation.

Timbering in English Mines*

Special Correspondence

THE question of substitutes for mine timber has long been a subject for the consideration of the English mining engineer, but until the commencement of the war supplies of timber for coal-mine use were both plentiful and moderately cheap so that the matter received no serious consideration. However, when the war started, the question of the supply of mine timber became quite a critical one, owing to the fact that 85 per cent. of the timber used for mine props was imported. The matter assumed a serious aspect and it was thought that some of the mines might have to close down.

Owing to the large supplies of home-grown timber standing in many parts of the country, the scarcity of timber has not been so seriously felt as was at first anticipated. The home-grown timber, while not so good for mine props as Norwegian, has served an admirable purpose. Previously to the war there was a growing demand for timber in European countries, and although immense supplies were to be obtained from Russia, it was a question how long these would last at the rate of depletion. The British Government set aside a certain sum with which to purchase land and to start a number of forests on a large scale. However, this plan has not yet matured, and Great Britain is almost entirely dependent on colonial and foreign supplies of timber. It is therefore essential that the schemes for forestry development should be pressed forward by the Government through all its agencies and landowners, and that forestry associations combine to make it an unqualified success.

Substitutes Have Not Proved Successful

The use of substitutes such as concrete props has been widely discussed, but so far they do not appear to have achieved any great success; they were said to be too rigid, that they split into parts and were difficult to withdraw. The only place where reinforced concrete was thought to be of much service in dispensing with timber was in the area of the shaft bottom and pillar. Mr. Evans suggests that for at least 200 to 300 yards or more on either side of the shaft bottom all main roads should be arched with girders on brick or concrete walls. This would not only save timber but would largely do away with the accumulation of dust where in some cases it is most prevalent. Other substitutes for timber have been tried in the way of steel props and girders.

Wherever timber is used every effort should be made to protect it and preserve it against breakage; this requires strict supervision, modification of present methods and the coöperation of all workmen and more particularly the mine officials. It is undoubtedly a fact that a considerable amount of timber is broken, largely owing to the impracticable method of setting it. In nine cases out of ten if a workman is setting up a collar he will do so without giving any clear space for the side pressure, often putting in a wedge to make it tight; consequently, in a few days the collar breaks in the center and has to be replaced (see Fig. 1). If the official in charge had been sufficiently observant and diligent, he would have prevented this and the collar would have had a much longer life. In other cases the collar may not be made end-tight, but a piece of timber may be wedged in over the center of its length, thereby putting a load at the wrong place. When it is remembered that the carrying capacity of a timber collar depends on the method of loading and that the breaking point may be increased from four to twelve, according to the method of load distribution (Fig. 2), then it is essential that this matter should receive the attention of all mine officials.

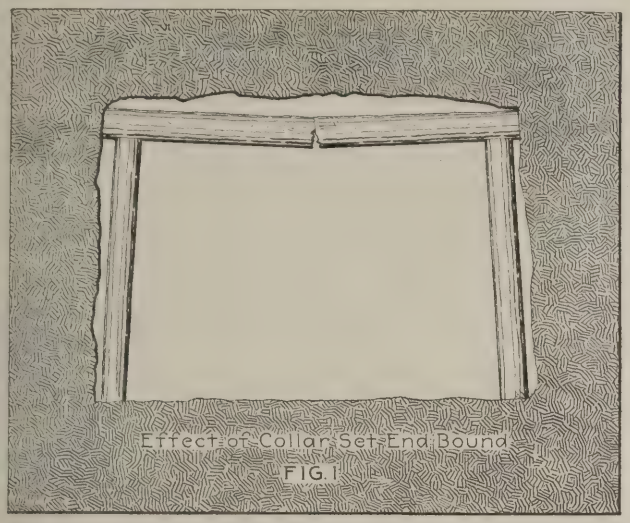
Additional Support for Important Collars

When necessary, additional support should be given to important collars; this can be done to advantage on roadways where there is sufficient height. A method commonly employed to give greater strength to collars at their weakest place is called the herringbone system (Fig. 3). This method also correspondingly strengthens the props which support the ends of the collar. Timber reinforced in this manner has been known to last for years, and although the collar may give way, the herringbone support usually remains intact and sound. If greater strength is required, then a double herringbone system may be adopted; this consists of a short horizontal strut under the middle of the collar with supporting timbers, as shown in Fig. 4. The efficiency of the herringbone method lies in the fact that the struts are short and withstand great pressure; also there are several places which absorb the lateral and vertical pressures.

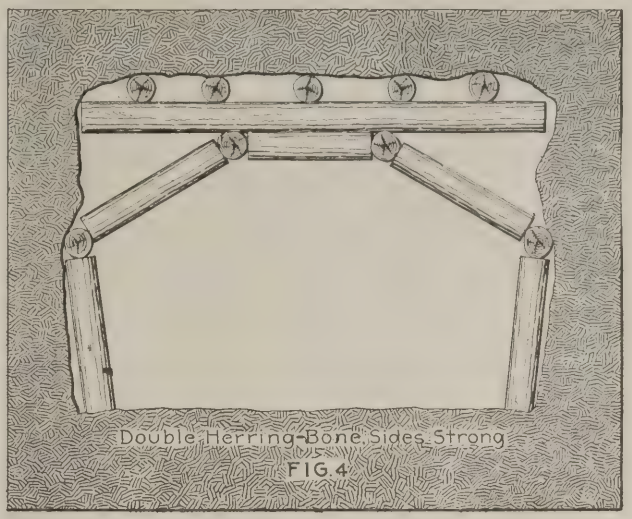
If the roof and sides are moderately strong the simple method shown in Fig. 5 may be adopted. If the roof is tender then either the double herringbone system may be adopted or collars may be placed, and then be supported as shown in Fig. 6. Previous to the adoption of the herringbone system steel girders were often used on the roadways and cross roads of longwall workings; but owing to the pressure these had to be frequently renewed or reset on account of becoming bent and twisted before the face had advanced many yards. The steel girders, however, are said to be preferable to the timber collars as they can be straightened and used over and over again. The herringbone system of timbering in the roadways has been extremely successful in the mines of Great Britain, both from an efficient and an economical point of view, as practically little new timber is required for long periods.

The question of substitutes for timber will now undoubtedly have to be seriously considered, as the demand for timber will be so great for buildings, for use in connection with railways, about mines and for other purposes that there will be little prospect of the supply being adequate or prices being much reduced. The use of steel props at the face has not received the con-

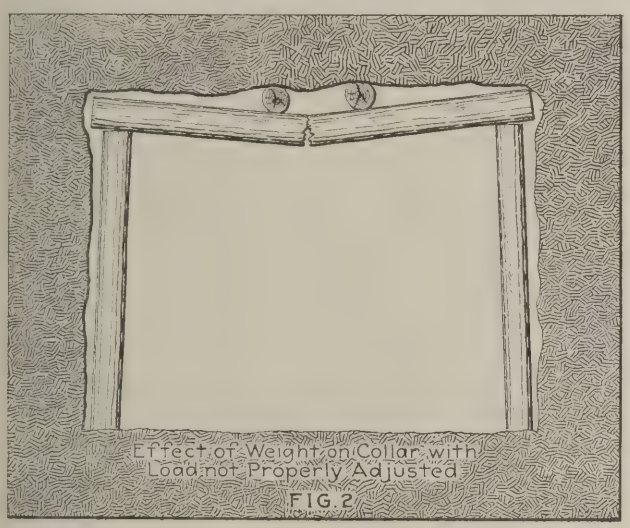
*Abstract of a paper by S. Evans read at a meeting of the National Association of Colliery Managers of Great Britain.



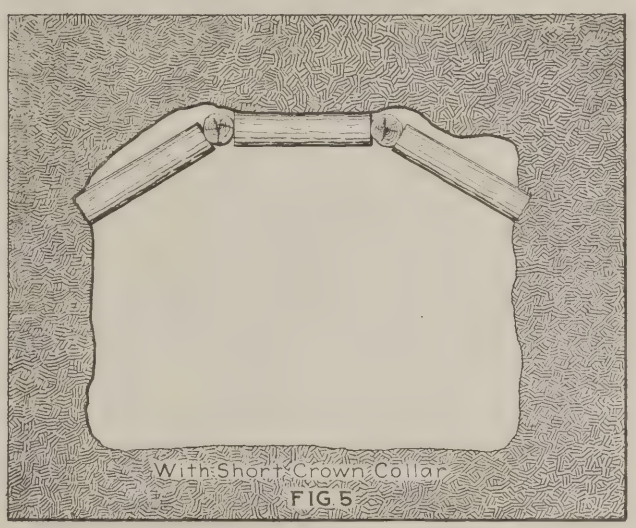
Effect of Collar Set End Bound
FIG. 1



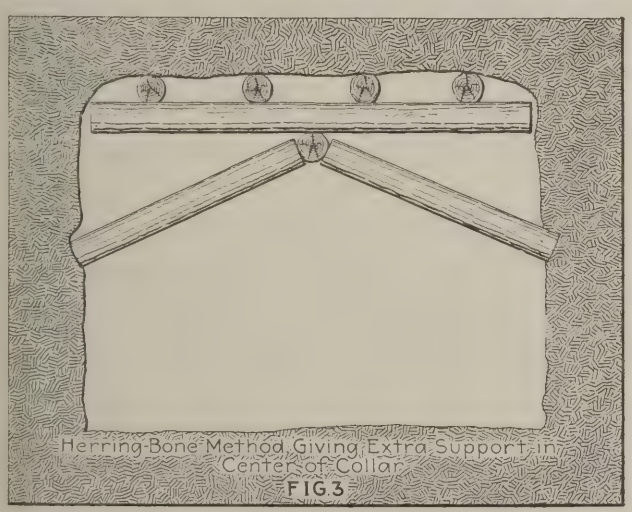
Double Herring-Bone Sides Strong
FIG. 4



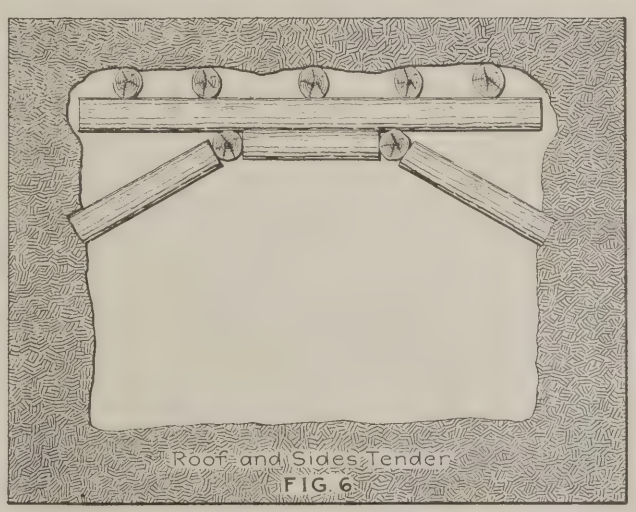
Effect of Weight on Collar with Load not Properly Adjusted
FIG. 2



With Short Crown Collar
FIG. 5



Herring-Bone Method Giving Extra Support in Center of Collar
FIG. 3



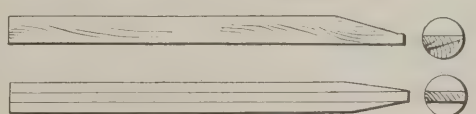
Roof and Sides Tender
FIG. 6



Collar Wrapped with Old Haulage Rope
FIG. 7



Section A-B



Methods of Pointing Props
FIG. 8

Good and Bad Methods of Timbering in Longwall Workings

Scarcity of timber in Great Britain necessitates conservation methods and the use of substitutes wherever practicable. Steel and concrete find increased application in roof support

sideration which it merits, probably due to a certain amount of prejudice of both managers and workmen. Some collieries have made attempts to use them and, for some reason, mainly owing to loss from their being buried and from their initial cost, have abandoned the idea as being impracticable. Other collieries have given them a thorough test and have found them to be satisfactory from all points of view.

After 20 years' experience with the continued and extensive use of steel props, Mr. Evans has proved them to be of great service and especially desirable from an economic point of view. They resist a much greater pressure than wood and can be used, after being straightened, for many years; in fact unless they are broken, they have almost an unlimited life. They are quite as safe as wood, are as easily set and are more easily drawn. The loss through breakage and from falls is small, and the cost per ton of output bears no comparison with wood, especially if both top and bottom are strong.

Steel Unsuitable Support for Tender Roof

It has been said that in the case of tender roof, steel is most unsuitable for support as it permits the roof to break around it; but this objection can be overcome by using a fairly large cap piece on top of the prop, thus distributing the weight over a larger area. Similarly, a footpiece is placed under the lower end of the prop. It may be found that, at least for the next few years, the initial cost of steel will not be much higher than timber. and consequently the use of steel props may be more universally adopted as they are considered the best substitute available. In order to give a longer life to wood collars some managers in Great Britain are making use of their old haulage ropes. The collar is flattened on two sides, much the same as a railroad tie, and then several coils of wire rope are passed longitudinally around the collar, as shown in Fig. 7. These ropes are secured in position by nails or staples, and afterward a wooden wedge is driven between the ropes and the collar at each end to keep the ropes tight. Although the timber may break, it is reasonably safe, as it is held by the coils of rope. This method is said, by those who have used it, to be quite effective.

As the softer woods (those commonly used for mine timbers) of Great Britain become exhausted it may be necessary to use the harder varieties. These latter woods are generally unsuitable for props but may be used at the longwall face as supports for the top on the gob side; such supports have been used many times before being of no further use. In such timbering the bottom front piece of timber is placed parallel to the face and bedded on slack, but no corresponding piece of timber is placed on the back side of the crib at the bottom. The wood pack is therefore more easily withdrawn. This is done by taking out the slack from under the bottom frontpiece and then shoveling out the remainder of the slack. If the wood cribs are sufficiently close, little of the timber is lost by falls in the gob.

The timbering at the face just described is able to stand a tremendous pressure and, as it can be made to cover large area of roof, often prevents the top from breaking down. Mr. Evans believes that if this system of timbering faces could be generally adopted a great saving of timber could be effected. Careful consideration should be given not only to the setting of timber but also to its withdrawal. It is now compulsory on the part of certain mine officials to examine all roof from which timber has to be withdrawn, and this duty should be most regularly and consistently observed.

Timber allowed to remain too long in a gob not only becomes a source of destruction but of danger, and it should be imperative on all officials to see that rock packs are made up without unnecessary delay and that all timber is withdrawn as the face advances. In this way numerous props may be prevented from breaking and be used over again. The suggestion is made that in all large collieries there be a special official whose duties shall be confined to the oversight of timbering generally; he shall see that props are withdrawn without delay so as to prevent waste and loss so far as possible. He shall make a daily report as to all timber which is either being buried or not withdrawn. Props left at the side of packs in roadways after the packs have been made up serve no useful purpose and frequently do harm; these props should be taken out so as to allow the gradual subsidence of the roof on the pack. No props should be buried in a pack unless it is absolutely dangerous to remove them.

Props Should be Carefully Tapered

It is the opinion that all props should be tapered before being sent into the mine, but this is of little use unless the work is properly done. If a prop is 6 in. in diameter and say 5½ to 6 ft. long, it should have at least a 10- to 12-in. taper and a portion not more than 3 in. in diameter at the tapered end. Unless this is done properly the prop tends to break as before. For the prevention of waste a face should be advanced as quickly as possible and worked at least 16 hours out of the 24. This means not only that much timber is saved at the face, but also in the roadways and crossways; consequently, the repairs to such roads are reduced by at least 50 per cent. as compared with a face moving slowly.

The question of having as great a length of face as possible between roadways has in a great many cases received preference, owing to the cost of brushing top and for maintenance of roads; in most cases this has been done at the expense of the timber used. Now that timber is so expensive, and may become quite scarce in the near future, it is considered questionable if this policy should be pursued. The timber cost at most collieries now far exceeds the expense of brushing top and repairing roadways; and Mr. Evans urges that the length of face between roadways be reduced, provided a saving of timber can be effected thereby, even if the repairs to roadways are increased. All faces should be kept as straight as possible and be advanced regularly so that no sections extend back into the gob; in the latter case a greater length of face has to be supported and the regular subsidence of the roof is interfered with—it tends not to break at regular intervals. The roof at a longwall face often proves to be bad and requires more timber if the face is not kept straight.

Packs should be of sufficient width and well built—stowed as tight as possible—as these are the only supports on which a roof should rest. If peaks are improperly built or are not of sufficient width, the weight must settle on the timber, often causing it to break.

In the discussion following the reading of Mr. Evans' paper the idea was expressed that to get a good pack it should be built of rock and timber be done away with altogether. Others knew from experience that it was not always possible to do without timber cribs at the face.

Cribs are sometimes very essential, as there may be tender roof in some parts of a mine and not in others. Mr. Evans called attention to the fact that he had not recommended the use of timber cribs, although he considered that there were circumstances in which they were not only an advantage but were almost essential.

The idea that Mr. Evans intended to convey was that in the future, when props would be more difficult to obtain, that it might be necessary to use hardwood cribs at the working face as a substitute for props. He agreed that if an abundance of good material was available for rock packs then it was not desirable to use too many timber cribs, especially in longwall workings, as they might be an impediment to the complete subsidence of the roof.

Some illustrations were given of new systems of pointing props (see Fig. 8). The method at the left of the illustration gave good results and the one to the right even better results; both systems have recently been demonstrated in practice as cheap and effecting a reduction in the number of props used—the props were 5½ ft. long.

One of the War's Heroes

Col. G. A. Burrell has, during the war, had charge of the chemical-warfare research work for both War and Navy Departments. He had full charge of the investigations preliminary to the manufacture of toxic gases, gas masks, smoke screens, incendiary bombs, gas shell, etc. A staff of 1900 people were engaged in the work, which thus formed the largest research organization in the world. The work started in the United States Bureau of Mines and was carried on by that organization until July 1 of this year, when it was transferred to the War Department to become a part of the newly organized Chemical-Warfare Service. Now that the war is over, Colonel Burrell will return to Pittsburgh to resume, by the way, his consulting engineering practice, which covers oil and gas problems, mining problems and chemical-engineering work in general.

Colonel Burrell states that the gas masks finally developed for the American soldier were the best in the world. Prior to the close of the war toxic gases made in America were being used in France and when the war ended more were on their way to France. Authorities fully expected that one of the gases being manufactured would be more effective than any hitherto used. Huge gas-mask and toxic-gas plants which embodied some of the greatest developments in chemical engineering during the war were put in operation in this country. Gas masks were the first American-made equipment for the American soldier to arrive in France. Every American soldier had a gas mask of American make, and at the time of the signing of the armistice the United States was making more toxic gases than either France or England. Col. Bradley Dewey had charge of the manufacture of gas masks and Col. William H. Walker of the manufacture of gas.

The toxic-gas manufacturing industry is dangerous from first to last, whether we consider the experimentation or the strictly manufacturing end of the business. A large degree of real heroism was demanded daily of those who undertook this important work.

Minecdotes

A Little Matter of Annealing

Rolling in his mouth a cud of tobacco large enough to knock a gin cat's eye out at forty rods, "Scotty," the pit boss, began:

"Boys, I used to be the derndest kidder that ever lived; but I was cured, and suddenly at that. It was like this: One of the crossheads of the duplex hoisting engine needed rebabbitting. About this time we got a new fireman in the boiler house, and this chap possessed more ambition than experience. One Sunday the hoister took out the crosshead and told the fireman that he could take it over to the drill press in the blacksmith shop and drill a few more anchor holes in it. I happened to be within hearing distance at the time, so I slips over to the shop and crosses the belt on the drill press. When the drill was started it turned backward and would not cut. The fireman never noticed this. I just casually happened into the shop again, and in answer to his question, I told him that the crosshead was too hard and that he would have to anneal it in the forge fire. No sooner said than done. Pretty soon the hoister came over to the shop, and you can bet that he was not long in getting things straightened out.

"Things run on for quite a while. Finally, cold weather set in, and it was necessary to run steam in the hoisting shaft to keep it free of ice. The steam made it very foggy on the bottom, and it was practically impossible to see anything. One day the mine was idle and I had a bunch of tracklayers over on 3d East, laying some new motor road. I had to come out for my dinner, so along about noon, when I came to the bottom, I never thought and gave the hoister three bells. In a minute I received the answering bell, so I gave him one to hoist away. Boys, what did I do? Nothing; only I stepped into five feet of ice water in the sump at the bottom of the shaft. I thought all the time that the cage was on the bottom. Well, I finally got outside, but I was dern near frozen. I started in to give the Hoister Billy h—, but he just grinned. After I had finished he said:

" 'Scotty, always remember that a man who gives a joke must be able to receive one in turn. When you signaled I knew your whistle, so I decided to just give you an "annealing." The fireman requested it.' "

Legality of Joint Sales Agencies

By A. L. H. STREET
Attorney at Law, Minneapolis, Minn.

A COUNTY association of coal operators asks the opinion of *Coal Age* concerning the propriety of forming a pool for the sale of the members' products. "This newly formed association," our correspondent writes, "represents through its membership over one million tons of bituminous coal output per annum. Owing to conditions, these operators are striving to build up a trade without running foul of the law, whereby they can continue to do business. Many of their operations are developed to a point where they are beginning to repay on the investment. A meeting developed that the coal should be pooled and sold through an agency, thereby enabling the broker to fill orders with coal to suit particular requirements of his trade. In this method it is deemed possible to continue to operate the numerous mines of this section, both wagon and tipple."

The matter was referred to Mr. Street for his opinion, which is published below for the benefit of others who are interested in the subject of joint sales agencies.

AN EXAMINATION of the law reports convinces me that the best advice that can be given at long range and in the brief time available for research, is to proceed with extreme caution in the creation of any joint selling agency and to act under the direct assistance of counsel.

So far as I am able to ascertain from a view of the adjudicated cases, arrangements of this kind in the coal industry have been uniformly frowned down by the courts as being violative of the anti-trust laws.

If the plan mentioned by your correspondent will involve a suppression of full competition between the members of the association as to prices or production, it would doubtless be held by the courts to be invalid as being monopolistic. But whether the public interests would be actually so affected as to result in litigation testing the validity of the pooling arrangement is, of course, conjectural. All that can be said is that during our participation in the war the Federal Government has completely reversed its policy of discouraging combinations of producers. As I heard a prominent business man say the other day, the Government has lately *compelled* violation of the anti-trust statutes as a necessary means of efficiently and economically carrying out war measures. How soon it will be before affairs become so far restored toward normality as to cause a revival of agitations for strict enforcement of the anti-trust laws is not presently apparent.

What Courts Have Held

The judicial law of our subject appears to be comprehended by the several Appellate Court decisions reviewed below, all of which it will be noted are unfavorable to the validity of pools or joint selling agencies sought to be maintained by independent producers controlling a considerable portion of the production of a given district.

In the case of Slaughter vs. Thacker Coal and Coke Co., 55 West Virginia Reports, 642, 47 Southeastern Reporter, 247, it appeared that three of the four coal-mining companies operating on the Thacker vein in Mingo County, West Virginia, organized a corporation for the sole purpose of acting as sales agent for the operating companies, the three mining companies holding nearly all the stock. Each of the three mining companies made a separate contract with the agent corporation providing that the latter should act as the producer's exclusive sales agent, and sell at prices uniform as to all three companies. The corporation was to advertise and introduce the mining companies' product in the markets, establish and control sub-agencies, make all sales and collections, and deduct as its compensation certain tonnage commissions.

Supreme Court States Plan Was Invalid

Defendant, one of the three companies, later refused to be further bound by the arrangements, and in subsequent receivership proceedings against the agent corporation, suit was brought to hold defendant liable as for breach of the joint arrangement.

The Supreme Court of Appeals of the state affirmed a decision of the trial judge, holding that the plan was invalid as involving an unlawful restraint of competition. The following extract from the opinion on appeal shows, first, the individual view held by Mr. Justice Poffenbarger, who wrote the opinion, and, second, the views of his associates who overruled him:

It is impossible to see how the public was, or could have been, injured by this contract. Three small companies, out of the vast number of coal-producing companies in this state, entered into it. The quantity of coal put upon the market by them is an utterly insignificant portion of the vast quantities thrown upon the market by the numerous competing producers. In the absence of some great combination, virtually controlling the production and price of a commodity in the country, the price is regulated and determined by the law of supply and demand. It is manifest that, by this agreement, the production of these three mines was facilitated and increased rather than stifled or curtailed. . . . The validity of this contract must be determined by its practical effect rather than by ascertaining whether it falls within the terms of a legal definition. Contracts in restraint of trade and contracts eliminating competition, as a general proposition, are illegal and void on the ground of public policy. But it is, nevertheless, true that there are numerous contracts which all the courts hold good and which, at the same time, tend, in some degree, to restrain trade and stifle competition. . . .

Upon this view of the contract, my inclination is to hold it legal, but my associates are of a different opinion. Applying the principles hereinafter stated, they consider it void, as against public policy.

". . . The true test of the illegality of the combination being the injury to the public, and whether its necessary consequence is to control prices, limit production, or suppress competition in such way as to restrain trade and create a monopoly. To render the combination illegal on this ground, it is not necessary that evil intent or actual injury be shown, but it is sufficient to know that the inevitable tendency of the act is injurious to the public. . . .

"In some way several corporations competing in production merge into one, and cease competitive production. By means of large capital this new corporation can produce largely, or limit production, lessen supply, enhance prices, and lower the prices of materials used in production."

In the later case of Pocahontas Coke Co. vs. Powhatan Coal and Coke Co., 60 West Virginia Reports,

508, 56 Southeastern Reporter, 478, a similar arrangement for sale of coke produced by about twenty different manufacturers was held to be void, although the purpose of the plan, as stated in the formal contracts, was "to improve conditions in the manufacture, inspection and shipment of coke, and to improve and regulate the quality of coke manufactured in the district."

"We are clearly of the opinion," said the Supreme Court of Appeals, "that it was not necessary, in order to arrange for the improvement of conditions in the manufacture, inspection and shipment of coke . . . for the said corporations to form a trust or combination, the direct effect of which is to destroy all competition among them, to pool their production and to cause them to enter the market for the sale of their combined production as a single concern and which tends to restrain competition between them and others engaged in the same business."

The Pennsylvania Supreme Court adopted about the same line of reasoning in the case of Morris Run Coal Co. vs. Barclay Coal Co., 68 Pennsylvania Reports, 173. In this case it was shown that five coal companies controlling two regions agreed to appoint a committee to take charge of their interests and appoint a general agent. Each producer was to make deliveries on orders of the committee and on the terms and at the prices fixed by the committee.

Responding to a claim that the arrangement was designed "to lessen expenses, to advance the quality of the coal, and to deliver it in the markets it was to supply, in the best order, to the consumer," the Supreme Court said:

It does not follow that these advantages redeem the contract from the obnoxious effects so strikingly presented by the referee. The important fact is that these companies control this immense coal field; that it is the great source of supply of bituminous coal to the State of New York and large territories westward; that by this contract they control the price of coal in this extensive market, and make it bring sums it would not command if left to the natural laws of trade; that it concerns an article of prime necessity for many uses; that its operation is general in this large region, and affects all who use coal as a fuel; and this is accomplished by a combination of all the companies engaged in this branch of business in the large region where they operate. The combination is wide in scope, general in its influence, and injurious in effects. These being its features, the contract is against public policy, illegal, and therefore void.

Another case in which a coal-pooling arrangement was held to be illegal was United States vs. Chesapeake and Ohio Fuel Co., 115 Federal Reporter, 610, decided by the United States Circuit Court of Appeals. Three individual, three partnership and eight corporate operators bound themselves for five years to deliver all their output to the defendant fuel company. A committee of the operators fixed prices at which the coal should be sold to the fuel company. The company was bound to pay over to the operators the excess of profits on resales above a certain percentage compensating the fuel company. As the contract involved interstate commerce and was found to illegally restrain competition, it was held to violate the Federal anti-trust act.

And it will be remembered that the United States Supreme Court, in 1912, decided in the case of United States vs. Reading Co., 226 United States Reports, 324, that a series of identical contracts between interstate carriers with a great majority of independent coal operators to market all the product of the latter at an agreed percentage of tidewater price, constituting a scheme to control the sale of coal, violated the Sherman Act.

Legal Department

Operation of Company Stores—A merchant has no standing in law to complain of the maintenance by the owner of coke works of a store at which the employees of the works are required to buy their supplies as a condition upon the continuance of their employment; there being no showing that the owner of the coke works was actuated by malice against the complaining merchant in establishing the company store. (Dagostino vs. Rogers, 68 Pennsylvania Superior Court Reports, 284.)

Injury to Adjoining Property by Mine Drainage—Discharge of mine water, either by drift or from a lower level by a shaft, does not impose liability upon a coal-mine owner for resulting injury to adjacent property if the injury is not negligently or maliciously inflicted. But the burden is on the operator to show that the natural use of his property which causes the injury complained of is unavoidable except by an expenditure which would substantially deprive him of the use of his property. (Clouse vs. Crow, 68 Pennsylvania Superior Court Reports, 248.)

Employment of Minors—A Pennsylvania coal operator who employs a boy in a mine, he being under the age limit fixed by statute for such work, is liable for accidental death of the minor in the employment, regardless of whether the accident be attributable to negligence of the operator. Nor are the parents to be precluded from recovering damages because the father knew the work the boy was doing, and the mother received the wages, if they did not know the boy's exact age until after his death. (Telinko vs. Pittsburgh Coal Co., 68 Pennsylvania Superior Court Reports, 143.)

Injunctions Against Unlawful Strike Measures—In 1907, a coal company obtained an injunction against certain unlawful interferences with the company's business in an attempt of the defendants to unionize the mines of the corporation. The injunction was directed, also, to "all other persons whatsoever who may have acquired notice, information, or knowledge of the judgment," etc. It is held by the United States Circuit Court of Appeals, Sixth Circuit, that this decree did not bind persons who were not parties to the suit, and who ten years later took part in another and unrelated strike, although members of the same labor union involved in the first strike. (West Kentucky Coal Co. vs. Tosh, 252 Federal Reporter, 44.)

Liability for Malicious Prosecution—Affirming a judgment against defendant, awarding damages in favor of plaintiff, for malicious prosecution, instituted by an employee of a detective agency engaged in looking after defendant's interests, it is held by the Virginia Supreme Court of Appeals that to sustain such an action it must be shown that the prosecution was instituted by defendant, and has terminated favorably to plaintiff, that it was instituted without probable cause and with malice. A private detective working for a coal-mining company, and subject to its control, is an "employee" of the company in the sense that the company is liable for malicious prosecution set on foot by him in the course of his work for the company, although he may have been paid for his services by a detective agency which assigned him to the work under the agency's contract with the mining company. It is a good defense to an action of this kind that the defendant acted in good faith and in reliance upon legal advice in starting the prosecution. (Redd vs. Clinchfield Coal Corporation, 96 Southeastern Reporter, 836.)

DEPARTMENT OF HUMAN INTEREST

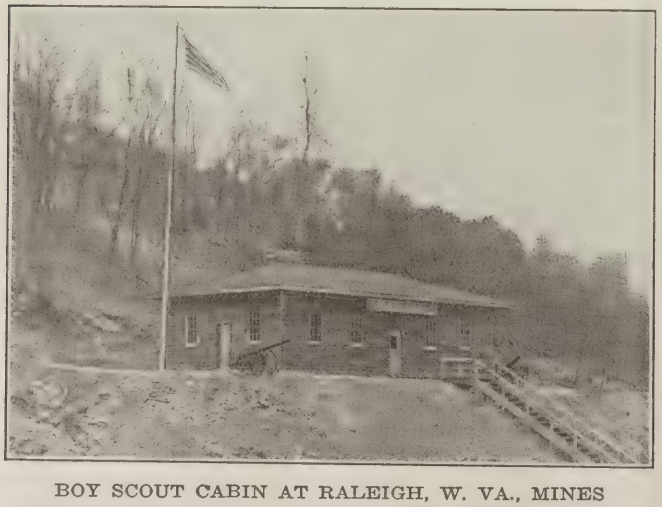
President Wilson Recognizes Loyal Help of Raleigh Boy Scouts

The Boy Scouts of Raleigh, W. Va., like the other bodies of that up-to-date mining town, is a thriving institution. *Coal Age* has already spoken of the Virginia theater erected by the Raleigh Coal and Coke Co. and of the large number of automobiles that are owned by the employees of the same company (see *Coal Age*, Vol. 9, page 977). The employees of the company have also a mining institute and several bands (see *Coal Age*, Vol. 9, pp. 680 and 681). In earlier years the Boy Scouts formed a less imposing feature of the village, but when the war occurred it gave the boys an opportunity to show their spirit.

During the canvass for the Third Liberty Loan the boys of Raleigh Troop No. 2 were extremely active, and as a reward they succeeded in securing the American flag which was offered in every state by President Wilson to the Boy Scout troop which performed the largest service. They have the flag in a glass case at their troop cabin. It measures 5 x 8 ft. and is of pure silk bordered with a gold fringe. It has a silk cord and tassel. There is also a leather socket and belt for carrying the flag.

A broad silver band at a joint in the staff has the following inscription: "Presented by the President of the United States of America to Raleigh Troop No. 2 of West Raleigh, W. Va., for distinguished service in the Third Liberty Loan of April, 1918, for State of West Virginia."

The work of the troop was no less remarkable when it undertook the sale of the bonds of the Fourth Liberty



BOY SCOUT CABIN AT RALEIGH, W. VA., MINES

Loan. The boys placed three large subscription clocks in conspicuous places in Raleigh and moved the hands of these clocks daily so that they registered the progress of the drive. One clock showed what was being subscribed by the white people and another the bond purchases of the colored people. A third showed the pledges of the whole people, white and colored. At the close of the campaign the total subscription was found to be $53,250. Of this the white people subscribed $28,000 and the colored people $25,250.

Taking into consideration the fact that the majority of the colored citizens have been at Raleigh less than a year, this subscription by the colored people demon-



BOYS WHO WON PRESIDENT WILSON'S TROPHY

strates that they were equally interested in the great fight for democracy, 135 of them having subscribed this magnificent sum. These good fellows did not stop at the lowest loan procurable, for their subscription averaged, as a little calculation will show, $187.04 per person.

Consolidation Coal Co.'s Subscription to the Fourth Liberty Loan

The employees of the Consolidation Coal Co. subscribed $728,950 to the Fourth Liberty Loan. The Maryland division subscribed $62,500; the West Virginia division, $294,000; the Pennsylvania division, $140,000; the Elkhorn division, $151,200; the Millers Creek division, $55,650, and the Baltimore office, $25,600.

The officials of the company also purchased large amounts, the largest sum subscribed being $105,000. These purchases by officials brought the total subscriptions above the million-dollar mark. In addition to this the company, as a company, bought a million dollars of the loan, making a total for employees, officials and the company of over two million dollars.

The employees subscribed $498,950 more to the fourth loan than to the first, $455,950 more than to the second and $200,100 more than to the third. In all they have subscribed $1,761,700 to the four loans. Each loan has shown an increase, though the ranks were thinned by 12 per cent. of the men entering military service. There are 1282 stars on its service flag, and in its January issue of the *Monthly Magazine* the company had regretfully to record that eight men had made the supreme sacrifice and given up their lives in the service of their much-beloved country.



Director General Hines Sheds Light on Railroad Fuel

With 80 per cent. of its coal requirements covered by existing contracts, the Director General of Railroads has announced that it will be impossible to effect much greater distribution of orders unless operators holding contracts will be willing to abrogate them for the general good. With regard to the matter of better distribution of coal purchases which have been insisted upon by the National Coal Association and by representatives of the United Mine Workers, the Director General said:

Only about one-fourth or a little more of the total bituminous coal production is consumed by the railroads. To a very large extent the mines whose output can actually be used for railroad purposes is restricted on account of the quality of coal needed. A further important point is that at the request and, indeed, at the insistence of the Fuel Administration the Railroad Administration has made contracts for a large part of its coal with the result that only about 20 per cent. of the coal used by the Railroad Administration is not covered by contract. Naturally the contract coal cannot be modified except with the consent of the operators.

The only other possibility that occurs to me is that if the operators with whom we have made contracts for about 80 per cent. of the coal are willing to release us from those contracts, we will be glad to distribute that coal among the various mines which can produce the necessary quality of coal and which will be willing to sell at the same prices we have under the contracts.

Some time ago our attention was called to the fact that there was a concentration of orders for the Railroad Administration in certain fields so as to leave other fields without orders. We promptly met this situation by giving instructions that coal should be bought as far as possible by each railroad on its own railroad.

With regard to giving publicity to bids the Director General has ordered that "any prices which are established will be available to representatives of the miners or others who may be interested and who may request the information, both as to prices and as to the names of the sellers."

So as to be clear of any charge of trying to force down wages, the Director General has provided that purchasing agents must not suggest any prices to operators and must stipulate that purchases are to be based on existing wages.

After promising that withdrawal of coal from storage would be diminshed, Director General Hines said:

The very large amount of storage coal which the railroads have accumulated was accumulated at the request of the Fuel Administration, and while we are endeavoring to use this storage coal in such a way as not to embarrass the situation, the fact remains that the coal is there and must be consumed.

The National Coal Association, which has been one of the principal parties to the controversy, accepts the ruling of the Director General as satisfactory. The Association has been contending that all bids should be opened at a given time and place in the presence of the coal operators interested. It is regarded as very likely that the Railroad Administration will go a step further and allow that procedure to be adopted. J. D. A. Morrow, the secretary of the National Coal Association, is outspoken in his commendation of the spirit of fair play which has actuated the Railroad Administration officials, throughout the entire discussion.

Pooling of Freight Equipment Proved To Be a Good Measure

Pooling of freight equipment has been accompanied by such success as to make a return to the old methods of car distribution unthinkable. This opinion was expressed by E. H. Degroot, Jr., assistant manager of the car-service section of the Railroad Administration. He expands his thought in this connection as follows:

So far as the work of the car service section is concerned, it should be possible to forecast the future with some degree of accuracy. For example, the common use of freight equipment under centralized control has proved so successful that a return to the old individualistic methods of car distribution is unthinkable, and the car service section or some other agency with plenary powers will undoubtedly have to continue to supervise and control the relocation of freight cars indefinitely.

Many of the responsibilities of the commission on car service in the days before the United States entered the war, and prior to the creation of such war organizations as the Fuel Administration, Food Administration, War Industries Board, etc., bid fair to become again problems of the car service section with the passing of those organizations, and as the transportation requirements of the post-war period of reconstruction develop. In short, for the car service section, the signing of the armistice promises to change the form of some of the questions which must be answered and to superimpose others which cannot be disposed of within any definite period which it is now possible to foresee.

Now I believe that one thought which your president had in mind when he said, "We want to keep the good things that have been developed," was that you would want to have a share in further developing these things in the days to come, and so I shall close with a few brief suggestions along that line. As shippers you can help by (a) ordering cars only as actually required; (b) loading them promptly; (c) loading them to journal or to cubical capacity, as the case may be; (d) tendering shipping instructions early;

(e) billing the freight (as far as is possible) direct to destination and to the final consignee; and (f) transmitting bills of lading promptly for all order shipments, making sure that consignees are given necessary information to permit expeditious handling.

As consignees you can contribute to this good work by (a) accepting freight promptly and, when switching orders are necessary, placing them in advance of the arrival of cars if possible, taking up bills of lading without delay in all cases where they are involved; (b) unloading cars as early as possible without taking advantage of free time allowances; and (c) advising agents as soon as cars are released.

Discusses Coal Provisions of the Oil-Land Leasing Bill

While principal interest surrounds the oil features of the so-called oil-land leasing bill, the coal provisions of that measure came in for frequent controversy during the discussion of the conference report in each House of Congress. Senator Pittman, in the course of debate, made the following statements with regard to the coal provision:

The bill provides that any citizen of the United States may acquire either by purchase or by lease not to exceed 2560 acres of coal land. That is the provision. Now, if it is acquired under lease it is acquired under the general provisions of the bill. If it is acquired by purchase he must designate the tract of land, and it must be advertised and published and put up to public competition. After the price and value have been fixed by competitive bidding, then the Secretary of the Interior decides whether he will accept any of the bids or not. If the Secretary of the Interior is honest, then the Government will get the full price of the coal land. But Mr. Pinchot says it will not buy coal lands because people would rather lease them. But if they do buy it, then it is on a value determined by competitive bidding, and even after the price fixed by competitive bidding the Secretary of the Interior can say, "I do not consider that fair to the Government and I will not take it." It all depends on the honesty of your administrative officers, both as to the leasing provisions and as to the sale provisions.

But that is not all. There is not a stockholder in one of the big coal companies in this country who can acquire a lease or title to a foot of coal land under this bill. There is not a man who is interested as a stockholder in any other corporation or as an individual in any other coal in the country in excess of 2560 acres of land who can become a lessee or a purchaser under this bill. Where does your monopoly come from? How can you possibly monopolize 40,000,000 acres of coal land under such a provision? I tell you the object of the bill is to fight the monopoly.

Regulation Suspended on Tidewater Shipments and Reconsignments of Coal

Reconsignments of coal now may be made without restrictions. Operators shipping to tidewater are no longer required to consign their coal to the Tidewater Exchange. A formal order making possible the return to pre-war conditions in the two particulars mentioned above was issued Feb. 22 to become effective Feb. 28. The Fuel Administration calls attention to the fact that voluntary arrangements to operate through the Tidewater Exchange are in no way interfered with by the order.

Exports of fuel during the latter half of 1918, according to the Exports Control Committee, averaged 165,255 tons per month.

Commission from United States to Observe Rehabilitation of French Mines

The Bureau of Mines commission which will spend several months in Europe observing the engineering practice in reopening the destroyed mines of France sailed from New York Feb. 15. The commission consists of George S. Rice, the chief mining engineer of the bureau; F. G. Cottrell, the chief metallurgist, and F. R. Probert, one of the bureau's mining engineers.

Warns Against Use of Army Gas Masks in the Coal Mines

Fearing that returned soldiers will attempt to make use of the army gas masks in coal mines or other places where poison gas may have accumulated, Director Manning of the Bureau of Mines makes the following statement: "The army gas mask should never be used in mines, because of the uncertainty that exists as to the amounts of gases in the atmosphere and the liability of there being insufficient oxygen to support life. Its use in the mines will lead to serious accidents and fatalities."

Toledo, Ohio, has been eliminated as a rate basing point for coal shipments. An order by the Director General of Railroads points out that no coal is produced at Toledo and makes unnecessary the Toledo coal tariff.

Conclusions of the Senate Committee on Manufactures, in regard to the coal situation, will be submitted to the Senate before the close of the session on Mar. 4, it has been announced. A. B. Jessup, Percy Madeira and A. C. Dodson appeared before the committee Feb. 18 to make supplemental statements. Members of the committee are already at work on the report.

Colliery Notes

In general, too much stress is said to be attributed to the advantages of pulverized coal, regardless of its manner of burning, and overlooking the operating difficulties. A wide range of choice is possible in regard to the equipment for drying and pulverizing, as the development of such machinery has been encouraged many years by the cement industry. It is thought that the real problems connected with the use of pulverized fuel are those of properly handling, feeding and burning it.

In a discussion about the smoke produced by byproduct coke ovens, W. H. Blauvelt stated at a recent meeting of the American Institute of Mining Engineers that it was made almost entirely during the time of charging the ovens; at that time the ovens are cut off from the hydraulic main. The amount of smoke that escapes at this time is extremely small compared with the amount produced by a beehive plant; the mechanical difficulties in preventing any escape of smoke at charging time are considerable. However, several devices are in operation at a number of plants which collect most of the smoke made during charging, and several devices are being worked on for its complete elimination. These will probably be employed only where the smoke is objectionable on account of the location of the plants, as the value of the byproducts in this smoke is quite small.

EDITORIALS

Mule Versus Motor

THERE are some who will be sorry to see the original motive power of the coal mine—the old mine mule—disappear. They will, however, be few and far between; and certainly the "skinner" will not be among them. There is little doubt that he will relinquish his mule in favor of the more inanimate but docile motor with a sigh of relief.

The mining reports for the State of Illinois give some interesting statistics showing the decline in the use of animal haulage and the simultaneous increase in motor haulage. In the year 1900 there were 512 mines in which animal haulage was used, and in 1917 there were only 113; electricity was used at only seven mines in 1900, and at an even 200 mines in 1917.

In 1900 the tonnage handled by the mine mule was about fifteen times as great as that handled by the electric motor, and perhaps it was little thought that the former would meet his Waterloo only ten years later. But in 1910 we find that mine motors in Illinois handled 23 million tons of coal as compared with 21 million hauled by mine mule. From this time on the tonnages handled by the two methods have spread rapidly apart, until in 1917 the mine motors are credited with 67 million tons as compared with less than 9½ million tons by animal haulage.

The result in other states, with similar haulage conditions is much the same. No better proof, perhaps, could be put forward of the phenomenal development of mechanical equipment in the mining regions. The handwriting is on the wall, and the operator who fails to put his plant on the most economical operating basis possible will some day find himself facing prohibitive mining costs.

It is to be hoped that the United States will get her full share of international trade, but whether she ranks first, second or even third in the matter of the world's financing is less important than that she make good in her effort to humanize the work of reconstruction and extend throughout the world her disinterested ideals.

New England Seeks Freedom of the Seas

WHILE the Shipping Board diligently plans for a plebiscite to determine the future policy of the American merchant marine, it is much to be hoped it will not overlook the present high freight rates on the Atlantic Seaboard; for the situation is one crying for immediate correction. That the high rates still prevailing on coal shipped northward from Hampton Roads and Baltimore have not had disastrous effects on industrial conditions in Boston has been due to the fact that when the war ended Boston had on hand an abnormally heavy tonnage of coal.

Figuratively speaking, since that time Boston has been leisurely "Fletcherizing" the cud and doing it with more than usual care; for the cud was delivered to Boston at a war figure, and, being bought at a cost higher than Boston had ever paid before, it has been utilized with more than ordinary care. Before the season is far advanced Boston will be looking for fuel and wondering why it cannot be shipped at a lower cost.

It is true there are a number of wood steamers that have been built as a part of the emergency program, and these could be used for the transportation of coal were not these and certain small steel vessels lacking in carrying capacity and so uneconomical in operation. This is generally acknowledged by trade and governmental authorities alike. Such vessels must find their place, if place there be, elsewhere.

What the coastwise people want, and what they must have, are the large steel colliers that were withdrawn for oversea transport last year to meet an actual need. That being the case, a thorough canvass should be made at as early a date as possible to determine what ships of 5000 tons and upward can be restored to the trade, for only such ships can meet the conditions competitively. An 8000-ton ship takes no more officers and only a few more seamen than a 3000-ton ship. Therefore only ships of the large size can transport coal at a low price.

While the war lasted it was imperative to reserve as much space as possible for Government shipments. It was necessary also to maintain coastwise rates at a point high enough to keep neutral vessels, and vessels built at high cost, in operation. The war is now to all intents and purposes over, and with it have largely ended the necessities just detailed. The neutral ships have departed, and the new steamers constructed on the Great Lakes are tied up in Atlantic ports without orders and without even railroad requisitions to keep them going. Despite this change in conditions, rates remain unchanged at the level established in April, 1918.

This posture of shipping matters causes the New England manufacturers much apprehension, as will be seen after a little consideration. As an example, a large power plant has been constructed at tidewater so as to obtain cheaply transported fuel. It has established business inland on the ground of cheapness of the water-borne fuel with which the power plant is provided.

Today the lowest rate by steamer is $3.65 from Baltimore or approximately $5.50 from the mines. The all-rail rate from central Pennsylvania is $3.75. Thus there is a differential of $1.75 per gross ton, right at the tidewater destination. This tidewater plant has power sold inland to stations where rail coal is easily accessible. Fortunately, each contract for power has a coal clause so that the extra cost of water-borne coal falls on the inland user as well as on the plants nearer tidewater. But the high cost of power is giving the client much

dissatisfaction. He feels that with rail-borne coal he could produce the current himself at less cost than he can buy it of the concern with which he has a contract. In any event, the tidewater power plant has not the advantage it sought in establishing itself along the coast.

Steamers owned by coal shippers are actually tied up because the rate of freight set by the Shipping Board is not merely a maximum rate, as was the price of coal recently set by the Government, but a mandatory rate, not to be deviated from upward or downward, and applicable to all steamers requisitioned by the Board in 1917; namely, to all those being of 2500 tons deadweight and upward.

This classification covers practically every steamer in the coastwise coal trade, so not a single shipowner is free to charter his boat at a penny less than the mandatory rate. Not only is this true, but furthermore a big tonnage has been operated largely through an office maintained by the Emergency Fleet Corporation. Barge rates were kept high to accord with those charged for boat tonnage. The barges could have been chartered at lower rates if the chartering had been done in an open market. Even those high in authority little understood the problem faced by tidewater coal users, but New England will have to make it understood if action is not soon taken.

It has been felt in trade circles that an adjustment of the railroad fuel problem would help clarify the status of coastwise shipping, because so large a proportion of railroad supply coal in New England has normally been shipped by water; but unless there is some coördination in the next few months between the two means of transportation, we shall experience difficulties far more serious than those we are now going through. Will not some capable man or body of men, in the Interstate Commerce Commission, or elsewhere, step forward and show some real grasp of this business of freighting coal?

Men, when they strike, do not strike so much against their employer as against the rest of mankind. Increased wages must inevitably come out of the pockets of consumers (all human beings are consumers) or out of profits. If they come out of profits, business is starved and becomes unprogressive and inefficient, and may even be destroyed as have been the railroads. Many of the street-car lines, owing to strikes, have been put out of business. A strike against mankind is justified only when the men striking are receiving a lower relative wage scale than their work and talent merit.

Why Doesn't the Consumer Get Busy?

CONSUMERS are the most futile of persons. They are always disposed to support any move for an increase in wages. When the increase is granted and costs rise in accordance, they are then extremely wrath that they have been bitten. They blame, however, the man that pays the larger wages and not the man who compels their payment. The consumer, like a child, puts his finger in the flame and wonders why it burns him and not somebody else.

There was a time when there were no labor unions or when labor unions were purely local things, and operators of coal mines could lower wage scales individually or locally and make a profit in so doing. In that period, long removed, so much removed as to be almost historic, it paid the operator to fight for low wages. At that time it became ingrained in the genus operator to resist the workman seeking an increase. It became a second nature, a nature so strong that the same spirit rules even though conditions have changed immensely, and the operator has now little or no reason for resistance.

Today unionism is not local. It is national, and the operator must everywhere pay the scale. The only questions are: Does the wage advance hit every producer equally? and "Can he pass it on to the public? Increases in mine wages do usually hit every producer in any industry almost equally. In steeply pitching measures where mining is unusually expensive, there is a difference in cost which is important, making wage increases naturally discriminatory and locally oppressive of the operator. But in general the operator is not moved by reason in opposing an increase, for surely the answer to the second question is that he can pass the increase in wage on to the public, wherever conditions are equal.

The average producer has now no cause for resistance. Let us hope he will never realize that conditions have changed so markedly that resistance to wage demands is merely patriotic and philanthropic and not a measure of self defense. Let us hope consideration does not drive that conclusion in on him, for he is moved so little, under normal conditions by patriotism and philanthropy that he will let his employees burden the public with high costs without any resistance whatever. Fortunately all the latent conservatism, and all the memories of bitter struggles when to win meant abounding profit and when loss meant impending gain makes a cave man out of the coal operator and he fights heroically for what he thinks is his own interest, but which is really the sole interest of the consumer. Meanwhile the consumer tries to trip him up. He brings pressure in every way to induce the operator to give up his battle.

Of course, there are wage battles in which the consuming public should take sympathetic interest, where, for instance, men are trying to get a percentage increase in proportion to their past wages equal to that already granted a large percentage of workmen. Labor unions will be excused if they look sympathetically on such struggles. But to aid all strikes, thinking it is helping the cause of labor, is a plain folly. The workman is a consumer. He is interested in seeking a lower wage for every other workman outside his family. Still, of course, as an honorable man, he will have no objection but rather a pleasure in seeing every good workman get a fair wage whether by striking or without such labor disturbance.

Some day the consumer is going to take a hand in preventing uncalled-for wage increases as unfair and unbalancing of labor conditions. We are all paying the wages of one another when we buy necessities and luxuries. We are all consumers. In so far as we are consumers, we are interested in keeping down the wages of production to a fair figure. We must not neglect that duty. We must not blame the employer if he does not perform it for us. It is the consumer's duty. Why, then, doesn't the consumer get busy?

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Labor matters are simmering gently. However, a little disposition seems to exist to ask the Government to take charge of the mines, but really the feeling is not strong. A Government that in some instances takes months to report casualties and pay soldiers' wages, to mention two matters only, is not likely to regulate business any better than it is now regulated.

The Government was the cause of the present overproduction of the coal. It is not at all to be blamed for it, of course. It is to its credit that it boosted production and made storage possible. But rightly or wrongly (it makes no difference which), it made this present condition and it would have made it had there been Government production rather than Government control.

If the people will not buy, even the Government will not produce coal indefinitely. If the coal is mined and stored in large quantities at one place it will catch fire and burn. After all, not all the idleness is at mines. The trouble is that the people will not buy. Will the Government compel the individual to buy against his will? The miner will say the public can be compelled to buy coal, but he will not readily admit that it can be required to buy a host of other things which could be made by people that are idle.

The public is like a child looking out at a rainy day. Almost the only course is to let it rain. An umbrella may be provided to shield us against some of the rain's violence, but on the whole what can we do to adequately meet the phenomenon? Why look to the Government? It has been slower than all other agencies since the war. It has shown less resilience than the average employer of labor.

The United Mine Workers of District No. 9 meeting at Kulpmont in the anthracite region feel that the Government should take the mines over. The men in Illinois have voiced the same idea. But it is not clear that it would lighten the burden at all and it is certain that leaving the affairs of the nation in the hands of one or a dozen men would not make for such efficiency as the present distribution of responsibility.

Board Gives Labor Favorable Decisions

After hearings covering several days Special Umpire Allison O. Smith, representing the United States Fuel Administration, rendered on Feb. 1 several decisions regarding matters long in controversy between the miners and operators of the New River and Winding Gulf fields. These points at issue were first presented to Judge Smith in December.

As to the increase in pay of monthly men he ruled that it should apply for every day worked, whether 25 or 31 days in the month. In the case of the employees of the Rayland Coal Co., who claimed that no allowance for yardage had been given them though it was stipulated in a contract with the company, Judge Smith gave his decision in favor of the employees. The discharge claim of D. L. Campbell against the Turkey Knob Coal and Coke Co. was settled by an agreement that the man should be reëmployed but that he should not be compensated for any time lost.

Further depositions were requested in a case growing out of a strike among the employees of the Elkhorn Piney Coal Mining Co., at Stannaford in Raleigh County. The employees of the company charge that the concern has not been living up to a decision previously given.

The statement made by the operators at the Feb. 1 meeting exhibits just how they regard the demand of the men for a new wage scale in the New River and Winding Gulf districts:

"Relative to your request for a conference at White Sulphur, W. Va., on or about Feb. 1, we desire to say that the New River and Winding Gulf Operators' Associations are of the opinion, and have so decided, that the United States Fuel Administration has heretofore, at what is known as the 'Washington Wage Conference' held at Washington, D. C., on Nov. 1, 1917, settled, for the period of the war, or until the peace treaty is signed, and possibly until April, 1920, the wage that should be paid our employees, thus rendering a conference between our employees and ourselves relative to wages unnecessary.

"The ruling of the fuel administration made at the 'Washington Wage Conference' is still in force and effect, and inasmuch as the ruling or order was accepted, adopted and acted upon by all the parties concerned, that is, the employees and employer alike, it became binding and by virtue of such adoption superseded the contract then in force between our employees and ourselves. In view of the status so fixed and determined by the Fuel Administration as hereinbefore mentioned, we have decided that we have no right to change the same during the time that such ruling, as heretofore announced, is effective."

With Peace Will Aliens Come or Go?

Although the operators in the Connellsville coke region have to learn what the Federal Congress or the Peace Congress may decide as to emigration or immigration, they are giving serious attention to the prospects of a general exodus of foreign-born mine and coke workers to Europe. The effect of an unlimited immigration program upon the labor situation in the region is also being studied.

Those, however, who have examined the matter most closely seem to be of the opinion that there will be no material exodus. They argue that should governmental restriction not prevent migration to Europe, the high taxation which will exist on that continent as a result of the war, possibly also the low wages and the unfavorable living conditions will discourage many of the foreign-born workers in the region from planning any extended stay in Europe, though some may make a short visit. Another factor is that the foreign-born worker, fearful of banks, has invested heavily in property in the Connellsville region and in federal securities which in many cases cannot be converted quickly into ready cash without a loss. The alien is usually a canny proposition in such money affairs.

It is believed that the more serious danger lies in an exodus of workers into the region. Of this there are prospects. Since the war began the aliens in America have learned more than ever the advantages of living in the United States and as their letters to relatives abroad have detailed their prosperity the war may easily result in a larger immigration than ever before.

Russians Not Coming to Western Canada

Considerable feeling has existed in some British Columbia and Alberta coal-mining centers relative to a report that operators were arranging to import Russian coal miners in order to permit of the fullest possible development of the mines. The rumor was denied, but it persisted, and as far back as Dec. 10 an inquiry was made by W. F. McNeill, Calgary, Alta., of the Department of Labor, at Ottawa, with the result that G. D. Robertson, Minister of Labor, sent the following explanatory letter flatly refuting the statement:

"In reply to your letter of Dec. 10 would say that, on Nov. 11, the department received notice to the effect that

the Canadian Pacific Railway Co. was negotiating with the Western Coal Operators' Association in regard to the importation of 400 Russian miners despite the fact that several of the Western mines through lack of orders were not then working to full capacity. My wire of Nov. 11 states that inquiry was immediately made in regard to the supply and demand for miners. That inquiry confirmed the statement that the mines were not fully occupied through lack of orders and that there was no necessity for importing miners from Russia.

"The Canadian Pacific Railway Co. was accordingly asked to discontinue any negotiations of this character. Subsequently the railway company advised that no negotiations had been in progress, which fact was later substantiated from other sources. Your letter indicates that an utterly incorrect interpretation was placed upon the telegrams exchanged."

Canadian Mine Worker Soldiers Resent Presence of Well-Paid Aliens

The Legislature of British Columbia has recently adopted a resolution advocating that all enemy aliens be deported from Canada and that the Canadian Government should be careful to retain full control of immigration to the Dominion, whatever other concessions may be granted at the Peace Conference.

The debate on this subject was of special interest to the coal miners and the workers of all industrial sections of British Columbia, but it was followed with particular keenness by the miners of Vancouver Island coal areas because the employment of aliens in the mines has for years been resented by the English-speaking classes of these sections. William Sloan, Minister of Mines, who is the representative of the latter districts in the House, spoke strongly in their behalf, supporting the proposal that the Dominion Government should be asked to deport all enemy aliens and moving an amendment to the effect that "Canada's representatives at the Peace Conference be asked to adhere firmly to the principle that Canada shall always exercise full control over immigration to the Dominion."

He not only wanted aliens put out of the country but wished to be sure that, once out, they would be kept out. This was a matter, he said, of primary interest to his constituents. The coal miners of the island, and in fact of the whole of the Province, had furnished considerable quotas to the Canadian Army. Their war record, as to fighting men provided and in every other respect was one of which they were proud. Now those who had gone were coming back to find, in many instances, that while they fought for their country at $1.10 a day, aliens had been filling their places at home at high rates of pay.

Their demand was that all enemy aliens should be returned whence they came, and their places filled by returned soldiers as far as possible and where this was not possible by British subjects. Recent statements indicated that the whole question of immigration was to be discussed at the Peace Conference. It was possible that, at such an international conference, some of the delegates developed a disposition to make concessions. He felt that Canada should not surrender in the slightest degree the principle that her Government control the character of the tide of immigration which was bound to flow from the mixed populations of Europe and Asia.

Canadians Will Make a New Wage Contract

The result of the election of officers of the United Mineworkers of America in District 18, which includes eastern British Columbia and the Province of Alberta, has recently been announced. In the contest for the presidency P. M. Christopher, of Blairmore, has defeated David Rees, of Vancouver, B. C., by a majority of 1486 votes. Alexander McFegan, of Brule, Alta., defeated William Dickenson, of Fernie, B. C., by 1100 votes for the vice-presidency. In the election of auditor G. Christie, of Bellevue, defeated William Potter, of Fernie, by 528 votes.

A second election had to be held before the offices indicated were filled, as the constitution requires that every officer must have over 50 per cent. of the votes cast and, in each case there were originally more than two candidates in the field. These officers will be installed Mar. 1, probably at the conclusion of the annual district convention. The newly-elected officers will be charged with the conduct of negotiations for the renewal of the working agreement with the Western Coal Operators' Association, which agreement expires on Mar. 31 next.

Want Political Prisoners Freed

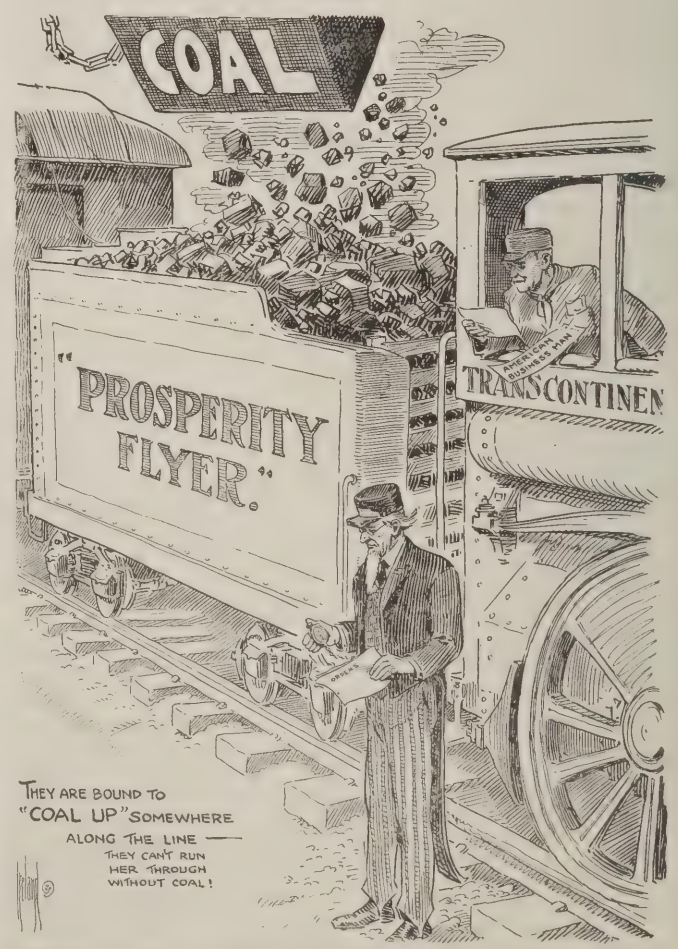
The local unions of Carbondale and Coleman, Alta., Canada, which are affiliated with the United Mine Workers of America, have passed the following resolution:

"We indorse the action taken by the Alberta Federation of Labor Convention at Medicine Hat, demanding the release of all political prisoners incarcerated during the war and are ready to fall in line with any action the Executive of the Alberta Federation of Labor may take, no matter how drastic, to attain that end."

In particular much resentment is shown to the arrest and conviction of Thomas Shannon, secretary for the Diamond City local, near Lethbridge, Alberta, on the charge of having in his possession banned literature and other correspondence in connection with the local. The men argue that if the action taken against Shannon were to become general the secretaries of all unions would be placed in a precarious position and liable to arrest at any time.

The following resolution was carried:

"It is unanimously resolved that we urge upon all locals in the district to take immediate action in this matter, fix a date as early as possible, and all cease work until Brother Tom Shannon is released from prison."



BETTER DAYS ARE SURE TO FOLLOW. BE READY WHEN THEY COME

Courtesy of "Retail Coalman"

Turn About Is Fair Play



Miner—Give me some more, Columbia, me good lady, and a little for the other boarders, too?
Columbia—No more for you my friend. We can't keep any star boarders here. Already you have the share of the other boarders.

Every man is both worker and consumer. A worker in one industry is a consumer in another. When one group of workers gets increased wages, the other groups have to pay more for the goods produced by the first group. Mine workers' wages have risen more largely than the wages of bricklayers, stone masons, carpenters, teachers and others. These people have to pay the mine workers' wages, and they think they ought to make the mine workers pay them more before they are asked to pay the mine workers more. Remember the workers in many industries are getting but little more than before the war and they are entitled to first consideration.

DISCUSSION BY READERS

Coal, Railroads and the Government

Letter No. 1—The proposition presented by the Foreword, in *Coal Age*, Jan. 23, is an interesting one and, as stated, underlies, in a great measure, the future prosperity of the coal industry in this country. The question of the ultimate effect of government control of the railroads on the marketing coal is one that is beset with many possibilities. It is my opinion, however, that the action of the Government in taking over the railroads will prove a benefit to the coal industry.

Investigation by the Government into the conditions that hampered the production of coal revealed the influence exerted by the railroads, who controlled the distribution of the product of the mines in an unfair manner. Such was the condition that it became necessary for the Government to take a hand and assume the responsibility of railroad transportation and management. My belief is that, from the lessons then learned, the Government will not permit the coal industry to suffer a repetition of those influences that held it in restraint at that time.

The crisis brought about by the war furnished the chief reason for the Government assuming the control of the railroads, in order to bring about a more equitable distribution of car supply at the mines, establish a suitable zoning system for the marketing of the coal produced, and in other ways relieve the serious fuel situation that then existed.

Railroad Influence Restricts Coal Industry

Judging from the information available, it would appear that the railroad companies have never done anything to improve the coal business. Their action in buying large quantities of coal at the mines, at their own price, has been most unfair, especially to the smaller operators. The effect has been to injure the business.

It was, previously, in the power of the railroads to control the supply of cars to the mines to their own advantage. The resulting car shortages prevented many operators from meeting their coal contracts. It is my hope and belief that government ownership will eliminate these conditions and establish a more equitable basis for the marketing of coal than has hitherto existed.

Even when the Government fixed a maximum price, per ton of coal at the mines, the railroad companies claimed that a special price should be made to them, owing to the large consumption of coal in the operation of their engines. This and other questions of similar import must be settled by the Government, in their administration of railroad matters.

While there are many Government reforms necessary to be made, before one can say positively that Government ownership of railroads will be successful, there is scarcely a doubt but that such ownership will prove a benefit to a large number of coal operators.

It will be well for operators to consider carefully how this action of the Government is going to affect their business, and prepare to meet the problems that will be presented under the changed conditions, with a view to counteracting any injustice that might otherwise inadvertently fall to their lot. W. H. Luxton.

Linton, Ind.

Effect of Prohibition in Mining

Letter No. 2—From numerous letters that have appeared recently, in *Coal Age*, discussing the many hindrances to coal production, it seems to be the general opinion that the use of intoxicating drinks was the greatest hindrance. Most of these letters came from writers in wet states; but, even in this dry state of West Virginia, the intemperance of miners is a distressing problem to the coal industry.

Time was when every thatched roof sheltered at least one jug, even at the expense of the loaf of bread; and the song commonly sung was,

> "Father, Oh Father, come home with me now,
> The clock in the steeple strikes one."

A Sunday, then, seldom passed without its cutting or shooting scrape; a wife driven from her home and a general assortment of broken bones, cut faces, bleeding noses, torn clothing, shattered dishes, and domestic broils too numerous to mention.

Mondays were days to be dreaded by the coal operators. Few men showed up at the mine and those that did might just as well have stayed at home, so far as their ability to work was concerned. It was no uncommon thing for a mine superintendent to go to the house of every man who failed to appear at the mine and drag him from under a bed or from a closet in which he was hiding and compel him to go to work.

Effect of State Prohibition

Such, more or less, were the conditions in West Virginia mining camps when the state went dry. Then, for a time, there was a marked improvement; but, unfortunately, this section is as a small desert surrounded by three wet oases, as it were. Following each payday, a large proportion of the mining population of the district visits some near-by town in Ohio, Pennsylvania, or Maryland, in the fond hope of bringing with them on their return what the state law has prohibited here. At times, they "get by"; but more often the assumed innocent expression and nonchalent air, ludicrous to the onlooker who knows their habits and ways, betrays them to the authorities, and they are locked up and their recent purchases confiscated.

Another feature of state prohibition is the resulting home manufacture of what the foreign element fondly call "light wine." From its effects, the appellation given to this beverage seems to refer more to the head of the drinker than to the drink. The man becomes fairly crazed and his utterances are as ridiculous as

the fantastic performances he executes when under the influence of this drink. In one instance, the drinker tore up his parlor carpet; and, then, not satisfied with that took from its hiding his savings of several months and staked them at a game, which he lost in less time than it takes to tell it.

This "light wine" is made every fall by the French, Italian, Austrian and Hungarian elements. They do this with the same regularity that the housewife performs her summer canning of fruits and vegetables. They manufacture several hundred quarts for home consumption alone, and often more for outsiders. In one house in the Morgantown district, the authorities found and seized several thousand gallons of this wine. The drinker will seldom tell the name of the one who sold him the drink or say where he procured the beverage.

Today, this country is waiting with impatience to see the effect of nation-wide prohibition on mining conditions. The fear is often expressed that something bad or worse will be found to take the place of that which is lost. The coal industry must wait and hope for the best. M. P. H.

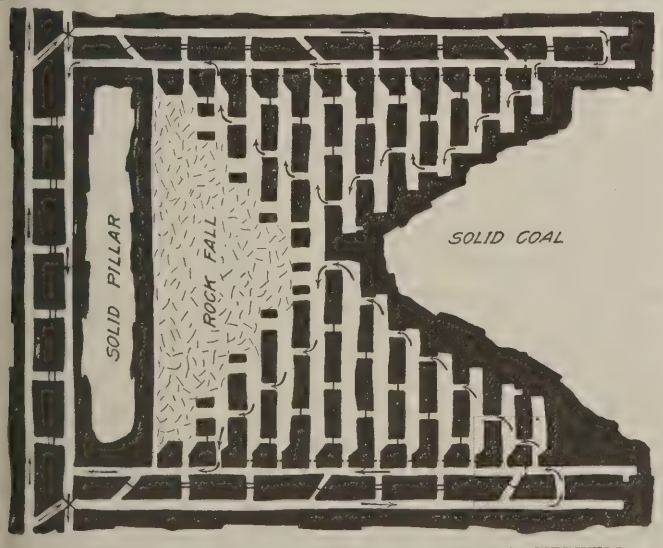
Rosemont, W. Va.

Drawing Pillars in Machine Mining

Letter No. 5—It pleased me much to see the method that I described for drawing pillars in machine mining appear in *Coal Age*, Feb. 6, p. 288. However, I am afraid that I did not make myself clear in regard to the method of attacking the pillars, since the figure given on page 288 shows that they are being cut on the side toward the falls.

That is wrong, as when a fall occurs from the drawing of the last pillar it will generally extend clear across the room and make it impossible to draw the next pillar from that side. The cut must therefore be started on the opposite side of the pillar from the falls.

In order to make my point more clear and to explain more fully how this method can be applied equally



DRAWING PILLARS IN THE ADVANCING SYSTEM

well when rooms are turned off two pairs of headings and driven to meet each other, I have prepared the accompanying sketch showing such an arrangement. It will be observed that the circulation here shown is suited to a gaseous mine, the intake air being conducted to the face of the crossheadings, where it enters the last room turned and passes back over the working faces of all the rooms before reaching the gob section where pillars are being drawn.

This plan not only provides for the ventilation of the working faces with fresh air and carries the gases generated in the pillar workings directly into the return airway; but, by advancing the crossover so as to keep pace with the pillar workings, all the coal from the rooms can be hauled out on the intake air. If desired, the coal from the pillar workings can be back-switched when the crossover to the intake is carried further forward. As fast as the ribs in the rooms are drawn, the section of road on the return airway is abandoned and the track lifted.

Pillars Attacked on Side Opposite to Falls

The plan shown in the figure is the advancing system of mining, which gives an early development of the coal. It will be observed that all the pillars are attacked, in the manner previously described, on the side opposite to the falls, which is the particular feature to which I desired here to draw attention. In the figure are shown thirteen places turned; one rib has been drawn back and is finished, while four other ribs are being drawn. Work on the sixth rib will soon be started at the face of room No. 7, which is just finished. The remaining six rooms are still working on each pair of entries.

When the entries have been been driven up and the rooms and ribs all drawn between the two pairs of headings that are shown in the figure, the work of retreating is started by turning rooms on the other side of these entries and working them back on the retreating system, after the same manner as has just been described in respect to the advancing system.

As the work progresses and the pillars between the rooms are drawn back, the entry stumps and chain pillars are taken out by the same system of retreating. Less and less difficulty will be found with the breaking of the roof, as the face over which the roof pressure is exerted is increased by the extraction of the coal, becoming practically double what it was previously. This will insure good roof falls and lessen the danger of a creep developing. D. F. M.

Meadow Lands, Penn.

Letter No. 6—I was much interested in reading the practical question of "Operator," *Coal Age*, Jan. 2, p. 32, asking for information in regard to the best method of drawing pillars in machine mining. Kindly permit me to give a little of my own experience.

In the coal mines of Australia, where I was formerly employed, conditions are more adapted to the use of machines than is generally the case in the mines of British Columbia where I am now working. However, I believe there are many localities here where machine mining could be employed to advantage, particularly as this system does not require a practical knowledge of mining coal, on the part of the man running the machine. He must, however, be able to operate a machine properly and keep things running regularly and systematically.

In machine mining, where pillars are to be drawn, the safest plan to adopt, in my opinion, is the following:

In British Columbia, the law requires that both the machine runner, who must be a practical man, and his helper must have a miner's certificate of competency. These two men will be able to handle, say four places and make a 5-yd. cut in each place, in a single shift of 8 hours.

Now, assuming the working places are double, the machine runner and his helper first make a cut, say in No. 1 left. When this is finished, the runner transfers his machine to No. 1 right, where he makes another cut. When that is finished, he takes his machine around to No. 2 bord or chamber and repeats the operation there, first making a cut in No. 2 left and then transferring his machine and making another cut in No. 2 right.

In the meantime, two loaders have started to load the coal that has been drilled and blasted by the miners working in these places. The work of loading is started in No. 1 left, the loaders following the machine and loading out the coal as quickly as it is blasted. There are also two practical timbermen, who do what timbering is necessary for the proper support of the roof, for the protection of the machinemen and loaders, so that each place will be ready for the machine to make another cut on its return.

A thin strip of coal is always left on the gob side when cutting through the rib. This is necessary to protect the machine and the men until that lift is finished. When a lift is finished, two practical miners are employed, at the current tonnage rate, to dig out the strip of coal left by the machine.

Success in Pillar Work Depends on Numerous Items and Considerations

In some instances, these miners drill and blast the coal after it is cut with the machine. At other times, the machinemen are provided with a rotary drill operated either by compressed air or electricity. In that case, it takes but a short time for the machine runner to set up the drill and put in three holes, one in the center and one on each side of the cut. This procedure, however, is at the option of the mine manager (foreman).

Any kind of labor will answer for the loaders, who will be under the direct charge and care of the timbermen. The success of the operation, the amount of coal recovered in drawing back the pillars, and the amount of timber saved will depend on the quickness with which each lift is cut through. Strong cogs should be built at the mouth of each lift to give better protection while the work is being performed. The front and bottom of the cog is set on a little mound of dirt to facilitate the withdrawal of the timbers forming the cog.

It is important to withdraw all timbers and other supports as the work proceeds, particularly where the coal is overlaid with a strong sandstone roof that is difficult to break. When timbers are left in the gob, the weight will be thrown forward on the pillars, which will induce a creep or squeeze, and it is necessary to guard against this contingency.

If desired, the above procedure can be varied by the practical miners doing their own loading and timbering, besides drilling and blasting the coal and mining out, with picks, the thin rib of coal left behind the machine. This will result, in most cases, in a considerable reduction in the current tonnage rates.

Wherever conditions are favorable to the use of machines, they should be employed as a means of increasing the production and lowering the cost. The system that I have described can be carried on in any number of districts desired, at the same time. However, the safer way would be to start with one district and learn what is necessary to effect any desired improvement in the method. This will, also, overcome the natural prejudice of the average miner, by beginning in a small way. The miner is generally inclined to oppose new methods; but most miners now prefer loading after a machine, to the old system of pick mining.

Matthew Stafford.
Chase P. O., Vancouver Island, B. C.

Safety in Shotfiring

Letter No. 1—Only recently, my thoughts have been recalled to an inquiry of a correspondent in Colorado, published a year or more ago. [*Coal Age*, Vol. 12, p. 647]. The inquirer desired to know to what extent the work of shotfiring was safeguarded in mines generating gas, and to what extent the mining laws of different coal-producing states discriminated between the firing of shots in gaseous and nongaseous mines.

As I say, my thoughts have been recalled to this inquiry by an accident that occurred a short time ago to a shotfirer, who was severely burned by igniting a quantity of gas with his carbide light. In this instance, the mine was classified as a "gaseous mine" and the law required the use of electric lamps, besides imposing other restrictions in regard to the powder used in blasting, copper-tipped tamping bars, etc.

The shotfirer, in this case, had 90 shots to fire and was accustomed to do his work in 4 hours. In his haste to finish, he neglected to make the required examination for gas before preparing the shots and further violated the law by using an open light. No objection had been made to this rapid work. As usual, we go on believing that everything is all right and ignore the fact that the law is being violated, until someone is hurt or killed, and then an effort is made to fix the blame.

Improved Methods Needed in Shotfiring

We have done well in saving thousands of lives by adopting improved shotfiring systems and making this a requirement of the law. Now, let us get busy and try to save the shotfirer from his own heedless neglect of these requirements. We may find that the coal-mining laws of Colorado will have to be altered so as to place more responsibility, for the proper performance of this work, on mine officials, who should know that the shotfirers whom they employ are fulfilling all the requirements of the law.

When a shotfirer is employed, he should be given to understand that 8 hours constitutes a working shift. His time should be divided so that 2 hours should be employed in making the examination of the working places, in his section of the mine. Then, 3 hours should be required to prepare, tamp and fire the shots, followed by an hour's rest and then 2 hours for making an examination of all places in that section, for fire and other dangers.

While the coal-mining laws of Colorado are good laws and insure ample safety when they are not violated,

trouble frequently grows out of the classification of mines by the state inspector, as required by law, designating certain mines as "gaseous" and others "nongaseous." It is my belief that every mine in Colorado should be classed as a gaseous mine and only electric lamps be permitted to be used except in testing for gas when it is necessary to employ an approved type of safety lamp, in the hands of a competent fireboss.

But, aside from the trouble growing out of difference in classification, there are many violations of the law, such as the use of open-flame lamps and matches by firebosses; the use of fuse, which is too often ignited by a match, a lamp flame, cotton cord or punk.

Igniting the Fuse in Presence of Gas

In many instances, firebosses have been instructed to use cotton cord or punk. One instance is recorded where a shotfirer had his eyebrows, nose and the back of his neck burned with gas that was inflamed when he used cotton cord to ignite the fuse, in firing a shot. He had been told that cotton cord and the spit from a fuse would not ignite gas; but, at the same time, he no doubt knew that he was violating Sec. 154 of the mining law.

In many instances, shotfirers are not intelligently informed in regard to what methods must be employed in the performance of their work, in the presence of gas. The object and aim of mining laws and the desire of the people is to secure safety in mines. It is my belief that the conditions that relate to safety, particularly in regard to the use of black powder, methods of firing and the time that should be employed in performing this work, as well as the ascertaining of the competency of firebosses who are employed, are not sufficiently outlined in the state mining laws.

The lesson is brought home to us, from time to time, that either the shotfirer's duties must be performed in the strictest compliance with the laws as they stand, or new laws must be made to safeguard the work of shotfiring in our mines. Robert A. Marshall.

Farr, Colo.

Efficiency in Firebossing

Letter No. 5—Having given much time and study to efficiency, in the work of firebossing in which I have been engaged during the past few years, I was greatly interested in the letter signed F. G. J., *Coal Age*, Dec. 19, p. 1133. I fully agree with the writer of that letter in his statement that "firebossing, in many coal-mining states, offers little inducement to the best-trained men." There is little incentive for men to study and prepare for this position, as it is at present regarded in many mining districts.

When a position begins to lose its importance and value, in the minds of the higher officials of an industry, it is bound to be classed or regarded by highly trained men as a position not worth having. In one instance that came under my observation recently, I noticed that it was a difficult matter to keep firebosses on the job. Inquiry as to the cause developed the fact that, after the morning examination of the mine, the firebosses employed there were compelled to go to work as ordinary daymen. However, the plan did not work well and the foreman, who thought that he could run the whole mine himself after 7 o'clock, openly admitted, a few weeks later, that "the man who does not consider the duties of his firebosses as important if not greater than his own is not working for efficiency in general."

A foreman who is wise enough to give credit to a good fireboss is unwittingly encouraging him to work in his own (the foreman's) interest, as well as that of the company and himself. A good fireboss means more to a mine foreman than anything else. At times, a danger arises in all mines that requires the best judgment and experience of a competent fireboss, to insure safety. A foreman may then rest contented while his fireboss directs the work. At the same time the foreman is free to attend to other matters that may need his personal oversight. Contrast this condition with a foreman who cannot trust his firebosses or who has failed to gain their confidence. Necessarily, such an one must give his attention to the matters that should be in charge of a man trained for that particular work.

Responsibility and Authority of the Fireboss

My opinion is that a competent fireboss should be counted the most important official on the daily force of a mine. He is responsible for the safety of both the men and the mine, and on his actions largely depends the production of coal in that mine. When a fireboss is underestimated by the other mine officials, the men are prone to disregard his orders, knowing that he is not backed by the foreman; whereas, an order of the fireboss should be *the last word* in respect to the safety of a mine, if accidents are to be avoided and the mine made healthy and safe for work.

A competent fireboss is as important to a mine foreman as the superintendent is to the company, because he spends all of his time in the mine and knows well the condition of every place in his district. He is always able to give any needed information that the foreman may ask.

In case of disaster or danger from fire, explosion, or squeeze in the mine, a competent fireboss has generally prearranged plans of what is necessary to be done for the safety of the men and gaining control of the situation. In his efforts to forestall any danger that may arise in the mine, the fireboss should never be discouraged by the other mine officials, which he is when his work, in that direction, is discounted by them as not of immediate importance.

Observing Firebosses Assist Their Foremen

The advantage that a foreman takes of the knowledge to be gained through his firebosses, is plainly evident by the inquiries he makes, each morning, in regard to how much coal is standing in certain parts of the mine ready to be hauled to the bottom, and what coal is loaded at the working face, besides asking for other information regarding trackwork and timbering that will assist the foreman in starting the men on the most important work to be done that day.

It goes without saying that the first consideration of a fireboss is the safety of the men in his charge, and when he is burdened with looking after matters pertaining to the movement of coal and the work to be performed by daymen at the start of the day's run, his own duties will naturally suffer. In his hurry,

many small matters that menace the safety of the mine will often escape his notice or be set aside for attention later. There is no question but that the efficiency of a fireboss is greatly lessened when he is compelled to attend to matters that should be looked after by others.

At the mine where I am at present employed, I am proud to say that the firebosses are given ample time to do their work properly. There is a good system in use regarding the movement of the coal. When the fireboss checks the men in the morning he marks on a blank, furnished for that purpose, what coal each man thinks he can load that day.

The runner in each lift gets this blank, which he returns to the foreman at the end of the shift, and reports how many cars each man has loaded and whether or not a loaded or empty car is standing in each place, besides the number of loads and empties on the main branch of each lift. This arrangement relieves the fireboss of all matters, except those pertaining to the safety of the mine, and has resulted in a remarkably low accident list, which is entirely due to the efficiency of the work of firebossing in this mine.

Low Standard of Efficiency in Firebossing

Were it not for the discouragement of the situation, it would be amusing to enter a fireboss station, in the morning, and watch him give his orders to the daymen and then proceed to daywork himself. Where a foreman has occasion to censure a man for not doing a fair day's work, the man comes back with the excuse that he has done as much as the fireboss, who gets more pay for the same work. The man apparently forgets that the fireboss has already done half a day's work, in making his morning examination of the mine.

Such a system presents a low standard of efficiency and sows the seeds of discontent among the men, which causes no end of troubles to the foreman. Where competent firebosses are subject to such treatment, it will be difficult to hold them in that position. The really competent fireboss will seek work elsewhere, before he will tolerate a low estimate of his ability and the importance of the work he performs.

Then, in closing, let me say that the only way to secure true efficiency in firebossing is for the higher officials of the mine to recognize the importance of that position and permit firebosses to give their whole time and attention to matters pertaining to safety.

Plymouth, Penn. Joseph R. Thomas.

Letter No. 6—I read with much interest the excellent letter of F. G. J. on this subject, *Coal Age*, Dec, 19, p. 1133. That writer emphasizes the point that "the fireboss should be, and is, in many mines and in many respects, as important as the foreman." There is little doubt but that being so considered will establish confidence in the fireboss, stimulate his ambition and increase the efficiency of his work.

The same writer, in closing his letter, urges that the fireboss "be regarded as a mine official, put on the salary list and treated by the mine foreman as his assistant." I wonder how many of the firebosses, in Colorado, desire to be put on the salary list, as formerly, when they were paid $110 a month for their services. The present wage scale of the fireboss, here, is $5.95 per day, which enables him to make from $178 to $184 a month. The salary of the mine foreman was formerly $130 per month and, by the present wage scale, that official draws $185 per month.

The fireboss in Colorado is a mine official in the meaning of the mine law, which provides for his examination and certification in common with other mine officials and, in my opinion, the fireboss is such an official. For the sake of argument, allow me to disagree with the suggestion made in the letter to which I have just referred that the fireboss should be "treated by the mine foreman as his assistant."

The Colorado coal-mining law provides for the employment of assistant mine foremen, whose duties are to carry out the instructions of the foreman and take his place in his absence; but the duties of the fireboss are of a different nature. That official goes home at 11 a.m., not to return to the mine until about 4 p.m. It is easy to see that he occupies a distinct position in the mine, and his efficiency depends only on the manner in which he performs his duties.

If the fireboss was an assistant to the mine foreman, he would have to obey his instructions. Right here is where trouble would begin. Suppose, for instance, that a fireboss is busy putting up a brattice to remove the bad air from a working place and the foreman orders him to make the second examination of the mine. The fireboss drops his work on the brattice to obey the instructions of the foreman, with the result that the miners who are thus left working in bad air get sick and go home.

However, the fireboss would seldom complain when thus called away, because he is given an opportunity of visiting the working places and marking the date on the face of the coal in any place where, in his hurry in the morning, he has failed to do that which the law requires. The foreman sees the date on the face, later, and believes the fireboss is efficient.

Need of Revising Mining Laws

It is a pleasure to know that the columns of *Coal Age* are open to any suggestions that are intended to make the mine more safe; and I want to say that it is my belief that the Colorado law could be revised to advantage, in one or two instances. In my estimation, the law should provide that the fireboss should enter the mine at 1 a.m., having with him a bratticeman and timberman. With their assistance, it would be possible to erect the necessary brattices for the removal of gas; or set such timbers as may be required to support bad roof; or take down a loose piece of top that is about ready to fall. By removing these dangers promptly when found, the efficiency of firebossing would be greatly improved.

Again, greater safety would be insured if the law provided for the appointment of a safety inspector instead of the present assistant foreman. A first-class, certified, mine-safety inspector or examiner would find ample opportunity for his services, in every gaseous mine and wherever dangerous roof conditions exist. Copies of his report made at the close of each shift and stating what dangers were found should go to the manager of the mine and the state mine inspector, which would inform them of the general safety of the mine.

Farr, Colo. Robert A. Marshall.

INQUIRIES OF GENERAL INTEREST

Belting Used in Anthracite Breakers

Can *Coal Age* or any of its readers inform me in regard to the amount of leather and rubber belting used in the operation of a modern anthracite breaker? I am desirous of securing figures that will show, approximately, the amount of belting required to operate an uptodate anthracite breaker, capable of handling a given tonnage per day.

In other words, I want, if possible, to compile an estimate showing the amount of belting required, either leather or rubber or both, per ton of coal handled. I do not refer to the amount of belting consumed in a year or other period of time; but, simply, what amount of belting is required to equip a modern breaker.

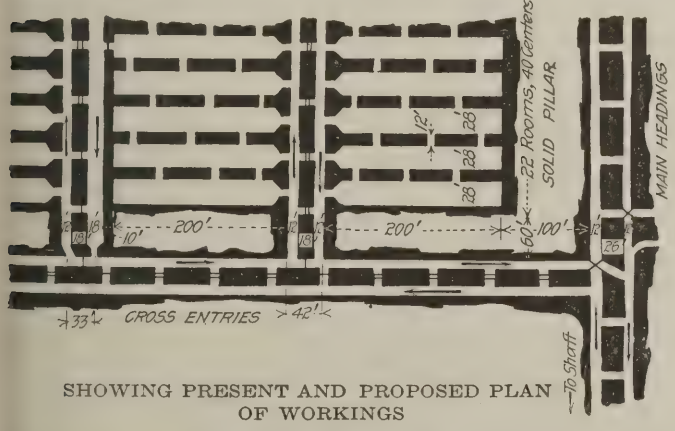
Scranton, Penn. MECHANICAL ENGINEER.

This question should not be difficult to answer, where one has access to the working plans or drawings of a modern breaker, such as is in use today throughout the anthracite region. We hope that some of our readers who are able to give this information will reply to this inquiry, as the information thus offered would be a valuable contribution to technical mining literature.

Panel System of Mining

The mine of which I have charge is a machine mine, all the coal being undercut with a 6-ft., Sullivan, shortwall machine. As indicated in the accompanying figure, the mine is worked on the panel system.

Cross-entries or panel-entries are driven off the main headings, about 1000 ft. center to center. Room or butt



SHOWING PRESENT AND PROPOSED PLAN OF WORKINGS

headings are then turned on one side only of each pair of panel headings. The room headings are driven on 442-ft. centers, which allows for rooms 200 ft. deep, turned to the right and left of these headings.

The width of all entries is 12 ft. and the entry pillars are 18 ft. wide. A solid pillar of coal 100 ft. wide separates the main headings from the faces of the rooms. The rooms turned to the right and left of the butt headings are driven on 40-ft. centers and widened to 25 or 30 ft., which makes the room pillars vary from 10 to 15 ft. in width.

There are several disadvantages in the employment of this system. In the first place, there is always a back haul for all coal mined in the rooms driven toward the main heading. This back haul amounts to about 200 ft. when these rooms are about finished.

Again, it frequently happens that much coal is lost, owing to bad roof conditions, poor ventilation, and the difficulty of maintaining good roads in the rooms where the drainage is often poor. Owing to these causes, the cost of getting out the last of the coal, between two pairs of butt headings, is more than the coal is worth and necessitates its being abandoned and lost beyond recovery.

Another bad feature is that the panel entries, in this system, must be driven forward a distance of 442 ft., before another pair of butt headings can be turned, which is a long way to go for a single car of coal. But, more important still, is the slow development of the mine necessitated by this plan. Because of these hindrances, we have been seriously considering changes that will overcome the most or all of the objections mentioned. The proposed changes are as follows:

As shown on the left of the figure, when the panel headings have advanced a sufficient distance, an 18-ft. air-course and a 12-ft. roadway, separated by an 18-ft. pillar, will be turned at such a distance as to leave a 10-ft. solid pillar between the air-course and the faces of the 200-ft. rooms driven from the last pair of butts. In this plan, there will be no back haul; and it will be possible, by holing through from the air-course, to reach and recover any coal that may have been left in the faces of the old rooms.

This proposed system can be continued indefinitely by driving a similar 18-ft. air-course and 12-ft. roadway across the faces of the 200-ft. rooms, as before, and leaving a 10-ft. solid pillar to protect the air-course. The panel entries will then require to advance only 258 ft., before turning a new pair of butts. Kindly say if, in the opinion of *Coal Age*, this proposed plan will improve the present system. R. J. PICKETT.

Shelburn, Ind.

There is no question but that the proposed change will prove a great advantage over the system formerly employed. We shall be glad, however, to hear the opinions of *Coal Age* readers on this proposition.

It is possible for practical miners to offer many good suggestions and criticisms on the proposition presented in this inquiry and, by so doing, give this correspondent the benefit of their experience. Many letters, received from time to time, bear testimony to the helpfulness of this department of *Coal Age*, when their inquiries have been taken up and discussed by readers.

EXAMINATION QUESTIONS

Mine Managers' Examination, Springfield, Ill., Dec. 17, 1918

(Selected Questions)

Ques.—To increase the velocity from 5 ft. per sec. to 10 ft. per sec., how much will it be necessary to increase the ventilating power and what will be the increase in the consumption of coal to accomplish this purpose?

Ans.—Other conditions remaining unchanged, the power producing circulation in an airway varies with the cube of the velocity of the current. In this case, the velocity being doubled, the power must be increased eight times.

For the same quality of coal and efficiency of the plant, the coal consumption is proportional to the power generated. To double the velocity, then, will require eight times the weight of coal consumed.

Ques.—What power will be required to give a current of 60,000 cu.ft. of air per min., in a mine having four equal splits, the airway in each split being 6 x 8 ft. and 5000 ft. long?

Ans.—In this case, the total sectional area of the four splits is $4(6 \times 8) = 192$ sq.ft. and the total rubbing surface $4 \times 5000 \times 2(6 + 8) = 560{,}000$ sq.ft. The velocity of the air in each split is $60{,}000 \div 192 = 312.5$ ft. per min. The power on the air, in this case, is therefore,

$$H = \frac{ksv^3}{33{,}000} = \frac{0.00000002 \times 560{,}000 \times 312.5^3}{33{,}000} = 10.35\ hp.$$

Ques.—If a collar or crossbeam, 10 in. in diameter and 6 ft. between notches, bears a certain load, what should be the diameter of a collar 12 ft. between notches, to bear the same load?

Ans.—As the question reads, it refers to the total load borne by the collar, in each case. Then, assuming an equal load is uniformly distributed over the length of each collar, the diameter of the collar will vary as the cube root of its length. In other words, in that case, the diameter ratio is equal to the cube root of the length ratio. Calling the required diameter of the 12-ft. collar x, we have,

$$\frac{x}{10} = \sqrt[3]{\frac{12}{6}} = \sqrt[3]{2} = 1.26$$

$$x = 10 \times 1.26 = 12.6 \text{ in.}$$

It is evident, however, that this does not represent the condition of a load on a collar, in mining practice where a 12-ft. collar, being twice as long, must carry twice the load of a 6-ft. collar. Hence, in mining practice, it is the unit load, or load per foot of length of collar, that is the same in each case, and the diameter of the collar then varies as the cube root of the square of its length; or,

$$\frac{x}{10} = \sqrt[3]{\left(\frac{12}{6}\right)^2} = \sqrt[3]{2^2} = \sqrt[3]{4} = 1.587$$

$$x = 10 \times 1.587 = 15\tfrac{7}{8}, \text{ say } 16 \text{ in.}$$

Hence, a 12-ft. collar, capable of withstanding the same roof pressure as a 6-ft. collar 10 in. in diameter, must have a diameter of practically 16 inches.

Ques.—An entry is parallel to a landline and 150 ft. from it. If the rooms turned off the entry run at an angle of 45 deg. with the entry, what distance can they be driven, allowing a barrier of ten feet to comply with the mining law?

Ans.—Since the sine of 45 deg. is 0.707, the length of the room measured on the straight rib, from the entry to the boundary line, is $150 \div 0.707 = 212.1$ ft. The same result is found, in this case, by extracting the square root of twice the square of the distance between the entry and the landline; thus,

$$\sqrt{2 \times 150^2} = \sqrt{45{,}000} = 212.1 \text{ ft.}$$

Ques.—With three horsepower, we are producing 20,000 cu.ft. of air per minute; how many horsepower will be required to produce 40,000 cu.ft. of air per minute, in the same airway?

Ans.—For the same conditions in the airway, the power producing an air current varies directly as the cube of the quantity of air in circulation; or, in other words, the power ratio is equal to the cube of the quantity ratio. Then, calling the required power, in this case, x, we have

$$\frac{x}{3} = \left(\frac{40{,}000}{20{,}000}\right)^3 = 2^3 = 8; \quad \text{and } x = 3 \times 8 = 24 \text{ hp.}$$

Ques.—(a) Does a high water gage always indicate a large quantity of air passing? (b) What does a low water gage with a large quantity of air passing indicate?

Ans.—(a) No. A high water gage may be caused by an undue length of airway; a restricted sectional area of the airway; or an obstruction in the air-course, all of which will increase the resistance of the mine and decrease the quantity of air in circulation, for the same power applied.

(b) The circulation of a large quantity of air under a low water gage indicates an ample sectional area of the air-courses, and shows that they are free from obstructions that would hinder the flow of air through them. In a large mine, the conditions mentioned indicate that the air current is divided into two or more splits, which reduces the velocity of the air and the mine resistance.

Ques.—What are the breaking strain and safe working load for a good steel rope $1\frac{1}{8}$ in. in diameter?

Ans.—For a 6-strand, 19-wire, crucible cast-steel, hoisting rope $1\frac{1}{8}$ in. in diameter, the breaking strain is $S = 39\ (1\frac{1}{8})^2 = 49.36$, say 50 tons. Using a factor of safety of 5, the safe working load on this rope is 10 tons.

For a 6-strand, 7-wire, crucible cast-steel, haulage rope, $1\frac{1}{8}$ in. in diameter. the breaking strain is $S = 37\ (1\frac{1}{8})^2 = 46.83$ tons; and, using the same coefficient of safety, the safe working load of this rope is $46.83 \div 5 = 9.36$ tons.

FOREIGN MARKETS AND EXPORT NEWS

Coal Imports of Greece

Greece in normal times imports more than 500,000 tons of coal annually. This amount consists usually of 10 per cent. Welsh coal (best Cardiff); 25 per cent. second quality Welsh (Newport), containing 20 to 30 per cent. of small coal used for factories and steamers; 10 per cent. of second quality used only for obtaining gas; 35 per cent. bunkering coal (Durham, Yorkshire and Northumberland); 10 per cent. patent briquets; and 10 per cent. German coal. As will be seen from this, England has had practically the monopoly of coal in the past. After the outbreak of the war America shipped a certain quantity of coal to Greece. American coal that sold best was the Pocahontas grade.

The question whether America can compete with England depends in great measure on return cargoes. In the past English vessels usually unloaded coal at Piraeus on their way to a port in the Black Sea to load grain. They thus brought coal to Greece at a nominal freight, preferring to do this than go out in ballast. Therefore, if the United States is to compete with England in this commerce, it will have to be assured that ships exporting coal to Greece will come back laden. It is thought that this might be done through arranging cargoes of tobacco, skins, emery, magnesite and marbles from Greece, with licorice root, carpets, dried fruits, emery and tobacco from Turkey.

In normal times ships discharged in the port of Piraeus at the rate of 400 tons per day, except when a strong southeast wind was blowing, which made unloading difficult. After the outbreak of the European war, when even a few days' delay meant a great loss to a steamer, owing to the increase of freights, steamers of four or five thousand tons succeeded in unloading 500 tons a day on an average. It has been stated, however, that larger ships with four holds and separate winches for each hold could discharge easily 700 tons per day.

Formerly the coal merchants at Piraeus held a stock of about 60,000 tons of coal available for purchase at $5 to $9 per ton. After the war broke out and up to the time of the blockade of December, 1916, to June, 1917, fair amounts of Welsh steam coal and American Pocahontas could be obtained at Piraeus at $55 or $60 per ton.

Ships coming in during that period and desiring coal, on giving notice the evening before, could begin coaling the next morning at the rate of 300 tons per day; in those days coal was always kept on lighters. A fleet desiring to coal could, on four or five days' notice, obtain 1000 tons daily.

A list of the principal coal merchants of Piraeus may be obtained from the Bureau of Foreign and Domestic Commerce or its district and coöperative offices upon referring to file No. 104,449.

Shanghai Coal Market

Under date of Jan. 16, Wheelock & Co., of Shanghai, report that the annual contracts for Japanese coal for 1919 have been concluded, and that buyers can consider themselves fortunate to have closed their contracts when they did, as prices have risen still higher in Japan owing to large orders for the Government railways and increased industrial and shipping requirements. It is hoped that during the year the output of the Japanese mines may be somewhat improved, but there seems to be no doubt that the demand for coal will far exceed any possible increase in output that may be attained; so that there is little prospect, judging from present indications, of any easing up in prices.

Owing to various difficulties caused by insufficient labor and transport facilities the Fushun coal mines have found it quite impossible to cope with the demand and they have been forced to ask for some delay in deliveries. These mines will not be able to entertain any new business for some time to come.

A large demand continues for the better grades of Kaiping coal, and although the freight market is slightly easier than it has been, it is not expected that there will be any large slump in local freights, as the building of small vessels has been neglected for the past two years. Some idea of the extension of the Kaiping coal market can be gathered from the fact that during the last few months over 40 steamers per month have left Chinwangtao for Dalny, Korea and Japan—a business that did not exist a few years ago.

Increase in Coal Exports

Some indication of the growth of coal exports from Norfolk, Va., within the past twenty-five years is shown by a comparison between the figures for January, 1894, and January, 1919. During January, 1894, William Lamb & Co., agents, exported 120,051 tons of coal from the port of Norfolk. This, export authorities say, represented practically the entire shipment of coal from the port during that month.

The records for January, 1919, show that during that month the coal shipments from Norfolk aggregated 796,139 tons. This includes the dumpings of both the Norfolk & Western piers at Lambert's Point and the Virginian piers at Sewall's Point. The total coal exports for all of Hampton Roads, which includes, besides the Norfolk & Western and the Virginian, the Chesapeake & Ohio piers at Newport News, were 1,068,262 tons.

Hampton Roads exports, as divided between the three big coaling terminals, for the month is as follows: Norfolk & Western, 490,336; Virginian, 305,803; Chesapeake & Ohio, 272,123.

The records show an increase of 209,894 tons for January, 1919, over the same month of last year, the exports for January, 1918, being 858,368 tons. Exporters say that this is due in a measure to the railroad tieups during the unusually severe weather of last January.

No Ships for Coal Exports

Tonnage that will permit of any extensive forwardings by the Coal Export Association, probably will not be available during the next ninety days. The charter for the association has been applied for and it will be possible to begin shipments at an early date if the tonnage could be secured. Food is being exported at the rate of 1,000,000 tons a month, which, with the turning back of the Dutch vessels, gives little promise for the allotment of ships for coal exports. The operations of the new association will be begun at Hampton Roads.

There arrived at Rio de Janeiro, Brazil, during October, 1918, reports Vice-Consul R. P. Momsen, 16,033 metric tons of foreign coal (all American fuel), as compared with 25,396 tons (19,365 tons American, 6031 tons British) in the corresponding month of 1917 and 51,814 tons (all American) in October, 1916. For November the imports amounted to 18,282 tons (12,842 tons American, 5440 British), contrasted with 27,488 tons (22,697 tons American, 4791 British) in November, 1917, and 77,121 tons (American 65,341 tons, British 11,780) in November, 1916.

Anthracite for Scotland

In a recent communication Consul H. D. Van Sant, Dunfermline, stated that the question as to whether anthracite is suitable for the open grate fire—almost in universal use in Scotland—is now being seriously considered, owing to the soft-coal scarcity, though there is still considerable doubt expressed as to its practical utility in relieving the coal shortage situation. Its advocates claim that this coal can be used with good results in an ordinary open grate, and that those who can purchase anthracite or who may have it in stock are in a position to secure an ample supply of heat during the winter by adding a small portion of the rationed supply of coft coal. The fires must always be started with ordinary soft coal, then the anthracite coal added when the soft coal is well alight.

Scottish anthracite is claimed to be more bituminous than Welsh coal and not so plentiful, being found in such thin seams that, owing to the present lack of miners, it would not be profitable nor possible to mine it to any great extent. American anthracite is said to be a much better quality than the Scottish, but the price is practically prohibitive.

In case the effort to introduce anthracite throughout Scotland is successful, and the future price of American anthracite is sufficiently low to meet competition, the question of the introduction of American hard coal in this soft-coal-producing district is an interesting one and worthy of consideration by American coal exporters.

New Brunswick Coal Imports

The report of the Fuel Administrator of New Brunswick, Canada, shows that of the total allotment of 77,140 tons of anthracite made to the Province by the United States Fuel Administration for the fiscal year ending Apr. 1, 1919, a total of 46,334 tons was used during the eight months ending Nov. 30, 1918. In addition to this it is estimated that 700 tons have been imported into the Province which have been obtained through jobbers, not operators.

There is no change reported in the South American port strike situation. Latest advices state that more than 180 vessels are being held in the harbors of Buenos Aires, Montevideo, Bahia Blanca and other ports on account of the strike. The vessels have a tonnage of 550,000.

One of the principal imports at the port of Santander, Spain, in normal times is coal, which is needed in the province for the railways, gas companies, electric-light plants, metallurgical works, domestic use, etc. In 1914 the demand for local use was about 150,000 tons, and came from England. Since the war started but a very small proportion of this quantity has been received. Efforts are being made to increase the production of domestic coal, although up to the present time supplies are limited and not satisfactory, and many industrial works were obliged to curtail or close up completely on account of scarcity.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Feb. 10	Amer. S.S. Point Adams	Pearl Harbor, Hawaii	2,973	....
Feb. 11	Nor. Bk. Steinsund	Rio de Janeiro, Brazil	4,422	....
Feb. 12	Br. S.S. Siamese Prince	Buenos Aires, A. R	6,064	1,379
Feb. 12	Amer. S.S. Kiowa	Bridgetown, Barbados	2,196	361
Feb. 15	Ital. Bk. Santa Caterina	Piombino, Italy	2,107	....
Sewalls Point				
Feb. 12	Amer. S.S. Point Arena	Pearl Harbor, Hawaii	2,137	470
Feb. 13	Amer. S.S. Lakeland	Cristobal, C. Z	3,341	532
Newport News				
Feb. 11	Amer. Sc. Daisy Farlin	Sagua la Grande, Cuba	596	....
Feb. 13	Nor. Bk. Aleyon	Rio de Janeiro, Brazil	2,807	....
Feb. 13	Amer. Sc. Sara E. Turner	Point a Pitre, Guadalupe	741	....

Coal and Coke News

Harrisburg, Penn.

Representative McIntyre has introduced in the House a bill providing that every corporation doing business in Pennsylvania shall deposit with the Bureau of Statistics in the Department of Labor and Industry a sworn list, giving the following information: Its capitalization, bonded indebtedness, physical value of each corporate holding, gross income, gross expenditures for the fiscal year preceding the making of the list, and how the expenditures were proportioned between labor, capital taxes, improvements and repairs; and further, provides for the regular filing of a list giving the names and addresses of all stockholders and shares of stock held by each.

Representative Glass, of Philadelphia, has introduced a bill in the House which provides that the Governor be authorized to appoint a commission to make an inventory of the food and fuel products of the state. This bill covers both anthracite and bituminous coal. The bill of 1915 provided only for a commission to investigate anthracite coal, but the present bill is much wider in scope. The proposed commission will be authorized to investigate the question of the reduction in the cost of fuel and empowers the commission to provide for the proper and equitable distribution of food and fuel, and to fix a maximum price therefor; also to confiscate any food or fuel products in the possession of individuals or corporations refusing to sell at prices fixed by the commission.

The Governor is authorized to appoint a commission of nine citizens of the Commonwealth. Two of the commissioners shall be members of the present House of Representatives and two shall be members of the present Senate. The sum of $25,000 is asked for the use of the commission for the purpose of carrying out the provisions of the proposed act.

Representative Goehring has introduced in the House an amendment to the act of June 2, 1915, which established an elective schedule of compensation and procedure for the determination and compensation under the Workmen's Compensation law. The amendment calls for "Serious and permanent disfigurement of the head, face or hands, 50 per cent. of the wages during 215 weeks."

Uniontown, Penn.

Interest in the Connellsville coal and coke trade just now is centered upon contracts made for the first half of the present year upon the basis of the Government price of $6 per ton, coke, at ovens. That phase has been before the trade since Feb. 1, when Government prices were removed, and it is now believed that agreements have been reached upon all contracts that will be revised.

Revision of contracts calling for the Government price have ranged down as far as $5, with some at $5.50, but the largest independent coke operators have yet in force the original $6 contracts and there seems little likelihood of any more revisions as regards prices although quantity of delivery has been sharply reduced. In one instance of a revised contract upon a basis of $5, the furnace operator agreed to submit cost sheets to the coke operator at time of settlement. If at that time he could show that it was unprofitable for him to operate his furnace with coke at more than $5, the coke operator agreed to sell him coke at that figure. On the other hand, if a profit was shown by the cost sheets the price of coke was to be advanced accordingly.

There is a unanimity of opinion that the stabilization of the region upon a fixed basis during the present period of uncertainty was reached this week. The region is now operating at a 50 per cent. basis with a four- and five-day run the general rule. Operators in many instances have organized their plants for a five-day run by placing ovens on the inactive list and operating the others continuously. There has as yet been no employment problem in the Connellsville region, all workmen being given restricted employment.

Charleston, W. Va.

The output of coal in the Kanawha region during the week ending Feb. 15 was smaller than for the previous week. Innumerable mines throughout the district are shut down. As the month grows older there appears to be no improvement whatsoever, more and more mines having been shut. Kanawha producers are not so optimistic as they were a few weeks ago.

New River mines continue to be affected insofar as their regular, continued operation is concerned by tidewater congestion, and while a limited tonnage is moving to western markets, it has not been sufficient to make up for the loss of eastbound coastwise tonnage. The effect of such conditions during the week ending Feb. 15 was of course to hold down production to an appreciable extent. The claim is made that New England needs coal but is waiting to place orders in the hope of securing better prices. Some of the largest producers in the New River field have simply discontinued operations. Consequently, not only are a large number of mines shut down, but there is much idleness and the Bolshevik spirit is more or less rampant.

Production in the Guyan or Logan mining district dropped to 96,363 tons for the week ending Feb. 15, only a little more than one-fourth of the full-time capacity of the whole district. The district has been hard hit by present market conditions.

During the first half of February the mines of the Pocahontas district felt the effects of a waning market severely. Up until Feb. 1 production held up remarkably well, but it has now dropped to 279,151 tons, a decrease of over 100,000 tons, the last report showing an output of 385,000 tons. Such a slump, of course, was caused by a restricted market. Production would have been even less had it not been for the fact that it was possible to utilize part of the coal produced in the manufacture of coke, the coke production having been doubled from 46,000 tons to 82,379 tons.

Still further increases in the number of idle mines on the Monongah division of the Baltimore & Ohio and, in fact, throughout the twelve or thirteen coal-producing counties in northern West Virginia, were observed during the week ending Feb. 15. At that time on the one division the number of idle mines totaled 181. As there are 215 mines on that division, only 35 mines were operating. The same was true throughout the whole northern region. Production was virtually at a standstill and even where mines had not shut down coal was accumulating in cars unconsigned and therefore subject to demurrage, which has been mounting very rapidly throughout the northern section.

New York, N. Y.

To have a full and free discussion regarding the situation in which anthracite industry finds itself there was a gathering of operators and distributors in the Whitehall Building last Friday afternoon (Feb. 21), but at its conclusion it was stated that no definite plan had been outlined. Every person present agreed that the coal market at present is in a bad condition; and that owing to the warm weather, the supply is greater than the demand.

It was also stated that there was no effort being made to change prices from what they now are, and that it was generally agreed that the industry must be put back on a normal basis. In the meantime, it was stated, every individual concerned will try to work out his own salvation.

At the mining session of the annual meeting of the American Institute of Mining Engineers held here last week, S. D. Warriner, president of the Lehigh Coal and Navigation Co., in discussing mining conditions said that more than 60 per cent. of the coal now being sent to market is sold at a loss. Along these lines Mr. Warriner stated that with the reëstablishment of commercial conditions the prices arbitrarily fixed disappear, the result being financial operating loss to more than 60 per cent. of the industry.

The consumer, Mr. Warriner said, would not be especially interested in this phase of the situation were it not that with the indefinite closing down of high-cost operations, which is now taking place, the capacity of the anthracite mines is below the average annual production needed. This will inevitably tend to create a shortage unless coal can be stored by the companies for future use. Storage, however, is only economically practicable when there is stability of market conditions, otherwise the expense and risk make it prohibitive. For this reason the trade policy of the industry has been so far as possible under existing laws, to promote stable conditions by the summer discount in price, thus encouraging the consumer to store a portion of his winter supply, the operator storing the rest. By this method steady operation of the mine was insured and the annual supply required by the market obtained. For a number of years the anthracite industry would otherwise have been unable to supply the market requirements.

Today, continued Mr. Warriner, the anthracite industry is left by the Fuel Administration under the handicap of inadequate prices, a wage structure still under Government control and a tendency toward declining prices in all commodities, with the problem of recreating the stable commercial condition necessary to the prosperity of the industry as well as to the comfort of those who are dependent on anthracite for fuel.

Others who spoke along similar lines were R. V. Norris, who predicted an increase in the price of coal; Edwin Ludlow, vice-president of the Lehigh Coal and Navigation Co., who discussed conditions under which operators worked during the war and who stated that increased wages meant decreased ambition; and J. B. Neale, of Thorne, Neale & Co., who outlined some of the work accomplished by the Fuel Administration.

Victoria, B. C.

C. A. Magrath, Fuel Controller for Canada, has announced that the control of coal prices in British Columbia by the department of which he is the head ceased on Feb. 11 last. The collieries therefore are put back on the old competitive basis.

A. I. Fisher, member of the British Columbia Legislative Assembly for Fernie District, delivered an address in the House recently deploring the waste existent in the Crowsnest Pass coal fields in the manufacture of coke. He declared that it was a pity that the byproducts of the coal continued to be driven off into the air by the use of the obsolete beehive ovens. It was only a matter of chemistry, he declared, and the application of such measures as could be defined by experts which would permit British Columbia to profit by the manufacture of many commodities which, in pre-war days, were held as monopolies by other countries.

A bill has been introduced to the British Columbia Legislature providing for the application of a 44-hour week to all industrial workers of British Columbia. Its sponsor is James Hawthornthwaite, the member for Ladysmith, B. C. There are on the statute books of British Columbia two acts passed in 1918 through the instrumentality of Hon. William Sloan, Minister of Mines. One sets the hours of labor for all employed above ground in connection with coal mines of this Province at eight hours, thus placing this class of employee on the same basis as underground workers, except that the working day of the latter begins the moment they leave the surface. The other gives miners engaged in metalliferous mines, above or below ground, the eight-hour day. Both these enactments are effective on Mar. 31, 1919. If Mr. Hawthornthwaite's measure is indorsed, therefore, it means that in addition to the eight-hour day the miners of British Columbia will have a half holiday on Saturday.

PENNSYLVANIA

Anthracite

Beaver Brook—C. M. Dodson and Co. are preparing to take out the coal from their latest stripping proposition, a Wharton vein working, on the southern boundary of their property. They have recently completed a machine shop, replacing one damaged by a mine cave.

Jeanesville—Mine workers' officials are trying to arrange with the Lehigh Valley Coal Co. officials to give the suspended miners at the Jeanesville and Yorktown collieries their share of employment so that they will not be discriminated against. While the operations have been indefinitely shut down, the miners are urging that the company rescind its order to the extent of permitting work for three days a week.

Hazleton—Declaring that the steady pull at the mines during the past three years was extraordinary, managers of the big coal companies in the Lehigh field said that the present slackness in the trade would give them a long-sought opportunity for making necessary repairs. It was not thought possible that the big plants could be kept going much longer without breakdowns, but not one mine in this section had to close on account of accident.

Port Blanchard—A new washery has been completed by the Pennsylvania Coal Co. at No. 14 colliery and will be in operation some time during the summer. The washery will have a capacity of 500 tons a day and will be operated by steam. The plant was ready for operation Jan. 1, but on account of the mild winter the demand for anthracite decreased to such an extent that it was not deemed advisable to begin preparing coal until later in the year. Men from No. 14 colliery will operate the washery.

Jeddo—The G. B. Markle Co. has cut the price of coal to its wagon trade 75c. per ton in accordance with the passing of the Fuel Administration's price restriction. The company is storing coal in underground chutes and on the surface, and is working a normal schedule. A worker engaged in storing coal was drawn into an underground chute and, after an exciting experience, was rescued unhurt.

Miners employed by J. S. Wentz & Co. and the Upper Lehigh Coal Co. were cutting coal on idle days and making full-time pay. Their action was resented by the transportation employees, and their local unions have ordered all idle-day coal-cutting stopped.

Bituminous

Brownsville—The Rich Hill Coke Co., operating a mine and 150 beehive coke ovens 12 miles east of Uniontown, on the Baltimore & Ohio R.R., has closed down indefinitely on account of lack of business.

Connellsville—The H. C. Frick Coke Co., which for the past few weeks has been operating its plants only four and five days a week, will put half its plants in this region back to six days a week. The other half will be operated five days.

Leisenring—The du Pont Powder Co. is erecting two large storehouses and distributing stations here to relieve the overwork at its Fairchance and Leckrone stores. The new stores are in charge of A. W. Matthews. The explosives will be distributed from this point by motor trucks.

Scottdale—James Wardlaw, of this city, has organized a mining class at the Dearth mines to instruct several mining men in questions and current topics on mining to prepare them for the annual mine foreman's examination, which will be held in April. The mining class meets two days each week.

Tarentum—The West Penn Power Co. is preparing to open a large mine in Allegheny County on the Allegheny River near Tarentum (on the Allegheny Valley division of the Pennsylvania R.R.) to supply coal for the large power plant it is building at Springdale, nearby. It will be a shaft operation in the Freeport coal.

Somerset—On account of the increasing coal traffic in the Somerset District, on the Baltimore & Ohio, the railroad company has moved a large portion of the Meyersdale employees to Somerset and will work these crews from the new division headquarters here. This will move about fifty families to this place from Meyersdale.

Somerset—The Pennsylvania Smithing Coal Co. has purchased the Adams mine near here, formerly owned by S. M. Hamilton & Co., of Baltimore. The entire property was purchased a few months ago by Charles F. Roy and others, of Somerset, who made the sale to the Pennsylvania company. The property includes about 1200 acres of coal and all improvements, tipple, houses, etc. It is located on the Somerset & Cambria branch of the Baltimore & Ohio and is opened in a seam of coal that has not been developed at any other point.

Uniontown—Development of the Fuller tract of coal in Perry township to an eventual capacity of 2000 tons daily will be commenced at once by the Jamison Coal and Coke Co., which recently purchased 575 acres at a little more than a million dollars. The company has recently acquired the plant of the No. 3 opening of the Washington Coal and Coke Co. and will use that plant as an outlet for the Fuller field. Another outlet is now situated on the opposite end of the field and a restricted tonnage has been taken out during the past few months. The entire output of the Fuller field will be shipped in raw coal to the Bethlehem Steel Co. for its by-product plants. About 50 men are now employed at the new operation, engaged principally in erecting houses. Ten bungalows are under construction and more will be built when required. R. M. Pollack, formerly with the Washington Coal and Coke Co., is superintendent of the Jamison's new plant.

WEST VIRGINIA

Bower—Since last summer, when announcement of the company's plans were made in "Coal Age," the West Virginia Coal and Coke Co., has had under construction one of the most complete Y. M. C. A. buildings in the coal fields of West Virginia, at this place. The structure is now practically completed. Within its walls every provision has been made for the comfort, convenience and amusement of its employees.

Williamson—As a preliminary step toward engaging in extensive development of the large area of coal land recently purchased from the Kountz Bros. estate of New York, the United States Steel Corporation has a corps of engineers going over the property.

Work has been completed on a new tipple erected by the Standard Thacker Fuel Coal Co. A number of other improvements have also been made by the same company.

A new tipple is being built by Goodloe Brothers on their leased tract of coal at the mouth of Pond Creek near Williamson.

Philippi.—William Taylor George, on behalf of himself and associates, has sold to the Raccoon Coal and Iron Co. the following mines: Randolph Smokeless Coal Co., the Joseph Hart land on Rich Mountain, 2500 acres, $250,000; the T. J. Jones tract of 35 acres at Wilmoth for $50,000; the Maranz Coal Co. at Middle Creek, in Clay County, $60,000, and the Clay County Fuel Co., near Hartland, $65,000, making a total of $425,000. This is one of the biggest deals in this section of West Virginia in a long period.

INDIANA

Terre Haute—The average number of mines idle in Indiana daily is 52. The approximate number of miners who are out of employment is 10,000. In the Terre Haute field there are 42 mines, half of these being idle, throwing 2000 men out of work.

Clinton—Joseph Colan was brought before Justice of the Peace M. L. Casey on a charge of opening a keg of powder with a pick. Colan is a miner employed in the Clinton fields. He pleaded guilty and was fined $1 and costs, amounting to $8.75, which he paid. Colan claimed he did not know he was violating any law.

Petersburg—The Pike County Coal Co., with head offices in Chicago, which recently leased 5000 acres of coal land in western Pike County and eastern Gibson County, has a number of testing rigs at work on its leases and as soon as the tract is thoroughly tested two new coal mines are to be located near Oatsville, nine miles west of this city. The mines will be connected with the Evansville & Indianapolis R.R. by switch from Littles, and will follow the Patoka River to a point near Oatsville and then extend north to where the new mines are to be located. The switch will be built this summer. The Pike County Coal Co. owns the Atlas No. 1 mine in this city, and in March will start the erection of a steel tipple capable of handling 4500 tons per day, which will make it the largest mine south of the Baltimore & Ohio R.R. in Indiana. Just east of Spurgeon, during the past month, 3500 acres of coal land have been leased and bought, and a number of stripping mines are to be operated on this land during the coming year.

ILLINOIS

Pana—Members of the four Pana locals of the United Mine Workers, alleging that the charges made by undertakers for burial of members are extortionate, are taking steps to organize an undertakers' coöperative association, to membership in which all citizens of the township as well as the miners, will be eligible. The miners in their statement assert that they have been unable to reach any agreement with Pana undertakers for burials at reasonable prices.

Pekin—Satisfied to leave whatever grievances they may have for settlement with the proper officers of their organization, all of the 500 mine workers in the employ of the Groveland Mining Co. have returned to their work. Pending the settlement of the controversy, which resulted over the refusal of the men to work under Clait Maupin, top boss at Groveland Mine No. 1, the resumption of mining was renewed and from all outward appearances no strike or trouble of any sort is evidenced in any part of Wesley City.

Edwardsville—It is said that work will be started within a few days on the most modern coal-mining plant in Madison County. The Donk Brothers Coal and Coke Co., of St. Louis, is putting down the mine. It will mean the expenditure of approximately $500,000 and will give employment to 700 men when running at full blast. After the mine is in full operation the owners expect it to produce 5000 tons of coal daily, making it a rival to any mine in southern Illinois. The Allen-Garcia Co., of Chicago, has the contract for the work. The coal and air-shafts will be sunk simultaneously. Grading will be begun within a few days and the sinking of the shafts will be started Apr. 1. It is hoped to hoist coal by July 1. The coal shaft will be about 12 x 32 ft. making a double hoist of 12 x 16. This will permit large cages carrying coal cars with a capacity of three tons each. It has not been decided yet whether the company will erect houses for the workmen or whether the City of Edwardsville will have to look after this matter. Walter Clark, of Collinsville, will be the superintendent of the new mine. The Donk Brothers Coal and Coke Co. has been operating shafts at Collinsville, Maryville and Troy. The company has some mines which are well worked, and the new mine is to take the place of these.

ALABAMA

Risco—The new coal washery, crushing and screening plant of the Republic Iron and Steel Co. at this place, is nearing completion and most of the units will be placed in operation within the next two weeks. The haulage will be changed over to the new slope, from which a greatly increased tonnage will be taken.

OKLAHOMA

Broken Arrow—Tulsa County, Oklahoma, produced in 1918 a total of 200,000 tons of coal, according to figures prepared by Garland Marrs, president of the Seneca Coal Co., which is now opening a mine at this place. It is believed that this total will be exceeded in 1919, as mining operations are being carried on on a much larger scale. The Sand Springs Railroad Co. is preparing to build a railroad line from Tulsa into the new Broken Arrow field, which will mean the immediate development of this promising area. None of the companies operating in Tulsa County have yet found it necessary to limit their operations.

Foreign News

Vancouver, B. C.—The British Columbia Chamber of Mines is busy organizing an international mining convention to be held Mar. 17, 18 and 19.

Victoria, B. C.—The immediate future of coal industry in the Merritt (B. C.) field is reported to be uncertain. For some time the Canadian Pacific Railway Co. has been taking a considerable proportion of the output of that field for steaming purposes, a use to which the coal is well adapted. Recently it has been necessary, according to the operators, to increase the selling price because of the demands of men for more wages and the generally high cost of production. The company, apparently, does not care to pay at the higher rate and has cancelled its contract. If some arrangement cannot be made to continue the former business relations it is predicted that the collieries affected either will be forced to close down or to materially curtail their output. Hon. William Sloan, Minister of Mines, has been asked to assist in the effort to reach an adjustment of the difficulty, to which he has acquiesced; but whether the representations which have been made through him, as well as from other sources, will be effective is doubtful at the present moment.

Personals

J. C. Douglass is superintendent for the Dor-Mar Coal Co. at Savan, Penn., taking the place formerly held by **William Reid,** resigned.

C. W. Stafford has resigned his position as chief engineer of the Pond Creek Coal Co. and has opened a mine efficiency engineering office in Huntington, W. Va.

Albert Dally, Knightsville, Ind., has been appointed assistant mine inspector by the State Industrial Board, to succeed William Moore, of Terre Haute, resigned. Mr. Dally is a member of the United Mine Workers of America, District 11.

Herbert G. Parker, for many years with the Pittsburgh Coal Co. and recently Assistant Manager of Railroad Fuel Distribution, United States Fuel Administration, has been appointed sales manager of the coal department of the Iron Trades Products Co., Pittsburgh, Penn.

Lieutenant-Colonel Lloyd G. McCrum, who has been manager at the Rock Island Arsenal, has been discharged from the service and has returned to New York to his old position as manager of the W. H. Bradford Co. Mr. McCrum will also remain associated with the Victor Coal Mining Co. at Somerset, Penn.

J. Corbus Bushnell, formerly associated with the Business Men's Clearing House, Chicago, Ill., and until recently connected with the U. S. Employment Service as special agent to examine the personnel methods in vogue at Vickers Ltd. and Woolworth Arsenal, England, has been engaged by the General Engineering Agency, Pittsburgh, Penn., as personnel director.

A. S. Learoyd, during the past year Director of Distribution of the United States Fuel Administration, has been appointed assistant to the president of the Lehigh Coal and Navigation Co. Prior to Mr. Learoyd's connection with the Fuel Administration he was for many years employed as general freight agent by the Delaware, Lackawanna & Western Railroad Co.

Walter E. Hoots, formerly Northwestern sales agent for the Macon County Coal Co., of Decatur, Ill., with headquarters in Waterloo, Iowa, has resumed his position with this company after a year in the Navy. Mr. Hoots was discharged from the service in Boston the first of February, serving as a radio electrician at the U. S. Naval Radio School at Harvard University and aboard the battleships "Alabama" and "Kearsarge."

Wyman Eaton has been appointed chief engineer of Freyn, Brassert & Co., engineers, Peoples Gas Building, Chicago, Ill. Mr. Eaton was formerly connected with the engineering offices of Julian Kennedy, Youngstown Sheet and Tube Co., William Tod Co., Corrigan McKinney Co., and has recently resigned his position of engineer in charge of the rolling mill work of the Mesta Machine Co. to take up his new duties.

Lieutenant George Conway of the 27th Engineers, U. S. A., is in the General Hospital at Fort Douglas, Salt Lake City, Utah, recovering from an operation due to an injury received in France. Before enlisting as a private, Lieutenant Conway was assistant to A. C. Watts, chief engineer of the Utah Fuel Co. During a large part of his service in France, Lieutenant Conway was attached to the British Royal Engineers as a mining expert.

H. M. Crankshaw, general manager of the Cranberry Creek Coal Co., operating the Cranberry and Harwood collieries, has resigned and will return to England, where he will enter the engineering firm of which his father is the head. Mr. Crankshaw will be succeeded by **J. P. Warner** of Lansford, Penn., who was one time chief mining engineer for the J. B. Markle Co. at Jeddo and has been with the Lehigh Coal and Navigation Co. for some years.

Obituary

J. R. Richardson, engineer for the Black Mountain Coal Corporation, Evarts, Ky., recently died of pneumonia at the Harlan County hospital.

Wallace H. Rowe, president of the Pittsburgh Steel Co., and affiliated with other large corporations, died Feb. 1 at his home in Pittsburgh following a lingering illness. Besides being actively interested in a number of steel companies Mr. Rowe was also president of the Monessen Coal and Coke Co.

Harrison W. Matters, vice president and secretary of the J. Woolley Coal Co., Evansville, Ind., died Feb. 13 from a rare disease which involved a gland in his back. He had been confined to St. Mary's hospital, Evansville. Mr. Matters was first associated in the coal business with Jabez Woolley, following a period of railroad service. He was born at Vincennes, Ind., and was a graduate of De Pauw University, Greencastle, Ind.

Industrial News

New York, N. Y.—There was a well attended meeting of anthracite jobbers at the Whitehall Club on Tuesday of this week (Feb. 25) at which the matter of demurrage charges was discussed.

Pinesville, Ky.—Richard M. Lambert, receiver for the Calvin Coal Co., Pineville, in proceedings brought by the Matthew Addy Co., Cincinnati, Ohio, has filed notice that all claims must be presented by Mar. 3. Mr. Lambert has headquarters in the First National Bank Building, Cincinnati.

Milwaukee, Wis.—The Sterling Wheelbarrow Co. is manufacturing a wheelbarrow that has ten spokes instead of eight. The company states that this is an important improvement in the design of wheelbarrows, as the two additional spokes help greatly to strengthen what is the weakest part of the average barrow.

Chicago, Ill.—The Under-Feed Stoker Co. of America announces that it has removed its general offices from the Harris Trust Building, Chicago, Ill., to the Book Building, Detroit, Mich. This change will not interfere with the sales work of the concern's Chicago district sales office in the Harris Trust Building nor any of its other district offices.

Indianapolis, Ind.—The State Senate has passed Bill No. 79, introduced by Senator Bainum, providing for an increase in the salaries of the state mine inspector and his assistants. The first noted will receive an annual compensation of $2500, and the deputies $1800 each per year. The bill also provides for an increase in the present number of deputies.

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces the removal of its Cleveland district office from Room 813 to Rooms 406-408 Engineers Building, effective Mar. 1. The new headquarters will provide excellent facilities for giving the best possible service to the company's expanding interests within the Cleveland district. Ross Watson is district manager.

Beckley, W. Va.—Subject to the action of the stockholders at a meeting to be held here on Feb. 27, the capital stock of the Hawley Coal Co. will be increased from one thousand to five thousand shares, so as to permit of the company taking over the leasehold, equipment and assets of the Combs Coal Co. At the same time it is proposed to change the name of the Hawley company to the Big Sewell Consolidated Coal Co.

New York, N. Y.—Delos W. Cook, state fuel administrator announced on Feb. 22 that on Mar. 1 the office of Federal Fuel Administrator for the city and State of New York will be closed and that this action automatically retires from office all county fuel administrators. Mr. Cooke in his order expressed his great appreciation of the coöperation of the public. Mr. Cooke, who assumed the duties of state fuel administrator last August, was at that time one of the vice presidents of the Erie Railroad Co. He succeeded in office A. H. Wiggin, of the Chase National Bank, who resigned in May last.

Charleston, W. Va.—Casualties in West Virginia mines in January reached a total of 28. As is usually the case, the largest number of such deaths were due to falls of roof, 28 losing their lives in that manner. Two met death through mine-car accidents and three through motor cars, while electricity killed one other. One man was killed in a premature explosion and two in handling explosives. There were five deaths outside the mines, two of which were caused by mine cars, three resulting from miscellaneous causes. McDowell had the largest number of accidents—seven—and Logan the second largest—six.

New York, N. Y.—The Pulverized Fuel Equipment Corporation has recently been organized for the purpose of taking over the business of the Locomotive Pulverized Fuel Co. The latter company had developed the "Lopulco" system for the preparation, distribution, storage, feeding and burning of pulverized fuel for steam generating and heating purposes. The officers of the Pulverized Fuel Equipment Corporation are: J. S. Coffin, chairman; J. E. Muhlfeld, president; H. F. Ball, vice president executive; H. D. Savage, vice president in charge of sales; V. Z. Caracristi, vice president in charge of engineering; S. G. Allen, secretary and treasurer.

Decatur, Ill.—The Decatur Association of Commerce has called a meeting of the large users of coal in this city for the purpose of ascertaining why Decatur factories and industries do not use Decatur coal exclusively. It is estimated that as much as 4000 tons of coal are shipped into Decatur each week, and the committee from the Association of Commerce figures that if all Decatur industries would use local mine coal that 160 more miners would be employed, which would increase the pay-roll to at least $275,000. The mining of coal used by one factory alone, if done in the Decatur field, would give employment for seventy more miners.

Huntington, W. Va.—Two hundred and fifty coal operators, representing practically every operation in the mine fields of southern West Virginia, eastern Kentucky and a part of Tennessee, have completed plans for the organization of the Central Coal Association. Colonel E. O. Dana, of Cincinnati, was elected president of the association, and Mr. Rodgers, of Pikeville, Ky., was elected treasurer. A board of directors was appointed by Colonel Dana, and the selection of a secretary will be made later. The headquarters of the association will be in Cincinnati, where the next meeting will be held Mar. 4. One of the main purposes of the new association is the publication of reports which will give the average cost of producing and selling, together with the maximum and minimum prices.

Jefferson City, Mo.—A bill has been introduced in the Legislature which provides that railroad companies must weigh all carload shipments of coal at point of origin or the nearest point at which track scales are maintained, and again weigh such coal at destination, if there be railway track scales maintained by the railroad company at such destination. Where there are no track scales the consignee would have the right to have the coal weighed on wagon track scales, and the railroad company would be compelled to accept the sworn statement of the person in charge of the scales, subject only to a deduction of 10 lb. for each wagon load to cover variations and errors. The railroad company is required to deliver to consignee the original weighbill and expense bill showing the gross tare and net weight at each weighing. The penalties provided are from $100 to $500 for each offense.

Charleston, W. Va.—Final action has been taken on the Hale Bill, originating in the House of Delegates, increasing the number of district mine inspectors in the state from 15 to 19 and their annual salaries from $2100 to $3000 per year. The measure also increases the salary of the chief of the department from $3600 to $5000 a year, and recreates the department so as not to run counter to the constitution of West Virginia. The bill makes no other changes in the mining laws of the state. Both houses have now acted on the Hale bill. There is a bill known as the Blizzard bill which has passed the House of Delegates and which provides that scales shall be installed at every mine where ten or more men are employed, and that all miners shall be paid by the actual weight of the coal mined. There is a proviso, however, that upon petition of half the miners in any mine scales may not be required.

New York, N. Y.—Charles S. Allen, secretary of the Wholesale Coal Trade Association has addressed a letter to each of its members asking expressions upon a number of propositions in order that the views of the members may be used as a guide to the course to be taken by the association upon the subjects. Some of the propositions are: Do you approve of filing sales contracts as suggested by other associations or in modified form; Shall the Coal Exchange be continued or discontinued temporarily; Shall the association take action with respect to matters of public interest; Do you approve of the proposed bill to restrict immigration for four years; Do you approve of the use of uniform contract forms; Will you support adoption of use of trade acceptances; Will you support a bureau of credit information by giving the information with respect to your customers; Do you approve of adoption of net ton basis for freight rates in order to place sale of coal on net ton basis; and, Do you propose to use the Tidewater Coal Exchange after March 1.

MARKET DEPARTMENT

Weekly Review

Operators and Consumers Waiting—Feeling That the Worst Phases of the Bituminous Situation Are Over—Stocks Dwindling and Production Falling Off—Anthracite Situation Still Deplorable—No Signs of Improvement

IF ONE wanted a phrase to convey tersely the present status in the coal market, he could do no better than choose the one made famous before our entry into the world war—"watchful waiting." Unlike other industries, the coal mines cannot store their product against the time when demand becomes active and an urgent call for fuel is again manifested. If the public does not buy coal, the mines cannot operate. Coal cars on railroad sidings the country over stand loaded with coal, all awaiting a market that is slow to materialize. It is inconceivable that this condition can long continue.

Reserve stocks in the hands of consumers are daily growing smaller. And speaking of reserve stocks, it is rather mystifying how the so-called non-essential industries, which were presumably receiving no coal whatever during the critical period, were discovered with large accumulations of fuel when the armistice was signed. But why uncover the family skeleton? Reserve stocks cannot last forever. Already many of the well informed in the bituminous branch of the coal industry profess to see a rift in the clouds, and a feeling of optimism is fast dispelling the gloom.

It cannot be denied that the closing down of the soft coal mines, with the consequent decrease in output, has served immeasurably to pull together the strings on what promised to be a loose market. Prices are holding well to the former Government maximums, and there is not the slightest indication whatever of a definite price-cutting policy. Most of the coal moving is in fulfillment of contracts made many months ago, few purchases of spot coal being reported.

With the nearing of the new coal year and the time for the making of new contracts, it can be stated that the worst part of the depression from which the bituminous industry has been suffering is over. In fact it would occasion no surprise if market conditions from now on should change for the better.

Production of soft coal during the week ended Feb. 15 is estimated at 7,761,000 net tons, a decrease of 3,887,000 net tons compared with the same week of 1918. (How the mighty have fallen!) The production for the coal year to date is estimated at 509,775,000 net tons, exceeding that of last year for the same period by 27,149,000 net tons.

The hard coal industry is still groping in darkness. In spite of the fact that many of the anthracite collieries have shut down, while others are working only part time, considerably more coal than the market can absorb is reaching tidewater. Domestic sizes are plentiful, thanks to an open winter, while the smaller steam sizes are glutting the market.

Retailers are not at all anxious to stock any more anthracite, preferring to clean up what they have in their yards while awaiting the schedule of summer prices. At this writing it is uncertain just what the future will bring forth in the hard coal market; there are no reassuring signs.

Anthracite production during the week ended Feb. 15 totaled 1,100,000 net tons, as against 1,444,000 net tons during the week of Feb. 8 and 1,854,000 net tons during the week of Feb. 15, 1918. The total production for the coal year to date now amounts to 84,907,000 net tons as compared with 87,383,000 net tons for the period Apr. 1, 1917, to Feb. 15, 1918.

WEEKLY COAL PRODUCTION

Bituminous—The production of bituminous coal during the week ended Feb. 15 is estimated at 7,761,000 net tons and is a decrease of 186,000 net tons compared with the week preceding and a decrease of 3,887,000 net tons compared with the same week of 1918. The daily average for the current week is estimated at 1,294,000 net tons as compared with 1,847,000 net tons for the coal year to date and 1,749,000 net tons for a similar period of last year. The production for the coal year to date is now estimated at 509,775,000 net tons and exceeds that of last year for the same period by 27,149,000 net tons.

Anthracite—Production during the week ended Feb. 15 is estimated at 1,100,000 net tons as compared with 1,444,000 net tons during the week of Feb. 8, and 1,854,000 net tons during the week of Feb. 15, 1918. The daily average per working day during the current week is estimated at 183,000 net tons and is equivalent to 60 per cent. of the daily average for the coal year to date and 58 per cent. of the daily average for the similar period of last year. The total production for the coal year to date now amounts to 84,907,000 net tons as compared with 87,383,000 net tons for the period Apr. 1, 1917, to Feb. 15, 1918.

Carriers' Reports—Reports received from the carriers for the week ended Feb. 15 show increased loading during that week over the week preceding in central Pennsylvania, Ohio, Tennessee and Kentucky, and the district including Iowa, Texas and the southwest States. Decrease occurred in all other fields, the southern West Virginia fields falling behind the most—1153 carloads or 8 per cent.

New England Shipments—Shipments of bituminous coal to New England during the week ended Feb. 15 are estimated at 240,971 net tons, as against 286,433 net tons during the week preceding. The rail receipts through the New England gateways were in excess of that of the preceding week, and amounted to 119,040 net tons, while tidewater shipments, amounting to 121,931 net tons, fell considerably below the shipments during the week ended Feb. 8, which amounted to 176,369 net tons. All harbors report a decrease in tonnage loaded, with Hampton Roads falling behind the most. The tonnage loaded at this harbor, during the week ended Feb. 15, amounted to 59,637 net tons, as compared with 107,665 net tons during the week of Feb. 8.

Tidewater Shipments—Bituminous coal shipped from the North Atlantic ports and Hampton Roads, during the week ended Feb. 15, amounted to 526,085 net tons, as compared with 670,445 net tons during the week ended Feb. 8. Shipments during the week from Baltimore increased slightly, while shipments from New York and Philadelphia fell approximately 9 per cent. behind the tonnage shipped during the week preceding, and shipments from Hampton Roads amounted to but 58 per cent. of the tonnage shipped from the same port during the week of Feb. 8.

Beehive Coke—The production of beehive coke in the United States during the week ended Feb. 15 is estimated at 422,000 net tons, as compared with 501,000 net tons during the week ended Feb. 8 and 560,000 net tons during the corresponding week of 1918. The average production per working day during the current week is estimated at 70,000 net tons, as against 84,000 net tons, during the week preceding, and as against 93,000 net tons during the week of Feb. 15 of last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running considerably less than for the same week of 1918. Orders for immediate delivery from road salesmen were of greater volume than for the corresponding week last year. Fall lines have not yet been opened. More merchants were in the market seeking immediate requirements for stocks depleted by excellent retail business which still continues. Collections were satisfactory.

Dry Goods Economist—Purchases of the retailers during the week indicate that present conditions in the dry goods trade are exceptionally good. In New York and in Chicago wholesale houses it is noticed that retailers are buying for every department. This is taken to indicate the free movement of all lines of goods. As a rule the goods now being ordered are wanted at once, and in many cases it is evident that the ability to make immediate deliveries is regarded as of more importance than the possibility of the price being shaded at a later date.

American Wool and Cotton Reporter—Buyers of wool are having their difficulties in securing it from the foreign markets. In South America there has been labor trouble, and in South Africa there seems to have been delay in cablegrams. It is felt by some that after the London sale in April that the basis for the world market prices on wool will be more definite. The cotton market does not show very much activity. The surprise of the week was the January consumption report, which showed an increase of 15 per cent. or more over the previous month regardless of curtailment, labor unsettlement, etc.

Bradstreet's—While reports as to trade and industry have not greatly changed, the more cheerful feeling noted last week, particularly in the territory west of the Mississippi, is fully maintained, and in addition there are reports from larger eastern centers that price reductions in textiles have seemed to bring about freer trading. Proof that talk of enlarging export trade has had a really good and sufficient basis is at hand in the excellent export statement for January. Contributory to the spread of better feeling also has been the sustained and accentuated strength of the stock market, which has witnessed the retreat of a rather extended short interest, moved thereto by the favorable tenor of reports from the Peace Conference and the prospects that the movement for government operation or ownership of the railroads has been checked. Liberty Loan bonds have been aided by prospects of a change from long to short term issues.

Atlantic Seaboard

BOSTON

All-rail prices not so soft. Operators in most cases follow conservative policy. Recent Government bids reflect this tone. Railroad buying looked for only in a small way for the present. Tidewater shipments spasmodic from Hampton Roads, but dumping light at other ports. Shipping Board announces its lack of interest in New England coal freights. Shippers will get restive when any buying starts. No prospect of active market for months to come. Stocks apparently as large as ever. Anthracite extremely dull. Outside freights a notable factor. Company barges swinging at anchor, instead of rates being modified to meet conditions.

Bituminous—A slight change in the New England situation can be noted this week. There are fewer reckless quotations all-rail than has been the case since Jan. 1. Instead of prices on fair to good grades being ragged around $2.50@2.85 per net ton f.o.b. mines and $2@2.40 for inferior coals, quotations seem to have settled into grooves on a higher range, especially for those of better quality. This territory is still being closely canvassed for new business, but evidently the operators have taken a hand and made it plain to sales agents just what prices they would accept for current output. The result is all the better for the market, for the few buyers who are now interested will have more confidence. It is apparent also that even on the scattering business that is to be had there is more discrimination between grades. So much poor coal was dumped into this market last year that shippers are now obliged to state pretty exactly what coal is to be furnished. That the whole situation all-rail is slightly firmer is a good sign, and foreshadows a better market in general when other conditions improve.

The fact is that operators are today following a close-hauled policy, in most cases. In central Pennsylvania there are a lot of mines shut down, but those that are at all in operation are generally insisting upon remunerative prices. Operators who produce good to high-grade coal are holding to the recent Government figure, if they do not ask more, and while orders are few they are apparently willing to put out only one-fourth or one-fifth their usual tonnage rather than reduce prices, when they are not at all certain that lower figures would to any extent increase their tonnage. While they pursue this policy there will be some encouragement for the future of the market.

Recent Government bids confirm this attitude on the part of operators. The Watertown (Mass.) Arsenal, for instance, recently invited proposals to furnish 10,000 tons at the rate of two carloads daily from Mar. 10. The only bids were on coals that would appear on the Navy acceptable list; on one was quoted $3 per net ton and on the other 5c. less. Of course, it should also be stated that these coals had to be submitted on rather rigid specifications, but they will come near enough the limitations named so that there would probably be little correction in price for quality. These bids were somewhat of a surprise to the trade here, which had become accustomed the past two months to a much lower price level even on good grades.

The conference on Feb. 18 in Washington with regard to the coal-purchasing policy of the Railroad Administration has apparently had no direct result on the railroad fuel situation in New England. The tonnage in storage is still very heavy and any prudent management would come pretty near insisting that this coal be used before any comprehensive purchases are made. It is true, also, here as in other sections, that only a small percentage of the coal now being used is not covered by contracts made at a time when the Fuel Administration very strongly counselled such action. These are among the reasons why there will probably be only light buying on the part of the railroads for weeks, if not months, to come. The volume of traffic in this territory is still far from heavy and railroad consumption is much less than a year ago.

While a considerable tonnage is coming forward from Hampton Roads on contract the movement is irregular and spasmodic. One week may show quite an increase as compared with another, but the average is low, and the agencies are still wondering where coal is to be placed when current contracts expire. The textile mills continue on short time, and practically all the industries are using less coal than has been customary the past two years. The export market is not developing the way it was hoped, and except for Navy purposes current demand is light. Dumping at Baltimore, Philadelphia and New York is much less than at Hampton Roads, and in some of the pools there is no movement whatever. It is reported that 170 mines are shut down in the Fairmont district alone, and with current marine freights and the differentials in favor of all-rail delivery from central Pennsylvania, it is hard to see how there can be much improvement. The use of the Tidewater Coal Exchange ceases to be mandatory on Mar. 1, and it will be interesting to see to what extent the larger shippers withdraw from pooling arrangements.

Little is heard of prices on Pocahontas and New River, since practically all the tonnage coming forward to this market now is on last year's contracts. Market cargoes still meet with hard going, and it cannot be said that any of the grades ordinarily received here by water are being absorbed any better than has been the case since the year opened.

At last the Shipping Board has made a declaration of policy with regard to coastwise coal freights for the near future. During last week a stereotyped telegram was sent in answer to all inquiries and offers of the past 60 days to the effect that the demand for tonnage was so good in other directions that the Shipping Board "was not particularly interested in New England coal freights," and that rates on requisitioned tonnage would remain unchanged for the present. In other words, the owner of a steamer, 2500 tons and upwards D.W. capacity, "requisitioned" in 1917 by the Shipping Board, must charter at $3.50, Baltimore to Boston, or tie up his ship. The rate is mandatory, and no intimation is given of a possible change. While the steam trade is in its present posture there is perhaps no great injury being done, but once there is an active market for fuel there is sure to be some loud talking that will be heard at Washington. The whole rate situation needs revision, and such a revision cannot come too soon for New England, or there will be trouble next fall and winter.

The indication that there will be no active market for several months is one of the dangers in the present situation. Manufacturers now have such heavy supplies on hand it is quite within the range of possibility that they will overdo a non-buying policy. It is now very plain that operators intend to keep coal in the ground unless what they consider a fair price is offered, and should this general situation continue until June, as there are signs it may, there might be real difficulty about getting forward coal for those industries who will need volume shipments once they begin buying. This will be all the more complicated if the present glaring differential between rail and water delivery is allowed to continue.

Anthracite—The demand for domestic and all sizes of anthracite continues extremely dull. The retail dealers are having no business, partly because of the mild weather and partly because so large a share of the season's business was done last season while the scare was on. Without doubt another factor is the present scale of prices. No dealer will take on coal much in advance of actual need, so great is the uncertainty over what will happen in the spring. The trade seems to feel that although there is a program on the part of operators that calls for a 50c. advance over present prices by Sept. 1, it will be hard to make the public think any such advance is justified. Of course, it is the delivered price at this end that gives them most concern. The proportion moved by the all-rail route has very largely increased the past two years, but there is still a large tonnage that must be taken by water. It is the high range of water freights on anthracite as well as bituminous that gives many dealers much concern.

On Dec. 28 the Railroad Administration, after months of consideration, advanced rates on railroad-owned barges, although at the time outside transportation in the open market had begun to offer at less rates, due to the slackening demand. Now that owners of these outside barges are trying to get charters at rates that run from an even dollar to points like Providence from New York to $1.35 to Boston, while railroad-owned barges are still held at $1.75@1.80, the discrepancy is too great to enlist any buying of company coal to come in the higher-rate barges. The result is that the latter swing at anchor, mines are shut down, and retail dealers run on as light stocks as possible, naturally preferring the all-rail route for such current supply as they may need.

NEW YORK

Coal industry in serious condition. Operators fear the outcome and discuss remedies. Demand slackens and buyers hesitate. No prospects of spring improvement. The bituminous market stronger, following tidewater clean-up. Worst is believed to be over.

Anthracite—Conditions in the anthracite market are unprecedented. Tradesmen who have been in the coal business for years declare that the situation has never been equalled. "Dead" is the way the situation can be summed up in a single word. There is no demand, and there is no opportunity for salesmen to dispose of a few cars of coal even at a sacrifice.

Salesmen returning from their trips inland report "mountains of coal" in the retail yards. Bins are filled and most retail dealers have good-sized stocks on the ground.

That the industry is in a serious condition is reflected in the meeting of operators held here on Feb. 21, at which time the situation was thoroughly canvassed and remedies suggested.

"More coal than we know what to do with" is the way the situation is being sized up by many dealers, and notwithstanding the curtailment policy adopted by the operators there is too much coal being sent to market.

Operations which have been on about a half-time basis for a few weeks are working still less time now, but this does not appear to decrease dumpings at the local docks, which for the week ended Feb. 21 were 3732 cars, an increase of 323 cars over the previous week.

Efforts to send coal westward are not successful, as that section is well stocked. Similar reports come from New England, while on Long Island the dealers are flooded with coal.

There is no prospect of buying improving before operators make some definite announcement regarding spring prices. Many rumors are heard, but so far no definite announcement has been made.

Many reports are heard regarding price concessions. Quotations for so-called Independent coals in many instances are said to be 20c. below company schedule. Demand for the larger of the domestic coals is about evenly divided, with little moving. Pea coal is difficult to dispose of, although large concessions have been offered. Efforts to ship this size into the West have proved unsuccessful, dealers reporting full stocks.

The cut in production is having its effect upon the anthracite steam coal situation. Stocks are not burdensome, but there is plenty to meet all requirements and producers are storing considerable quantities.

The retail situation is quiet. Dealers report little business and an inclination on the part of consumers to refrain from buying in expectation of the usual spring discount. If it is not forthcoming it is unlikely that buying will be heavy this summer, and most consumers are likely to hold off until early fall before ordering their next winter's supply of coal.

Bituminous—Operators and shippers are in a better frame of mind regarding the situation. There is not so much gloom about and the opinion seems to be strong that the bituminous market has turned and the worst part of the depression is past.

There has been a general clean-up at the local tidewater docks, and while the immense surplus has not been entirely wiped out the quantity of coal on hand is not large enough to cause any further apprehension. Shippers are obliged to dispose of their holdings here at concessions below the former Government maximum

price, but quotations on coal at the mines are much stronger. Accumulations at the docks have been reduced and efforts are being made to prevent a recurrence of the former trouble, due in most part to overshipments.

Operators and jobbers report many more inquiries, the result of reduced stock piles and the nearness of the new coal year, when contracts expire and new contracts begin. So far neither operator nor consumer has shown any hurry to sign up for the next twelve months. Nearly every operator has a different view of the situation and, of course, wants to make the best terms possible. Consumers are not willing to sign up at the present high prices asked, believing they are going to get coal later in the season at less than the prices quoted now and are willing to take chances, feeling they have nothing to lose.

One form of contract heard of provides for a readjustment of prices every three months. This form has found favor among some tradesmen, while there are others who favor the flat price for the entire year.

Nearly every day reports are heard of various manufacturing concerns substituting oil for coal for generating power, and it is said that the plan is being considered by other industries.

Dumpings at the local piers for the week ended Feb. 21 were 6248 cars as compared with 5624 cars the previous week, an increase of 624 cars.

The retail price of bituminous coal in Manhattan and the Bronx was reduced 25c. per ton on Feb. 21, the price now being $7.25 per ton. This is the second change in retail prices put into effect by the retail dealers in these two boroughs since the removal of price restrictions by the Fuel Administration, the first reduction affecting anthracite coals.

PHILADELPHIA

Anthracite dullness continues. Collieries on short working time. Retailers say big business done for the season. Pea coal trade vanishing. Reason sought for lack of ordinary demand. Sales now all based on circular prices. Some little retail price cutting. Independents cut prices in few instances. Rumors of spring price advance. Buckwheat only steam size in demand. Bituminous very quiet.

Anthracite—With the collieries that produce the very best grades of anthracite shutting down two and three days a week for want of orders, it is probably unnecessary to go further in commenting on the condition of the market. That the largest operating company sees fit to advertise in the daily press that it is prepared to make immediate shipment of all sizes is another unusual feature for the month of February.

The dealers are being reluctantly forced to realize that their business is about over for the season, for the prospect of any prolonged spell of cold weather is not at all good with the first of March almost here. With the vanishing of their hopes for this month, many of them feel certain that March will surely bring numerous small orders that will help in reducing the very heavy stocks which they have on hand of all sizes and which they are anxious to move in the event of any spring reduction.

All the retailers are in a quandary as to why they have lost so much of their pea coal business, as there is scarcely a yard that is not over-supplied. The operators are also giving much thought to the question, and it is becoming a serious problem with some of them. We have this week interviewed some of the largest buyers on this subject, but they are unable to cast much light on the matter. There are some who claim the fault lies entirely with the size itself. It will be remembered that acting upon a suggestion of the fuel authorities, and in order to increase the tonnage for family use, the operators quite willingly changed the size of the screens thus permitting a larger percentage of buckwheat in the pea coal than was allowed by the old standard of preparation. This, some dealers say, has caused the customers to complain and refuse to continue to pay the prevailing high price for it; and they have in the meanwhile changed to chestnut, apparently with much satisfaction.

Other dealers, including some of the representative ones, insist the trouble rests solely with the price. They say it is unreasonably high and that the difference between it and chestnut is too small, which just now is $1.60 per ton on the delivered price. It is known that a number of the operators are listening with interest to both sides of the controversy, for it is becoming apparent that something must be done to improve the sale of pea coal if it is to continue to hold its high place among the family sizes. Undoubtedly they dread to look back to the old days when it was looked upon only as a steam size. Right at this time the independent operators are experiencing the most trouble with this size, on account of the cars standing at the mines loaded with this size accumulating demurrage and with no storage yards to dump it.

Just as every operator has adopted the same price, not forgetting that the middle houses' "brokerage fees" have also been abolished, so have the dealers pocketed the loss on all individual coal in stock, and announced the same rates to the public. These are based on company circular plus freight and the retained gross margin of $2.50 per ton.

To date there have been remarkably few instances of retail price cutting among the dealers, it being confined principally to those dealers who formerly indulged in this practice. However, it is noted that where the rates have been reduced they have not materially increased sales. The prevailing retail rates are egg $10.30, stove $10.55, nut $10.65, pea $9.05. Among the cutters the lowest prices offered are a flat rate of $10.25 for egg, stove and chestnut, with $8.50 for pea.

We hear that dealers located along the lines of the Pennsylvania Railroad complain because they pay a higher freight rate than their competitors along the lines of the Reading. Of course this made little difference in the historic months just past, but with business falling back into usual channels it now affords an opportunity for the retailers to claim a concession. No doubt some of the independent operators are willing to absorb the difference, and we know that some of them have cut far deeper into the so-called circular than this, but the companies have so far refrained from making any such allowances. Among the individuals we have heard of prepared coal being offered for as much as 50c. off circular, yet even at that price they find difficulty in placing coal. We know of a dealer offered pea coal at a liberal concession and who accepted it simply as a favor to the shipper, as he put it, because he had treated him right during the war. However, price cutting by the independents is far from general, as they claim they are doing business at a loss even at circular price on account of the short working time of their mines with the lessened production. Such concessions as are given are simply to move coal that is accumulating demurrage.

One amusing feature in making the trip around the offices of the retail trade is to hear the dealers actually admit they made money in the past year. During those strenuous days they made pitiful pleas for coal and gave one the impression that the cost of labor, etc., was taking up the entire gross margin. Now we hear them admit it was the best year they ever had, and judging from the remarks of quite a few, the war contained few horrors for them.

Naturally there is much speculation as to April prices. As a whole the trade seems convinced there will not be the usual decline. While no shipper will risk a definite statement to his trade to this effect, they appear to be giving that impression. Also is the feeling growing that prices will advance. Some high in the trade predict that commencing May 1, and taking the present circular as a basis, prices will advance 10c. a month for five months. As the labor question is one of utmost importance with all large employers, so it is to the forefront with the operators. We believe it is justly claimed that they cannot reduce prices and assume the loss; and to reduce the wages of the miner is a proposition fraught with much danger.

Practically all dealers anticipate going through a dull period, some claiming it may last until early fall. They intend to watch collections closely and avoid filling the bins of their customers during the coming spring and summer with next winter's coal and waiting for the money until they commence to burn it, as has often been done in the past.

Notwithstanding the poor prospect for the immediate future of the coal business we hear of a number of prospective buyers who are apparently anxious to embark in it, but there are no yards in the city for rent and few if any for sale. In the case of a yard sold recently, there were half a dozen real buyers in sight, five of whom were bitterly disappointed when they found the other fellow had got it at a good figure.

We know that most operators have been embarrassed by having coal standing at the scales and on demurrage for want of orders, which accounts for most of the low prices quoted. Egg, pea and the steam sizes are causing the most trouble here. What business there is continues to be chiefly stove and chestnut, but with all the salesmen on the street and showing unusual activity there is competition for every order.

In the steam sizes buckwheat coal is the only size for which there is any demand, and while the companies stick closely to the $3.40 prices many of the individual shippers are selling for less. Barley and rice are extremely heavy and the big companies continue to put fair tonnages into the storage yards on account of the lack of sales.

Bituminous—The market fails to gain in strength. All operators report their mines on short working time and consumers are loath to buy. Of course the heavy stocks on hand are being fairly well used up, still it will be months before anything like active calls for fuel will be made. Shippers of the better class of coal are insisting on the price of $2.95, or thereabouts, for their output, athough there are plenty of offers of $2.50 and even lower. The consumer, though, has learned much about coal and is quite dubious of the quality of coal offered at the low prices, as much of it is of most doubtful quality. For strictly blacksmith coal the price range is $3.25 to $3.50, with a fair amount taken.

BALTIMORE

Demand for soft coal continues flat and an oversupply of fuel at tide is still noted. Prices are weak and regulated largely by individual circumstances of sale. Government changes pending. No snap to hard coal selling.

Bituminous—There is little market for soft coal here. The supply at this point is excellent as to quality and more than sufficient as to quantity. It is one of those markets where it is difficult to quote a price range even as sales are largely dictated by individual sale circumstances. Probably the most interesting feature here is had in expected changes due to coming Government regulations being dropped. The shippers have been told that there will be an abolition of the no-consignment rule of the Fuel Administration after Mar. 1. This will enable coal to be reconsigned after reaching consignees here, where in such a market as the present it is not infrequently declined. The ordinary railroad switching charge would then be effective as compared with the present requirement under the "no-reconsignment" order that the coal be reshipped at the full mines-to-city rate with an added tax of a special shipment nature. That changes are due in the pool orders is also evident. Coal will soon be running in quantity direct to the piers from producers who desire to load on ships, lighters, etc., outside of pool regulations, thus restoring the competition as to class fuels. Whether the pools will be abandoned completely is a question, for while the majority of larger coal shippers and producers seem to favor some such move there is a considerable element in the trade that favors a continuance of the pooling arrangement under Government control. The Federal Railroad Administration is also said to be favorable to an upkeep of the pooling plan.

Anthracite—The anthracite market lacks any element of snap. The users of fuel who are running low are ordering in one-ton or even half-ton lots, encouraged by the unusually mild winter to believe that an exceptionally early spring may save them from buying in a market which is popularly regarded as top-notch as to price. This sort of buying makes the dealers cautious in orders for the month, and the inducement of independent mine offers of coal at company mined prices is little inducement at all when company mines are closed part days some weeks in order to prevent an over-supply. Even now there is more hard coal here than can be put out promptly, and the yard stocks are slowly mounting despite the effort to hold them down.

Lake Markets

PITTSBURGH

Operation between 25 and 30 per cent. Two sets of market prices. Decreasing consumption.

The coal situation still drags along a weary existence. It is a case of allowing stocks to be liquidated, and the operators seem to be getting along quite well in restricting their operations to the actual demands of the market. Production is between 25 and 30 per cent. of capacity, many mines being closed entirely, while those that operate generally run at between

40 and 60 per cent. capacity. There are two markets, one the regular market for coal to be mined and the other the market for odd lots that through mischance or design have been loaded on cars and must be moved to save demurrage. Such coal frequently goes at less than $2, but the total turnover is small.

The season circular price of $2.50, 15c. over the former Government limit, has not been formally withdrawn, but is a dead letter except as to high-grade gas coal, which occasionally brings up to $2.60 for ¾-in. Byproduct coal and ordinary gas coal generally bring about $2.35, with occasional shading. The general market is quotable roughly at $2.10 for slack, $2.35 for mine-run and $2.50 to $2.60 for ¾-in. gas, per net ton at mine, Pittsburgh district.

Railroad consumption of coal has fallen off, as has consumption by the steel industry, which each week operates at a lower rate than the previous week. The steel mills in the Pittsburgh and valley districts, however, are doing better on an average than mills elsewhere, most of them operating at between 60 and 90 per cent. Many small detached mills are closed entirely. There is almost as heavy coal consumption as formerly by the byproduct coke ovens. It was owing to the indifference of byproduct coke operators that the Geological Survey had to discontinue the weekly report of production, and it is not certain that the proposed monthly reports can be carried on. While stocks of coal held by consumers have been decreasing they are still a factor, and a late opening of lake coal shipments is expected, so that it may be quite a while before there is much improvement in coal demand.

Miners in some sections are reported as being in a restless mood, but in general the miners understood that the operators are curtailing operations for the purpose of maintaining the market and recognize that this is desirable if their wages are to be maintained.

TORONTO

Market remains quiet. Dealers doing business at a loss. Large stocks on hand. Some price-cutting in bituminous.

The demand for coal though far below normal at this season shows a slight improvement, but is mainly confined to the class of small consumers who buy only for present requirements. Dealers who laid in large stocks as soon as the opportunity offered are carrying on business at a loss and claim that the present price of $11.50 for anthracite leaves no margin for profit. Several of the smaller dealers have suspended business. There is no change in the situation as regards the demand for bituminous, which remains limited, but prices are generally well maintained, though in some cases deductions are being made in order to push sales.

BUFFALO

No improvement in coal demand. Bituminous moving slower than ever. Mines shutting down when orders run out. No move to load anthracite into vessels.

Bituminous—The trade slows up perceptibly, for the industries of the country are not yet active. The factories do not know what to do. Everything costs so much that the consumer is buying as little as possible. So long as this state of things lasts the consumption of coal must be light. From all sides still come reports that stocks are heavy and not running down, for the seller somehow manages to get enough coal into consumers' hands to keep the supply up.

At the same time the prices are strong. Less report is heard of cutting than when the Government price was dropped. The fact is that it would take a disastrous reduction now to interest the consumer. He does not call the prices so very high, but he has coal enough and often has no more room for it. How, then, can he buy? So all that can be done is to sell a little here and there. It is likely to last quite a long time, perhaps till the labor deadlock is off. Capital cannot see a return dollar for a dollar spent at present figures, either for material or for work. The effort to keep all prices up may succeed, but it is not much of a success yet.

Meanwhile the bituminous jobbers are uneasy. They have a hard time to make a living and they see nothing better ahead. The question with most of them is whether they can go on in this way till business moves again. Even those who did fairly well awhile ago are now complaining with the rest. They believe their poor sales are due to a falling off in consumption. The only improvement in the situation is that the refusal to reconsign cars will be given up at the end of the month. The rule requiring them to guarantee freight on the shipment of slack into Canada is not regarded as a great hardship. They do not believe it will be strictly enforced, any more than it was previously.

Shutting down the mines is now the rule, just as soon as the coal begins to accumulate. It will not answer to send it out on consignment, for a loss is pretty certain and sometimes it is heavy. The margin, either to the operator or to the jobber, is too small for anything of this sort. Meanwhile the prices are strong.

Anthracite—The announcement that the price is to be allowed to advance 75c. a ton will astonish most of the trade, as only 50c. seems to have been asked. It will do what it can to make this coal a luxury. Maybe that is what the producers are after, for the supply is not everlasting. At the same time the mines that were allowed a margin over the others are down to the general level and finding it hard to sell their output at that.

The demand is everywhere light. Many orders have been cancelled lately, for February is turning out not to be much colder than were the other winter months. The anxiety expressed by distributors some time ago lest there should set in a severe spell of weather lasting some weeks and so create a shortage of coal is now about laid aside. The supply is no doubt sufficient for all emergencies and every day makes any sort of stress less likely. What is now troubling many consumers is how to get rid of the substitute fuel that they have laid in.

Nothing more is said of loading lake coal. The upper lake supply is so large that nobody there wants any early, so the thing is to wait and let the spring take care of itself. If loading a good-sized fleet here right away would take care of the surplus it might be undertaken, but as it would not the best thing to do is to wait. The miscalculations made in the estimates last season have produced a decidedly embarrassing result, but that is now a matter of history. It does not appear to have been avoidable.

CLEVELAND

Both the steam coal and domestic markets continue to mark time. A slight stiffening is noticed, chiefly because of the 25c. increase in Pocahontas at the mines. Receipts in northern Ohio still are about 40 per cent. of normal. The cheaper grades of steam coal can be had all the way from $2.15 to $2.60—the last Government maximum.

Bituminous — Statements, predictions, speculations and hopes that business will be revived are more numerous now than at any time in the past month; but, like all that has gone before, the improvement appears to be confined to the printed page. Industry in northern Ohio continues to operate at about 50 per cent. of capacity. Roughly, about 40 per cent. of this operating percentage is being done by power generated from stock-pile coal. The state of the steam-coal market thus becomes obvious.

Local operators are living in the future and look forward to the opening of navigation on the Great Lakes, which now is only five weeks off. But even this does not fill some No. 8 operators with optimism, for upper lake dock men appear more strong for Pocahontas—now that it is once more obtainable—than ever before—and considerable No. 8 coal will be crowded out of the lake market. In the meantime, operators are keeping mine operations apace with demand, and three days a week is a mighty good schedule for southern and eastern Ohio.

Car shortage is a subject not now discussed; it may be said to exist no longer. Labor at the mines is becoming restive, but is showing no inclination to accept a lower wage in order to stimulate business. In several cases operators have put out feelers among their mine workers, but acceptance of a lower wage apparently is something foreign to the thinking of the workers.

The larger operators are standing pat on the Government maximum, but steam coal can be had in varying tonnages from $2.15 up to $2.60. Some coal has been said to have been tendered at less than $2.15, but the range from $2.15 to $2.60 pretty nearly represents the market. A steam-coal user can buy fuel within those limits according to his luck in happening on to car service coal and what is understood to be second-grade coal.

Pocahontas lump has finally made its appearance in quantity and is retailing at $7.50. Run-of-mine is priced at $7.20. Its competitors are anthracite at $10.85—which is a reduction of 40c.—No. 8 Pittsburgh at $6.35, Massillon lump at $7.10 and West Virginia splint at $7.15. On account of the small demand for slack, Pocahontas operators have added 25c. to the price at the mines. This has served to stiffen the market for all grades, although a slight raise would add strength to the market's present weak state. Domestic demand shows a slight increase as colder weather has set it, but it cannot compare with normal.

Anthracite—The promised reduction of 40c. has been made in domestic anthracite, which is now priced at $10.85. The incoming of Pocahontas has cut slightly into the demand for anthracite.

Lake Trade—The trade continues without word of a reduction in demurrage rates, which is held indispensable to the abandonment of the Great Lakes coal pool. If nothing is done prior to the end of March the pool will be continued in a way, it is said. "Private" pools, such as has been conducted at Huron, Ohio, by three large lake shippers prior to the larger pool, probably will be resumed. In the absence of a new price the last one is holding, but this is still open.

DETROIT

Little buying is being done in bituminous by either the steam or domestic trade.

Bituminous—Orders for bituminous are not coming out freely, jobbers say, notwithstanding some recent predictions that the removal of Federal zone rules and control would impart considerable stimulus to the market. Under more normal conditions such a result might have followed the lifting of Government barriers. The situation in the local market at present, however, may be described as abnormal, made so by the excessive supplies of bituminous in reserve at the steam plants and the storage yards of the retail dealers.

The working down of these supplies is not proceeding rapidly. The factories are using less coal than a few weeks ago. Instead of running at capacity production, the cancellation of Government contracts has left many in a position where operation is limited. The restoration of before-war business is being attempted, but in many instances obstacles are encountered such as delay by the Federal Government's representatives in completing settlement of claims of contractors and the lack of promptness in removing equipment installed by the Government for war work, which is now in the way of the equipment that must be replaced to resume business on products turned out before the war.

Unusually mild temperatures have interfered with the movement of coal from retailers' yards, by curtailing demand from domestic consumers. The retailers who bought large quantities of bituminous, expecting their customers would be largely dependent on that form of coal, owing to restrictions on the use of anthracite and its limited supply, saw part of their prospective market taken when the Fuel Administration regulations were relaxed to permit use of coke by householders to the full limit of their needs, and again when restrictions were lifted from the use of anthracite.

Anthracite — Supplies of anthracite are apparently adequate to meet all present requirements. While shipments are not large, weather conditions have aided in conserving stock. Numerous Detroit retailers are advertising their ability to supply domestic requirements with any form of anthracite and in unrestricted quantity. The plentiful supply of coke that has been available recently has lessened pressure for anthracite.

COLUMBUS

The coal trade in Ohio is quiet. Little change has been noted, as the weather continues warm. There is a slight increase in the steam demand. Prices remain fairly steady

The Ohio coal trade shows little change during the past week. Demand is still limited to small orders and there is no disposition to stock up under present circumstances. The steam business is showing a little more activity in the way of inquiries, although orders are not numerous. Taking it all in all the trade is playing a waiting game, to see what happens before buying fuel. Prices are fairly steady at former levels, although there is considerable cheap coal on the market.

The retail trade is quiet, as is inevitable when the unfavorable weather conditions are taken into consideration. Retailers are loath to buy under present conditions and are content to try to clean up before spring. There is still some demand for Pocahontas and other fancy grades, but the bulk of that business ha been taken

care of. Retail prices are still maintained at the Government levels. The demand is limited, as it is realized that cutting would not stimulate trade to any extent. Rural dealers are probably doing the best business at this time.

Steam business is slightly more active, especially in the way of inquiries. A canvass by salesmen shows that the larger consumers still have large surplus stocks and will not be in the market for some time. This is especially true of the rubber plants and iron and steel mills. General manufacturing on a peace basis is slow in getting started. The railroads are buying a larger tonnage, but not nearly what the war period required. Public service corporations are probably the best customers at this time. There is some cutting of prices on current business in steam circles, but contracts are still maintained. Operators are now figuring on the renewal of many steam contracts that expire around Apr. 1.

Production in all Ohio fields has been rather light. Estimates show that the Hocking Valley mines produced about 25 to 30 per cent. of normal and other fields in the Southern field about the same. Eastern Ohio is credited with about 30 per cent. of normal.

CINCINNATI

General dullness in the market continues, with consumption below contract deliveries and spot demand at zero.

The absence of demand that has characterized the market for some weeks continues unabated, with no indication whatever that any improvement is to be expected in the near future. So far there has been no effort at stimulation by the expedient of sacrificing prices, as it is generally appreciated that the situation is due solely to an absence of need for coal, and that nothing but demoralization would be the result of price-cutting.

In some instances shippers find it difficult to get large consumers to accept deliveries on contracts, although this situation is not giving rise to any great complaint. The principal anxiety in this market is how soon and how extensively it will be possible to revive business in the West and North, as it is realized that this will depend considerably upon the amount of coal carried over.

It is hoped that the convenience with which the winter's supply was stored and the widespread dissatisfaction with cheap fuel delivered not only here, but especially in Western markets, in place of the accustomed high-grade coals, will make it comparatively easy for producers and handlers of first-class coal to make arrangements for the sale of it. The real suffering in the scramble for business, it is naturally felt, will occur among producers of low-grade coal. For the better grades that comprise most of the coal moving through this market there is no real anxiety regarding market conditions later on, when industrial conditions will have improved and the customary spring activity will be in progress.

LOUISVILLE

General market stagnant, with fair demand for better grades of domestic. Steam coal generally draggy. Prices being well maintained. Expected improvement about Apr. 1.

The situation is showing little improvement at the present time, due to continued mild weather, small demand for domestic and a much smaller demand for steam. Domestic can only be produced at high cost due to inability to dispose of screenings and small sizes, with the result that operators are getting a premium of 20c. to 30c. per ton on domestic, and taking a similar reduction on steam.

Mines are continuing on a two- to three-day basis, with only the larger mines making any real effort to run. Low-grade coals are hard to sell at any price, and operators in such fields are having much difficulty in marketing their product.

Western Kentucky operators are making a hard fight before the Interstate Commerce Commission for better freight rates into the Chicago territory and also into the South, present rates making competition almost out of the question.

Although February is almost over and no ice has been encountered in the Ohio River, movement of river coal continues at a standstill, there being only a few small tows coming through. For a time the rail operators of Kentucky were much worried concerning river mines shipping from the West Virginia fields on a lower freight rate, but with the river towns well stocked the river shippers are not making a hard drive for business. Some coal is expected in March, however.

BIRMINGHAM

Steam market very quiet with little spot demand. Domestic mines unable to meet the requirements for this grade of coal. Dull market conditions being met by decreased coal production.

Market conditions as respect steam coal have shown no improvement during the past week, and there is virtually no demand for the output of the commercial mines in the spot market. Consumers seem to have sufficient stocks to meet their requirements for a time and are refraining from entering the market for more coal. There is a fair tonnage of contract coal moving, which enables the larger mines to maintain practically full-time operation with some reduction in daily output, but numbers of the smaller producers are not running steadily. Steam prices are being maintained on the basis of the Government schedule in effect at the close of January.

Lump and nut coal for domestic use is still very much short of requirements, and while there is some little improvement noted in the local supply, due to the absence of cold weather, other sections of this territory have been unable to secure the fuel needed from this district, and temporary relief has been afforded in the Mobile section by shipments from the Illinois field. The inactive steam market has naturally affected the output of domestic sizes, the bulk of which comes from operations which are primarily producers of steam fuel.

Coke

CONNELLSVILLE

Slightly steadier market. Consumptive outlook not promising. Output further reduced.

The spot coke market has steadied somewhat, through the curtailment in production nearly overtaking the curtailment in consumption. There are still some offerings of demurrage coke, but they are not as numerous as a week or two ago, prices obtainable are no better and such coke is often sold at $4.25 or $4.50. For coke that is to be made after receipt of order a much stiffer situation prevails, and as formerly leading operators refuse to shade $5 for furnace coke or $6 for foundry coke. On an attractive inquiry for a month's or a fortnight's supply of furnace coke $5 might possibly be shaded, but this is doubtful. The operators have so much at stake in their regular contracts, which call for a monthly price adjustment according to the market, that they are anxious to sustain the spot market. The market is quotable at $5 for furnace and $6 for foundry coke, prompt or nearby shipment, with occasional offerings of odd lots at cut prices, while on contract coke there is no market at all.

Blast-furnace operations show a slightly decreasing tendency, but on the whole coke consumption is heavier than would have been expected in such a quiet pig-iron market. The furnaces are making scarcely any sales but shipments against old contracts are fair, and the question is how long customers will continue to take shipments. There was a fairly well attended meeting of blast furnacemen in this general district last week, at which the sentiment was developed that pig-iron prices are too high to develop buying, but no means lay open for effecting an orderly reduction and the matter is left for time to adjust, there being an expectation that the steel mills will shortly reduce their steel prices and that may give a cue to the blast furnacemen.

The "Courier" reports production of coke in the Connellsville and Lower Connellsville region in the week ended Feb. 15 at 200,356 tons, a decrease of 25,430 tons. Raw coal shipments are no longer reported.

Buffalo—The trade is quite as dull as coal. All points report such a light demand that prices are slack and declining. The Buffalo price is now down to $5 to $6, oven price, plus $2.60 freight and a few cents war tax for 72-hour foundry and a dollar less for 48-hour furnace and the off grades generally. Fuel and stock grades are moving at consumer's prices, if at all. Much of this class of coke has to be stocked. No move has been made yet in the ore trade for the coming lake season, but it is expected that the trade will go on much as last season. A period of dullness now may not mean much as to the entire season.

Middle Western

GENERAL REVIEW

Conditions cannot be much worse, and next change is expected to show improvement. Sales being made at Government prices. Question whether Illinois and Indiana will hold on to Michigan market.

The mild spring weather is continuing throughout the Middle West, and consequently even less coal is moving than would ordinarily go forward in a normal winter, when manufacturing activities were at a low ebb. The coal operator and the jobber have one consolation, and that is the situation cannot become much worse. If there is any change in conditions at all, it will be a change for the better.

There is some buying on the part of retailers, but in volume these purchases do not amount to enough to be of any great help or any great factor in the present situation. The steam market continues dead. Every now and then, however, some buyer, looking for a bargain, steps into the market and attempts to purchase coal at a reduction from the present prices. Usually this purchasing agent is able to pick up about all the coal he wishes, at the price he is willing to pay, but what he secures is not standard stuff; in fact, he usually finds that the coal offered at a reduction is not such a great bargain after all.

Prices on all well-known first-class coals are remaining firm. The reason for this is that the operators producing the better grade fuels are usually men who have been in the coal industry a long time, and know exactly how much it costs them to produce their product. After what has been taught them during the war, they feel that it is wiser to close their mines rather than sell their fuel at a loss. The parties making the low prices are usually men new at the coal game, and they probably do not know what it costs them to produce their coal. This type of operator just referred to has always been a stumbling block in the path of the entire industry, and will continue so until steps are taken to curtail his activities by those in authority.

Since Feb. 1, the buying public, both steam and domestic, have been divided into two classes. The first—those who want good coal and will pay for it. These men usually have a system whereby they can tell exactly how many heat units they get for a cent, and are fully aware of the folly of buying poor coal when the best offered is to be had at a fair price. The second class—those who may be termed "bargain hunters," consists of men tempted by the price alone, and hypnotized into the belief that they are getting standard coal below what the coal is really worth. It is encouraging to note that although little coal is being bought, most of it is sold at the old Government prices.

The situation in Michigan at this writing is perhaps worthy of note. Before the war, practically all coal going to that state originated east of the Ohio state line. During the war, and until the zones were lifted, Michigan was shut off from Eastern coal, as that fuel either went to the seaboard or was consumed by adjacent war industries. As a result, Michigan had to fall back on Illinois and Indiana mines for its fuel supply, and a large tonnage of mid-West coal was shipped into a market hitherto closed to it. It was a great question, and is still open to debate, as to whether or not the best grades of Illinois and Indiana coals will stick to their new market when normal conditions return.

As it looks now, Michigan has gone back stronger than ever to eastern coals, being willing to pay extra for the higher quality. This is especially true of the retail trade, as practically no Indiana or Illinois coal is moving to retailers in Michigan at this time. So far as steam business is concerned, some Indiana coal is being used and will continue to be used, but only the best grades that Indiana has to offer. Practically no Illinois coal is moving into Michigan, as the freight rates from Illinois mines to points in Michigan are high; in fact, so high that Illinois cannot compete with Indiana in the Michigan market, and therefore what cheap steam coal is being bought for Michigan is obtained from Indiana properties producing good coal and enjoying low rates.

CHICAGO

Practically no market. Retailers with large stocks face big financial loss. No demand for anthracite.

There is little to say about the steam coal market in Chicago, as there practically

is no market. Reports come in from time to time to the effect that plant after plant is either closing down for the time being, or working from one to three days per week. No news about new plants opening or renewing industrial activities.

The rule of the Fuel Administration in Chicago has brought about a curious situation, which will undoubtedly result in a substantial loss to a great many coal dealers, especially some of the largest dealers in this city. When all prices and other restrictions were removed by the Fuel Administration, many of these dealers found their yards stocked with a heavy tonnage of Illinois and Indiana coal—lump, mine run and screenings. Since the market eased up, it has been almost impossible to sell this accumulated storage coal at anything but a big loss; in fact, it is a difficult thing for the dealer to break even on what he has stored. Eventually this is going to work a great hardship on the retail trade in this city, as some big losses will have to be stood.

Coal from the anthracite field, as well as the West Virginia and eastern Kentucky fields, is being offered freely to the trade, with little sold. The idea of the retailer at this time is to clean up his yards and get rid of all the coal he has on hand before he obligates himself for any further fuel.

ST. LOUIS

Warm weather continues and there is no demand for any kind of coal. The surplus of screenings has brought about a critical condition at the mines. Railroad demand light, cars plentiful and transportation good.

The coal situation in this region continues to grow worse, owing to the mild weather. A great problem right now in the Standard field is to move the screenings. Some mines have been accumulating screenings for over four weeks, and all the tracks available are loaded. The railroads have been more lenient with the operators in allowing their idle equipment to stand on the tracks filled with screenings, but it has about gone the limit. Several mines that were loading railroad coal are jammed up with mine-run and are unable to move it.

There is a little demand for lump in the Standard field but it is almost impossible for the mines to work on account of the other sizes not moving. The miners are dissatisfied because they are not getting sufficient work to pay their living expenses.

The Mt. Olive operators are up against it. The Fuel Administration, in its desire to help the situation in St. Louis a year ago, classified the different coals. Several coals were taken out of the Standard field because of their quality and preparation, and put in the Mt. Olive classification. These operators, with a lower producing expense than the operators in the Mt. Olive field, are able to sell their coal for 55c. a ton less than the Mt. Olive operators are getting, with the result that all the Mt. Olive coal coming into St. Louis is the coal that was raised from the Standard grade to the Mt. Olive. This action has shut out of St. Louis almost entirely the real Mt. Olive coal, and the situation is a strenuous one for the Mt. Olive operators. The little coal they are moving from this territory is going north and on some railroad contracts. An effort is being made to have the Fuel Administration show the cause for the classification at the time it was made and that that reason does not exist today.

In the Carterville field of Williamson and Franklin Counties, and also in the Du Quoin field in Perry County, the mines are having a strenuous time to keep working as much as half time. It is a matter of steam coal here, too, there being no place to put screenings as a rule; but even at that the demand for the screened sizes is not anywhere near what the operators anticipated. Screened coal is holding pretty well to the $2.75 price in Franklin County, while in Williamson County the association members are asking $2.75 and the independents are asking as low as $2.35.

The mines in the Big Muddy district around Murphysboro in Jackson County are idle and have been for some time, on account of their inability to move sizes.

In the St. Louis market proper business is at a standstill. There is practically nothing moving in the way of steam, for the storage piles are being used up. The same applies to railroad coal in a general way.

The mild weather brings no demand for domestic tonnage, only in small lots. There is no demand for the anthracite that has been brought in recently, and the little tonnage of Eastern smokeless that is coming in is for the most part being piled up in the dealers' yards. The same applies to the coke situation.

The prevailing prices are, per net ton f.o.b. mines:

	Mt. Olive and Staunton	Standard	
Franklin County:			
Prepared sizes (lump, egg, Nos. 1 and 2 nut)	$2 75	...	...
Williamson County:			
Prepared sizes (lump, egg, nut)	$2 55	$2.55	(As noted
Mine-run	2 20	2 20	above)
Screenings	2 05	2 05	...

Williamson-Franklin rate to St. Louis is $1.10; other rates, 95c.

MILWAUKEE

Fine weather keeps the coal market flat and stale. Prices held firmly. Consumers buying soft coal in preference to anthracite at present prices.

The coal market continues flat and stale, with the weather still in favor of the consumer. As one dealer remarked: "Last year they were chasing us; now we are chasing them." Prices are being maintained, notwithstanding, and the probability is there will be no letting down until present stocks are exhausted. All yards are well supplied and are not in the market for additions to their stocks just at present. If a break ever comes it will be in soft coal, and then only in the event that Western operators begin to shade rates in order to capture new business. Coke is also firmly held, but producers are not disposing of their output with as much rapidity as formerly. Coke and anthracite coal are both deemed too high, and while there is a hue and cry throughout the city about the filthiness of soft coal smoke, dealers say there will be more soft coal burned regularly from now on, especially if coke and anthracite are maintained at anything like present figures.

The state fuel administration office will close for good on Mar. 1, in fact it is practically closed now, there being only a few of the clerical staff at work making out reports of the activities of the office during its existence.

General Statistics

CENTRAL PENNSYLVANIA SHIPMENTS

Traffic reports from the railroads for the week ending Feb. 8 show that the greatest falling off in coal shipments occurred in the central Pennsylvania field. During that week 20,970 cars were shipped from the district, as compared with 25,481 cars the week before, the loss amounting to 4511 cars, or 18 per cent. Market conditions and numerous embargoes against tidewater shipments were responsible.

The second largest loss occurred in the district which embraces southern West Virginia and northeastern Kentucky. Shipments from that territory amounted to 17,273 cars in the week ending Feb. 8 as against 18,498 cars for the week of Feb. 1. This was a loss of 1125 cars, or 7 per cent.

Other districts showed the following totals for the two weeks under consideration:

	Feb. 8 Cars	Feb. 1 Cars
Western Pennsylvania	6,623	6,654
Cumberland-Piedmont-Somerset	4,453	4,478
Fairmont	3,906	4,059
Michigan	451	327
Ohio	12,142	11,382
Southwest Virginia	2,247	2,135
Tennessee and Southeast Kentucky	9,466	9,809
Alabama	3,145	3,174
Illinois, Indiana and Western Kentucky	32,700	30,233

JANUARY ANTHRACITE SHIPMENTS

The shipments of anthracite in January, as reported to the Anthracite Bureau of Information in Philadelphia, amounted to 5,934,241 gross tons, a gain of nearly 200,000 tons over the preceding month and of nearly 300,000 tons over January, 1918. The opening month of last year was one of almost unprecedented severity which, while creating an urgent demand for coal, seriously handicapped its production and transportation. The shipments in January, 1918, amounted to only 5,638,383 gross tons, more than 1,600,000 tons less than were made two months later in March. In December, 1918, the shipments amounted to 5,736,260 gross tons. The exceptionally mild weather of this winter has been favorable to mining and transportation, and as a result production was well maintained up to the last day of the month, the shipments being the heaviest for January, with two exceptions (1913 and 1917) in the history of the trade.

The shipments by companies were as follows:

	January, 1919	January, 1918	Coal Year, 1918–1919	Coal Year, 1917–1918
P. & R. Ry	1,155,803	932,146	12,614,019	12,351,463
L. V. R.R.	1,048,173	983,964	11,942,817	11,823,066
C. R.R. of N. J.	497,990	524,650	5,593,362	5,722,732
D. L. & W. R.R.	934,369	1,029,977	9,635,924	10,375,386
D. & H. Co.	717,045	636,875	7,532,802	7,292,061
Penna. R.R.	442,059	458,408	4,482,781	4,664,424
Erie R.R.	687,241	632,332	7,217,303	7,361,401
N. Y. O. & W. Ry.	156,328	171,667	1,641,322	1,688,509
L. & N. E. R.R.	295,233	268,364	3,196,587	3,384,414
Total	5,934,241	5,638,383	63,856,917	64,663,456

Coal and Coke Securities

New York Stock Exchange Closing Quotations Feb. 24, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com.	(BB)	144	146
Burns Brothers, Pfd.	(BB)	110	115
Central Coal & Coke, Com.	(CK)	55	...
Central Coal & Coke, Pfd.	(CK)	63	...
Colorado Fuel & Iron, Com.	(CF)	38	38¼
Colorado Fuel & Iron, Pfd.	(CF)	99	...
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com.	(EH)	25	29
Elk Horn Coal, Pfd.	(EH)	...	27
Island Creek Coal, Com.	(ICR)	39	...
Island Creek Coal, Pfd.	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	60	...
New Central Coal of West Va.	(NCC)	5	...
Pittsburgh Coal, Com.	(PC)	46¾	47
Pittsburgh Coal, Pfd.	(PC)	85¼	86
Pond Creek Coal	(PD)	12⅞	13½
Virginia Iron, Coal & Coke	(VK)	55	60

*Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd., 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A., 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	89½	91
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74	74¼
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87¼	90
Grand River Coal & Coke, 1st 6s, 1919	...	...
Jefferson & Clearfield Coal & Iron, 2d Mtg. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99½	...
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	78¾	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s. Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	85¼	86¼
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	87½	90
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	81½	88
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	91	95¼
Utah Fuel, 1st Sinking Fund, 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	...	74
Virginia Iron, Coal & Coke 1st 5s, 1949	87¼	89½

COAL AGE

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Lessons Worth Learning

By Floyd W. Parsons

THE war has undoubtedly widened the outlook of all humanity; both labor and capital have gained in imagination. However, it appears now that mankind's social vision has outstripped mankind's ability to make the dreams materialize. Radicals throughout the world are taking advantage of the moment to preach an abandonment of the old order of things and an adoption of an entirely new order—or a lack of order.

It is perhaps fortunate for other nations that in Russia we see the spectacle of what happens under a government that holds forth the belief that wealth can be obtained by the individual without working. In Russia we see the dire consequences of a rule based on prejudice and class hatred. We now know what to expect of a government operating entirely for selfish benefit and having no thought of injury to others.

Bolshevism has revealed itself to an astonished world and is nothing more or less than a "starvation conspiracy." It is an administration of crushed skulls and bayoneted bodies. Not even in the Dark Ages, when humanity was emerging from a state of ignorance, was there a government equally as inhuman and unjust.

Here in America, even though an ocean separates us from the turbulent peoples of Europe, we are not safe in believing ourselves independent of the troubles abroad. The United States harbors many people, especially those of foreign origin, who do not realize that prosperity cannot be organized under a rule by class, whether that class be capitalistic or labor.

There is room in this country for an educational campaign that will teach loyal citizens to meet reason with reason, but at the same time to understand that force can be met only with force. There should be no further parleying with those who create disorders. Sympathy must be extended to the workers and to those who desire to work, for these are the ones who show good faith. Americans must be taught that the solidarity of the whole mass is superior to solidarity of the class. Class patriotism is a menace, while mass patriotism is sound and true.

The chief danger here in the United States lies in the fact that Americans may fail to distinguish between conditions that exist here and those that have existed, and still continue to prevail, in Russia, Germany and other countries. In these countries the people in destroying their governments got such momentum that they want to keep on going and wipe out institutions that are not a menace but part of their very lives. Thus they have attained to the other extreme and have brought about the elevation of labor over capital, which is no more to be desired in its extreme form than the order that existed before.

New ideas are always infectious. So it is not surprising that following the disorders in Russia and elsewhere some of the labor leaders in other countries have announced that what they are really after is not so much short hours and increased pay as a destruction of the whole capitalistic system. This was the talk in Seattle and down in Buenos Aires, where the workmen were enjoying record wages and still were so greedy that they did not hesitate to injure the whole cause of unionism, in order to gain a personal and purely local advantage.

Great danger lies in the present doctrines of foreign origin that are wholly ***unadapted to*** America. It is the duty of every citizen who loves this land of his birth or adoption to see that propaganda of an insidious nature gets no foothold here. It was inevitable that with the coming of unemployment we would get the radical agitators. However, there is no reason, even in these serious times, for our confusing ideas and ideals.

During the war labor and capital were cordial in their attitude one to the other. Now in these less favorable times we must place a firm heel on everything tending to create discord. Capital must bend every effort to maintain wages at the highest possible standard. On the other hand, the workmen must not forget that the cost of earning a dollar can never for any length of time be more than the dollar itself. Above all else, the workingman today must think for himself. In too many cases the rank and file do not oppose extreme views, even when they are clearly unjust. Never has America had such an opportunity to lead the world as it has today. All that is needed is sound sense on the part of individuals and confidence on the part of all classes in their dealings with each other.

Use of Lignite, Bagasse and Wood Waste for Power Generation and Heating

By John B. C. Kershaw
Colwyn Bay, North Wales

SYNOPSIS — *There are immense deposits of lignite in the United States, Canada, Australasia, and other parts of the world, the development and utilization of which are of great interest. The four principal methods of using this fuel are here described in detail; they include air drying and use in the natural state for power generation; briquetting; distillation and gasification. Various plants in this country and in Europe are described. Note is made of the properties of bagasse and the methods of burning it; also the method of using wood and sawmill refuse.*

THE work of the U. S. Geological Survey has revealed the existence of very large areas of lignite in North Dakota, Montana, Wyoming, Colorado and Texas. In the first-named state, it is estimated that the deposits cover 32,000 square miles of territory, and are capable of producing several hundred billion tons of brown coal. According to reliable authority, there are also vast deposits of lignite in Alberta, Saskatchewan and Manitoba, in the Dominion of Canada, and 1700 square miles in Australasia. The total world deposits of this fuel, consequently, are probably equal to those of the other and deeper-lying coal measures.

The developments that are now occurring in the use of lignite are therefore worth studying, in connection with the better utilization of the fuel resources of the world; the following résumé of all recent articles and publications upon the subject, especially of those dealing with American practice, ought to prove of interest and value to readers of *Coal Age*.

Lignite is a fuel intermediate to peat and ordinary bituminous coal as to age and also in respect to chemical properties. The percentage of water in freshly mined lignite is large, ranging from 30 to 50 per cent., and even after air-drying, the moisture content is still quite high, and varies from 10 to 20 per cent. When large lumps of lignite are dried rapidly, the escape of the excessive moisture causes them to break up into small pieces; this crepitation of course detracts from the value of lignite as a fuel, except after briquetting or other treatment. The ash content varies from 5 to 10 per cent. and the volatile hydrocarbons from 35 to 45 per cent.

Four methods of utilizing lignite are in operation in different parts of the world: (1) Air-drying and use in the natural state for power-generation; (2) briquetting; (3) distillation; (4) gasification. The most notable examples of these four different methods of use will now be described.

Power Generation from Air-Dried Lignite — The electro-chemical works at Bitterfeld, in Saxony, are operated entirely with electric power derived from the extensive beds of lignite which occur in the vicinity. In fact, the site of these works was purposely chosen by the promoters because it was believed that the cheapness of the power would more than counterbalance the distance of the works from the usual markets for the manufactured goods. These works are an offshoot from the original German electrolytic soda works, at Griesheim, near Frankfort, operating what is known as the "Elektron" process of soda and bleach manufacture. The fact that these Bitterfeld works have been greatly extended since their erection in 1894, when the plant was designed for the utilization of only 3000 hp., proves that the successful production of electric power from lignite was quite possible, even under the pre-war conditions of competition with power derived from coal and water.

Few details of these interesting works, or of the power plant, have been allowed to appear in print. It

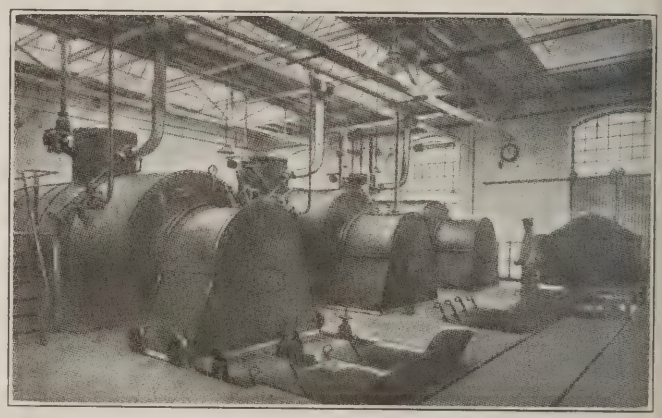


FIG. 1. GENERAL VIEW OF BOILERS FOR BURNING LIGNITE IN GERMANY

is known, however, that the lignite is cut from the beds in which it is found by mechanical cutters or shovels; it is subjected to a certain amount of air-drying, and is then carried to the works by aerial transportation. No official figures showing the actual results obtained at the power plant have been published. A German paper[1], however, in 1908 published an illustrated description and tests of an installation of four tubular boilers with step grates specially designed for operation with lignite; some details of this plant are given here, for no doubt the Bitterfeld power plant is similar in many respects.

Figs. 1 and 2 show a general view of the charging floor of the boilers, and also a sectional elevation of the grate. The latter, it will be seen, is sunk below the floor level, and the lignite is dumped directly into the charging hoppers from the cars in which it is brought into the boiler house. A sliding door, divided into three sections, regulates the admission of the fuel to the grate of each furnace. The angle of the step grate can be altered from the ground level. The lower

[1] "Zeitschrift Vereines Deutscher Ingenieure," Vol. 52, Feb. 15, 1908.

part of the grate is horizontal, and the combustion of the partly consumed fuel is completed here. The ashes are then allowed to fall into inclosed ash boxes by drawing a horizontal damper; from these they are discharged into small cars running on a track below the step grate. The admission of air during the discharge of the ashes is prevented by this system of removal. The whole of the lower part of the step grate is inclosed, and the admission of air to the grate is regulated by the levers, which open or close the doors in front of the space under the furnace. The air required for combustion is drawn through a system of pre-heating stoves and as the use of the step grate causes the gradual evolution of the gaseous matter of the fuel, little or no smoke is produced. A secondary air supply, though provided for, is seldom required.

Trials carried out with this boiler installation have shown efficiencies of between 67 and 69.7 per cent. when using a fuel having the low heating value of 2721 kg.cal. (equal to 4897 B.t.u.). From 2.66 to 3.01 lb. of water were evaporated per pound of fuel; the rate of evaporation varied from 2.1 to 4.1 lb. per sq.ft. of heating surface. The waste gases contained from 16.1 to 17.2 per cent. CO_2, corresponding to an excess of air of only 1.08 per cent. above that theoretically required. The successful exploitation of the lignite deposits at Bitterfeld has caused this previously unknown and unimportant place to become a flourishing center of German electro-chemical and electro-metallurgical industries; the rapid developments here prove that electricity, generated by power from burning lignite under steam boilers, is quite capable of competing with electricity produced from the power obtained in the more customary manner. Passing on to consider American practice and experience, Bulletin 89 of the U. S. Bureau of Mines, upon "Economic Methods of Utilizing Western Lignites," by E. J. Babcock, contains some useful information upon the correct methods of burning lignite for power generation. The author of this bulletin states:

The proper combustion of lignite depends largely upon using a size of coal that will give an abundant air surface, but in addition a good draft should be so arranged that the air can be directed through the burning coal to the best advantage, and can also be controlled and closely shut down when it is desired to hold the coal at a relatively low heat. The firebox should be kept reasonably well filled, but the firing should be carried out frequently by the application of thin layers of fuel to the surface of the bed of hot lignite. The ash and clinker should be removed carefully and at a sufficient rate to prevent the accumulation of clinkers.

Many firemen fail to get good results in the use of lignite because of uneven firing. The fire is allowed to run low and then a large quantity of the lignite, much of it in large lumps and carrying a high percentage of moisture, is introduced. The large addition immediately slackens the fire and materially reduces the temperature in the firebox, and by the formation of considerable vapor, reduces still further the temperature of the gases, the heat from which should be left for boiler absorption. By such firing it is impossible to keep a uniform load with a high boiler efficiency, and much loss of fuel is experienced. By using coal of reasonably small size and firing in thin layers frequently, this difficulty is reduced to a minimum.

This view of the conditions required for the proper combustion of lignite is supported by the experience of the Hughes Electric Co., of Bismarck, N. D., which has been using the deposits of this fuel in Dakota for some years as a boiler fuel. According to C. L. Larsen, the chief engineer of this company, in order to obtain a high efficiency with lignite, it is necessary to maintain a high temperature in the boiler furnace, and the proportion of excess air must therefore be cut down to the lowest possible point. Larsen recommends for burning lignite "a flat sawdust grate with ½-in. round holes.

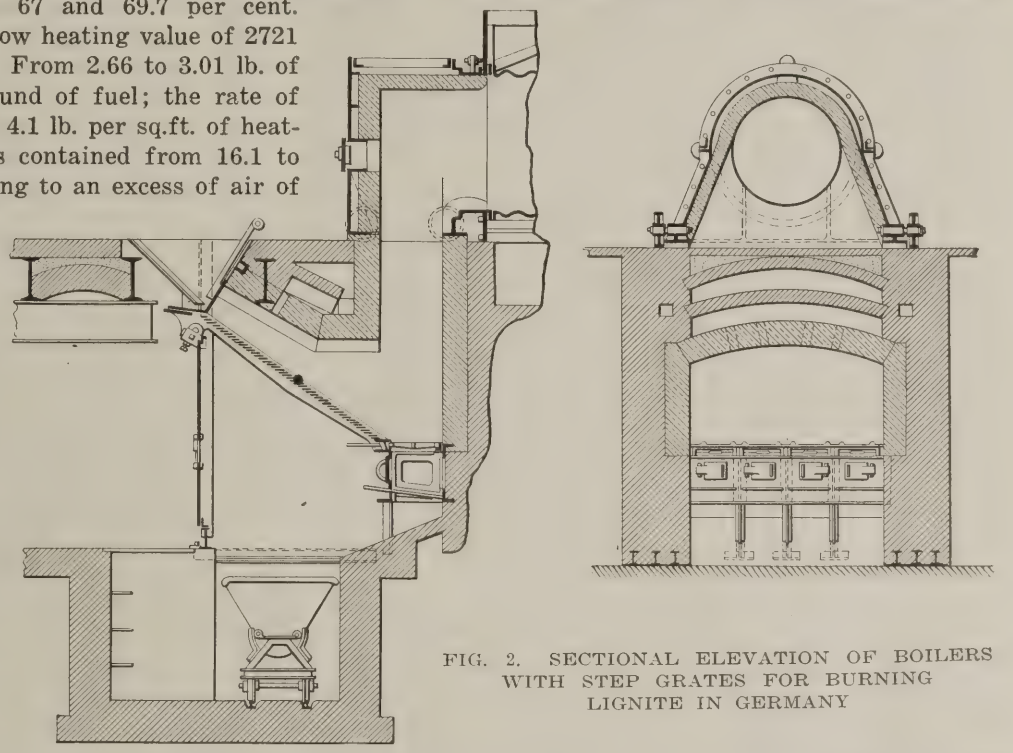


FIG. 2. SECTIONAL ELEVATION OF BOILERS WITH STEP GRATES FOR BURNING LIGNITE IN GERMANY

Such grates contain only 15 per cent. air space, but by having small openings a higher air pressure in the ash pit can be maintained, and the air passes through the small holes and through the bed of fuel at a greater velocity. This produces a high temperature in the furnace, and as the volume is small, the heat is not rushed through the boiler and up the smokestack, but is absorbed by the water in the boiler, and a low temperature in the smokestack is obtained."

Working under these conditions, Larsen asserts that an evaporation of nearly 5 lb. of water per pound of fuel can be obtained from a lignite testing 35 per cent. moisture and 6 per cent. ash, and showing only 7000 B.t.u. in the calorimeter. To obtain such an evaporation result, however, the boiler must not be pushed at all above its rated capacity, and only 3 lb. of water can be evaporated per square foot of surface per hour.

Another American contribution to the subject of lignite is that of Randall and Kreisinger (Bulletin 2 of the Bureau of Mines) upon "The Use of North Dakota Lignites for Power-Plant Boilers." The conclusions arrived at by these two investigators were (1) that a

large combustion chamber was necessary in order to obtain the best results and (2) that the gases yielded by the lignites must be completely burned in this chamber and raised to the highest possible temperature, before being allowed to come into contact with any of the water-cooled surfaces of the boiler. A Dutch-oven type of furnace was employed in this investigation, and the following is their description of the furnace and its method of operation:

The most striking features in the construction of the furnace are the deep-set grate and the contraction of the space between the bridge wall and the end of the prolonged firebrick arch. The furnace is designed to work on the gas-producer principle. The solid fuel is gasified on the grate, and the gas passes through the space under the arch into the combustion chamber, where most of the gaseous combustible burns. The necessary air for combustion is added through the openings in the bridge wall. This air is preheated from 200 to 300 deg. F. in coils, and forced into the furnace under a pressure of from half an inch to an inch of water. The grate is 21 in. below the lower edge of the firing door. The object of this construction is to enable the fireman to carry a thick fuel bed and still see its condition at the top; the side furnace door used in removing clinkers is only seven inches above the grate.

The grate was equipped with rocking bars to facilitate the removal of ash, and each grate bar was supported by a 2-in. pipe through which cold air was circulated. The thermal efficiency of this type of furnace, when used for steam raising with lignite, was from 55 to 58 per cent., and the two investigators state that no difficulty was experienced in working up to the full capacity of the boilers. North Dakota lignite has in fact been employed with this type of furnace at the pumping plant of the U. S. Reclamation Service at Willaston, N. D., with good results. Figs. 3 and 4 show sectional elevations of the boiler and furnace.

Lignite Converted Into Briquets

Briquetting—The chief center of the manufacture of lignite briquets in Germany is at Horren, a small town lying west of Cologne, the industry at this place having been developed within the last 25 years. According to C. A. Davis, who prepared a report upon the subject in 1913 for the U. S. Bureau of Mines, there are 26 factories producing lignite briquets in this neighborhood; about 20,000 metric tons were being manufactured daily during the season of active production, at that time. The mines are on the high terraces of a broad shallow valley, the strata of coal are from 230 to 400 ft. in thickness, and the lignite is brought to the various works by an overhead transportation system.

This one district, in 1911, produced rather more than one-fourth of the total German output of lignite briquets, the largest works having 28 presses and turning out about 1600 metric tons of briquets per day of 24 hours. The following description of the method of manufacture and of the plant at the most recently erected works is taken from the report referred to above. The brown coal as mined contains 60 per cent. moisture, and when dried is dark brown in color and easily powdered. The coal on delivery at the briquet factory of the "Gewerkschaft Kohlenquelle" is first crushed and screened, and is then dried in four Schultz driers, each with a capacity of 70 metric tons per 24 hours. Each drier consists of a large cylinder of boiler iron 23 ft. in length and 10 ft. in diameter, mounted on trunnions, with the main axis inclined about seven degrees from the horizontal. Inside of the outer drum or shell of the drier is a second drum fitted with 366 tubes, each about four inches in diameter; the drier thus resembling a modern water-tube boiler. The exhaust steam from the engines is admitted to the space around the tubes, under a pressure of three atmospheres, through valves in the trunnions that support the drier. The moist powdered material is fed constantly from the storage pockets into the tubes by means of spiral conveyors, and the rate at which it passes through the drier is regulated according to its moisture content.

Technique of the Briquet Industry

To reduce 60 per cent. moisture down to 15 per cent. requires the fuel to be three-quarters of an hour in passing through the dryer. The steam from the drier is forced through a cyclone chamber by means of fans, before being turned into the atmosphere through the escape flues. By this plan the dust, amounting to 3 per cent. of the total material dried, is collected from the escaping steam and is added to the material to be briquetted. The air in all parts of the factory building is practically free from floating dust, because the dried brown coal is handled in closed conveyors and dust is not at any point permitted to escape into the factory. In this way all danger of dust explosions, which in early types of such plants were not infrequent, has been eliminated. The cost of the whole process of drying is about 70 pfennigs (or 17c.) per ton of product.

The briquetting portion of the plant consists of five compound three-cylinder horizontal engines, directly connected with open-mold plunger presses. The cross-section of the plunger and mold of this type of press is lozenge-shaped, and in the single presses is about 7 in. long by 2¼ in. wide. In this press the long axis of the mold is horizontal. In the double presses the molds are placed side by side, so that the two briquets formed at each stroke of the plungers issue from the press end to end. The powdered brown coal, containing about 15 per cent. moisture, is fed into the mold from hoppers and is subjected to a pressure of from 18,000 to 22,500 lb. per sq.in. A pressure equivalent to 300,000 to 400,000 lb. is exerted therefore on each briquet. The press forms, or plates that form the molds of the briquet presses, are made of hardened steel and are changed when they become so worn that the plunger no longer fits the mold well enough to make good briquets. The chief cause of the wear is the sand or other mineral matter contained in the powdered raw material. The time that these plates last varies from three days to about four weeks, according to the amount of mineral matter present. The briquets weigh about 7 lb. each. No pitch or binding material of any sort is used in manufacturing them; the tarry matter liberated from the brown coal by the heat developed in compressing the material serves this purpose. The briquet presses are jacketed and water-cooled. Each single press has a capacity of about 70 metric tons of briquets per 24 hours and requires 120 hp.; a double press requires 200 hp.

The power for driving the plant is obtained from a battery of eight boilers, fired entirely by brown coal as

mined, and containing 60 per cent. moisture. The boilers together furnish 750 hp. and supply steam to the engines at a pressure of 180 lb. In addition to the boilers there is a superheater in which the steam for the driers is superheated to 300 deg. C. One carload out of three of the brown coal brought to the plant from the mine is sent directly to the feed hoppers of the boilers. From these hoppers the material is fed by mechanical stokers to the fires, and is burned on step grates. Each boiler has about 1300 sq.ft. of heating surface; 270 sq.ft. of superheater area and 65 sq.ft. of grate area. Only three men are required to attend to the entire battery of eight boilers—one keeps the feed hoppers filled, shifts and empties cars, etc.; the others attend to the stokers and grates. The briquets sell for $1.90 per ton at the factory; the retail selling price at Cologne in 1913 was $2.75 per metric ton.

As regards American experience, the U. S. Bureau of Mines in 1908 to 1910 carried out some valuable experimental work with the lignite found in North Dakota, Texas and California, in order to ascertain whether the methods and form of briquetting press used in Germany (and described above) could be applied with success to these American lignites.

[2]"Briquetting Tests of Lignite at Pittsburgh, Penn.," by C. L. Wright.

The results of this inquiry are recorded in Bulletin 14 of the Bureau of Mines[2], and although the investigation was not completed, sufficient testing has been carried out to prove that many of the American lignites are quite as good as the German ones in thermal value, and that they can be briquetted upon a commercial scale without the use of any binding material. It has also been proved that contrary to the generally held opinion, lignites that had been slacked by exposure to atmospheric influences could still be briquetted without a binder. Cohesion and weather tests which were made with raw lignite, and with the finished briquets, showed that the latter were the superior in resistance to handling, and also to weather influences.

With regard to practical developments, a description of a plant at Denver, Colo., designed for the commercial production of briquets and valuable byproducts from lignite, was published in *Coal Age*, Apr. 15, 1916. The fuel at this plant is subjected first to dry distillation in order to obtain gaseous fuel, light oils, ammonium sulphate and creosote and pitch; the residue of coke left in the retorts is finally briquetted with the aid of binding materials. The ovens or retorts are designed to take ten-ton charges, and the heating period lasts two hours at a temperature of 500 deg. C. The yield of byproducts at this temperature, per ton of raw lignite, is stated to be as follows: Gas, 10,000 cu.ft., tar-oil, 13 gal., ammonium sulphate, 2.5 lb. The pitch and some other binding material are employed for briquetting the residue of coke left in the retorts, after the distillation is completed. The briquets, or "carbonets," as they are called locally, have the following composition: Moisture, 1.34 per cent.; volatile matter, 7.60 per cent.; ash, 7.02 per cent.; fixed carbon, 84.04 per cent.; calorific value, 14.061 B.t.u. They withstand unfavorable weather conditions and rough handling quite

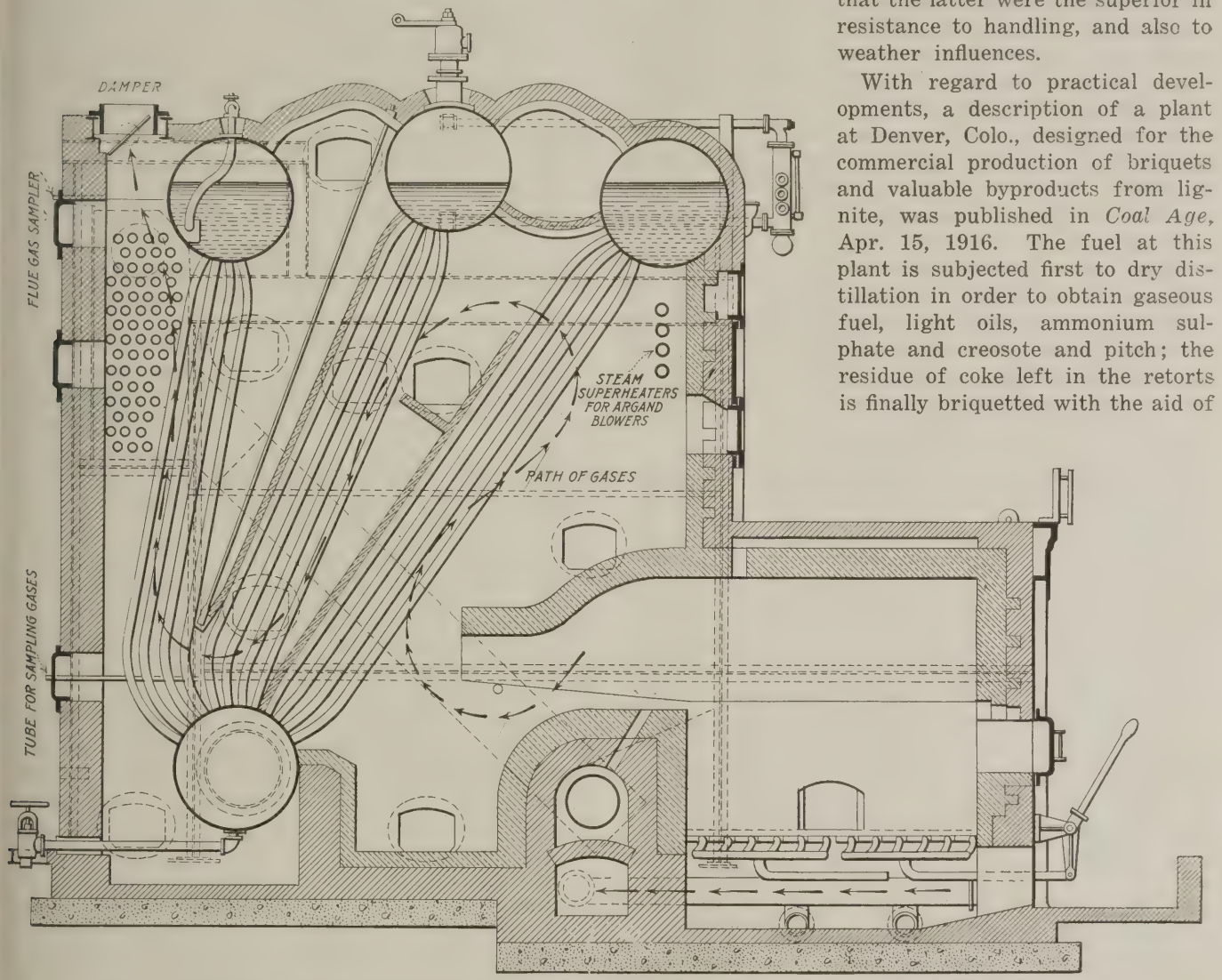


FIG. 3. SIDE SECTIONAL ELEVATION OF BOILERS FOR BURNING LIGNITE AT WILLASTON, N. D.

satisfactorily, and also retain their form when burned until they are practically all consumed. The Denver works as originally planned were designed for the treatment of 500 tons of raw lignite per day, and the briquetting plant for an output of 25 tons per hour.

The details of this method of treating the Colorado lignites were worked out in the laboratory before the works were designed or erected, and it is hoped that this careful preliminary study of all the scientific data will lead to the foundation of a new and flourishing local industry.

Valuable Byproducts Derived from Lignite

Distillation and Recovery of Byproducts—A lignite suitable for low temperature distillation is characterized by a high content of bituminous matter. In the absence of this bitumen the fuel is not adapted for the retort process and is only suitable for direct burning by either of the two methods previously described in this article. One can distinguish roughly between the two classes of lignite by observing closely the changes that occur on heating, and by comparing the specific gravities of the samples. Lignites suitable for subjection to the distillation or retort process melt or soften before ignition and burn with a smoky flame; they also possess a specific gravity between 0.90 and 1.10, whereas the lignites suitable for direct burning do not soften or melt on heating, and have a specific gravity of 1.2 to 1.4.

The distillation of lignite is carried on in Germany at two centers—at Halle in Saxony and at Messel near Darmstadt. Stewart, in a paper read before the Edinburgh section of the Society of Chemical Industry in January, 1917[3], has given a full account of the process as carried out at these two centers, and has described the method and apparatus used for the recovery of the byproducts. The latter consist of crude oil, containing various hydrocarbons of the paraffin and aromatic series, paraffin wax, and a coke testing about 12,600 B.t.u. The yield of crude oil at Halle is about 18 gal. per ton of lignite; in this district there are twelve works which distill one million tons of brown coal per annum and produce 60,000 tons of crude oil and 7000 tons of paraffin wax. At Messel the crude oil is distilled from the lignite in the presence of steam, and the coke that remains in the retorts is dropped directly into gas producers below. Vertical retorts (covered by German patent 200,602 of May, 1906) are employed—the working of these being continuous—and the brown coal is fed into the retort from a hopper closed by a valve. In the upper part of the retort the lignite is dried, and the steam produced here is drawn off by an electrically driven fan. Part of this steam is reintroduced into the retort lower down, in order to keep the temperature at the required low limit; the remainder is used for the gas producer, which is worked with the coke residue from the retort process. The laboratory distillation of the lignite used at Messel yields 44 per cent. moisture; 7.8 per cent. crude oil; 6.2 per cent. gas; and 36 per cent. of coke; the latter, as already explained, is used for gas production and no marketable coke is produced. The actual yield of crude oil is about 19 gal. per ton of lignite; the final products obtained by distillation of the crude oils are benzine, solar oil, pale vaseline oil, fat oil, solar scale, red oil, heavy vaseline oil and paraffin wax.

In America the only distillation works of which full details have been published are those referred to in this article as established at Denver, Colo., in 1915, for the production of briquets and byproducts from the Colorado lignites. The ovens or retorts here are 36 ft. long by 9 ft. high by 18 in. wide; the charging period is 2½ hours, and the temperature limit is 500 deg. C. The average yield is 10,000 cu.ft. of gas, 13 gal. of tar oils and 2½ lb. of ammonium sulphate. The gas is used for heating the ovens and also for steam generation, in order to supply the plant with the necessary electric power; the crude oil is distilled and is separated into light oils, heavy oils and pitch. At temperatures up to 150 deg. C., 10 to 14 per cent. of the crude oil passes over to the light oils storage tank, and between 150 and 325 deg. C. the heavy creosote oils, which form about 68 per cent. of the total oil, are distilled. The manufacture of briquets from the lignite coke has already been referred to under "Briquetting," and it is only necessary to add that the works was planned by C. O. Hoover, of Denver, and that it is owned by the American Coal Refining Company.

A large amount of experimental work upon the distillation of North Dakota lignites has been carried out at Grand Forks by the College of Mining and Engineering of North Dakota, where a specially designed briquetting and gas-making plant has been erected for the purpose of studying the utilization of lignites. The details and results of the investigation are given in Bulletin 89 of the U. S. Bureau of Mines[4].

This bulletin contains a full account of all the experimental work carried out, in order to determine the best conditions for the gasification of lignite. The relation between the moisture content of the raw lignite and the yield and thermal value of the evolved gas was closely studied, and the effects of temperature variations were also examined and tabulated. The statement in Table I, prepared from the figures presented in the bulletin, shows the average results of the gasification tests made in this experimental plant with 25 representative samples of United States lignites.

Certain Lignites Converted Into Gas

Gasification Without Recovery of Byproducts—The fact that many lignites are too poor in their content of bituminous matter to render distillation profitable accounts for some of the past failures that have occurred with plants erected for this purpose. Lignites of this type, however, are quite suitable for gasification without attempting the recovery of the tar or ammonia; there are many places where gas producers, of the type designed for use with bituminous fuel, would prove of great value in connection with the utilization of lignite deposits. Small plants of this kind are quite as efficient as large ones, for there is no necessity to design the plant on the large scale that is required for successful byproduct recovery. Whether the gas obtained from these lignite gasification plants would be best used to raise steam or for direct power production in gas engines would depend upon local conditions and require-

[3]Journal Society Chemical Industry, Feb. 28, 1917.

[4]Economic Methods of Utilizing Western Lignites, by E. J. Babcock.

ments. In New Zealand the use of lignite producer gas for power production is quite common in the electric power stations, and the natural moisture content of the raw lignite renders it possible to work the producers without steam. Producers of this type, in which the upper part is used as a gas retort and the lower part as an ordinary producer, have been designed by Ziegler, Zwingenberger and others and have been successfully employed for peat and lignite gasification in Germany and Austria.

"Bagasse" is the technical name for the tough fiber that is left after milling sugar cane, for extraction of the sugar. The proportion of combustible matter in this residue varies considerably in different districts, ranging from 35 to 60 per cent., while the water content and ash make up the balance of 40 to 65 per cent. In Louisiana the average composition is fiber, 40 per cent., sucrose and other sugars, 7 per cent., and moisture, 53 per cent. The heat value of dry bagasse is found by experiment to be 8300 B.t.u. The proportion of the total heat which can be rendered available in practice, for power generation, depends upon the percentage of water which remains in the bagasse when burned.

Heating Value of Bagasse

According to Freeland,[5] the average Louisiana product has a calorific value of about 8300 B.t.u. per lb. of dry bagasse, and from 3620 gross (56.7 per cent. moisture) to 4800 B.t.u. (42.8 per cent. moisture). The net heating values are respectively 2200 and 3350 B.t.u., and 1 lb. of this wet bagasse will evaporate from 2 to 3½ lb. of water, from and at 212 deg. F. Professor Kerr found that at a Louisiana sugar house the bagasse from one ton of cane generated from 1.16 to 1.44 b.-hp. The bagasse from a 1000-ton house will generate therefore a total of 1160 to 1440 b.-hp.-hr. per 24 hours, and it would require about 60 tons of coal per day to do the same work. Professor Kerr has also stated that in Louisiana 16 per cent. of the total heat generated by the combustion of 1 lb. of bagasse was required to evaporate the moisture present in the raw material. As about 14½ per cent. of the moisture in bagasse could be removed by drying, the dry bagasse had a heating value 55 per cent. greater than the wet bagasse. For this reason the methods of burning bagasse are now being improved, and in the larger sugar-cane factories of Cuba and Hawaii the bagasse is subjected to a preliminary drying before entering the combustion area of the grate.

TABLE I. AVERAGE RESULTS OF GASIFICATION TESTS

	Yield per Ton	Calorific Value per Cu.Ft. B.t.u.	Composition—Per Cent. H	CO	CH_4	CO_2	N
Gas	11,038 Cu.Ft.	396	40.1	20.09	15.31	10.48	9.98

	Yield per Ton, Lb.	Calorific Value B.t.u.	Composition—Per Cent.—Vol. Matter	Ash	S	H_2O
Coke	1,092	11,838	C 75.52	7.57	15.91	1.98	1.00

Methods of Burning Bagasse—The grate surface must be small in furnaces intended for burning the waste sugar cane, since the rate of combustion is high, rising at times to 300 lb. per square foot of grate surface per hour. In some of the recently installed 500-hp. boilers the grate area is only 25 sq.ft., whereas a coal-fired boiler would require quite three times this area for the satisfactory combustion of the same equivalent weight of fuel.

In many other respects, the grates and methods used for burning bagasse resemble those employed for coal, with high volatile matter content. Mechanical stokers are also now being tried since, with stokers of the coking type, the bagasse can be subjected to a preliminary drying and its heat value improved before actual combustion occurs. When used with these stokers the bagasse is spread out upon the front portion of the stoker and the rate of feed is regulated so as to obtain the maximum heating effect. Furnaces of the step-grate type are also being used in some of the more up-to-date sugar mills, for the air supply is more easily controlled with this type of grate.

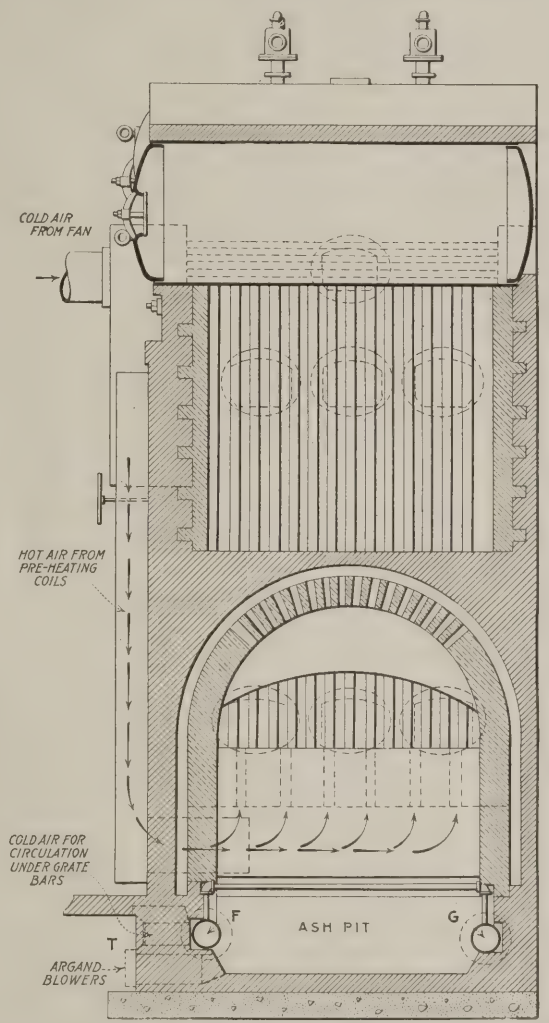


FIG. 4. END SECTIONAL ELEVATION OF LIGNITE BOILERS AT WILLASTON, N. D.

Sawmill refuse is one of the staple fuels for steam-power plants in certain of the timber-felling districts of the United States, Canada and Australia, and a considerable amount of power is also developed from the wood shavings and refuse produced by the woodworking factories in cities where boxes and packing cases are made by machinery on a large scale. The waste material produced in these mills and factories may be burned either directly under steam boilers, or it may

[5] Journal American Society Mechanical Engineers, November, 1917.

be gasified[6] in producers and the gas employed in gas engines.

According to Fernald, manufacturers of gas producers are now designing producers specially for gasifying the waste fuels of this type; with reasonably dry raw material for feeding the producers, the consumption of wood has been reduced to 2 lb. per b.-hp.-hr. as generated by the gas engine. The figures for the best results yet attained with these various kinds of wood waste, when gasified in producers and the gas used in gas engines, running at full load, are as follows:

	Lb. per Hp.-Hr.
Box blocks	2.15
Mulga scrub	2.30
Pine shavings and blocks	2.31
Jarrah-wood sawdust and shavings	2.40
Spent tanbark (dry)	3.13
Spent tanbark (wet)	4.50
Sawdust	3.50

As examples of the type of furnace used in the United States and Canada for burning sawmill refuse under steam boilers, the equipment at the plant of the Portland (Oregon) General Electric Co., and at the Rockwell Manufacturing Co., New York, may be cited. The boilers at the former plant are provided with external furnaces of the Dutch-oven type. These furnaces are provided with charging holes, into which the sawdust and wood waste are tipped from the conveyors which transport it from the timber yards of the locality, and the Dutch-ovens are kept completely filled in order to prevent air leakage. The two generating stations of the company in Portland, equipped with this style of wood-burning plant, consume 100 to 150 box loads of refuse (equivalent to 20,625 cu.ft.) per day of 24 hours, and the average evaporation attained is 10,500 lb. water, per 200 cu.ft. of cut fuel. Assume that 1 cu.ft. of the refuse weighs 15 lb.; this equals an evaporation of 3.5 lb. of water per pound of wood, which is quite a good result under the circumstances. The calorific value of wood varies from 8300 to 9000 B.t.u., and its maximum evaporation value in practice is 5 lb. of water per pound of fuel.

At the Rockwell Manufacturing Co.'s plant there are two 125-hp. horizontal tubular boilers installed, each 66 in. by 18 ft., with 1250 sq.ft. of heating surface and working at 150 lb. steam pressure. A blower fan system of collection for the woodworking waste is used, in order to collect and transport it to the boiler room. From the storage place on the boiler-room roof the waste fuel falls by gravity into the chutes that carry it to the furnaces.

Six Out of Ten Miners Foreign-Born

In the bituminous-coal industry 62 per cent. of the workers are of foreign birth. The percentages in various other industries range from 85 per cent. in sugar refining down to 13 per cent. in collar, cuff and shirt manufacturing. Three out of four of the foreign-born workers are able to read or write their own language. A little over one-half of the foreign-born workers from non-English-speaking countries are more or less able to use the English language.

[6]U. S. Bureau of Mines, Technical Paper No. 123, "Notes on the Use of Low-Grade Fuel in Europe."

Discrimination in Favor of Shipper Need Not Affect Rates

That there may be a discrimination or concession in favor of a shipper in violation of the Elkins Act as amended by the Hepburn Act, although there is no discrimination affecting transportation charges or rates, is the principal holding in the case of United States vs. Metropolitan Lumber Co., recently decided by the United States District Court for the District of New Jersey.

The indictment charged that the defendants, notwithstanding a governmental embargo on the shipment of lumber, caused lumber to be consigned to the defendants in such a manner that the Pennsylvania R.R. was led to believe that the shipment constituted a consignment of war supplies when in fact it did not, and that thereby a discrimination was practiced. On demurrer to the indictment it was contended that the facts alleged charged no offense in that there had been no discrimination as to rates. The court held this position to be untenable, and decided that a discrimination within the law was charged. The effect of this holding appears to be that any privilege or concession obtained by a shipper, not accorded to shippers in general, is within the statute.

It is also held in this case that a consignee who obtains a discrimination for his benefit is liable as a "shipper" within the law, and that an offense may be committed under the statute although there is no knowledge or connivance on the part of the carrier. The opinion, which is per Haight, J., contains a searching review of the legislation and decisions.

Output of Fuel Briquets in 1918 Greatest Yet Recorded

The production of fuel briquets in the United States in 1918 was 477,235 net tons, valued at $3,212,793, an increase, compared with 1917, of 70,379 tons, or 17 per cent., in quantity, and of $978,905, or 44 per cent., in value. The production in 1918, which represented the results of the third successive year of material progress in the industry, was the highest yet recorded. It was more than double the production in the year 1915.

The number of plants in operation in 1918 was one less than in 1917. Three of the plants that were operated in 1917 were idle in 1918—those of the Denver Coal Byproducts Co. (formerly the American Coal Reduction and Byproducts Co.), in Colorado; the Johnson Fuel Co., in North Dakota, and the American Briquet Co., in Pennsylvania. Two new companies, at Trenton, N. J., began operations in 1918, the Fuel Briquet Co. and the Trent Brick Co. The Belgian Coal Briquette Co., of New York City, and the Anthracite Briquet Co., of Sunbury, Penn., expect to begin operations during 1919.

Of the 12 plants in operation in 1918 six used anthracite as a raw material, one Arkansas semi-anthracite, one semi-bituminous slack, one anthracite culm and bituminous slack, one bituminous slack and sub-bituminous coal, and two oil-gas residue. Coal-tar pitch and asphaltic pitch were used as binders by six plants, one used sulphite pitch, two used no binder, and three used a vegetable binder or employed special processes.

Cost of Mule and Locomotive Haulage

By William L. Cross, Jr.
Scranton, Penn.

FOR some time I have been looking for a method of comparing the relative costs of mule and locomotive transportation with especial reference to gathering and short haul work where frequently it is a question as to which of several systems is the cheaper. This article deals with a method that I finally devised, one that has proved satisfactory.

By means of curves similar to those shown in Fig. 2 most of the problems commonly met with can be quickly and easily worked out on a comparative basis. Other

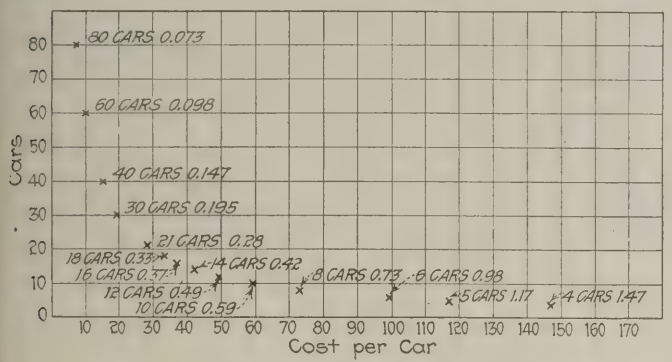


FIG. 1. DATA PLOTTED FOR COST CURVE

factors, such as availability of power and the possibility of securing locomotives and equipment, are matters for consideration after or before the relative costs of the different organizations are determined. The data from which the costs were compiled are not by any means correct for all cases, but a set of curves can easily and quickly be made up for each colliery or group of mines which will be approximately correct in all cases.

The curves are made up as shown in Fig. 1, and from figures similar to those appearing in Table I, worked out in this case for one driver and one mule, as follows:

TABLE I. COST PER CAR FOR ONE DRIVER AND ONE MULE

Cars	Cost per Car	Cars	Cost per Car
4	$1.47	18	$0.33
5	1.17	21	.28
6	.98	30	.195
8	.73	40	.147
12	.49	60	.098
14	.42	80	.073
16	.37		

The figures in Table I, when plotted as shown in Fig. 1, give the basis for the regular curve for an organization or transportation unit of one driver and one mule, The other curves shown in Fig. 2 are plotted in a like manner. In the case of locomotive haulage, the power, installation and repair costs given or estimated for any single locality will not be correct for every installation. This is one weak point in the tabulation. However, because unforeseen conditions usually develop in mine electric installations, and at the present time repairs and repair parts are costly, it is best to be on the safe side and figure locomotive maintenance high.

A close inspection of these curves will also show that the handling of four or five more cars makes much more difference in the cost per car than does a few cents in the figures representing power, repairs, etc. For instance, in the case of a crab locomotive with one engineer and two brakemen working in pitching rooms, let us estimate that this machine will handle 40 cars per day. This, from Fig. 2, would cost 60c. per car. If another place can be added so that the machine will handle 44 cars, it will do so at a cost of 56c. per car—a saving of four cents per car, or $1.76 per day. We cannot always estimate mine haulage possibilities closer than four cars, but our cost figures certainly will not be in error to the amount of $1.76.

Two representative problems are given below to ilustrate the use of the curves:

Problem 1—Assumption by colliery superintendent that his transportation gathering cost shall not be over 60c. per car. How many cars must each unit handle in order to give him this cost?

Follow the dash line on Fig. 2: It crosses one driver and one mule at 10 cars; one driver and two mules at 12 cars; one driver, one runner and two mules at 19 cars; one driver, one runner and three mules at 22 cars; one driver, two runners and three mules at 29 cars; one locomotive, one engineer and one brakeman at 34 cars; one locomotive, one engineer and two brakemen at 40 cars.

Problem 2—It is known that one driver, two runners and three mules in a certain section where there are

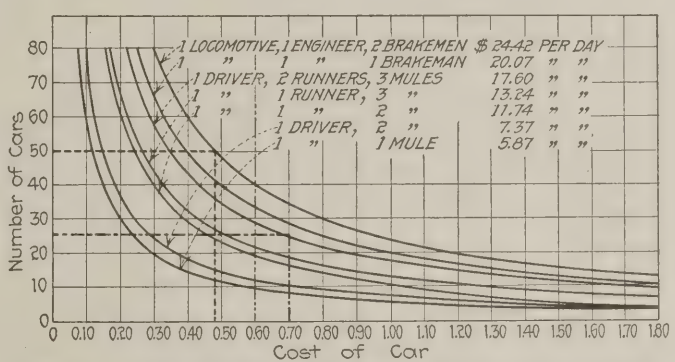


FIG. 2. COST CURVES FOR VARIOUS HAULAGE UNITS

	Per Day
Locomotive Data:	
Power, $90 per month	$3.60
Installation, $2000, 5 per cent of $2000 Depreciation—Locomotive, 15 per cent of $8000 Repairs—Locomotive lines, etc., $900 per year } $2200 pr. yr.	7.33
Labor—Engineer at $0.28, plus $0.25 allowance for 9 hours.	4.77
Brakeman at $0.2351, plus $0.25 allowance for 9 hours	4.36
Mule Data:	
Mule value, $250; 20 per cent. depreciation; 5 per cent. interest	0.23
Feed and care	1.25
Labor—Driver at $0.2351, plus $0.25 allowance.	
Runner at $0.2351, plus $0.25 allowance.	

pitching rooms will handle 25 cars per day. This section due to its development can produce 50 cars per day with two-mule organizations. Which relatively is the cheaper plan, to use two-mule organizations or one crab locomotive to handle 50 cars?

By following the two dotted lines in Fig. 2 it will be seen that one driver, two runners and three mules will handle 25 cars at a cost of 70c. per car; one locomotive, one engineer and two brakemen will handle 50 cars at a cost of 48c. per car. This shows in this case, of course, that the locomotive is the better installation.

This presupposes that power lines are fairly near the

section and that one will not have to wait a year or a year and a half to get a locomotive.

Close inspection of the curves in Fig. 2 will also show that there is a certain fairly definite limit to the number of cars handled, below which the cost per car increases rapidly. This limit can be taken from the curves by noting the point at which the curve from right to left deviates from practically a straight line. Thus, for instance, in the case of the one driver and one mule curve, the line is practically straight from the right-hand side of the figure to the 10 or 12 car point, and from here turns rapidly into a curve. This possibly is better illustrated by Table II. These figures give the costs per car for the various organizations or units.

Taking the limit for the differences or decrease in cost per car at 4c., we see that 12 cars must be handled by one driver and one mule, 18 cars by one driver, one runner and three mules, etc., before this limit is reached. Taking 2c. as the limit, 16 cars must be handled by one driver and one mule, and a corresponding number by other units before reaching this limiting figure.

A further study of these curves will bring out other applications, but great care must be taken in their practical use as, unless the actual mining conditions are clearly understood and the practical working limits of the various organizations carefully taken into consideration, the curves may show a low cost for an impractical organization, or transportation unit.

TABLE II. COST PER CAR FOR DIFFERENT UNITS FOR INCREASING NUMBER OF CARS

Cars	One Driver, One Mule, Cost per Car	Decrease in Cost per Car	One Driver, Two Mules, Cost per Car	Decrease in Cost per Car	One Driver, One Runner, Two Mules, Cost per Car	Decrease in Cost per Car	One Driver, One Runner, Three Mules, Cost per Car	Decrease in Cost per Car	One Driver, Two Runners, Three Mules, Cost per Car	Decrease in Cost per Car	One Engineer, One Brakeman, One Locomotive, Cost per Car	Decrease in Cost per Car	One Engineer, Two Brakemen, One Locomotive, Cost per Car	Decrease in Cost per Car
1	$5.87		$7.37		$11.74		$13.24		$17.60		$20.07		$24.42	
		2.94		$3.69		$5.87		$6.62		$8.80		$10.04		$12.21
2	2.93		3.68		5.87		6.62		8.80		10.03		12.21	
		.97		1.22		1.96		2.21		2.93		4.34		4.07
3	1.96		2.46		3.91		4.41		5.87		6.69		8.14	
		.49		.62		.97		1.09		1.47		1.67		2.03
4	1.47		1.84		2.94		3.32		4.40		5.02		6.11	
		.30		.37		.59		.67		.88		1.01		1.22
5	1.17		1.47		2.35		2.65		3.52		4.01		4.89	
		.19		.25		.39		.44		.58		.66		.82
6	.98		1.22		1.96		2.21		2.94		3.35		4.07	
		.14		.17		.28		.32		.42		.48		.58
7	.84		1.05		1.68		1.89		2.52		2.87		3.49	
		.10		.13		.21		.29		.32		.36		.43
8	.74		.92		1.47		1.65		2.20		2.51		3.06	
		.09		.10		.16		.18		.24		.28		.34
9	.65		.82		1.31		1.47		1.96		2.23		2.72	
		.06		.08		.14		.15		.20		.22		.28
10	.59		.74		1.17		1.32		1.76		2.01		2.44	
		.06		.07		.10		.12		.16		.18		.22
11	.53		.67		1.07		1.20		1.60		1.83		2.22	
		.04		.06		.09		.10		.14		.16		.18
12	.49		.61		.98		1.10		1.46		1.67		2.04	
		.04		.04		.07		.08		.11		.13		.16
13	.45		.57		.91		1.02		1.35		1.54		1.88	
		.03		.04		.07		.07		.09		.10		.14
14	.42		.53		.84		.95		1.26		1.44		1.74	
		.03		.04		.06		.07		.09		.10		.11
15	.39		.49		.78		.88		1.17		1.34		1.63	
		.02		.03		.05		.05		.07		.09		.11
16	.37		.46		.73		.83		1.00		1.25		1.52	
		.02		.03		.04		.05		.07		.07		.08
17	.35		.43		.69		.78		1.03		1.18		1.44	
		.02		.02		.04		.04		.05		07		.08
18	.33		.41		.65		.74		.98		1.11		1.36	
		.02		.02		.03		.04		.05		.06		.08
19	.31		.39		.62		.70		.93		1.05		1.28	
		.02		.02		.03		.04		.05		.05		.06
20	.29		.37		.59		.66		.88		1.00		1.22	
		.01		.02		.03		.03		.04		.04		.06
21	.28		.35		.56		.63		.84		.96		1.16	
		.01		.02		.03		.03		.04		.04		.05
22	.27		.33		.53		.60		.80		.92		1.11	
		.01		.01		.02		.03		.04		.04		.05
23	.26		.32		.51		.57		.76		.88		1.06	
					.02		.02		.03		.04		.04	
24					.49		.55		.73		.84		1.02	
					.02		.02		.03		.04		.04	
25					.47		.53		.70		.80		.98	
					.02		.02		.03		.03		.04	
26					.45		.51		.67		.77		.94	
					.02		.02		.02		.03		.04	
27					.43		.49		.65		.74		.90	
					.01		.02		.02		.03		.03	
28					.42		.47		.63		.72		.87	
									.02		.02		.03	
29									.61		.69		.84	
									.02		.02		.03	
30									.59		.67		.81	
									.02		.02		.03	
31									.57		.65		.78	
									.02		.02		.02	
32									.55		.63		.76	
									.02		.02		.02	
33									.53		.61		.74	



Mauch Chunk, Pennsylvania, in 1845—Shipping point for the Lehigh Coal and Navigation Company *—From an old print*

The Story of Coal

By W. B. Richards, M.E.
Lansford, Penn.

WHAT is probably the first reference to coal as a fuel is found in the Bible (Proverbs XXVI, 21) in the words: "As coals are to burning coals and wood to fire, so is a contentious man to kindle strife." This particular sentence was written in 1016 B.C., at the time King Solomon came into power. Part of this ruler's domain consisted of Syria, and near the present City of Beruit coal mines were worked at that time. Coal is being mined there to this day.

The earliest notice we find of stone coal is in 371 B.C., at which time Theophrastus, a Greek author, mentions *Lithanthrax* as being found at Ellis and refers to its use by the smiths of that period. In England tools and cinders have been found in the excavations near the Roman Wall, indicating that the Britons were familiar with the use of coal prior to the Roman Invasion in 54 B.C.

The first actual record of a coal transaction exists in the form of a receipt for twelve cartloads of coal, which was given by the Good Abbott of Peterborough, in England, in 852. At about this time the monks of Belgium mined the "earth fuel" and used it for manufacturing purposes.

In 1239 King Henry III of England granted the privilege of digging coal to the good men of Newcastle. By a proclamation of Edward the First, and again in the reign of Queen Elizabeth, stone coal was prohibited to be used in London during the sitting of Parliament lest the health of the Knights of the Squire should suffer during their residence in the metropolis. In 1316 the Parliament petitioned King Edward II to prohibit the use of coal, and a proclamation was accordingly issued against it. Owing to the high price of wood, however, its use gradually became general in London.

Coal was used in the City of Paris in 1520. The fuel was shipped to France from the mines of Newcastle, in England. At the outset it met with little favor in Paris, as for some time was the case in London, owing to the difficulty attending its application. The coal was submitted to the Faculty of Medicine at this time, to ascertain if the new fuel would be injurious to the public health.

In America the existence of coal was proved by the French explorers at an early date. Father Louis Hennepin, Franciscan missionary, and chronicler of La Salle's expedition of 1678-1679, was the first to preach the gospel on the Niagara frontier and was the first who saw and described the Falls of Niagara. He knew of the existence of coal in 1679. On a map made by him is shown a "cole" mine above Fort Crevecour, on the Illinois River, near the present site of Ottawa. In his journal he states that in the country then occupied by the Pimitoui Indians there were mines of coal, which is the earliest record of the existence of coal in America. Father Hennepin also marks the site of a coal mine on the James River, near Richmond, Virginia.

In the Atlantic Coast Triassic coal field lies the Richmond Basin. This basin contains the oldest worked mine in America, and the first systematic coal mining in the United States was carried on within its borders. Coal was used in America as early as 1750, and in 1779 shipments were made to northern cities. The use of coal at that time was credited with lessening the febrile ailments of the inhabitants. During the War of Independence it was used at Westham, on the James

River, five miles above Richmond, for the manufacture of shot and shell. This plant was destroyed by the traitor Arnold in 1781.

At what precise period the bituminous coal of western Pennsylvania first came into use is not known. In 1684 privilege was granted by William Penn to mine coal in Pittsburgh. The earliest record of coal mining in the Pittsburgh region is that supplied by Thomas Hutchins, who visited Fort Pitt (now Pittsburgh) in 1760 and found a "cole" mine opened on the west side of the Monongahela River.

In 1775 S. Boyd took up and patented a tract of land to mine coal. In 1804 coal was shipped from mines at the headwaters of the Susquehanna River (near the present site of Clearfield) and the Indian village of Chincleclamoose down the Susquehanna River. It was sent down by Mr. Boyd and was landed at Columbus, a distance of 260 miles. It was a matter of great surprise to the inhabitants of Lancaster County to see an article with which they were wholly unacquainted brought to their door. In 1828 the first cargo of Pennsylvania bituminous coal reached Philadelphia from Karthaus, and some was forwarded to Baltimore.

Discovery of Anthracite Coal

Anthracite coal was discovered in Rhode Island in 1760. In 1762 the existence of coal in the Wyoming Valley of Pennsylvania was proved by the pioneers who had migrated from Connecticut to that region. It was found at the mouth of Mill Creek, on the Susquehanna River, near the present site of Wilkes-Barre. The Indians who inhabited eastern Pennsylvania knew of the existence of anthracite coal long before it was discovered by the white settlers, and made use of it only for pipe heads.

In 1769 Obadiah Gore, a blacksmith, was the first to use anthracite coal. He tried it in his forge and found it to give satisfaction. During 1775 mines were opened and the first shipment of hard coal was sent down the Susquehanna in boats from Wilkes-Barre to Harris Ferry, now Harrisburg; from here it was hauled in wagons to the arsenal at Carlisle, for use in the manufacture of munitions of war. These shipments were continued annually during the Revolutionary War.

Coal was discovered in the Pennsylvania Schuylkill Region in 1790, at the foot of Broad Mountain north of Pottsville, by Nick Allen, a noted hunter. He came from the New England states and was called the "black Yankee." During one of his hunting expeditions Allen had camped for the night under the shelter of some overhanging rocks and trees. He built a fire on top of fallen rocks and laid down near the fire to sleep. Some time during the night he was awakened by more heat about his legs than was comfortable, and getting up he found the stones red hot. Examining the rocks lying around, he found them black and shining, and came to the conclusion that these were stone coal, of which he had heard. He reported his discovery to the settlers in the vicinity.

Coal was discovered by Philip Ginter, a hunter, in 1791, at the present site of Summit Hill; this section is near Mauch Chunk (the Indian name meaning Bear Mountain) at the eastern extremity of the southern anthracite region. Ginter had built a rough log cabin in the forest and depended solely on the proceeds of his rifle for the support of himself and family. The game he shot included deer and bear, which he carried to the nearest store and bartered for the other necessities of life.

While returning from a hunting trip he discovered the black dirt that covered the coal bed and reported the extraordinary appearance to Jacob Weiss, an intelligent gentleman who lived at what was then known as Fort Allen (now Weisport), which was within 12 miles of the spot. An examination was immediately made and a small shaft sunk. Good coal was found at 10 feet from the surface.

Taking a keen interest in the discovery, Colonel Weiss immediately took specimens of the coal to Philadelphia and submitted them to John Nicholson, Michael Hillegas and Charles Cist, the last named a printer, of more than ordinary intelligence, who pronounced it to be the purest of anthracite coal and authorized Colonel Weiss to reward Ginter for his discovery. Ginter was accordingly given the title to a small tract of land, upon which he built a mill; however, he was shortly after deprived of this tract by the claims of a prior survey.

Hillegas, Weiss and Cist, in 1793, formed the Lehigh Coal Mining Co. They purchased for Jacob Weiss the tract of land upon which Summit Hill is now located, and afterward took up under warrant from the Commonwealth about 10,000 acres of unlocated lands, including the Mauch Chunk Mountain, embracing most of the lands now owned by the Lehigh Coal and Navigation Co. This was the beginning of the Old Company, and from that day to the present coal from these mines has been justly famed because of its purity and high calorific value.

Construct Road to Mauch Chunk

In 1793 one of the company and four miners started mining at the site of the old quarry, and an appropriation was made of £10 ($26.67) in Pennsylvania currency to construct a road nine miles long to Mauch Chunk. The coal opening was in the midst of a wild and mountainous region, surrounded by forests and only traversed by the war paths of the Indians or the trails of the hunter. The nearest market was Philadelphia, over 100 miles distant.

Many fruitless attempts were made to get coal to market over the company's road, and thence by the Lehigh River, which in seasons of low water in its unimproved state defied the floating of a canoe over its rocky bed. The difficulty of kindling the coal made its introduction anything but easy, and after calling for contributions of money from the stockholders until calling was useless, the Lehigh Coal Mining Co. became tired of the experiment and temporarily gave up in disgust.

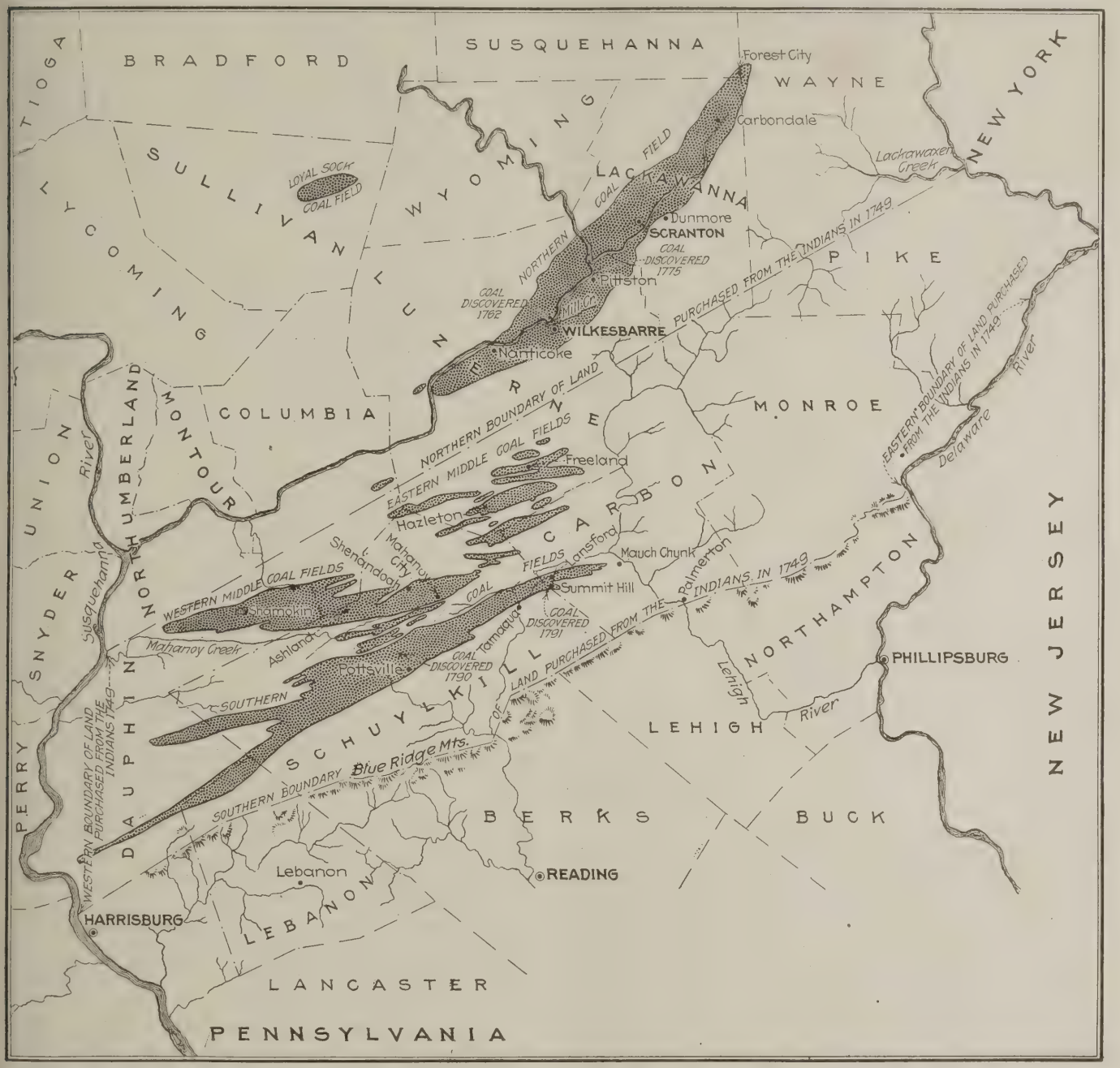
It is an interesting matter of record that in 1788 nails were made with the aid of anthracite coal by Judge Fell of Wilkes-Barre. In 1803 the Lehigh Coal Mining Co. made another effort and sent two arkloads of coal to Philadelphia. The fuel was tried, but could not be burned, and it was rejected as worthless. The spurned material was then utilized in the making of walks, and the "black rocks" of the Lehigh Coal Mining Co came in for much suspicion and ridicule at this time.

In 1805 John and Obadiah Smith, from Derby, Conn., settled in Plymouth, Penn. They bought coal lands and immediately began shipping coal by arks to points along

the lower Susquehanna River. In 1806 William Turnbill constructed an ark (a rough timber boat) to carry about 200 tons of coal via the Lehigh River to Philadelphia. Some of this coal was sold to the manager of the Philadelphia Water Works, but because of his inexperience in handling the fuel, which seemed to extinguish the fire, it was rejected as worthless. In 1808, under the direction of Judge Fell, grates were constructed at Wilkes-Barre to burn anthracite coal for domestic purposes.

In 1812 Col. George Shoemaker, of Pottsville, loaded nine wagons of coal from his mines at Centersville, about a mile from Pottsville, and proceeded to Philadelphia with them, hoping to find a market. But the opinion of the Philadelphians in regard to anthracite, or stone coal, was very unfavorable at that period—the frequent and persistent attempts to impose rocks on them for coal had aroused their indignation—and Colonel Shoemaker was denounced as a knave and a scoundrel. Colonel Shoemaker persisted, however, and disposed of two loads at the cost of transportation, one to Messrs. White and Hazard, of the Fairmount Nail and Wire Works, at the Falls of the Schuylkill, and one to the Delaware County Rolling Mill. Part of the remaining seven loads he sold for a trifle to some blacksmiths, who promised to try it; the rest he gave away.

Though Shoemaker lost money and went to considerable trouble in his attempts to introduce the fuel, the very men to whom he gave his coal obtained a writ from the authorities of the city for his arrest as an impostor and a swindler, and Colonel Shoemaker was forced to beat a hasty retreat. He only saved himself from prosecution by taking a wide circuit around the Quaker City



MAP OF EASTERN MIDDLE, WESTERN MIDDLE, SOUTHERN AND NORTHERN ANTHRACITE COAL BASINS

The two Middle and Southern basins were purchased from the Indians by the proprietary Government in 1749 for £500. The Northern coal basin together with the bituminous coal fields in Pennsylvania, were purchased from the Indians by the Penn family for $10,000.

on his way home. Such were the trials and tribulations suffered by some of the early pioneers in the anthracite coal industry!

In the meantime Mr. White, who was anxious to succeed in burning this coal, and some of his men spent a whole morning in trying to ignite it and raise a heat in one of their furnaces. They tried every possible expedient which skill and experience in other fuels would suggest. They raked it and poked it and stirred it and blew upon the surface through open furnace doors with perseverance and persistent determination, but all to no purpose. Colonel Shoemaker's rocks would not burn, so the attempt was abandoned and the door slammed shut. Returning from dinner at the usual time, all hands were astonished at the phenomenon which they beheld on opening the doors of the furnace. A glowing mass at white heat was discovered; so hot a fire had never been seen in the furnace before. Thus the secret of proper draft was discovered, and from this time anthracite, or stone coal, found friends and advocates in Philadelphia. The motto "Let it alone" became a receipt for its use, rather than its abuse. The result of this success got into the press, and as usual soon gave it a reputation. Everybody knew stone coal was coal, now that somebody had proved it such.

Shortly before this time, when an act was about to be passed authorizing the improvement of the Schuylkill River in order to convey coal to Philadelphia, the representative of Schuylkill County in the State Senate declared that there was no coal in his district, that there was a kind of black stone called coal, but that it would not burn.

Leased Property for One Ear of Corn

In 1813 Messrs. Miner, Cist and Robinson opened mines at Room Run and Summit Hill. On Aug. 9, 1814, the first ark with 24 tons was started to Philadelphia on the Lehigh River. The coal cost $14 per ton delivered at Philadelphia. Josiah White bought some of this coal and used it in his works. When the War of 1812 was over, anthracite could not compete in price with bituminous, and the mines were abandoned.

In 1817 Josiah White and Erskine Hazard, being desirous of supplying their works with anthracite coal, secured a lease from the Lehigh Coal Mining Co. for twenty years on its whole property, on the condition that after a given time for preparation they should deliver for their own benefit at least 40,000 bushels of coal annually to Philadelphia and the outlying districts, and that they should pay on demand one ear of corn as an annual rental for the property.

On Mar. 20, 1818, by an act of the Legislature, White and Hazard were granted the authority to improve the navigation of the Lehigh River from Stoddartsville to Easton, with instruments borrowed of the Delaware and Schuylkill Canal Co., the only instruments to be had at that time in Philadelphia. Having taken the levels from the river to the coal mines to ascertain that a road could be constructed on a descending grade from the mines to navigation, and being satisfied that it was feasible to make the necessary improvements, the next step was to raise the capital for carrying on the work.

On Oct. 21, 1818, the Lehigh Navigation Co., was formed with a capital of $50,000, for the purpose of making a road from the river to the mines in order to transport the coal to market. The road, including the road to the Summit Mines, was laid out in the fall of 1818 and finished in 1819. It was intended to use it as a railroad as soon as the business would warrant the expense of placing rails upon it.

On Apr. 21, 1820, the Lehigh Coal Mining Co. and the Lehigh Navigation Co. agreed to amalgamate their interests under the title of the Lehigh Navigation and Coal Co., and an additional sum of $30,000 was subscribed to the stock. With this aid the road was repaired and 365 tons of coal were sent to market. This quantity overstocked the market and was disposed of with great difficulty, the price asked therefor being $8.40 per ton. No anthracite coal came to market regularly from any other source than the Lehigh before the year 1825, and the reports of the anthracite coal trade began in 1820, when 365 tons were shipped to Philadelphia.

In May, 1821, the title of the company was changed to the Lehigh Coal and Navigation Co., and the stock of the old mine company was bought up by the new organization. The Lehigh stock generally stood high in the market, as Summit Hill was supposed to be all coal; but when it was learned that the bottom of the coal was found at 60 feet, the value of the stock depreciated 25 per cent.

First Stripping Operation in America

In 1821, 1073 tons were shipped to market. In 1821 a large quantity of coal was uncovered at the old quarry at Summit Hill by removing from its surface 6 to 20 feet of earth and slate. This process was continued until the excavation had a superficial area of 10 acres and a depth varying from 30 to 70 feet. The coal was uncovered and laid open to view, and it was worked in the open as in a stone quarry. The excavation was entered at different points by roads cut through the coal, in some places down to a depth of 70 feet. The vein ranged from 50 to 70 feet in thickness. The covering increased rapidly from the crest of the anticlinal, or saddle, to the synclinal, or basin, and it was found more economical eventually to excavate the coal by the ordinary process of mining by slopes than by the old or original mode of quarrying. This was the first stripping operation in America.

This remarkable exposition of an enormous mass of anthracite for a time excited much attention, not only in the United States but in Europe. It was a scene not presented by any other mining district in the world. For here a single vein reached the enormous maximum thickness of 70 feet, or equal to the workable thickness of the entire formation of the richest coal fields of the old world. This quarry was abandoned in 1847. The excavation, or place formerly occupied by the quarry, will cover an area of about 35 acres, and the amount of coal shipped from it will probably exceed 2,000,000 tons.

In 1822 a total of 2240 tons were shipped to market. The boats used in this descending navigation consisted of square boxes 18 ft. wide and 25 ft. long These boats made but one trip and were broken up in the city and the planks sold for lumber, the spikes, hinges and other iron work being returned to Mauch Chunk by land, a distance of 80 miles.

In 1823 anthracite coal was shipped to the New England states from Philadelphia by boats. In 1824 the Lehigh Coal and Navigation Co. started the great enterprise of driving the old Hacklebernie tunnel. This tunnel was 16 ft. wide and 8 ft. high, and was driven 790 ft. through hard conglomerate rock. The company engineers were under the impression that the coal found in this tunnel would dip to the south, but when the veins were cut it was found that they dipped to the north. The tunnel was abandoned until 1844, when it was completed. This tunnel in 1824 cost $34 per lineal foot. It was the first tunnel of its size driven in the United States.

In 1825 the demand for coal increased so much that 25,500 tons were sent down the Lehigh. The Schuylkill Canal was completed from Port Carbon to Philadelphia and 7143 tons were sent down the Schuylkill. This marked the turning point in the use of anthracite coal. People were now becoming accustomed to the new fuel, and the prejudice against it was fast dying out. The wood stove was beginning to be replaced by the coal stove, and it was during this year that firebricks were made.

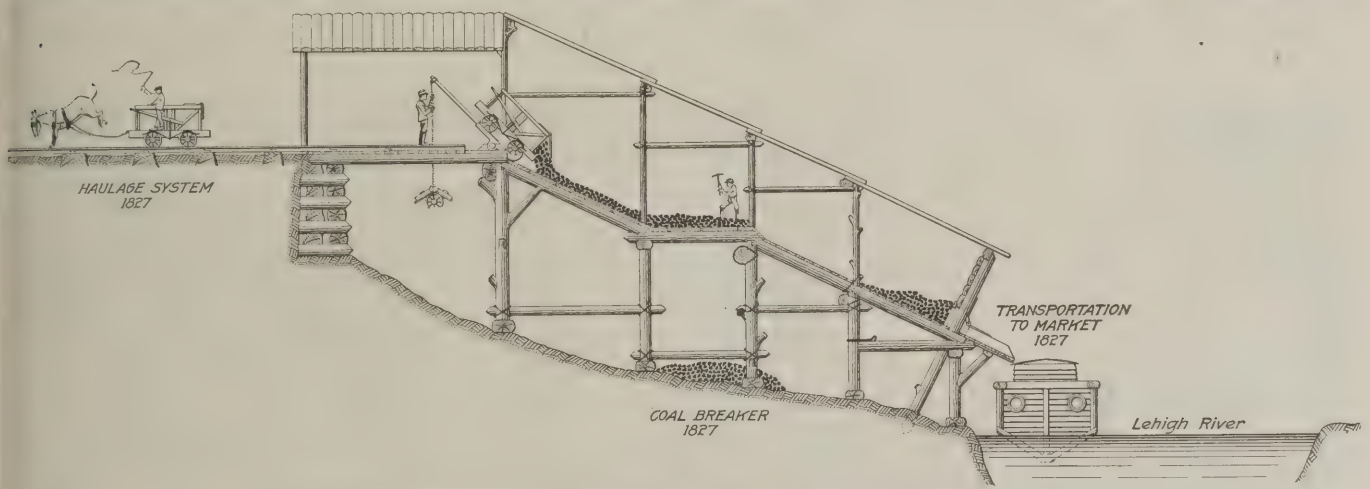
In 1826 there were 31,280 tons of coal sent to market down the Lehigh. The business was now becoming so large that it was difficult to keep the turnpike to the mines in good working order without coating it with stone, and it was determined that the best economy would be to convert it into a railroad. The only railroad then in the United States was the Quincy, made in the fall of 1826, and which was about three miles in length. There had previously been a short wooden railroad about three-fourths of a mile in length at Leipers' stone quarry, but it was now worn out and not in use.

The railroad from Mauch Chunk to Summit Mines was commenced in January and completely in operation by May, 1827. It was nine miles in length and had a descent all the way from Summit Mines to the river. The whole transportation of the coal upon it was done by gravity, the empty wagons being returned to the mines by mules, which rode down with the coal. When the wagons reached Mauch Chunk they were run down a gravity plane to a point near the river, where the coal was dumped into a chute, from which it was loaded into a boat or ark.

When the mules rode down four were placed in a wagon and seven wagons were connected into one train. This was coupled to the coal wagons and made the descent at the same time. The mules readily performed their duty of drawing up the empty cars, but having experienced the comfort of riding down they seemed to regard it as a right, and were reluctant to descend in any other way.

In 1829 the Lehigh Canal was opened from Mauch Chunk to Easton, and from White Haven to Mauch Chunk in 1837. In the same year the Baltimore Coal Co. was organized at Wilkes-Barre to mine coal. In 1832 the little Schuylkill began to be used for the transportation of coal from the Tamaqua region. In 1837 Beaver Meadow made the first shipment of coal. This was followed by Hazleton in 1838 and by Shamokin and Lykens in 1839. In 1834 the Lehigh & Susquehanna R.R. was completed, and in 1846 coal was shipped from the Wyoming region by the Lehigh & Susquehanna R.R. and the Lehigh Canal.

In 1839 Garrett and Eastwick successfully used anthracite coal in their locomotives on the Columbia R.R.



PRIMITIVE METHOD OF LOADING ANTHRACITE INTO BARGES IN 1827

In 1841 Dr. Casenhammer applied for a patent for making pig iron with anthracite. In 1838 it was used for this purpose at Mauch Chunk and Pottsville.

In 1843 great improvements were introduced in the preparation of broken coal. Revolving cast-iron cylindrical crates propelled by steam power were used for this purpose, and improved revolving screens were installed at the landing at Mauch Chunk and were driven by water, assorting the sizes and freeing them from dirt and impurities. The primitive breaker was a sledge in the hands of a brawny workman, who broke up the large lumps for market. It was in this manner that the term breaker was derived. In 1845 railroads were built by numerous companies, and the coal trade began to boom from then on.

It is strange to relate that near the spot where coal was discovered in 1791 by Philip Ginter a slope was sunk in 1847 in the Mammoth Vein, which was 50 ft. thick to the synclinal axis. In February, 1859, a fire, said to be of incendiary origin, broke out and altogether a large sum of money has been expended in the attempt to extinguish it. It has burned a mile in length and 1500 ft. wide, and has consumed millions of tons of coal. The fire is now confined east to the spoon end of the basin by a fire barrier of clay down to the level of the water in the old mine workings.

Selection of Stokers at Mines

By T. A. Marsh
Chicago, Ill.

SYNOPSIS — *The selection of stokers for use at coal-mine boiler plants must be made with care. Not only should low-grade fuel be burned, but no change can be made in the fuel if a wrong selection of stoker is made. To be thoroughly successful on low-grade fuels, a stoker should be entirely automatic.*

ALTHOUGH coal at the mines is plentiful and cheap, there is no reason why the practice of economy in its use should be neglected. In fact, there are certain considerations requiring more attention to items of economy in combustion at mine installations than elsewhere.

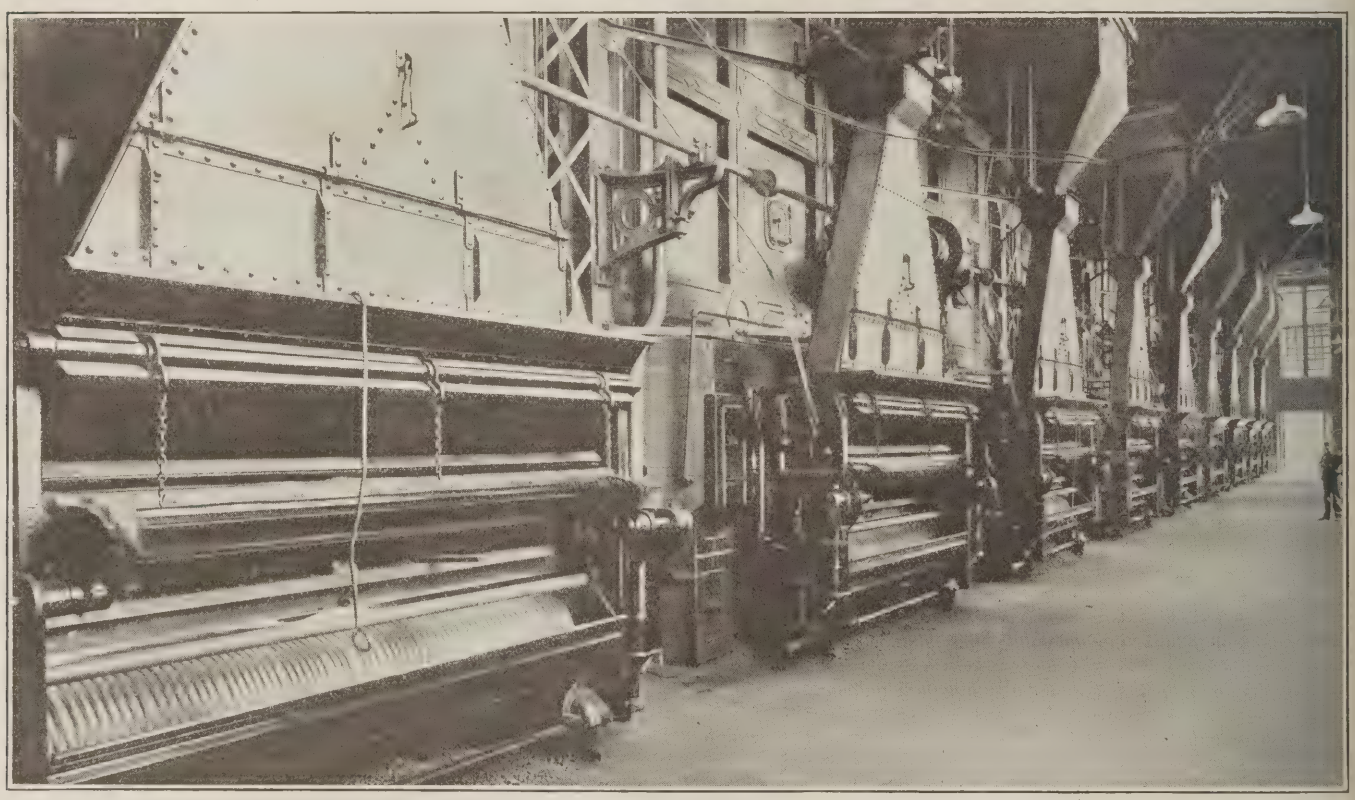
From an engineering as well as from a commercial standpoint, the selection of all steam-generating apparatus, but particularly that of stokers for coal mines, varies distinctly from the considerations influencing such selections in other localities.

The first and basic distinction is that if the purchaser in other localities selects a type of stoker unsuitable to his ordinary of accustomed coal, he can usually vary his fuel over a more or less liberal ra- dependent on the locality. In Chicago he can selec- from the various grades of Indiana and Illinois washed and raw coals. In Omaha he has a choice of Kansas, Iowa and Wyoming fuels. In St. Paul he has Illinois and Youghiogheny, Hocking and various grades of West Virginia and Kentucky coals from which to select. Correspondingly, practically every market offers some selection, and there is no secret to the fact that many a misjudged choice of stokers has been made to operate successfully through the purchase of selected coal frequently at prices above the minimum per 1000 B.t.u. existing for steam fuel.

The coal producer has no such alternative. He is bound to his own coal, and he must select a stoker suitable for its use or admit his error and change the stoker. He cannot change his fuel, although he may at times so desire.

A second consideration affecting the selection of stokers by coal producers is that the stoker selected should be capable of burning the lowest grades of fuel produced at the mines. Culm, washery refuse, bug-dust, No. 5 and, in fact, any combustible mine product not generally salable should be the natural fuel for stokers at the mines. This requires the selection of stokers not subject to clinker troubles. They should possess liberal grate areas and a generous draft supply. Without such provision, the mine plant will be forced to use the better grades of commercial coal, every ton of which has a distinct market value. With proper stokers and engineering, on the other hand, the fuel costs will amount to practically nothing, since a fuel may be used that has no definite commercial value.

A third consideration is that a type of stoker should be installed that is best adapted to the fuel, in order that the coal company's sales and engineering organiza-



INSTALLATION OF CHAIN GRATE STOKERS AT A LARGE BOILER PLANT

tions may become familiar with the possibility of burning the various sizes and grades of steam coal that are produced and in order that they may be fortified with facts obtained from their own company's power plant. If anyone ought to know the characteristics of a fuel, it is the producer of that fuel; and if he cannot select a type of stoker that will give good furnace conditions, what hope is there for the purchaser of this coal with only a casual knowledge of its properties and behavior?

A final but not to be neglected consideration is that the record and appearance of the mine power plant as well as the fact of burning the poorest grade of coal produced at the mine should be positive sales arguments for the fuel. What can be more convincing to a prospective purchaser of 1¼ in. screenings than figures showing him combustion rates, evaporation and horsepowers developed with this same fuel, and at a plant where he may be taken at any time for a thorough inspection of firing conditions.

The mine plant should therefore be a well designed one—in fact a "show" plant. Complete records should be kept of results; but above all, first, last and always, the correct type of stoker must be selected. The producer cannot take a chance with clinker-producing stokers. These would at once condemn the fuel. Let others who have a wide coal market experiment with stokers which involve a selection of coal on the basis of fusibility of ash. The producer cannot take a chance. He must use good engineering, which is simply common sense.

Mine Plant Stoker Should Be Automatic

The stoker for a mine plant should be automatic. It should feed the coal, burn it, discharge the ash and keep the air spaces in the grate always ready for the fresh fuel. Few types of stokers are strictly automatic; most of them push coal into a furnace and trust to someone to dump or pull ash, clinker and live coal out at a later date.

A stoker well adapted to low grade fuels as well as being low in operating cost and absolutely free from clinker trouble is the chain grate type. With the chain grate, coal is fed and burned; the ash is discharged to the pit and the air space automatically cleaned for the incoming fuel.

This type of stoker has been developed for and has been demonstrated to be well adapted to mine use with high ash clinkering coals. Originally designed for free burning coal, popular demand required a chain grate design for the coking coals. Accordingly, the "L" type chain grate was developed, embodying the chain grate principle of ash discharge and cleaning of air space with the breaking up action required by coking coal. Both types of these stokers have produced unusually high operating efficiencies and capacities. They are distinguished by freedom from clinkers, low labor and maintenance costs.

The plant at the mine is a problem by itself and cannot be judged by the usual considerations. A full appreciation of the problem and of the possibilities of a proper installation will lead to better plants and a greater return on the investment, not only as regards saving in fuel, but also as regards the marketing of steam coal.

Great Britain Relies on Foreign Countries for Supply of Mine Timber

By Mark Meredith
Liverpool, England

Lovers of the out-of-doors who wring their hands over the stripping of Britain's woods know, of course, that there is a patriotic necessity for the havoc, but they probably hardly realize how urgent the need is. Some facts in respect to England's position in regard to pit wood will enlighten them.

In the first place it has to be borne in mind that as one of the greatest coal producing countries in the world Great Britain is also one of the greatest consumers of pit wood. During the five years, 1909-13, the consumption of pit wood in the United Kingdom was about 3¾ million tons per annum. In 1913 it was roughly 4¼ million tons. For the greater part of this Great Britain had to rely on foreign countries, only 750,000 tons being home-grown timber.

Thus in normal times Great Britain imported some three million tons of timber per year. Of this over 1¼ million tons came from Russia, 820,000 tons from France, 446,000 tons from Sweden and Norway, and 392,000 tons from Spain and Portugal. As none was imported from other parts of the Empire, it will be seen that for at least 80 per cent. of its supply of pit wood the United Kingdom is dependent on foreign countries, a dependence that although, as it happened, was confined to the Allies and to neutrals, quickly proved unsatisfactory once war broke out.

It soon became evident that the supply, particularly from the Baltic, would be curtailed, and inquiries were therefore made with a view to ascertaining whether some part of the deficit could not be made up by obtaining supplies from Newfoundland and Canada. The Board of Trade representative on the mission of inquiry reported that there is an almost inexhaustible quantity of timber in certain parts of Newfoundland and the Maritime Provinces of Canada, much of which could be made available for pit props.

The real factor as to quantities procurable from these sources resolves itself into a question of cost of carriage. At the present moment, however, the question is not one of cost of carriage, but of the practicability of carriage.

Probably the cost of carriage had a deciding influence in 1915, when the shipping difficulties had not become so acute, for in that year, while the quantity of pit wood available from Canada and Newfoundland was 950,000 tons, less than 100,000 tons of it was actually imported. Newfoundland's share was 86,000 tons, which shows that the Canadian resources had scarcely been tapped. Grim necessity has compelled Great Britain to strip her own scanty timber resources, while the extended use of steel and concrete props in substitution for wood, especially on main roads and airways, has also helped Great Britain mines to continue operations.

If Great Britain must go abroad for her supplies after the war, it is to be hoped that her resources within the empire will not be forgotten, although it must be admitted the cost of carriage will not be a negligible factor even in normal times. It has been estimated that Newfoundland could eventually supply at least some 750,000 tons annually, and Canada much more.

Mining Institute Discusses Anthracite Prices

THE winter session of the American Institute of Mining Engineers (now, by the way, to be known henceforth as the American Institute of Mining and Metallurgical Engineers) was made notable by the paper of R. V. Norris on anthracite mining costs. As some of the speakers pointed out, many of the more important facts of the anthracite situation lie deeply hidden in Mr. Norris' figures. E. W. Parker, director of the Anthracite Bureau of Information, in his remarks called attention to the fact that 25 per cent. of the whole production of anthracite was priced at so low a figure that it had to be sold below its actual mining cost.

It was stated that when increases in wages were made the prices were advanced less than the computed average increase in costs due to the wage increase. The advances made no allowance for increases in the cost of materials that the operator had to purchase and, as said, only partially met what had been figured as the probable average increase in the cost of production.

Unfortunately, after one increase in wage when the adjustment was figured as 45c., the actual increase given was only 35c. It proved, however, that the increase should have been over 70c. The efficiency of labor probably had much to do with the miscalculation, for even though patriotism did a great deal to make the men willing and efficient workers, it could not give old men the energy of youth, or newly employed men the dexterity of the experienced. The young men and the experienced were being continually withdrawn leaving less capable men to take over the burden.

Sixty Per Cent. of Anthracite Mined at Loss

S. D. Warriner, president of the Lehigh Coal and Navigation Co., declared that 60 per cent. of the anthracite coal was being mined at a financial loss when all charges were considered, including depreciation, depletion, a reasonable interest on investment and Federal taxation. He said that only the fresh-mined coal should be considered in sizing up the situation, and that his estimate of 60 per cent. would be inadequate during the period of slow work now upon us.

An attack being made upon the preparation irregularities during the war, Paul Sterling declared for the company of which he is mechanical engineer (the Lehigh Valley Coal Co.) that it had maintained its standards inviolate throughout that period of stress.

R. V. Norris said that the anthracite mines had been conducted during the war with production alone in view. As a result development had suffered and the anthracite companies were faced with a large expenditure for the extension of tunnels and gangways.

Edwin Ludlow declared that enlistments of the men, especially in the mechanic class, had reduced the efficiency of labor. Some men also had taken advantage of the fact that the company was unwilling to discharge anyone who would work even supinely during the period of the war. The right of discharge had practically rested as an unused corrective ever since the United States entered the conflict. Increases in wages had produced not greater efficiency, but in too many cases the reverse. The output of certain collieries, he stated, had declined during the war 0.26 tons per man-hour, despite all efforts to increase unit output.

He said that a certain corporation having a payroll of about $8,000,000 a year had to pay an increase of $3,000,000 a year to labor. To meet this large sum it had been allowed to charge an increase on prepared sizes of $1,500,000 per annum. Thus $1,500,000 of a loss was incurred. However, there seemed a hope that this loss might be in part averted, for the business in steam sizes was then brisk and profitable. But the profit from steam sizes was wiped out by the increased cost of material, which loss alone was $960,000.

He prophesied that the survival of the fittest would wipe out many anthracite companies and operations of size and importance, which before the war were able to exist. With post-war conditions, unless prices were raised, they would have to close their operations. Should such a closing down result, there would be a runaway market this fall, for it is absolutely necessary that the fittest and the less fit in the anthracite industry be alike kept in existence if the urgent needs of the public are to be met, during and before any normal winter.

Inequitable Rates Put Mines Out of Business

It may here be said that an increase of prices equivalent to the *average* advance in wages cannot be made with fairness to the higher-cost operators where the difference in difficulties in operation are as large as those existing in the anthracite region. Large changes in wage rates thus inequitably adjusted cannot do otherwise than put a lot of carefully managed mines out of business—mines which the public is most anxious to keep in active operation. The correction for increased average wage costs in the anthracite region was not so readily made as in the bituminous region, where the estimate proved itself correct with but 1c. of error.

James B. Neale read a paper on the "Work of the National Production Committee of the U. S. Fuel Administration," and said he hoped that the efficiency of the operator would be increased by moral considerations and by a continuance of the work of the new production committees or something equivalent thereto. R. Dawson Hall stated that the economic basis of industry prevented the operator from yielding to those moral impulses toward efficiency as often as such moral impulses called on him.

The day laborer, if asked to do a larger and more efficient day's work, may do so because the appeal does not ask him to give anything entailing any loss. He works no more hours than he would if working less efficiently and he receives no less pay than he would if he loafed on the job. His efficiency, therefore, does not hurt him in any manner unless he is the kind of man to whom work is painful and abhorrent. The miner, on the other hand, when asked to be efficient, being on piece work, is sometimes quite willing, and indeed why should he not be? Efficiency, and the resultant increase in output, is reflected in his higher wages.

When, however, the operator tries to become so efficient that the miner gets all the cars he needs and all the cutting and loading facilities he can use, then there

has to be an excess of equipment, power and day labor. So efficiency in dealing with the miner means inefficiency as far as economical production of coal is concerned. The manager is confronted with larger costs of production, as his efficiency in supplying cars to miners is such an expensive matter to the company that he realizes that for him and the corporation it spells only a financial loss such as will inevitably be classed as inefficiency by the company.

The same is true when more efficient machinery for the undermining, drilling, face conveying and loading of coal is provided. There is also but little reward for the company which double-tracks rooms and headings to promote speedy car delivery or which introduces instantaneous ventilation and room car-pullers and electric lighting to facilitate the rapid extraction of coal.

Large tonnage, however, we are told spells low overhead. It does, if the orders are available and the miners will work a full day. If, however, the miner gets a frequent turn and every mining advantage, he is apt to come out at noon and so make the overhead come to the same percentage of production cost. But if he works there are apt to be more days of idleness, and the overhead charge again makes trouble.

Inefficiency in delivering cars to the miner is likely to continue until such time as the miner is paid wholly or partly by the day and not by the ton alone. With payment by the day, or partly by the day, the operator will not be complacent when he sees a miner waiting for cars, any more than he is happy in his mind when he sees a motorman lolling at the parting waiting for the arrival of gathering locomotives. Every efficient operator will then have his appropriate reward.

Nowadays the operator who gives the miner a generous car allotment and other equipment and power advantages soon realizes that his generosity is making him a weak opponent, in the market, of the man who seeks only to get out his coal at the lowest cost regardless of the desires and requirements of the enterprising miner. He also finds his day men disgruntled at the few hours in the working day that the average miner employed on the ton basis is willing to work when given prompt car service. There was no time for the discussion of these remarks by the assembly, but the Chair, R. V. Norris, registered the customary disapproval of such revolutionary remarks.

S. A. Taylor read J. D. A. Morrow's paper on "Distribution of Coal Under the United States Fuel Administration." Shortage of time, unfortunately, prevented a discussion of the paper.

The visit to the Federal shipping plant located at Kearny, N. J., occurred on the following day, Thursday, Feb. 20. The Federal Shipbuilding Co. was formed July, 1917, by the United States Steel Corporation, in order to assist in the great shipbuilding program being carried out by the United States Shipping Board for war purposes.

The plant is situated on the west bank of the Hackensack River, and comprises about 185 acres of land, originally a marsh which was practically covered by water at high tide. About 750,000 cu.yd. of fill was obtained by the excavation of the wet basin and by the dredging of the Hackensack River, after which a final top fill of cinders was applied.

The first pile was driven on Aug. 6, 1917, and the construction work was prosecuted in a most energetic manner, despite the severe winter and other difficulties. All of the facilities and organization of the United States Steel Corporation were generously placed at the service of the Federal Shipbuilding Co., which accounts for the remarkable and substantial progress made.

The plant is entirely self-contained, having 12 ways and a fitting-out basin capable of accommodating eight steamers at one time, besides the necessary workshops for carrying out every detail of manufacture required in ship construction.

Special attention has been paid to welfare work and safety appliances, as in the other subsidiary companies of the corporation. The first keel was laid in November, 1917, and up to the present time nine boats have been launched and six delivered. The sixth left for trial on the morning of the visit. These steamers are 410 ft. over all, 55-ft. beam, with a deep draft of 27 ft., carrying 9600 tons of cargo, and they will make a speed of 11½ knots loaded. Tests on the unloaded boats have shown a speed of 13 knots. Satisfactory results have been given by all the vessels delivered, and the boats are a fine type of the modern economical cargo carrier.

In order to make the greatest possible progress under war conditions, about 60 per cent. of the first thirty steamers was fabricated by the American Bridge Co., and sent into the plant all ready for erection; the remaining portions, consisting of the two ends, were fabricated in the plant.

During the early part of 1918, extensive preparations were made for carrying out experimental electric welding with the view of building steamers without rivets. This work was under the charge of the Emergency Fleet Corporation's Experimental Section, but on the signing of the armistice operations were suddenly stopped, and the equipment for electric welding is now dismantled and shipped away.

No attempt has been made to cover all the features in the program as the outlines of the occasion were duly covered in the advance notice published in the issue of Jan. 30, page 237. This early draft of the program was closely adhered to.

Kentenia Coal Sales Co.

In the Feb. 20 issue of *Coal Age*, p. 383, there appeared a news note stating that the Kentenia Coal Sales Co., of Pikeville, Ohio, had filed a petition in voluntary bankruptcy in the United States Court at Cincinnati. The coal company in question calls attention to the fact that this information is wholly incorrect. It appears that the Kentenia Coal Sales Co. is entirely solvent and is conducting a prosperous business. Our correspondent finds on investigation that the error grew out of the fact that the Kentenia Coal Sales Co. was one of three petitioning creditors who filed an involuntary bankruptcy petition against a Kentucky coal corporation. The news reporter who originally supplied the information to the *Coal Age* correspondent evidently did not know the difference between a petitioning creditor and a defendant in an involuntary bankruptcy proceeding. The error is regrettable, and *Coal Age* is giving the facts this prominent display in order that no injury shall result to the Kentenia company from the mistake.



Opportunities in South America for American Coal

As a result of the war, conditions are especially propitious for the extension of the American export coal trade to South America. This is the firm conviction of Grosvenor M. Jones, the assistant chief of the Bureau of Foreign and Domestic Commerce, who recently returned from a trip to South America, during which he made an intensive study of the region with respect to markets for American coal.

With the expansion of American foreign trade, which must come if the nation's ambition with regard to the merchant marine is realized, must come also an increase in sea-borne coal, in order to balance the freight movement. If American ships are to compete successfully with foreign shipping, means must be found to have cargoes each way. When one leg of the voyage must be made in ballast, the costs of operation become prohibitive for most trade. It has been said that English coal has made possible that nation's merchant marine. Conditions now have changed so as to limit the amount of English coal that can be sent to South America, while the United States is in a more advantageous position than ever to enter those markets. It frequently has been pointed out that France never can have a great merchant marine, since it cannot furnish the required bulk of outbound cargo. This does not apply to the United States, and it is to coal and to other products of the American mines that American exporters are looking to furnish the major part of an outbound freight.

Latin Americans, more than any other peoples, adhere to established customs in the purchase of goods. During the four years of the war they were forced to get their coal supplies from the United States. This has afforded an opportunity for the introduction of American coals into South America, and now that Latin American consumers have become accustomed to the fuel there is every reason to believe that the market can be retained.

While Cuba will continue to be the most important Latin American market for American coal, that of Argentina should rank a close second, Mr. Jones believes. The Cuban market has been made, to a large extent, by the activities of American enterprises. Capital from the United States is becoming increasingly interested in Argentine developments, which will make it easier to expand the demand for American coal; but during the war the almost unassailable preference for Cardiff coal on the part of most of the other consumers of fuel has given way to a decided appreciation of Pocahontas coal. Pocahontas coal was put to an exacting test by the Argentine Railways, with a most satisfactory result. The wide grate bars in use in South America make it advisable, Mr. Jones states, to screen the coal more carefully than has been the American custom. It is his opinion that the example of the English should be followed and all export coal be screened carefully at tidewater, where the fine material could be converted into briquets.

Briquets are popular throughout Latin America. Many consumers will buy nothing else. Fuel in this form can be piled up regularly, making pilfering easy of detection. This latter feature is one of great importance to Latin American coal consumers. With the price of coal high and with a general tendency toward pilfering among the lower classes, the safeguarding of the fuel pile is important and oftentimes difficult.

While two American companies, the Consolidation Coal Co. and the Pittsburgh Coal Co., are well entrenched at Buenos Aires, Mr. Jones declares it is absolutely necessary to pool interests under the Webb Act if the American producers are to capture a substantial part of the South American market.

Argentina offers a particularly promising field, in that the extension of railroad lines and the increasing demand for coal for industrial power plants will make continually for a greater market. The bunkering trade, already important, also is expected to assume greater proportions.

Montevideo, which is at the mouth of the Rio de la Plata, is better situated than are other Plata River ports. It is destined, many believe, to become an important bunkering point. It is easier of access for vessels of great draft, while the congestion that often exists at Buenos Aires is not met at Montevideo. In addition, there is an increasing demand for coal for use industrially in Uruguay. Brazil, Columbia and Venezuela offer less important east coast markets, but their needs as well are increasing along with the extension of railroads and construction of power-consuming public utilities and industrial plants.

West coast markets are not so promising as are those on the east coast, but in the aggregate a considerable tonnage of coal is consumed in those countries each year. Much of the bunkering trade on the west coast has fallen to the United States, because of the splendid facilities operated in connection with the Panama Canal.

The development of American mining enterprises has added greatly to the amount of coal imported, particularly by Chile. The great development in copper and iron requires large quantities of fuel. The transportation of these raw materials, as well as of tin and other products, requires a large amount of tonnage. These ships, on making the return trip from the United States, afford the service necessary to lay down American coal at west coast ports at prices that will compete with Australian coals. Since the amount of coal taken by the returning ore ships would be too great for any one port, plans are being made for the installation of the best of facilities at a central point from which the coal can be transshipped to smaller vessels and delivered at the numerous points where the coal is needed.

Fuel oil has been used extensively on the west coast of South America. The increasing price and the tendency on the part of American producers to make less fuel oil, in favor of the more valuable byproducts, are causing them to use less of that fuel.

Mineral Leasing Bill Talked to Death by Senator La Follette

The mineral leasing bill, which provided for the leasing and sale of coal lands on public domain, was talked to death by Senator La Follette, of Wisconsin. After the measure had passed the House and the Senate and had been the subject of long deliberation in conference, it was caught in the legislative jam of the expiring session. Even then four hours of the precious time was allotted to the discussion of the conference report. The greater part of this was used by Senator La Follette, who declared he was prepared to continue indefinitely. There were 65 votes pledged in the Senate for the measure, which insured its passage by a comfortable majority, had it been allowed to come to a vote.

Few bills have traveled a rockier road than have the measures providing for the leasing of mineral lands. Similar measures have passed the House and Senate on three occasions. The bill just killed, however, was the first on which the conferees had agreed. In fact, Senator Smoot, of Utah, was the only one of the ten conferees who objected to the conference report.

Senator Vardaman Scores the Anthracite Coal Operators in Report

Interference on the part of the Federal Government to divorce the transportation companies from the mining companies in the anthracite region of Pennsylvania is recommended in a report submitted to the Senate on Mar. 3 by Senator Vardaman, the chairman of the committee which has been investigating the coal situation.

The report points out that 72 per cent. of the anthracite is produced by eight transportation companies, "notwithstanding the fact that the constitution of Pennsylvania prohibits a transportation company from engaging in mining."

One of the things declared to have been proved at the hearings is that the Susquehanna Collieries Co. has taken over the Pennsylvania companies.

Much emphasis is laid upon what is termed the "dog-in-the-manger" attitude of the companies in reaching out for more leases when their own properties are to a great extent undeveloped.

The Fuel Administration is criticised for not using its "despotic" power to compel the reclaiming of coal from culm banks.

The Girard estate is being operated so as to be a curse to the householder, the report declares. It fixes the standard for high royalties, it is said, which makes for the condition wherein anthracite royalties are ten times those levied against bituminous lands. Royalties and freight rates need the attention of Congress, the report asserts, together with the "underlying cause of it all that one group of financiers control the anthracite production of the country.

"It is unfortunate," the report continues, "that the Federal Government cannot take control of coal mines and operate them for the benefit of all the people. The price of coal should be fixed by the Government and a fair return on investment also should be vouchsafed."

Deputies Named to Continue Compilation of Coal Traffic Statistics

W. D. McKinney and F. C. Honnold have been named deputy directors of the Bureau of Statistics of the Fuel Administration. This has been done so that they may continue the compilation of coal traffic figures along the lines formerly followed by the Ohio Bureau of Coal Statistics and the Illinois-Indiana Coal Traffic Bureau. These bureaus were railroad organizations. They were abandoned when the Government took over the roads. The work was taken over by the Fuel Administration on Apr. 1, so that necessary statistics could continue to be made available. In order that statistics for the entire coal year may be had, the work will be continued until after the March figures are all received.

Coal Seams in Matanuska Field Badly Broken and Faulted

Discussion of coal in Alaska brought about by the debate on the leasing bill led Secretary Lane to make the following statement in regard to the Matanuska field:

Two leases have been entered into by the Government, one with Lars Netland, a miner, who has as a backer Mr. Fontana, a business man of San Francisco, and the other to Oliver La Duke and associates. Neither of these parties has any other interests of any kind, so far as is known, in Alaska or any connection with any railroad, and neither of them has been successful in developing any large amount of coal. There are many thousands of acres in this field which are open for lease and which will be leased to any responsible parties who will undertake their development. There is no possibility of monopolizing this field, even if someone wished to do so, for the Government reserves are kept to be operated in case such monopoly should arise. Thus far, however, the Government in operating its own mine has been no more successful than the private lessees, for the coal is so badly broken and faulted that exploration work to follow the seam must be undertaken before development work can be wisely done. And this is being undertaken. Government experts who have examined this field do not promise without further exploring a larger output of coal from this field than 150,000 tons a year.

Problems in the Merchandising of Coal

By George H. Cushing
Managing Director, American Wholesale Coal Association, Washington, D. C.

IT IS a curious fact in American life that no man is expected to talk disinterestedly, or is believed capable of doing so, unless he is a United States judge. The latter is presumed to be truthful because, assumptively, he is supposed to have been bought off for life. All others must stand to have their words discounted on the theory of personal interest. Even presidents of the United States are not excepted. Their discussions are presumed to be tainted with that self-interest which has to do with an extension of term.

So, I suppose that when I discuss coal merchandising my word will be discounted liberally on the theory that I am talking the way I am paid. Even so, there is one most excellent reason why I cannot speak as I am supposed to do—for the coal jobbers. There are no coal jobbers any more. They all disappeared last November. They eliminated themselves from the earth to get rid of the stench of having been classified as purchasing agents. Therefore, since I cannot talk for some one who does not exist, I am not pleading for the jobbers.

Instead, I speak only for the "wholesalers." That is a most generous term. It embraces all who distribute coal in carload lots.

If by some process I may be allowed to divest myself of so mystifying a connection, and if permitted again to assume the rôle of a private citizen deeply interested in the safety, the welfare and the sanity of coal, I would like to discuss the Foreword on coal merchandising in the Feb. 13 issue of *Coal Age*.

It advised all coal operators to study carefully their merchandising programs. In that recommendation I concur most heartily. Nothing is more needed. Nothing that can possibly be done will pay bigger or surer dividends on the outlay. So, I say the recommendation is wise and sound.

Objections to Eliminating Existing Selling Machinery

But, if the further argument of the editorial means to advise operators to throw away the old selling equipment and install a new and untried system in these times of grave distress in coal, I ask leave to disagree. It isn't safe. It isn't good business.

My objection to that proposal is based on a common practice in business, to wit: No new piece of machinery, no matter how advanced in design or how economical in operation, ever completely and instantly supplants the old. Instead, there is always a period when the old is a receding factor and when the new is coming more and more into its own. This is so out of respect for the fact that it cost money to establish the old machinery and that it still is capable of some service, before it is junked. It is out of respect for the further fact that the new machine is untried. It must be given time to correct its small defects and to have its running parts smoothed off by use. Changes in machinery are made gradually, at least by careful men.

What is true of the machinery of a factory must be equally true of selling machinery of a coal mine. The new must have time to prove and perfect itself. The old must have time to liquidate its value.

I must demur, therefore, to the theory—now commonly expressed—that the so-called middleman in coal can be supplanted instantly. I do so on several accounts. Not the least of these is that it is no more safe to destroy one system of selling in the hope a better one will grow in its place than it is safe to adopt the principles of Bolshevism and destroy one form of government and one social order in the hope that something better will grow in its place. I say the two ideas are one. And, I say that both are equally and terribly dangerous.

This does not even pretend to say, however, that there is no room for improvement in the methods of selling coal. There is, in fact, both room and need for a revolution, or as near to it as we can get. One fact alone stamps the coal industry as deficient in this respect. We have no Marshall Field in the coal business. We haven't even a John Wanamaker. Certainly we have nothing approaching the Crane Company. There is not only plenty of room for one, but the coal trade will be behind the procession until it gets something of the sort.

A Few Beginnings in the Right Direction

We have, it is true, a few beginnings in the right direction. Williams & Peters are great merchants—in their line. They have been so for many years. But, their field is limited to a few grades of coal and that reduces their standing to less than that of a truly great house. The same, almost precisely, is true of the greatest coal merchandising house of them all—the Berwind-White interests. Its field has been too small even though its methods are great. Castner, Curran & Bullitt started toward true greatness in coal selling. Unfortunately, they stopped halfway to real achievement because they allowed their efforts to be confined mainly to one grade of coal. The Golbe Coal Co. could have become a real merchandising house if it had continued as it started. It is headed by a big man and a real merchant. It had the right policy. But, it fell short only because its head allowed himself to be tempted to scatter his fire by becoming interested in other things. And, so it goes through the list. Coal has some good merchants but no great ones. It needs great merchants.

The reason for this lack, as I believe, is that coal men as a class have never studied the sales end of their business to get at the essential facts about their merchandising program. For example, no one knows what amount of annual tonnage will support a private selling organization and what amount of annual tonnage will not. We do know that a man with ten million tons of annual output should have his own sales force. We know that a mine with 100,000 tons annually cannot afford it. But, where the dividing line is, we do not know. No studied effort has been made to find the facts. Still, that information should be gathered.

Again, it is obvious that a man who has less than 100,000 tons of coal a year to sell cannot travel over a big territory at his own expense. It would make his selling cost per ton too high. But, we have not the slightest idea how big is the territory over which a selling force can travel, economically, to sell an annual tonnage of a million or five million or even ten million tons. That information surely is necessary.

Further, it is assumed broadly—but without anything more than assumption behind it—that a man with an assortment of coals in his catalog can afford to travel a bigger territory than can the man who has the same tonnage of but one grade of coal. That may be true. Again, the likelihood is that it isn't true at all. A careful study of the facts might disclose that the man with the assortment of coals could make a bigger and surer selling record at less expense and at greater net profit to himself by the intensified cultivation of a much smaller selling zone.

It is along these lines that the trade needs to study if it is ever going to get that improvement in its selling efforts and that economy in selling which the trade must have. Seeing how much remains to be learned about the simplest things in coal merchandising, there is evident need for careful study and painstaking inquiry.

But, so long as we remain in the dark on these fundamentals, I cannot agree that the trade is ready to try any such dangerous experiment as to throw away its old selling system and to try a new one built on the old pattern.

So long as we remain in ignorance of correct coal merchandising the present mood of the trade to experiment on the selling question is closely akin to that of the child who tears up a toy to see what is inside it. It is both dangerous and destructive.

A Plague of Associations

By N. H. Seaburg

Boston, Mass.

During the past year and a half the coal industry has been swept with a plague, an epidemic of associations, every one the panacea for whatever exigency the constantly changing situation developed in the trade. Each little perplexity had its own particular mushroom panacea—a new association. The mere formation of an association seemed to allay the anxiety of those individuals interested, even if no cure was effected by it. It was felt that action had at least been taken, which was in itself some relief. Oftentimes the evil which had brought the association into existence disappeared or was eradicated long before the duly ordained committees had begun and, in the majority of cases, finished their investigations.

It is surprising to note how few the associations are that survived, if we disregard the blatant pretensions of the tail-ends of several which are desperately trying to maintain their identity. Indeed there are not many more of any real significance now than there were before the plague. But while this may be true, it is equally true that the trade as a whole has been greatly benefited by this epidemic of associations. It has brought home to every person engaged in the coal industry that greater and more substantial progress can be achieved by association and unity of interests than by individual action. And this lesson is well worth the price paid in hours and hours of valuable time spent in useless talk and vain efforts to remedy fleeting emergencies.

In consequence of the fact that the coal business is so broad in scope, competitive and antagonistic trade methods have been the rule. Any form of coöperation has always been looked upon with suspicion and disfavor. Perhaps of all business men in the country coal men are the most suspicious of their own kind—or have been until recently. "Mind your own business" has been the Koran. While this may be an excellent policy in personal affairs, the intricate civilization of today has outgrown it, particularly the business world. Interdependence is the fundamental support of society. We are today witnessing the greatest nations of the world struggling with this important problem in an effort to establish a League of Nations.

So, likewise, though in a lesser degree, the individual members in the coal industry are tentatively seeking to work out some program of associated effort that will be advantageous to all. The actions so far are somewhat half-hearted, due mainly to a lack of confidence, but this is to be expected. It will be overcome just as soon as the officers and members of sound associations realize that in order to be successful and efficient they must work just as hard and give just as much of themselves to the business of the association as they would and are doing in their own private undertakings.

Patronage is not worth a tittle if it is not backed up by something substantial. There has been too much of this kind of shirking. If the man and his ability and organization are not behind the name which he lends to the support of an association, then it may as well be withdrawn; it means nothing. Active work is what counts and brings results. Letting the other fellow do it is a human quality, but no healthy business has ever been founded on such a policy.

Also, there should be more concentration and less dabbling with every panacea that some well-meaning but unnecessarily alarmed person suggests. In union there is strength and efficiency, while "too many cooks" simply hamper the efforts of every one else. Strong and practical associations are the order of the day, but a plague of them should be avoided.

They Shiver in Paris for Lack of Coal

By Mark R. Lamb

In Paris, we are cold, but will be colder. The coal is of poor quality, anyway. Many slack heaps in Pennsylvania are coarser than the best grades delivered here. From this it will be seen why any kind of briquet is acceptable. It is a fact that large rectangular briquets are still made. They are stacked carefully each time they are moved. Then when used they must be broken by hand. The small oval briquet is in evidence, and when properly made is in great demand.

The heat is turned on in the hotel morning and evening for an hour, but now that the Peace Conference is on, we keep warm (with rage) wondering if the Germans are to be paid their war expenses. In Paris the men are happy enough, but one sees too many sad-eyed women in mourning. Who will pay *them?*

EDITORIALS

Your Services Respectfully Solicited

LIBERTY BONDS are being sold extensively throughout the country, as can be seen by the quotations on the various Stock Exchanges of the Nation. Unfortunately, there are few persons who are seeking to buy Liberty Bonds from the original purchasers, and many who are trying to sell. A decline has been inevitable under these circumstances; but as prices fall the bonds become increasingly desirable.

The present price for $100 Liberty Bonds paying 4¼ per cent. ran, on Feb. 27, between 94.14 and 95.54. The regular brokers having seats on the Stock Exchange will market these bonds for $1 a bond and $50 bonds for 50c. Thus a $100 bond will yield about $93 to the person who sells it. There is therefore no need for any man to sell his bonds at a large sacrifice.

The operator should buy the bonds from his employees at par or at the market price, or else buy them for a dollar or so below the market and sell them through a broker. The first plan is the best where the operator has the money. In case the workingman should be suspicious, the operator should post conspicuously the quoted rates as recorded in the public prints day by day.

Confidence would be increased if the operator did his utmost to argue the employee out of a purpose to sell his bonds when necessity did not so dictate, especially if the operator would post notices asking the men to hold on despite the short working week and ill health. It would be further increased if the operator would sell the bonds thus received as far as possible to local purchasers and at the price at which they come to his hand.

Financiers have at no time been surprised that bonds have been selling at a low figure. That was the experience in every foreign nation. Everyone knew that the reason for this fall was not the doubt that any nation would redeem its bonds, except in the case of Russia, but rather the fact that while patriotism will buy new bonds it will not always keep them; and it will not buy bonds that persons have bought and disposed of for good reasons, or for reasons not so adequate.

There has been a disposition among those who have never bought bonds before to say that the Government has not kept its word. This is, of course, an unreasonable argument. The Government only agrees to pay the bonds off when they become due. It might be truer to say that the bond holder who tries to sell has not kept his contract with the Government. The face of the bond shows that the purchaser lent the money to the Government for the time specified thereon. He now wants it before that time, and he it is who has not kept his word. If he has to sell his bond before the time, owing to difficulties in handling his finances and meeting his bills, then he is excused; but he must be contented to suffer the loss just as he has to do when surrendering his life insurance.

However, there is no need to rob the wage earner of three-quarters of his savings, as some sharks (not in the coal business, we trust) have done. The operator can handle the bonds and get the mine worker at least 92c. on the dollar, and thus show his good will to his employees and the sincerity of his patriotism.

The operator felt himself in duty bound to try every expedient to sell the bonds. He should be just as anxious now to uphold the national credit in the selling of them. Should, however, any man sell his bonds for liquor or other foolish thing, the less he gets for his bond perhaps the better it is for him. Yet such a man will be the first to declare that he has been unfairly dealt with. The hour to sell Liberty Bonds in order "to have a good time" is certainly not now, and it is doubtful if at any time it is a wise and good thing, or even a patriotic thing, to sell for self-entertainment a bond that represents a part of the national savings.

Operators should help to restore business by urging public improvements of a worthy character. When business hesitates, the municipal, state and national governments should bare their right arms.

Some Unrecognized Uses of the Wealthy

THE fare from Mt. Vernon to Coney Island, 29 miles, is a nickel. The public seems satisfied with that fare though the company is not. The fare on the railroad is 3c. a mile, or 87c. for 29 miles. The people are temporarily contented with that fare but would not consent to its being raised.

The public, then, is willing to pay 3c. a mile or less. Would it be willing, as a whole, to pay $1 or $1.50 a mile? It is unthinkable at present. A few wealthy men fortunately will put down their $100 to go 100 miles by aëroplane, and the art of flying will be developed, till the price falls to a level that workmen can meet.

So it has been with every development. Bicycles were manufactured for the well-to-do long before they became the recognized steed of the messenger boy. Automobiles were purchased for $20,000 for a long time before the Ford and the runabout took Guiseppe Sartor to the mine mouth. The rich are the pioneers. If there were none there could be no progress. In the wasteful economy of nature, the wasteful man is a necessary part, just as much as the wasteful water current and wasteful mountain breeze.

Nearly all developments come from the encouragement given them by the well-to-do. All improvements are tried first by them and on them, and then, when proved and standardized, they bring their benefits to those less fortunate. It is not a coincidence that Australia, that has no extremely wealthy people, has contributed little to the world. Admirable men and women.

their continent is a place apart. It cannot lead because of the dead level of the population. Art, invention, enterprise—all depend on wealth, though wealth without discretion and frugality is as unfortunate as poverty.

The luxuries of the rich soon become the necessities of the poor. Oranges, lemons, spices, bananas, were at one time luxuries. Who will so class them now? Their sale has stimulated industry, so that the rarity of the past has become the commonplace of the present.

Supply and demand regulate prices, and supply will fail as well as demand if the price is made so low that there is no profit in production. Goods on shelves may have to be given away if the demand ceases, but coal in the hill need not be disturbed if the price is inadequate.

A Clever Augur Can Find Whatever He Will

ARTHUR F. RICE, of the New York State Coal Merchants' Association, has prophesied that the price of coal (meaning doubtless domestic anthracite) is going to be greatly reduced. At first it would appear as if Mr. Rice believed that the price of coal charged by the producer was too high, in consideration of the costs of production, but later he makes it clear that his charge is that labor in the industry is overpaid, as also in other industries, and that materials purchased by the coal operator cost him too much.

Because of Mr. Rice's explanatory remarks it will not be necessary to take up the question from the point of view of the operator, whom he does not accuse. It will not be needful to repeat or prove what has already been repeated and proved, that 25 per cent. of the anthracite coal is sold for less than the mining cost and 60 per cent. is sold at such a figure as precludes a bond rate of revenue on the money invested. It is only required of us to show that the price of labor and materials is quite unlikely to decline.

The strength of the labor unions is such that they will not allow any reduction in wages. In fact not only the unions but most operators also are opposed to decreases in wage schedules. The general consensus of opinion among men in and out of the industry is against any scaling down in wage. For this reason it will not occur. It would not do the workingman any particular harm if only costs of living came down concurrently, as they ultimately would, but these costs would probably decline quite slowly and there would be an important exception in wheat, the price of which is regulated by law. But such a reduction would unsettle values and undermine confidence to such a degree that distress would be almost sure to intervene.

It is just as well that high-level wages remain stabilized. A few wage scales will be graduated upward till matters are equalized, and then prices will be fixed and business will move along without jarring or uncertainty. It is not likely that there will be any great scaling down of prices. A few things like anthracite will undoubtedy cost more. Bituminous coal will decline little if at all. Building costs will go up a little higher rather than down; wages have hardly reached their final adjustments among some of the trades involved. As for rents, they are sure to go up, though in many industries with low increases the renters will find it hard to pay such advances in rent. But till a further increase occurs building will not be remunerative, and no building program will go forward till immediate and adequate returns are certain.

A clever augur can find what he will, and some of the persons who happened not to be in a unionized trade or happen not to have to deal with unionized labor are not aware of the forces which now sustain the labor market. Mr. Rice's contention would have been incontestable 25 years ago, conceivable even 10 years ago; but it is impossible today. Let us cease advocating and prophesying what cannot happen, and pin our faith on facts, not on visions. Prices of materials will not decline, wages will remain just where they are, though outside the coal, munition, shipbuilding and a few more industries they may even rise. Knowing this there is no reason to delay buying, in fact anthracite should be bought now. It will never be as low in the future as it is at the present time.

Let the mine operator control the byproducts of his industry. Why should he restrict himself to mining and let others take his coal and make a fortune out of it? The operator should make byproduct coke, near coal, byproducts and power. He should not leave it to others to do this work and retain the profits.

Adoption of Larger Mechanical Units

IT IS a well-known principle in power-plant operation that the greatest economy is effected by the largest units. That this theory is generally recognized in the coal industry is well shown by an examination of statistics bearing on the subject. During the seven-year period 1902-1909, the total number of steam engines in the coal fields of the country increased from 11,142 to 19,318, or 73.4 per cent. During this same time the total horsepower increased 107.2 per cent. The average horsepower of all engines in use in 1909 has thus shown an increase of 50 per cent.

More recent figures for the Pennsylvania bituminous fields throw still more light on this subject. In 1910 there were 2880 steam engines in use, or one for each 52,000 tons of coal produced. Up to 1913 the total number of engines remained practically unchanged, but during the three succeeding years the number declined rapidly until in 1916 there were only 2313 steam engines in use in the Pennsylvania bituminous fields. The production of coal showed a consistent and fairly uniform increase over the entire six-year period, so that the tonnage produced per engine in 1916 amounted to 73,000, an increase of 40 per cent.

Progressive mine managers will follow this rapidly increasing development in mechanical efficiency closely. Manufacturers of machinery are devoting more attention to the requirements of the mines. Firms specializing on coal machinery of various descriptions are bringing some of the best brains in the country to bear on the subject, and the next decade will see an even more rapid development in the use of machinery in the coal fields, due to the increasing cost of labor.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

By no means let us fear discussing labor matters. The obvious may for some months, years or decades deceive the discussers, whether operators or mine workers, but time and study eventually lead to the truth, and maxims of the operator, long banned by the mine worker, become accepted and advanced by the latter, while the shibboleths of the mine worker, indignantly denied by the operator, finally meet his acceptance.

Let us, in labor matters, never despair of the coming of the light. It rises with education and discussion as surely as does the sun with cock crowing. A little learning is a dangerous thing; a few days of consideration may make a bolshevist, but several years of study cannot fail to make a conservative democrat. If it did not there would certainly be something wrong with conservative democracy and something to be commended in bolshevism. Truth always in the end justifies itself.

High Wages and Low Prices Conflict

Not in this present preface shall anything be said of that growing progress in economic orientation which has come to the operator almost without his realizing it. That which should be said is rather about the mine worker. He is beginning to see that wages are a function of prices, that prices are cost plus and that an orderly condition is not to be expected in business when that plus is dropped or converted into a minus. Listen to the anthracite mine worker's cry that no attempt shall be made to muckrake the coal industry and depress prices to such a low point as shall make it hard to pay fair wages. The workingman is beginning slowly to learn that the operator is the indispensable middleman who passes on as wages the greater part of what he receives as prices.

Five presidents of the United Mine Workers of America and their secretaries met in Harrisburg, Penn., on Feb. 19 and declared that they would fight the Glass bill in the House of Representatives. This bill provided for the appointment of a commission to investigate the prices of fuel and food and report recommendations for the lowering of those prices.

Labor Representative Opposes Price Inquiry

The mine workers fear that if fuel prices are lowered wages will go with them. This is what Representative David Fowler, of Lackawanna County, and a national organizer for the mine workers, had to say:

"Our present contract with the operators expires Apr. 20, 1920. Until that time there is no chance of a reduction in the wage scale, but we have to look ahead a little to the time for shaping a new contract. If this commission provided in the Glass bill recommends a decrease in fuel prices and it is placed in effect, there will be considerable difficulty in drawing up a contract that will suit the workers and the operators."

Time was when the mine workers disliked the operators so much that they tried to burn them like the proverbial candle at both ends. They fired them at one end with wages and at the other end they lighted the wick of lower prices, charging that the operator robbed the public by his exorbitant demands. They have learned better. In Illinois the mine workers have repeatedly threatened strikes on the luckless dolt of an operator who would cut prices which have been established as reasonable by the United States Fuel Administration. If these prices were fair during the war, they argue, they are still fair.

The disposition toward the day wage in western Canada recorded elsewhere in this department is quite interesting. It does not arise, however, from a proper consideration of economic principles. It seems to have its supporters in the laggards, the shiftless, the old men and the feeble.

Perhaps something might well be done for the two latter classes, when putting the more efficient day-labor principle into force. It should not be made hard for them to find a place in the scheme of things. However, is it not true that that place is not at the face but rather as watchmen, gatetenders, switchmen and what not? The older men and the feeble drift back, do they not, into the ranks of the day workers? After all, surely the problem presented by the feeble and the old does not throw a sufficient cloud on the validity of the day-work principle.

One cannot, nevertheless, advocate the total abandonment of piecework with its needful stimulus to production. A better plan would be a 50-50 arrangement, in which each man would get about half for his day labor and his presence at the mine for a full day and roughly half for his production in the course of that time. This economic arrangement would work for his good and for the good of the operator and public.

About 1500 Cape Breton mine workers are idle at the Florence and Sydney mines. The Nova Scotia Steel and Coal Co. has closed down No. 3 Florence mine as a protest, it is said, against the alleged interference in their operations on the part of the Dominion Coal Co. Whether the shutting down is a real protest born of resentment or only an action due to the inefficiency resulting from the Governmental decision to compel the Nova Scotia Steel and Coal Co. to surrender some of its lands to the Dominion Coal Co. is not clear. The Amalgamated Mine Workers of Nova Scotia at Glace Bay held a meeting Feb. 22 at which a resolution was passed calling on the provincial government to take what action is necessary to bring about the reëmployment of the men affected.

Alberta Miners Want Day-Wage System

Arguing that the present contract system or pay-by-what-you-achieve is not fair to the miner, the union mine workers of District No. 18 of the United Mine Workers of America in the western part of the Dominion of Canada declared that it produced wages excessively low. Asked what would be considered a fair wage, one delegate said $8 a day. The miners in Alberta are getting a little over one-half as much according to Delegate McRoberts, of Taber.

One of the men admitted at the recent 16th Annual Convention that some men were making good under the piecework contract, but he contended that the wage should be fixed on a per-diem basis. D. McNab, of Lethbridge, declared that some men in his district were working under contract and were making only from $2 to $2.50 a day.

It appeared to be the thought that in slack times the operators hired more men than necessity demanded and the result was that short time, short hours and slow run depleted the earnings of the contract workers and made it impossible to earn a good wage despite the fairness of the scale itself.

When Secretary Ed Browne was asked as to the ability of Alberta to start a system of its own, he replied that he was informed that each district had local autonomy in making contracts, but that the constitution of the union reserved to the international executive board the right of lending moral and financial aid when a strike is called. Ed Browne said he did not know of any district in America where the day-wage system was in operation.

An international organizer, Dave Irvine, stated that he had worked under the day-wage system at the mines of

the Stirling Coal Co. in Pennsylvania. On that occasion the operators took some of their largest mines and had them run to full capacity. They selected only the more efficient men, excluding all over 35 years of age. There was no compensation for working in wet or dangerous places. The feeling grew so strong that the manager was driven out of the district at the point of a gun. He said the day system would disrupt the union and declared that, under that method of payment, there would be ten times as many straw bosses as at present.

In the same convention a debate arose as to the condition of the bunkhouses which several delegates declared were of such character as to be unfitted for the housing of cattle. One man asserted that some had not been washed out for 18 months.

The *United Mine Workers' Journal* was described by one delegate as "more poisonous to the worker than any capitalist newspaper of Wall Street." The old wage scale in District No. 18 expires on Mar. 31, and the convention is for the purpose of determining what kind of contract will replace the old one.

Equal Time for Daymen and Miners

The local unions of the United Mine Workers of America, located within District No. 9, met in mass meeting at Kulpmont, Northumberland County, Pennsylvania, and decided, as stated last week, that they would be better off if only the United States Government could be induced to operate the mines. They want full-time operation and believe that it could be arranged if the Federal authorities had control and ownership. Irregular work gives them only inadequate pay, while food and clothing remain at the same high prices. The mines are working only about three days a week.

Some problems, which have lain low while work was steady and pressing, now come again to the fore. Miners where there are good haulage facilities often work on idle days preparing coal, so that on the next working day there will be no difficulty in producing large individual tonnage. At some mines there are men who earn as much with half-time operation of the mines as if the mines worked every day.

The mine workers meeting at Kulpmont attacked this practice of allowing miners to work every day while the day workers only work, say, three days a week. In Indiana and in some parts of the Middle West no work is done on what are known as "idle days," and miners are fined who fill cars when the mine is officially idle.

In parts of central Pennsylvania drivers themselves prepare coal on idle days. They are sometimes allowed to place a few cars at quitting time or on the idle day. These they themselves load with coal in chambers that would otherwise not be working. These practices are so general that they explain in part why, with steady work, the production last year was not so great as would have been obtained if the same per diem production had been maintained with full operation as was obtained with broken time.

The mine workers also passed a resolution directing miners not to do company work as they had been in the habit of doing during the war. Miners are not asked to do day work unless some day worker is idle. Refusal to do the work does not help the day worker but does cripple the mines and prevents the miner from getting the fullest time that conditions warrant, for a dayman short will delay the work of many miners.

Leaders in the Right on Bolshevism

The first open evidences of bolshevism among the United Mine Workers in West Virginia was exhibited on Friday, Feb. 14, when about 500 or 1000 miners in attendance at a special convention of district No. 17 paraded the principal streets of Charleston, winding up their parade in front of the capitol, from the portico of which a fiery speech was made by "Mother Jones." The demonstration staged was in the nature of a protest against the bill which prohibits anyone from displaying or having in his or her possession a red flag or any other kind of a flag except that of the United States, or of a nation with which the United States is not at war. It was also a protest against the enactment of any kind of law replacing the national guard by a police force in the work of providing for local order.

The miners' convention was called for the sole purpose of protesting against these two bills, and it lasted throughout the week, during which time many bolshevik addresses were made. Several delegations called on Governor Cornwell, insisting that he agree to veto both bills against which the miners were protesting when these bills came to him for approval; but the governor stood his ground, pointing out that he had recommended both measures in his message and that some form of state police protection was necessary.

The climax came, however, when the miners' convention passed a resolution condemning the representatives of organized labor in the House of Delegates for voting for the anti-red flag bill, Mother Jones heaping vitriolic abuse on the labor representatives as well as on the whole legislature in her speech from the front of the capitol. The labor representatives, in a statement inserted in the record of the House, while defending their course pretty plainly insinuated that the miners were on a par with the Industrial Workers of the World and the Bolsheviki. The statement follows:

"Organized labor is not afraid to trust the people. The American Federation of Labor performed a great task of patriotic duty when it set its face hard against I. W. W.-ism, bolshevism and those forces of destruction which believe in 'sabotage' or direct action, and which seek to destroy the confidence of the people in the Government, and would overthrow it if they had the power.

"We rejoice that the Administration at Washington is deporting these advocates of terrorism from the country. These forces are constantly working to misdirect the labor movement. The man or woman who marches under the red flag is in full sympathy with the progress of the terrorists.

"It is our deliberate judgment that we would have made a mistake if we had opposed House Bill 104. We would have placed organized labor in an unhappy light, and, by failing to support the measure, would have reflected on both your loyalty and intelligence."

Illinois Mines Are Working Slowly

Harry Fishwick, vice president of the United Mine Workers in Illinois says that there are 90,000 coal-mine workers in that state working less than half time. About 600 mines are running in a haphazard way. Some of them are operated only three days a week. Some mines are only working one day in seven, and the average time is only 2½ days a week. With our present way of looking at affairs such men cannot be said to be employed.

Coal operators say that owing to conditions in the market there is practically no demand for coal the state over, the amount still remaining in storage precluding any further purchases. The industrial unrest and the uncertainty as to future demand are also factors in the present dullness. However, Fishwick is optimistic over the general outlook.

The discontent is being fanned, not only by the slow running of producing mines, but by reason of the complete closing down during the winter of the mines started to supply the large war-time consumption. New mines were opened, old and abandoned mines were reopened and many of these were too new or too old or too poorly planned and managed to be profitable with declining prices. They are closed down already or will be closing during the course of the present year. With 20,000 more miners nominally at work than before the war started, readjustment of conditions is not without its difficulties.

Tonnage has decreased since the armistice is signed. In October when hostilities ceased (Oct. 11) the Illinois output was 8,286,000 tons, in November 6,286,000, in December around 6,000,000 tons. January and February are expected to show even greater decreases in coal output.

Leave a Little for Other Workers



A few mine workers have been expecting a further wage increase. There are unfortunately only just so many bites in the apple of the World's Production, so let us refrain from even the thought that we have the right to insist on taking two bites. The apple of the World's Production in 1919 is going to be small. Everywhere work has been lacking in steadiness; everywhere there has been ill health. There will be less than usual to divide, so the industry must not look for larger wages, but rest content with those it has. In this way every mine worker will get his share of the World's Production in 1919. Too bad the apple seems likely to be small, but we can look for larger apples when business gets adjusted to the present high wage scale.

DISCUSSION BY READERS

Gravity-Plane Haulage

Letter No. 1—I have read with a great deal of interest the question of using a gravity-plane haulage, presented in the inquiry, *Coal Age*, Jan. 2, p. 32; and, while I agree with the formula that was shown in the reply to this question, I would like to add a few comments designed to show further the impracticability of attempting to operate the proposed incline as a gravity plane for hauling trips of 25 cars, as stated in the inquiry.

Of course, the matter of laying out a gravity plane, so that the loaded cars descending the plane will pull the empties back up the grade, must be analyzed carefully and the number of cars that it is possible to haul in a trip determined by a calculation based on the various data given or involved in the question. It is the only way that such a problem can be successfully solved and its practicability determined.

However, let me suggest viewing the proposition from another angle and consider the case from the viewpoint of the descending load. Since the empty cars are said to weigh 1500 lb. and have a capacity of 2600 lb. of coal, each, the total weight of a trip of 25 loaded cars would be $25(1500 + 2600) = 102{,}500$ lb., or nearly 52 tons. On a grade of 20 per cent., I calculate that the strain on the haulage rope would be about 18 tons, which would require a $1\frac{5}{8}$-in. steel rope.

But, it is necessary to consider, also, the weight of the rope, which would be about 6 lb. per ft. This would increase the load on the rope considerably and would necessitate using a $1\frac{7}{8}$-in. rope, instead of that previously mentioned. Such a rope would cost over $1 per ft., which would make this proposed method of transporting the coal from the tipple to the tracks for shipment expensive. At the same time, the incline would have to be so arranged as to give a proper landing place, both at the top and the bottom of the plane, sufficient to accommodate 25 cars in a straight line.

In my experience, I have never seen an incline operated by gravity on as large a scale as this, and I am very doubtful if it can be done. Instead of the proposed incline, let me suggest the advisability of installing an aerial tramway for lowering this coal from the tipple to the point of shipment. The use of such a tramway would insure a large daily capacity.

St. Louis, Mo. WIRE ROPE.

[We quite agree with the suggestion of an aerial tramway, which this correspondent has offered as a substitute for the proposed gravity incline mentioned in the inquiry to which he has referred. It was shown in our reply to that inquiry that the conditions would only permit the lowering of a trip of five cars at a time; and we stated that it was practically impossible to handle trips of 25 cars of the size given, on such an incline.

However, our correspondent, in his calculation of the size of rope required to hold a descending loaded trip of 25 cars having a total weight of 102,500 lb., is somewhat in error. The gravity pull of this loaded trip, descending a 20 per cent. grade, and assuming a track resistance of 20 lb. per ton, is calculated by the formula

$$S = W\left(\sin a - \frac{\cos a}{100}\right)$$

In this formula S = the load on the rope (lb.); W = the total weight of a loaded trip (lb.); a = the angle of inclination of the incline, or the grade angle. For a 20 per cent. grade, based on horizontal measurement, the grade angle is 11° 19′; and $\sin a = 0.19623$; $\cos a = 0.98056$. Hence substituting these and the given values in this formula, we find, for the load on the rope when a loaded trip of 25 cars is at the top of the incline

$$S = \frac{102{,}500}{2000}\left(0.19623 - \frac{0.98056}{100}\right) = 9.5 \text{ tons.}$$

The size of rope required for this safe working load is a $1\frac{1}{4}$ cast-steel, 6-strand, 7-wire haulage rope, which will carry a safe working load of 9.6 tons and weighs 2.45 lb. per ft. The weight of this rope for a length of 5500 ft. is, therefore, $5500 \times 2.45 = 13{,}475$ lb. The gravity pull due to this rope resting on the rope rollers, on the incline, may be taken as adding $1\frac{1}{4}$ tons when the loaded trip is at or near the foot of the incline, which would make the total load on the rope about $10\frac{3}{4}$ tons, and would require increasing the diameter of the rope to $1\frac{3}{8}$ in., instead of $1\frac{7}{8}$ in., as estimated by the correspondent.—EDITOR.]

Coal, Railroads and the Government

Letter No. 2—Referring to the probable five-year extension of government control of railroads, to which attention is drawn in the Foreword, in *Coal Age*, Jan. 23, allow me to say many seem to think that a decided benefit will result under the guiding hand of the Government. It is quite generally thought that there will be a more equitable distribution of cars and markets, in the different coal-producing districts; and that strikes and lockouts by reason of labor difficulties will be prevented, and less frequent shutdowns occur by reason of lack of car supply. It is even thought that price fixing will make the profits of coal operators more uniform when the Government has full control of the situation.

It is argued that the unlimited ability of the Government to supply what capital is needed for the building of tracks, bridges, culverts, etc., to reach isolated mines, will greatly assist the development of properties lying in such districts. This, of course, particularly applies to mountainous regions, where private capital has been inadequate for such development.

In some cases, where it has happened that the managements of competing mines engaged in the development of adjoining properties, have labored under the unnecessary expense of building two lines to reach their properties, the advantage will be gained that, under a single

administration, a single track only will be required. This condition will prove a benefit under government control.

On the other hand, however, government control of railroads, in its effect on the transportation of coal, may be found to possess some disadvantages. The appointment of a single man clothed with power to direct affairs may be assumed to be not without the danger of prejudice developing in favor of one locality to the detriment of another. It can hardly be expected that the same interest will be shown in different developments as under private ownership and control.

Again, the large army of railroad employees, when working for the Government, may not manifest the same interest as they would show if working for a single corporation, and the efficiency of the system may thus be lessened. Permit me, here, to cite an instance that came to light, in my conversation with a man who had worked, last winter, to clear the tracks of snow, on railroads owned by the Canadian government.

Railroad traffic was completely blockaded between the largest cities in Canada. The force employed to clear the tracks were reported as "working full time," which they were not. In describing the situation, this man said, "What does it matter whether we work or not, when the government is good for our money?" Such may be the results in the States when the railroads are under government control. C. McMANIMAN.

Rawdon, Quebec, Canada.

Ventilating Power Excessive

Letter No. 2—I was both amused and astonished, in reading the statement of P. A. Grady, in *Coal Age*, Jan. 2, p. 27, to the effect that a large operation in his state (West Virginia) found that their ventilating power was costing 7c. per ton of coal mined, which was afterward reduced to 1c. a ton. This was an extraordinary occurrence and raises the question, in one's mind, as to what was the cause. It is my belief that the same conditions exist in almost every mine where the management does not possess a knowledge of the chief principles governing mine ventilation.

Too often it happens that little heed is given to the power consumed in the ventilation of a mine. The aircourses are not examined and cleaned up and the distance that the air must travel shortened as much as possible. Seldom is any attention given to a close examination of the many indirect causes by which the cost of production is greatly increased. But, when word goes out that the cost of operation must be reduced, the attention of the mine officials is commonly given to other matters, while these hidden causes are overlooked entirely.

What is necessary to bring about a more intelligent understanding of the causes that increase the cost of production is the installation of meters that will show the power consumed in the different operations of the mine. There should be a more general use of such meters, water gages, and other instruments to ascertain the exact condition. It is staggering to think that the installation of a single meter, in the case mentioned, brought to light the fact that a saving of 6c., per ton per day, could be effected. In other words, assuming the output of that mine was 1000 tons, it was found possible to save $60 a day, or from $15,000 to $20,000 a year, in ventilation alone.

Does not this fact impress the thought that there is great need of superintendents with technical education? Yet, how true it is that coal operators often regard such men as expensive luxuries that they cannot afford. But, where such men have been employed they have, at times, laid the foundation of future efficiency that some other fellow, less competent than themselves, has received the credit for accomplishing, because the management cut out the higher-price man just when he was about to reap the reward of his labors.

For a time, a great improvement is observed and the new man is credited with what was the other man's dues; but the later falling off of the output shows the management their mistake. I sometimes think that if more superintendents owned a little stock in the mine in their charge, greater efficiency and economy would result. W. H. LUXTON.

Linton, Ind.

Cost of Upkeep of Mine Cars

Letter No. 1—I was interested in reading the inquiry in *Coal Age*, Nov. 14, p. 918, relative to comparative systems of costs in repairing mine cars. The inquirer requested that readers of *Coal Age* having available records of such costs of upkeep of either plain- or roller-bearing cars should be willing to present them for discussion.

It was hoped that the attention thus drawn to this subject would help to show how the costs of repairs can be much reduced. That there has not been more of a response to this request seems to indicate that the matter of systematic repairs of mine cars is one that has not received the attention it deserves. As has been suggested, these repairs are too often made in a "haphazard or makeshift fashion."

CONSIDERATIONS THAT WILL REDUCE COST

While I have no figures to present, permit me to offer a few suggestions regarding the repair of mine cars. The first consideration is to give proper attention to the weakest parts of the car and those that succumb more easily to wear and tear in use. The type of car employed in any particular mine should be adapted to the conditions of the service. In mines where there are heavy grades—and there are many such mines—the cars should be equipped with a suitable brake, if it is desired to minimize the cost of repairs. The absence of good brakes on mine cars is the cause of more runaways and wrecks, resulting in bent axles, broken cars and other injuries that require the car being sent to the shop for repairs.

It will, of course, frequently happen that the poor judgment of a miner, or his negligence in not seeing that the car set in his place is out of danger when a blast is fired, will result in the end of the car being stove in by the blast. At other times, a car may be flattened out or otherwise injured by a heavy fall of rock in a place. Such accidents, however, are less frequently the cause of repairs being needed, than the neglect to equip the cars with good brakes. At least, that is my experience.

Another item that is the cause of the need of frequent repairs is the wear of wheels and boxes or bearings. Of course, this wear will take place sooner or later; but wheels and bearings will last much longer if they are properly lubricated or oiled. Also, the cars will need to be sent to the shop less often if worn wheels are not used and the bearings are kept in good condition. The car will run much more smoothly and be subject to less wear and tear when that is the case.

Prompt Repairs and Close Inspection Needed

Attention must also be given to other parts that are subject to the severe strain of service, such as drawbars, couplings and bumpers. It would seem unnecessary to mention, in this connection, that the roadbed and track should be maintained in good condition, if the cost of car repairs is to be kept low.

In closing, let me say that every car should be carefully inspected on the tipple, before it is sent back into the mine. It will often be found that a bolt is needed, or some similar slight repair is wanted and which can be made on the tipple without sending the car to the shop. Prompt attention to these seemingly simple requirements will go far toward avoiding more costly repairs in the future.

Of course, for the more serious repairs, it will pay better to shop the car, which should always be done before the latter is sent back into the mine, to be further weakened and cause a possible wreck. Car repairmen, foremen, and tipplemen should coöperate in the careful inspection of all cars, and no requirements, however simple, should be neglected, but should be attended to at once. Car Repairman.

Thomas, W. Va.

Iron vs. Wood Mine Cars

Letter No. 8—Referring to the discussion of the question of the relative merits of iron and wood mine cars, permit me to say that my own personal experience makes me prefer the wood car, which I believe is much better, considered from the standpoint of repairs. Few mines are equipped with appliances for making repairs on steel cars that have been damaged in the mine. On the other hand, nearly every mine in the country is equipped for making the necessary repairs to wood cars.

The composite car, part wood and part iron, while possessing much of the advantage in regard to lightness and being less rigid than the steel car, still presents much of the difficulty of the latter type, in respect to the repairs needed after the car has been in a wreck. Wherever it is possible to provide some simple and practical method for repairing the composite car, it is my opinion that this would be the most satisfactory type to employ in coal-mining practice. This is particularly true in mines where there is less danger of the cars being rusted and corroded by the acid mine water.

Where conditions are so variable as in coal mining, there is always bound to be much difference of opinion in respect to the merits and demerits of two types of equipment, such as are here presented. From the letters thus far submitted, however, nearly everyone has advocated the use of the wood car, and it would be interesting to hear from a strong advocate of either the steel or the composite car, and to observe what arguments he would present to support his view.

In his letter, *Coal Age*, Jan. 16, p. 157, "Progressive" asked for the type of wheel that has the longest life. In this regard, let me submit my conclusions, drawn from experience with different types of wheels, of which there are a large number on the market that merit consideration in respect to their material, chill and strength. I have tried practically all of these types.

In my estimation, the wheel that will give the best mine service is a good flexible, roller-bearing wheel that is so designed that the bearing will have a definite inclosure in which to work. I mean by this that the design of the wheel should be such that the bearing will at all times be free from end thrust and end wear, which will have a tendency to keep the lubricant well distributed in the bearing.

Practical Design of Roller-Bearing Wheels

The design of the wheel should also be such that it will be easy to get off without requiring the services of three men and a boy for that work. Some wheels require the knowledge of a man who can open a safe without knowing the combination, before he can get the wheel off the car. The resulting loss of time would eliminate such a wheel from mine use.

Another feature that appeals to me, in the construction of a mine-car wheel, is a cage for the rollers to work in. It has always been my experience that when the rollers are put in loose, they fall out in the dirt, the moment the wheel is taken off. It is then a pretty hard matter for a man to get them all back where they came from, to say nothing of the work of cleaning off the dirt and grit that adheres to the rollers.

Several of the manufacturers of this type of equipment make wheels that, with proper care, will last from seven to ten years, in mine service. Let me say that my idea of a good wheel is one that will give satisfactory service for this length of time and be easy to take off and put on, while at the same time being economical in respect to lubrication.

———, Ill. Richard W. Harris.

Letter No. 9—Regarding the relative utility of these two types of cars, in coal-mining practice, permit me to submit the following suggestions as the result of my own observations and experience.

Before a final selection of any mining equipment is made, careful consideration should be given to the many aspects that bear on the economical and successful working of the apparatus in question. In respect to mine cars, the shape, dimensions and capacity of the cars must be carefully determined, in conformity with the desired output of the mine and the conditions relating to length of haul and style of equipment. The kind of material entering the car must be selected with respect to the service required in the mine and the means at hand for repairing the cars when damaged.

In bituminous mining practice, in my estimation, a cheap and at the same time serviceable car is one made entirely of wood. The bottom planks are 3 in. thick, side planks, 1½ in. thick and the doors and back ends, 2 in. thick. The floor and side planks are bolted to properly bent car irons, which serve as stays to keep the car body from spreading.

Wood cars of this type are easily repaired and require no skilled labor for that purpose. The work is all done in an ordinarily equipped mine-car shop. The necessary iron stays, wheels and axles are readily obtained from manufacturers dealing in such material. The particular advantage gained in the use of wood cars is the ease with which repairs can be made when a wreck occurs in the mine. It will then require but a few days to put the cars in shape for use again. This is not the case where iron or steel cars are in use.

When a wreck occurs in a mine using iron cars it will often take a day or two to clear the track so that haulage can be resumed on that entry. Moreover, after the wreck is cleared, special equipment is required to straighten the bent cars and make them again ready for service. Another disadvantage in the use of iron cars is the corrosion that takes place by reason of the iron being exposed to the moist air and acid water of a coal mine.

The Composite Car in Anthracite Mines

In anthracite-mining practice, a part wood and part iron car is often used with economy and satisfaction where the cars are hauled in long trips over great distances daily. The bed frame of this type of car should be made of oak lumber. The end-sills and cross-sills must be tenoned or mortised into the side-sills and the entire frame held together with the tie bars. The side-sills are made to project at each end of the car so as to form bumpers. These are supported by an auxiliary block bolted to the frame and further protected with sheet iron to prevent the ends of the timber being split.

The bottoms and sides of this car are formed of heavy sheet iron to provide for the great wear due to the sharp hard coal, which is often loaded from a chute from 1 to 3 ft. above the car. This style of car being in parts is cheaply and easily repaired when damaged.

Sugarloaf, Penn. Joseph Lawrence.

Drawing Pillars in Machine Mining

Letter No. 7—My attention having been called, only recently, to the inquiry that appeared in *Coal Age*, Jan. 2, p. 32, regarding the drawing back of pillars by machines, allow me to give a brief outline of the method that has worked out very favorably in our mine, where the pillars are drawn back with electric chain machines, in a seam of coal varying from 5 to 8 ft. in thickness. The plan is as follows:

Assuming that the nature of the top and bottom presents conditions that are favorable to the use of machines, and that the rooms are driven on, say 50-ft. centers, giving a good width of pillar sufficient for the support of the roof when retreating, the first step is to drive a crosscut through the pillar, at the face of a room that has reached the limit.

Having cut through the pillar at the face, the machine is moved back and a new cut started in the pillar, leaving a stump of not less than 8 ft. in thickness, between this cut and the last one. This is done for the protection of the machine and the men while making the cut.

When this second cut has been carried through the pillar, the machine is brought around and the protecting stump is cut out, except two small stumps, one at each end, which are left for the protection of the cutter and must be taken out later with picks.

The same process is followed continuously, by making successive cuts through the pillar and removing the stump as each cut is finished, in the manner I have described, until the entire pillar is removed back to the entry stump. When this plan is given a fair trial, I believe it will prove successful under favorable conditions for machine work. Mine Foreman.

Homer City, Penn.

Letter No. 8—I regret that the inquirer, in this case, has not stated the thickness of the pillars, the hardness of the coal, or the nature of the bottom, all of which have an important bearing on the question of drawing back the pillars. One may assume, however, a two-thirds extraction of the coal, which is a common rule in practice; and this would indicate that the rooms were driven on about 40-ft. centers, which would make the room pillars 13 ft. thick.

Now, taking the average weight of material forming the overburden as 160 lb. per cu.ft., the roof pressure due to 200 ft. of cover is $200 \times 160 = 32{,}000$ lb. per sq.ft. This would mean that the pressure on a 13-ft. pillar, with rooms driven 27 ft. wide, would be $32{,}000 \times 40 \div 13 = 98{,}460$ lb., or nearly 50 tons per sq.ft.

Whether the pillars will be able to withstand this pressure will depend chiefly on the crushing strength of the coal, which varies widely with different coals and in different localities. In order to reduce this pressure, there must be a greater width of pillar as compared with the width of the rooms. Also, it will be difficult to draw back the pillar with machines where the bottom is soft, as the heaving of the bottom under the increasing pressure of the pillars would make it impossible to use the machines.

Assuming, however, that the conditions are such as to permit the use of machines, my plan would be to cut through each pillar 10 ft. wide, leaving 10 ft. of solid coal to be mined out with the pick. This work must be done regularly in order to give a good line of fracture. No. 1 pillar should be drawn by cutting through from No. 2 room. The first cut in No. 2 pillar should be made as soon as the second cut in No. 1 is completed.

The roof must be well timbered before starting any cuts in the pillars. When the stump 10 ft. in width has been removed with picks and the timbers drawn, if the roof fails to break, a fall should be started by placing one or more shots in the roof, a short distance back in the gob. It is important to do this in order to prevent the roof from breaking off at the pillar, which it may do later unless a fall is started in the manner I have mentioned. C. McManiman.

Rawdon, Quebec, Canada.

Efficiency in Firebossing

Letter No. 7—A few years ago, I was talking with a foreman who had given up his position, owing to a nervous breakdown caused by overwork. On recovering, he was content to accept a position as assistant foreman. In speaking of this backward step, he said, "Never will I again take a position as foreman where there are a lot

of firebosses who take no interest in any work other than their own. In my last place, I had no help; the firebosses were of no assistance to me and I was forced to keep plugging away, until I broke down under the strain. If I were to assume the responsibilities of foreman again, I would be very particular whom I selected as my lieutenants."

Helpfulness of Firebosses Who Coöperate

Many a foreman has had a similar experience and has succumbed to the arduous duties of his position, because of the lack of helpfulness and coöperation, on the part of the firebosses. Many firebosses are content to think that they have done their whole duty when their morning examination is finished, believing that nothing else is expected of them. But, give me the man who makes his rounds with his eyes open and is willing to cooperate with his foreman in every particular that will assist in making the day's run a success.

Such a fireboss can tell from his observation what coal is loaded and where empties are needed; what places should be timbered or roads cleared of falls and give other information that will assist the foreman in starting work in the mine where it is most needed. Such a one is constantly looking ahead and lending every assistance to keep the wheels turning in the mine.

Many a person who holds a certificate of qualification to act as fireboss has found, on assuming the duties of that position, that he must possess something more than his certificate, in order to successfully carry on the work required of him. The manner in which he performs his duties determines his efficiency as a fireboss. Much will depend on his training. The most successful fireboss is, often, a man who has had several years' experience as a bratticeman, which has taught him the most efficient means of handling gas accumulated in the workings, and what precautions it is necessary to take to insure the safety of the men employed in the mine.

During the last 20 years, I have watched men taken from other occupations, to assume the duties and responsibilities of firebossing, for which their previous training has ill-adapted them. In answer to some of the simplest questions relating to the work they were about to undertake, their words and manner betrayed their ignorance. In regard to some of the conditions they were liable to encounter, they showed that they had not even given the matter a thought.

Intelligent Firebossing Requires Constant Study

The position of fireboss is one in which a man is exposed to danger at all times. He must perform his work conscientiously and fearlessly, both for the welfare of the men in his charge and his employers. The intelligent fireboss will thoroughly familiarize himself with all the features of the safety lamp he uses to make his examination of the mine. He will study the mine map to acquaint himself fully with the requirements in respect to the ventilation of the present workings and the future development of the mine. He must know the requirements of the law and study to make the work conform to its provisions in every respect.

The fireboss who is alert to his opportunities at all times will devote his spare moments to the careful study of questions concerning the work in his charge. He will study these questions both from a practical and a theoretical standpoint. The district to which he has been assigned may be a gassy one, requiring the most careful attention in respect to ventilation and development. The results will show whether or not the man is qualified for the work and the manner of his performance will quickly show his ability to make a good lieutenant, who will coöperate with his foreman.

Another feature, in good firebossing, is a man's ability to handle his men successfully. He must make them understand that he is interested in their welfare. On finding a dangerous condition in a man's place, he must not pounce on the fellow as a catamount would pounce on its prey; but he must take the fellow aside, point out the danger and get him to realize what it means and what he must do to avoid it.

By civil treatment of men as human beings, a fireboss can do more to gain their confidence and have them respect his authority than by any other means. He will thus be able to secure their hearty coöperation and cause them to feel that a place is really dangerous "if the fireboss says so." All this can be accomplished with tact and good judgment, without catering to one and another; and by settling little troubles that arise, without sending for the foreman, which will cause the latter to sit up and take notice that he has a lieutenant that understands his business.

Firebosses the Foreman's Lieutenants

Let me say that any mine foreman who thinks he can run a mine properly without the aid of his lieutenants has an exalted opinion of himself. No wise foreman will bemean his fireboss by sending him to perform work described in the letter of F. G. J., *Coal Age*, Dec. 19, p. 1133, as "carrying bricks." To underestimate the capabilities of a good fireboss shows lack of gumption on the part of the foreman. This would seem to be the case in the citation given in the letter to which I have just referred.

In closing, I will say that a good fireboss is a man who has the initiative to act promptly when an occasion may require. It is that characteristic that will be of great assistance to the foreman. For instance: The morning round being made and the mine reported "O. K.," the men start work loading and blasting coal. A little later, an unfortunate shot has ignited a feeder, and the flame has crept back under the loose coal.

Let us say the miner becomes excited, as the foreman is in a distant part of the mine and can lend no help. But, the alert fireboss is quickly on the scene, and, summoning help, has the loose coal removed and the flame extinguished, thus proving himself a good lieutenant and averting a danger that would have proved serious but for his timely and efficient work.

Again, in the absence of the foreman, in that particular part of the mine, a heavy fall blocks the main road in a certain section. The capable fireboss, once more, shows his efficiency by taking charge and setting men to work to remove the fall and clear the track. Numerous other instances could be cited to show the efficiency of the man with initiative. Suffice it to say that the foreman who is surrounded with such firebosses can go home at night with his mind at ease. He will seldom be the subject of a nervous breakdown because of the strain of continuous overwork.

Kingston, Penn. Lewis R. Thomas.

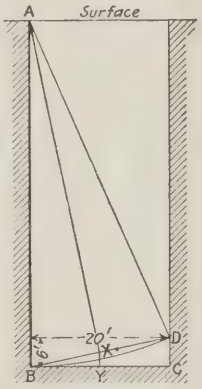
INQUIRIES OF GENERAL INTEREST

Calculating Depth of Shaft

A few days ago my foreman gave me a problem to calculate. As it has been a number of years since I studied trigonometry, I want to ask for the simplest method of solution. He stated that a plumb bob, hung from the top of a shaft that was 20 ft. wide, just reached the bottom, at one side; but when the bob was pulled to the opposite side of the shaft it raised 6 ft. off the bottom. I was asked to calculate the depth of the shaft, from this data. My method by trigonometry, gives this depth as 36 ft. 4 in. Is that correct, and is there a simpler method? STUDENT.

Carlinville, Ill.

It is not necessary to employ trigonometry in this case. The simplest solution is by means of two similar triangles. For example, referring to the accompanying figure, $AB = x$, the depth of the shaft; $BC = 20$ ft., its width; and $CD = 6$ ft., the height the bob rises from the floor when it is pulled to the opposite side of the shaft. Now, the triangle ABD being isosceles, AX, drawn perpendicular to BD bisects the latter and XY is one-half CD, or 3 ft.; and BY is one-half BC, or 10 ft. Then $BX = \sqrt{3^2 + 10^2} = \sqrt{109} = 10.44$ ft.



SECTION THROUGH SHAFT

But, the two right triangles ABX and BXY are similar, having their respective angles equal. Hence:

$$AB : BX :: BX : XY; \quad \text{or } AB = \frac{BX^2}{XY}$$

Then, substituting the given values in this formula, we find for the depth of the shaft,

$$x = \frac{10.44^2}{3} = \frac{109}{3} = 36\tfrac{1}{3}\ ft.$$

The depth of the shaft is therefore 36 ft. 4 in.

Payment for Yardage and Deadwork

I am interested in learning what is the usual practice of coal operators in the payment of their miners for yardage and various kinds of deadwork common to the mining of coal.

At present, I have in mind a coal seam averaging 3½ or 4 ft. in thickness and overlaid with from 4 to 10 in. of slate, above which is 6 or 8 in. of coal. The slate binder and the thin coal above it both come down easily without much shooting and are thrown back into the gob. At times, the rock overlying the wild coal comes down also and must then be handled and stowed in the waste.

Any information that *Coal Age* or its readers can give me, on the general subject of what should be paid for yardage and by what method these prices are determined, will be greatly appreciated. G. STERN.

Frostburg, Md.

The prices paid for yardage and deadwork, in coal mining, are necessarily quite variable, owing to the wide difference in conditions in mines. In any case, the price paid should be based on an agreed valuation of labor and a fair estimation of what would constitute a day's work. It is not to be expected that these matters can be settled and a satisfactory conclusion reached without much prolonged discussion, as the opinions of both employer and employee are more or less biased in favor of their own interests.

In many coal-mining districts, operators have entered into an agreement with their men and the prices to be paid for different classes of work have been adjusted to conform to the known conditions in the mine. In most cases, such an agreement or contract specifies in considerable detail the nature and extent of the work, which is to be performed at a fixed rate or scale of wages and for a specified period. This is the usual case in a union mine; but even where such agreements exist there are many instances of disagreement when the matter in dispute must be arbitrated.

Perhaps, there is no greater difficulty that arises between an employer and his employees than that of fixing a satisfactory price for piecework and yardage. Formerly, all work of that description was commonly done on company time, the miner being paid according to the regular wage scale. But, that did not satisfy him always, as he claimed he could make more money digging coal than by taking down top, lifting bottom or cleaning up roof falls.

Much will depend on the tact and diplomacy of the mine foreman in adjusting a miner's claim for extra time. Such claims are frequently made when a man's place meets a boulder or develops a small roll that thins out the coal. Frequently, a foreman will allow the miner working such a place a keg of powder to compensate him for his extra labor and loss of coal, although every practical miner knows that these troubles are common occurrences in the mining of coal; in other words, they are a part of the game.

By way of summing up this reply, let it be said that, in all cases, the determination of the price that should be paid for labor must be based on an average worker's earning power when performing the task in question. In estimating yardage when driving a 10-ft. heading in a 4-ft. seam, where miners load, an average of 10 tons, at 90c. a ton, thereby earning $10 \times 0.90 =$ $9.00 a day, assuming the heading is driven 1½ yd., the entryman loads, say 7 tons of coal for which he is paid $7 \times 0.90 =$ $6.30, and to equalize his earning power he should receive, as yardage, for handling the refuse over the coal, $(9.00 - 6.30) \div 1\frac{1}{2} =$ $1.80 a yard.

EXAMINATION QUESTIONS

Alabama First-Class Examination, Birmingham, Jan. 20-23, 1919

(*Selected Questions*)

Ques.—A large percentage of mine accidents are caused by miners persisting in loading coal where the roof is unsafe. What rule would you adopt to prevent this condition and reduce the number of accidents?

Ans.—The rule should be adopted making it the duty of every miner to examine carefully the condition of his working place when he first enters the same and before doing anything else. He must observe any marks or danger signs that may have been placed by the fireboss when making his morning examination. If any posts have been knocked out by a blast or a loose piece of top or loose coal is found, it must be made the duty of the miner to reset such posts and stand any other timber that may be required to secure the roof or coal. If loose top or coal is to be taken down, it must be done at once before the miner proceeds to load his coal or do other work.

However, the average coal miner is prone to disregard any rules made for his safety and it becomes necessary, in order to prevent accidents from falls of roof and coal in the working places, to require the frequent and close inspection of all places, by a competent safety inspector or fireboss, while the men are at work. If the fireboss finds a working place unsafe for work when making his morning examination it is his duty not only to place the customary danger signals at all entrances to the place, but also to take the man's check from the board, which will notify the man that he is not to proceed to his work till his place is made safe. All such checks are given at once to the mine foreman, whose duty it is to see that the places of those miners are put in condition for work. No miner must be allowed to proceed into the mine without his check.

Ques.—What method of ventilation lessens the danger of an explosion and, at the same time, reduces friction in a mine?

Ans.—Splitting the air current one or more times so as to ventilate each section of the mine with a separate air split reduces the danger of an explosion occurring in the workings, by conducting the gases generated in each section directly into the main return airway.

This system will make it possible to divide the air between the different sections of a mine according to the need and each section is supplied with a fresh current of pure air traveling at a normal velocity. The frictional resistance of the mine is much reduced and a larger quantity of air is circulated with less power than where a mine is ventilated by a single air current. Also, should gas or dust be ignited in one section, there is less danger of the explosion being propagated throughout the mine.

Ques.—Accidents from blasts and explosions of powder are on the increase. What should be done to reduce them? Answer fully.

Ans.—Where miners are permitted to do their own blasting, strict rules should be made and enforced in regard to the amount of powder permitted to be taken into the mine each day by each man, which amount should be determined by the number of shots the man is to fire that day. This would regulate the charge of powder that is safe to be used. No miner should be permitted to fire a shot or to charge a hole, until the same has been examined by a competent person and found to be safe. Every shot must be fully tamped to the mouth of the hole, with clay and dust taken from the road, or with other incombustible material. No coal slack must be used in tamping a hole. If the mine generates gas no shot must be fired until the place has been examined for gas by the fireboss and pronounced safe for work to proceed.

The safest method to adopt in regard to blasting is to employ competent shotfirers whose duty it is to examine, charge and fire all holes drilled by the miners. The work should be done after the men have left the mine, and plenty of time should be given for its proper performance. No shotfirer should be given charge of a section so large that he is obliged to hurry the work in order to complete his task in the specified time. The work of firing shots must be started on the last of the air and proceed in regular order against the air current. Suitable penalties should be enforced for any violation of the rules and regulations regarding blasting in mines.

Ques.—If the ventilation of a mine is insufficient how may it be increased without increasing the power?

Ans.—In order to increase the circulation in a mine or airway without increasing the power on the air, it is necessary to clean up the airway and remove all obstructions to the passage of the air current. All breakthroughs in rooms and entries must be enlarged to the full section of the airway and kept free of any obstructions, such as the presence of tool boxes, which are too often set in a crosscut to be out of the way of moving cars and where they will not be hit by flying coal or injured by falling roof.

Wherever possible, the distance that the air must travel must be shortened. Where the air can be split without reducing the velocity below what is required to properly ventilate the working places, this should be done to reduce the resistance and provide better ventilation with the same power.

Ques.—How many cubic feet of air will pass per minute along an airway 6 ft. high and 10 ft. wide, the velocity being 450 ft. per min.?

Ans.—The sectional area of this airway is $6 \times 10 = 60$ sq.ft.; and, assuming the average velocity of the air current as 450 ft. per min., the quantity of air passing is $450 \times 60 = 27{,}000$ cu.ft. per min.

FOREIGN MARKETS AND EXPORT NEWS

The Coal Situation in France

The whole of the French industrial situation hinges on the question of coal. For four years it constituted one of the most vital issues of the war, and now, in the face of an important era of reconstruction, it is destined to play a dominant part in the changing economy of the nation.

The position of France as regards the extent of coal deposits is shown in the following estimates of the International Geological Congress held at Toronto in 1913:

	Tons
United States	3,800,000,000,000
Germany	423,000,000,000
England (including 13,000,000,000 tons of lignite)	190,000,000,000
France	18,000,000,000
Belgium	11,000,000,000

In 1913 the production of coal of the leading countries was as follows:

	Tons
United States	562,595,000
England	292,202,000
Germany	278,627,000
Austria	43,800,000
France	40,844,000
Belgium	22,858,000

Although France ranks high among the great nations in the abundance of its deposits and in the quantity of coal produced per annum, its position is far less favorable when the proportional extent of domestic needs is considered. For instance, in order for the annual production to bear the same relation to the population as that which exists in Belgium, France would have to increase its annual output from 40,000,000 tons to about 200,000,000 tons.

The exploitable coal resources of France contained in deposits lying at a depth of not more than 1200 meters (3937 ft.) are estimated as follows:

	Tons
North (Pas-de-Calais)	9,500,000,000
St. Etienne	685,000,000
Alais	958,000,000
Fuveau (lignites)	1,300,000,000
Center	700,000,000
Total	13,143,000,000

By going to a depth of 1800 meters (5905 ft.) this total may be increased to 71,600,000,000 tons. As the aspiration of France is apparently to increase its production to 100,000,000 tons per annum, it will be seen that the above resources would at that rate be totally exhausted in about 150 years.

The situation in 1913, the last complete calendar year before the war, was as follows:

The French exports in 1913 were: Coal, 1,114,000 tons; coke, 205,000 tons; and briquets, 124,000 tons; making a total of 1,443,000 tons. Calculating the value of coke and briquets in terms of coal, the total exports for 1913 reached a figure of 1,500,482 tons, which may be generally accounted for by local reasons.

The imports of coal, coke, and briquets in 1913 and the amounts from each country were:

From	Coal, Tons	Coke, Tons	Briquets, Tons
England	11,257,000	10,000	175,000
Germany	3,491,000	2,393,000	188,000
Belgium	3,670,000	547,000	642,000
Other countries	293,000	120,000	81,000
Total	18,711,000	3,070,000	1,086,000

The consumption in 1913 according to industries was as follows:

	Tons
Metallurgical industries	12,545,000
Domestic heating	11,979,000
Railways	9,069,000
Mining	5,054,000
Gas factories	4,656,000
Merchant marine	1,720,000
Various industries	19,811,000
Total	64,834,000

It will thus be seen that the annual deficit was so considerable as to make the country dependent upon foreign markets for 37 per cent. of its supply. According to customs statistics the cost of these imports amounted to $111,168,000.

But the mere fact of being compelled to import in such large quantities is not of itself the most serious element involved. Such imports are attracted by a scale of prices which places France at a considerable disadvantage compared with the other competing countries of western Europe.

The average value per ton of French coal at the mouth of the mine for the three years preceding the war was as follows: 1911, $2.94; 1912, $2.99; 1913, $3.20.

As compared with the values current in the neighboring countries for 1912, the following differences are noted: England, $2.17; Germany, $2.54; France, $2.99; Belgium, $3.19.

Assuming that this relative proportion governs and is maintained in the selling price, it may be observed that the industries of France purchased their coal at the mine at prices 38 per cent. higher than those in England and 18 per cent. higher than those in Germany.

From the foregoing figures it might appear that France is more advantageously situated than Belgium as regards the price of coal, owing to certain difficulties of extraction in the latter country. This, however, is not the case, for whereas the foregoing values, except for a slight discrepancy, represent the average prices at which industries in England, Germany and Belgium actually purchased the coal which they consumed, the price in France is governed by the scale of its extensive imports and not by the relative value of domestic coal at the mine.

There is an import duty of $0.23 per ton on foreign coal. In 1912 the average price of foreign coal at the port of arrival after the payment of customs duty was $4.97. As this price applied to approximately one-third of the total amount of coal consumed, the average price of the aggregate was thereby raised to $3.67, which is in reality the figure to be employed in the foregoing comparisons.

Calculated on this basis it will therefore be seen that in 1912 the average price of coal as compared with the price in other countries was in reality much higher than it might appear to be.

Effect of the War on Production

Such, in brief, was the coal situation in France before the war. The German invasion in 1914 immediately cut off 24 per cent. of the mines of France by placing the rich regions of the Nord and of the Pas-de-Calais either in the occupied territory or in the army zone reserved for military operations. This deprived France of more than 50 per cent. of its coal production, the annual output of the invaded Departments of Nord and Pas-de-Calais amounting to 27,389,307 tons according to the statistics for 1913.

In addition to this, France suddenly found itself cut off from two of its principal outside sources of fuel supply (Belgium, 5,000,000 tons, and Germany, 7,000,000 tons), and rendered almost wholly dependent upon the aid of England for the fuel essential to the continuance of its industrial activities. The mines remaining in French possession had a productive capacity in normal times of some 19,000,000 tons, or about 1,600,000 tons per month. The possible length of the war being discounted and the tremendous extent to which its demand would tax the industrial resources not being realized, miners were mobilized with the army. The result was general disorganization and a decrease in production of the few remaining French mines of 60 per cent.

No sooner was this error recognized than steps were taken to withdraw the miners from the front. Refugee miners from the invaded regions were enrolled, and by March, 1915, the normal production of all mines remaining in French possession was virtually restored. The labor necessary to accomplish the effort made by France in the pressing matter of coal production during the war was secured through the demobilization of 50,000 French miners and the utilization of 14,000 enemy prisoners of war. The following scale of production shows the practical results obtained from this effort: January, 1915, 1,532,000 tons; January, 1916, 1,676,000 tons; December, 1916, 1,861,000 tons; October, 1917, 2,783,000 tons.

Comparative Output for 1913-1918

A more elaborate comparison gives a much clearer conception of these results, so gratifying and so promising to the French people, and affords a better understanding of the deplorable situation during the first six months of the war:

Mines	1913 Tons	1914 First Six Months Tons	1914 Second Six Months Tons	1915 Tons	1916 Tons	1917 Tons	First Ten Months of 1918 Tons
Mines of Nord and Pas-de-Calais (invaded)	27,389,307	9,226,227	.....	.....	.....	.....	.....
Mines of Nord and Pas-de-Calais (not invaded)		1,331,241	1,981,399	7,382,292	8,195,025	11,450,463	6,587,250
Other mines	13,454,911	5,567,646	5,461,745	12,150,571	13,115,040	17,441,240	15,730,570
Total production	40,844,218	19,125,114	7,443,144	19,532,863	21,310,065	28,891,703	22,317,820

Coal Shortage Relieved by Imports

Imports on which the nation so widely depended were pushed with equal vigor, Belgium and Germany having been lost as sources of supply. The following table illustrates the manner in which the problem of the importation was met:

Year	From England Tons	From Belgium Tons	From Germany Tons	From United States Tons	From Other Countries Tons	Total Tons
1913	11,257,431	3,659,669	3,482,287	.....	293,736	18,693,123
1914	10,759,058	2,032,099	2,477,735	.....	161,366	15,430,258
1915	18,918,203	45	737	145,398	3,355	19,067,738
1916	18,711,125	14	.....	53,883	9,701	18,774,723
1917	15,848,734	16	247	57,136	2,135	15,908,268

For some time Parliament has been reluctant about granting new coal-mining concessions, and for the past 10 years has granted none at all. This has discouraged coal prospecting and prevented the possible opening up of new mines in regions where workable deposits had been found to exist. The attitude of Parliament is inspired by objections to the mining law of 1810 which provides for the granting of concessions in perpetuity without any participation on the part of the government in the profits of the mines. A bill is now being debated which purports to amend these features of the statute by limiting concessions to 99 years and by providing for government participation in the profits.

According to the gist of the debates it is believed that such a bill would greatly encourage mine development and would afford an effective means of encouraging artificially the working of small mines as well as of those where extraction is difficult.

In addition to the above measures the utilization of inferior, or secondary, fuels is being strongly urged. France is rich in peat, and lignite exists in appreciable quantities. It is estimated that with proper encouragement these resources could be made to contribute largely to the saving of coal.

Netherlands Short of Coal

The nonarrival of British and German coal during the month of December, 1918, writes Commercial Attaché Paul L. Edwards, The Hague, under date of Jan. 5, 1919, has reduced the stock of coal in the Netherlands to such a low point that drastic measures are to be instituted to reduce the consumption of coal during the month of January, 1919. It is hoped that before February coal will arrive from the United States and from England, says Mr. Edwards, and that permanent arrangements will be made for Belgian or German coal. If not, the train service will be considerably reduced on Feb. 1.

The city of Amsterdam put into force on Jan. 6 the following regulations, with a view to saving electricity: Cafés, restaurants, shops and stores were to use only half as much electricity as they had been allowed since Oct. 30 last. Private residences were to reduce the use of electricity to 65 per cent of the amount used in November, 1918. All factories, etc., were to reduce their consumption of electricity to 65 per cent.; furthermore, they were not to use any electrity whatever for industrial purposes between 4 p.m. and 10 p.m. This restriction in hours did not apply to factories engaged in the preparation or manufacture of foodstuffs; such factories could recommence the use of electricity at 6 p.m., and the amount of electricity which they could use would be determined by the State Coal Bureau.

The "Maasbode" of Jan. 4 stated that the Netherlands Minister of Foreign Affairs was to send a representative to Brussels on Jan. 6 to endeavor to conclude the arrangement for the exchange of Belgian coal for Dutch milch cows. It is understood that Holland is also to offer about 10,000 work and army horses for an additional amount of coal.

During the week ending Jan. 5, 1919, 7000 tons of coal arrived from Germany, but this was to be used expressly to replace a similar amount of coal that was borrowed for the purpose of bunkering vessels that are taking Russian prisoners to Danzig. It is understood, however, that negotiations are being carried on with the Germans to secure the monthly import of 40,000 tons from the Ruhr district. The Algemeen "Handelsblad" of Jan. 4 stated that the first train to bring coal under this proposed arrangement would arrive on Jan. 7, and that thereafter there would be two coal trains regularly each day, providing unexpected transportation difficulties did not interfere.

Sweden offers American exporters of coal a market for steam coal. Those interested should communicate with Consul Wallace J. Young, Goteborg, Sweden.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Feb. 17	Amer. S.S. Lake Agomak	Barbados, B. W. I.	2,920	517
Feb. 17	Dan. Bk. Ternen	Rio de Janeiro, Brazil	1,545	
Feb. 17	Jap. S.S. Tsurugisan Maru	San Francisco, Cal	4,770	395
Feb. 17	Nor. Bk. Dagny	Rio de Janeiro, Brazil	1,748	
Feb. 19	Nor. Bk. Olive Bank	Rio de Janeiro, Brazil	3,374	
Feb. 21	Am. Sc. Harry G. Deering	Rio de Janeiro, Brazil	2,120	
Sewalls Point				
Feb. 15	Br. S.S. J. A. McKee	Papudo, Chile	1,776	395
		Los Vilos, Chile	1,000	
Feb. 18	Amer. S.S. Saguche	Mejillones, Chile	6,728	
Newport News				
Feb. 14	Nor. S.S. Sangstad	Rio de Janeiro, Brazil	2,956	945
Feb. 18	Amer. S.S. Lake Fondulac	Antilla, Cuba	3,131	356
Feb. 20	Nor. Bk. Skansen I	Rio de Janeiro, Brazil	3,185	

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Feb. 24 states that the demand for steamers to carry coal to South American ports is still very urgent, and there are few free boats available. South American shippers will now also entertain sailing vessels at the Chartering Committee's maximum rates, if tonnage is not too far distant. West Indian coal freights are also showing renewed activity after a long period of dullness. All recent fixtures have been at the Chartering Committee's maximum rates, which are as follows:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net, Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates). On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Range, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net; with 1000 tons dis. to Rio, $19.50 net, 1000 tons dis., or $21,600 tons dis. to Santos, $18.50 net, 1000 tons dis. to Buenos Aires, and $19.50 net, with 750 tons dis. to Montevideo.

Swedish Concern Wants Coal from America

It is reported by an American consular officer that a company in Sweden is desirous of purchasing American coal and coke. Correspondence with the Swedish firm may be in English. Reference. The address may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its district offices, and asking for information on Opportunity No. 28,525.

United States Supplies Bulk of Brazilian Coal

The war has changed Brazil's import trade in coal, which was formerly entirely in the hands of Great Britain, to the United States. Of total imports valued at $23,343,069 in 1917, the United States supplied $19,087,107 worth. Although the c. i. f. value of the coal imported increased from $18,651,927 in 1916, the tonnage decreased from 1,024,487 tons in 1916 to 818,327 tons in 1917, the average price having risen from 75 to 114 milreis ($18.75 to $28.50) per ton. While the United States at present controls the coal trade, under the present selling methods it seems improbable that this trade will be retained. Although they have had four years of opportunity, not one of the important coal companies of the United States has found it expedient to establish a permanent coal depository, which is largely the secret of British success in this market in the past. The imports of coal briquets declined to an insignificant value of $137,046.

Exports of Anthracite and Bituminous Coal and Coke, by Customs Districts and Countries—December, 1918

(Compiled by Bureau of Foreign and Domestic Commerce)

Customs Districts	To	Anthracite, Tons	Bituminous, Tons	Coke, Tons
Maine and New Hampshire	Canada	3,541	.....	55
Vermont	Canada	1,754	2,060	65
Massachusetts	Canada	75	.....	.....
	Newfoundland	20	195	.....
St. Lawrence	Canada	87,298	169,433	1,412
Rochester	Canada	15,490	59,132	230
Buffalo	Canada	177,799	297,616	38,819
New York	France	.....	.....	2,530
New York	Italy	260	.....	.....
New York	Canada	3,285	.....	.....
New York	Newfoundland	1,039	.....	.....
New York	Salvador	.....	.....	22
New York	Barbados	10	.....	.....
New York	Cuba	10	.....	.....
New York	Virgin Islands	.....	.....	5
New York	Fr. W. Indies	.....	.....	3
New York	Santo Domingo	.....	1,193	3
New York	Argentina	.....	.....	17
New York	Brazil	.....	.....	10
New York	Chile	.....	.....	39
New York	Colombia	10	10	10
New York	Uruguay	.....	.....	55
New York	Venezuela	.....	10	.....
Philadelphia	Cuba	1,003	1,032	.....
Philadelphia	Uruguay	.....	2,155	.....
Maryland	Cuba	.....	7,074	.....
Maryland	Brazil	.....	2,895	.....
Maryland	Chile	.....	.....	3,378
Maryland	Peru	.....	.....	1,405
Maryland	Uruguay	.....	20,934	.....
Virginia	Netherlands	.....	16,512	.....
Virginia	Bermuda	.....	349	.....
Virginia	Barbados	.....	1,719	.....
Virginia	Jamaica	.....	5,630	.....
Virginia	Other Br. W. Indies	.....	2,640	.....
Virginia	Cuba	.....	76,995	35
Virginia	Virgin Islands	.....	1,538	.....
Virginia	Dutch West Indies	.....	3,113	.....
Virginia	French West Indies	.....	2,785	.....
Virginia	Santo Domingo	.....	2,621	42
Virginia	Brazil	.....	19,079	.....
Virginia	Chile	.....	13,321	.....
Virginia	Uruguay	.....	18,269	.....
Virginia	Canary Islands	.....	6,531	.....
Virginia	Portuguese Africa	.....	5,908	.....
South Carolina	Cuba	.....	868	.....
Georgia	France	.....	1,128	.....
Georgia	Cuba	.....	1,620	.....
Florida	Cuba	.....	2,190	.....
Mobile	British Honduras	.....	13	.....
Mobile	Guatemala	.....	.....	25
New Orleans	Guatemala	.....	10	.....
New Orleans	Honduras	.....	385	.....
New Orleans	Nicaragua	.....	184	.....
New Orleans	Panama	.....	6,000	.....
New Orleans	Mexico	.....	9	35
San Antonio	Mexico	72	210	2,145
El Paso	Mexico	.....	2,905	1,385
Arizona	Mexico	.....	6,703	13,598
Southern California	Mexico	1	9	.....
San Francisco	Guatemala	.....	.....	3
San Francisco	Mexico	.....	.....	10
Washington	Canada	.....	192	970
Washington	Chile	.....	2,500	.....
Hawaii	British Oceania	.....	3	.....
Dakota	Canada	20	859	280
Duluth and Superior	Canada	32	437	25
Michigan	Canada	79	186,677	19,791
Ohio	Canada	16	186,804	5,698
Totals		292,014	1,140,455	93,100

COAL AND COKE NEWS

What Happened in January

[The bracketed figures in the text refer to pages in the present volume and should the reader desire further information he can obtain it by reference to the pages indicated.]

Jan. 1—The United States Fuel Administration removes all limitations on the duration of contracts for coal and coke made under order of Dec. 25, 1917, with amendment of July 26, 1918—United States War Department commences to handle its own coal requirements without reference to Fuel Administration—Men of Marvine colliery, of Hudson Coal Co., return to work [XV, 152].

Jan. 2—The United States Fuel Administration announces that it has induced the carbon-black manufacturers of Grantsville, W. Va., to cease using the natural gas of West Virginia for that purpose but to operate in Wyoming and Louisiana where gas cannot be otherwise utilized. This will save 15,000,000 cu.ft. of gas and 5000 gal. of gasoline per day—John E. Williams, Federal fuel administrator for the State of Illinois, dies at his home in Streator, Ill.

Jan. 3—Fire at the plant of the Steele Coal Co., Mossy Bottom, near Williamson, W. Va., destroys store and office buildings and causes a loss of $20,000.

Jan. 4—General March states that 6000 anthracite coal miners have been ordered released by the army [XV, 151]—Frank E. Harkness made Solicitor of United States Fuel Administration.

Jan. 5—George H. Cushing, since 1907 editor of the "Black Diamond," becomes managing director of the American Wholesale Coal Association—Practically all restrictions upon the sale and shipment of bituminous coal for bunkering purposes at points north of Cape Hatteras removed by order of United States Fuel Administration.

Jan. 7—Director of Railroads makes report to President in which he declares that the zoning law greatly helped the railroads in meeting the demands of the nation for transportation [XV, 150]—House of Representatives passes lignite bill, providing funds to determine the commercial practicability of using lignite in producing fuel oil, gasoline substitutes, ammonia, tar, solid fuels and gas for power and other purposes [XV, 191].

Jan. 8—George R. Sheldon, treasurer, Republican National Committee and director of the Union Colliery Co., is seriously injured at Dowell, Ill., by being crushed between a trip and the coal rib. Dies Jan. 14.

Jan. 9—Strike of 16,000 marine workers ties up more than 1000 boats in New York Harbor, causing railroad embargo —Burning natural gas in flambeaux, for outside light in daylight hours in inefficient apparatus, in larger quantity than needed, or in any manner not making efficient use of fuel, is forbidden.

Jan. 10—All fuel conservation provisions of Fuel Administration withdrawn, except those relating to waste of natural gas by free consumers or by inefficient appliances or through carelessness [XV, 165]—Restrictions on domestic and foreign shipments of egg and pea size of anthracite removed, though chestnut and stove continue to be restricted [XV, 165].

Jan. 14—The Cleveland & Western Coal Co. is fined $1000, to be paid to the Red Cross, for disposing of coal shipped to the McKinney Steel Co. for byproduct coke oven use. When the steel company said it had no need for the coal the coal company sold it to local consumers in violation of the zoning order—Explosion of gas at No. 9 mine of Pennsylvania Coal Co. seriously burned three men [XV, 209].

Jan. 15—Southport Miners' Federation demand that British Government demobilize all miners in army and require that corporations give them an increase in wage of 30 per cent. [XV, 210].

Jan. 16—Strike at Oneida colliery of the Lehigh Valley Coal Co., near Freeland, Penn., about the discharge of a careless man [XV, 193]—Store building and several dwellings of Standard Island Creek Coal Co., at Taplin, W. Va., are destroyed by fire [XV, 252].

Jan. 17—Fuel Administration announces that on Feb. 1 all district representatives would cease to function except for the purpose of preparing records of the work done to Jan. 31 [XV, 191]—Lawrence Mitchell, assistant business manager, is made property custodian of the Fuel Administration—Orders of May 16 and July 16, 1918, are suspended by Fuel Administration. These orders prohibited selling, shipping, delivering or distributing smokeless coal received at Lake Michigan or Lake Superior docks except for making illuminating gas, byproduct coke or coal briquets or other purposes designated by Fuel Administration—Coke and all coal, except Pennsylvania anthracite, is relieved of price restrictions and zoning rules. Filing of contracts with Fuel Administration is no longer required [XV, 191]—Director General of Railroads declares that Railroad Administration is not trying to force down coal prices [XV, 191]—Norfolk and Angle Tipple of Pocahontas Fuel Co. destroyed by fire [XV, 252].

Jan. 18—Strike for minimum wage at Heidelberg collieries, Nos. 1 and 2 ends Jan. 27 [XV, 238, 284]—Two men fatally burned in an explosion of gas at No. 2 shaft, Alden Coal Co. [XV, 252].

Jan. 20—Mine fire prevents six men from escaping from Mt. Braddock mine of the W. J. Rainey Co., Mt. Braddock, Fayette County, Pennsylvania. Two men lose lives in rescue work. The six men are ultimately rescued on Jan. 24 [XV, 252, 272].

Jan. 21—Harold B. Harris appointed Custodian of Records, Fuel Administration [XV, 237]—Cage in Hammond colliery shaft near Shenandoah frees itself of the guides and tears timbers loose so that they fall to the shaft bottom [XV, 252] —No. 5 breaker, of Hudson Coal Co., destroyed by fire [XV, 252].

Jan. 22—Fuel Administration decrees that all orders for the requisition of coal and coke are cancelled and annulled from Jan. 31 onward [XV, 236]—Fuel Administration announces that the Bureau of Labor, which works under the Fuel Administration, will continue its existence till the close of the war [XV, 238]—Employees of Yorkshire, England, mines, numbering some 150,000 men, go on strike for an extra 20-min. lunch time [XV, 239].

Jan. 23—Convention of miners in Winding Gulf field meets at Beckley, W. Va., to discuss a new wage scale which, as decided on by the convention shall give 12c. per ton more to miners and $1.50 to $1.75 per day to day workers [XV, 239].

Jan. 24.—George E. Howes is appointed historian of Fuel Administration.

Jan. 28—Shipping rates from the United States to the United Kingdom, Havre, Bordeaux, Antwerp, Rotterdam, Marseille, Cette, Genoa, Naples, Colombo, Calcutta, Rangoon and Madras reduced by British Ministry of Shipping roughly two-thirds—The ratification of the Prohibition Amendment to the United States Constitution is officially announced by the Secretary of State.

Jan. 29—War Trade Board announces that the government of Great Britain will on Mar. 1 prohibit the importation of specified classes of manufactured goods from the United States—Mine workers open coöperative store in Shenandoah [XV, 284]—Three miners are killed by the explosion of a pocket of gas at Goodyear Mine, Smoky Run, in Clearfield County, Pennsylvania [XV, 295].

Jan. 31—Treasury Department and Department of Interior reassume control of the supply of their coal requirements without reference to Fuel Administration—Order of requisition for coal and coke are annulled—Maximum prices for anthracite suspended, also all other coal and coke regulations but three [XV, 282].

Harrisburg, Penn.

Senator Albert Davis of Lackawanna has introduced in the Senate a bill aimed at remedying the mine cave conditions as they exist in Scranton and the immediate locality. The bill was drafted by Draper Lewis, former dean of the school of law, University of Pennsylvania.

The bill makes it unlawful to mine or remove coal as to cause the collapse of any public building or structure used as a place of resort, assemblage or amusement, including churches, schools, hospitals, theaters, hotels and railroad stations, also streets, highway roads, bridges or other public passageways, any tracks, roads, pipe lines, wires or other facilities used in the service of the public by any municipal corporation or public service company as defined by the public service company law.

Persons upon conviction of violation of the first provisions will be subject to fine not exceeding $5000, one year's imprisonment, or both, at the discretion of the court. Every president, director, general manager, superintendent or other person having supervision over any mine or mining operations, who wilfully participates in or connives at any violation of any of the provisions will be liable to the penalties.

A subsidence of the surface will constitute prima facie evidence and prosecution for violation of the act may commence at any time within two years from the time the subsidence appears on the surface. A threatened violation of the provisions may be restrained by an injunction. If one section of the Lewis act is declared unconstitutional it will not affect the other provisions of the measure.

The bill drawn up by Dr. Lewis differs greatly from the bill which Senator Davis intended introducing, which was the one got up by the Scranton Surface Protective Association. Probably the most radical difference is that the measure takes in all coal operations, whether it be anthracite or bituminous. The Surface Association bill specified anthracite operations alone.

As the bill includes all coal-mining sections in its provisions, there will be a greater number of representatives and senators interested in it during its course through legislative channels. It is understood that arrangements are already being made for a public hearing on the bill. This will in all likelihood be held within a month.

Senator Crow has introduced a bill which provides that the Secretary of Internal Affairs be made the custodian of all deeds, contracts, maps, surveys and other documents or instruments relating to the titles of real estate owned or hereafter to be acquired by the Commonwealth.

Charleston, W. Va.

Coal production has grown less and less in West Virginia, making it certain that February would prove to be one of the poorest months in recent years in point of production. From the first of February, when so many companies shut down their mines, until the latter part of that month many mines in addition were closed down because of lack of orders. Inasmuch as most of the mines of the state are not operating on more than a 25 per cent. basis, that means of course that they are being operated on an average of only one or two days a week. Idleness so prevalent throughout the coal fields of West Virginia has been relieved here and there by orders, but a resumption in such instances has been more than met by a suspension of operations at the plant of other companies.

Throughout all the depression so much in evidence in recent months producers of coal in West Virginia have not yielded in price, and during the week ending Feb. 22 except in rare instances coal prices were being maintained. Coal men know that in the course of the next 30 or 60 days business will pick up, because at this moment

coal is being used faster than it is being mined. For that reason it is freely predicted that there will be a slight improvement in the demand by Apr. 1 and that by July 1 there will be a general resumption of trade.

In West Virginia just at this time demurrage costs are cutting a considerable figure, not only because of the high demurrage rates, but because of the gamble indulged in by many operators in loading empties at their disposal and trusting to the receipt of orders sufficient to utilize the cars loaded. There have been brought to light several instances recently where small operators have had stiff demurrage bills to meet because of the producer taking a chance on getting orders.

One Virginian field operator finds high ocean rates and excessive demurrage rates operating to clog the wheels of the mining industry. He happened to have a personal interest in a recent demurrage case where one car in excess of the number ordered was shipped to the South and refused by the consignee. The car being on a branch line, it was found difficult and even impossible to get rid of it. After the consignor had been attempting for some time to dispose of the extra car of coal, he was notified by a railroad company of the high rate of demurrage running against the unloaded car. The only way the consignor was finally able to get rid of the car was by giving it away and by paying the donee $60 for unloading it in addition to demurrage charges of $123.80 and the expense of the trip. With ocean rates high and with strikes in swing in so many South American points, the Virginian field operator pointed out the futility of trying to market coal in South America at the present time.

New York, N. Y.

Samuel B. Crowell, who was the retail coal-dealer advisor on the staff of Federal Fuel Administrator Garfield, at the meeting of the New York State Coal Merchants' Association at the Hotel Pennsylvania, New York City, on Feb. 27, said that cooperation of the three branches of the coal trade is most essential; that is to say, between the operator, the jobber and the retail distributor.

The association adopted resolutions protesting against amendments now pending in the State Legislature to the workmen's compensation law, and to the bill to establish a system of compulsory health insurance for the benefit of the employees and their dependent families, which requires the employer to contribute in all cases not less then 50 per cent. of the cost of the insurance, and in some cases three-quarters or the whole of it.

Arthur F. Rice, Commissioner of the Coal Merchants' Association of New York, predicted that coal prices will come down, but that the most optimistic man cannot expect to see this done at once. There must be a rather gradual reduction in the cost of labor and materials first. That the readjustment will and must come is certain; and the indications are that it is not far off.

Other speakers included Harry T. Peters, of Williams & Peters, and S. Brinckerhoff Thorne, of Thorne, Neale & Co., who was a member of the Fuel Commission sent to Europe by the U. S. Fuel Administration last October.

Failure of the marine workers and boat owners to come to an agreement resulted in a strike order being issued by the workers late on Monday of this week, involving about 16,000 men. If effective it would result in a complete tying up of the tugs and barges in the New York harbor. At the time the order was issued it was said that the only exemptions would be army transports and hospital ships returning from France with soldiers. The strike order became effective at six o'clock Tuesday morning.

The men stopped work several weeks ago when their demands for an eight-hour day and wage increases were refused by their employers. At that time President Wilson instructed the War Labor Board to take hold of the situation and the men returned to work pending a hearing conducted by the Government. Subsequently the entire matter was referred to V. Everit Macy as umpire, and last week he handed down his decision granting the workers an eight-hour day, but without increased pay.

The men did not take kindly to the award and resumed their strike talk with the result that after several conferences the private boat owners organization on Monday of this week made three concrete propositions as follows: That the workers accept the Macy award; That the workers accept a wage increase (amount not stated) and working conditions remain as they now are; that the workers deal with the private boat owners and create a joint board to adjust their differences.

PENNSYLVANIA

Anthracite

South Scranton—Coal underlying the Daniel Webster and Wendell Phillips school buildings has been purchased by the school board at a cost of approximately $1000, according to deeds recorded. The coal in place was purchased for 35c. a ton. In selling the coal, the company stipulates several reservations, among them being that the Delaware, Lackawanna & Western, Coal Department, has no right to remove the coal, but that the company is allowed to make tunnels and passages and that they they shall incur no liability whatever from damages which may occur from caves or any other cause.

Minersville—The Oak Hill colliery, which has been idle for three weeks because of the dullness in the anthracite business, resumed operations on Feb. 26, giving employment to 800 men and boys. Another indication of revival in the anthracite business is the development of a big tract of coal land at Port Carbon, begun on Feb. 25. There are millions of tons of coal in this tract. The big Westwoods culm banks, owned by the Philadelphia & Reading Coal and Iron Co., have been leased to George Keiser, a well-known independent operator, and preparations have begun for the immediate marketing of the half million tons of coal there. These banks were deposited in 1860 and are rich in pea coal and nut coal, while the river nearby makes the work of washing easy.

Hazleton—M. S. Kemmerer & Co., operators of Sandy Run Colliery, have suspended operations and are taking out their pumps and mining equipment. The store has been closed and all work stopped. The mining conditions at this colliery have been unfavorable for some time, a squeeze having made coal recovery very expensive. Many of the suspended miners have found work with the G. B. Markle Co. and are removing their families to Freeland. Stripping contractors look forward to a prosperous summer season, although at present, their equipment is idle. The Lehigh Valley Coal Co. will strip the basin, between its Spring Brook and Spring Mountain collieries. The newly organized Raven Run Coal Co. is reported to have a stripping proposition under consideration at Raven Run.

Jeddo—The Mexicans employed by the G. B. Markle Co. at this place have nearly all left. The management announces that no more will be employed.

Scranton—The Lackawanna Coal Co. closed two of its collieries at this city and will prepare the coal at other breakers due to the cheaper underground haulage cost.

St. Clair—The Buck Run Coal Co. (Neale & Thorne) has taken over the Ellsworth colliery of G. M. Keiser, located near this place. The colliery is on a Philadelphia & Reading Coal and Iron Co. tract, and consists of a small breaker and washery, with a capacity of 300 tons per day.

Scranton—In the producing of 10,027,901 tons of coal in the fifth, sixth and seventh inspection districts of Lackawanna County during 1918, 60 men lost their lives, 133 were injured, 55 wives were widowed and 146 children orphaned. The number of tons produced per fatal accident, inside and outside, was 460,212, and the number of persons employed per fatal accident was 827. Reports from the remaining four districts have not been compiled.

Taylor—Satisfied that the company was negligent in not providing a safety block at the head of the shaft, a coroner's jury, sitting at an inquest into the death of the two men killed in an accident at the Greenwood shaft of the Hudson Coal Co., place responsibility for the accident upon the coal company. Witnesses testifying at the inquest stated that a headblock at the head of the shaft had been removed two months ago, and had not been replaced. Two men were killed and two others seriously injured when two runaway mine cars crashed into the mouth of the shaft, falling down upon the cage on which the men were riding.

Wilkes-Barre—A mine fire on No. 13 plane, Baltimore vein, that had gained considerable headway in the South Wilkes-Barre No. 5 colliery of the Lehigh and Wilkes-Barre Coal Co., was discovered on Feb. 21, and after attempts to put the fire out by means of water and other materials had failed to check it, that portion of the mine where the fire is raging was sealed up on Feb. 23. A concrete wall has been placed at all openings leading to the fire. This wall will have to remain for an indefinite period before it can accomplish its purpose. The fire will in no way interfere with the output of the colliery.

Freeland—The East Point Coal Co., operator of the Pond Creek colliery near Freeland, Penn., has closed its mine for an indefinite period. Three hundred men are made idle by the suspension. The Spring Brook and Spring Mountain operations of the Lehigh Valley Coal Co. have been completely shutdown. The mules have been hoisted and their shoes taken off; foremen are manning the pumps. Lumber is on hand to repair the Spring Mountain breaker. The union officials are much concerned over the idle mine workers, and consulted with General Manager Thomas, who promised them early action.

Bituminous

Vintondale—Etta Gibson and others have sold the coal underlaying a tract of 112 acres in Buffington township, Indiana County, to the Vinton Land Company, a subsidiary of the Vinton Colliery Co. The consideration was $10,722.65.

Savan—The Dor-Mar Coal Co. put its new plane and tipple into commission last week and is now loading coal from one of its mines on the John Hamilton farm. Work has also been started on a new opening in the Upper Freeport vein and the first timbers were put into place the same day the new tipple was put into commission. Both mines will load over the same tipple. Shipments are made over the Buffalo, Rochester & Pittsburgh Railroad.

Hollidaysburg—For several months the Allegheny Water Co. has had an injunction against the Russell Coal Co., of Altoona, to prevent the latter from constructing a tram road and tipple on a portion of the watershed which supplies the City of Altoona with water. The building of the tram, which would be about 3000 ft. in length, would shorten the coal haul to Altoona by about six miles and put the coal on the Buckhorn Pike only three miles from the city. The court succeeded in bringing the two companies to an agreement by changing the proposed tram road to another point. This was agreed to by both companies and will operate to better advantage for both parties. The tram will be constructed immediately and will relieve Altoona of any future coal shortages. Electric locomotives will be installed in the mine and on the outside tramroad.

Indiana—According to the annual report of Mine Inspector Thomas S. Lowther, of the 25th district, for the year 1918 there were 6,191,735 net tons produced, of which 6,082,332 were shipped to market. There are 65 mines in operation employing 5758 men; six of these mines are new operations opened during the year. There were 16 fatal accidents, 14 being inside the mines and two outside. There were 386,983 tons of coal produced and 360 men employed per fatal accident. There were 89 non-fatal accidents, 79 of which were inside the mines. There were 65 persons employed per non-fatal accident. All the mines of the district are in Indiana County. The largest producer was the Jefferson and Clearfield Coal and Iron Company with a production of 1,894,776 tons and the Pittsburgh Gas Coal Co., second, with 1,188,460 tons.

Irwin—The production of coal of the bituminous mines in the Nineteenth District in the year 1918 was among the respective companies as follows: Westmoreland Coal Co., 2,310,440; Ocean Coal Co., 827,078; New York and Cleveland Gas Coal Co., 590,897; United Coal Corporation, 465,443; Keystone Coal and Coke Co., 428,210; Irwin Gas Coal Co., 229,240; Delmont Gas Coal Co., 218,819; Union Coal and Coke Co., 157,773; Irwin Valley Gas Coal Co., 80,698; W. B. Skelly Coal Co., 78,232; Eiseman Coal Co., 64,362; Export Mining Co., 44,600; McAllister & Gray Coal Co., 41,657; Salem Gas Coal Co., 40,344; Westmoreland Gas Coal Co., 39,138; A. H. Pollins, 37,704; Cambria Steel Co., 36,650; Byerly Gas Coal Co., 35,421; Edwards Coal Co., 29,290; Larimer Gas Coal Co., 27,825; miscellaneous companies, 90,861; total, 5,874,682 net tons. All the mines are in Westmoreland County.

Greensburg—Inspector J. J. McDonald of the Eleventh bituminous district, which includes the region surrounding Greensburg, in his report for 1918 shows that the total production of coal in his district was 6,889,298 tons, of which Westmoreland county contributed 6,631,534, and Fayette county 257,764 tons. Of the companies the heaviest producers were the H. C. Frick Company, with 3,315,772 tons; the Keystone Coal and Coke Company, 1,227,184 tons; the Jamison Coal and Coke Company, 739,150 tons; Greensburg Coal Company, 450,769 tons; and the Mount Pleasant-Connellsville Coke Company, 328,528 tons.

Brownsville—The controversy between J. Harte Hillman, Jr., of Pittsburgh, Penn.,

President of the Hecla Coal and Coke Co., and T. J. Brennan, of Uniontown, Penn., president of the Thompson-Connellsville Coal and Coke Co., over the control of the latter company, which it was announced last week had been settled out of court, has been settled by agreement that no special meeting of the stockholders would be held at this time to elect new officers, but that Mr. Brennan would retain the presidency till the next regular meeting of the directors next July.

WEST VIRGINIA

Glen White—Some changes are to be made in the plans of the E. E. White Coal Co. in connection with the construction of a steel tipple at this place. The company had a complete survey made by a New York firm of engineers and upon consideration of a report made by the engineers will broaden its plans somewhat with a view to securing the greatest results in mining and loading coal from the various seams under development.

Fayetteville—Additional and unlooked-for orders have enabled the New River & Pocahontas Consolidated Coal and Coke Co. to start its mines at Minden going again, the plants having been closed down for two or three weeks because of insufficient orders. When operations were suspended at the Minden mines it was feared that it would be for an indefinite period, but unexpected orders caused a resumption of operations.

Philippi — Coal companies and coal properties located in various parts of the state which have been under the control and management of William Taylor George, of Philippi; A. A. Lilly, of Charleston; Samuel Morans, of Youngstown, and others, have been acquired by the Beacon Coal and Land Co. Among such properties are the Randolph Smokeless Coal Co. and the Hartlands, Rich Mountain, W. Va., said to be worth $225,000; Clay County Fuel Co., located near Hartland, $65,000; Morans Coal Co., Middle Creek, Clay County, $60,000; and 85 acres in the Jones tract at Wilmoth.

Rosebud—G. M. Shoemaker & Co., whose offices are at Clarksburg, W. Va., have taken over the property of the J. M. Macdonald Coal Mining Co., of this place, consisting of the Rosebud Nos. 1 and 2 mines, the Gilbert, on the Baltimore & Ohio Short Line, and the Hornor mine, at Hornor, W. Va., on the Weston & Pickands division of the Baltimore & Ohio. The combined capacity of the four mines is about 20,000 tons per month at present, but the new owners expect to increase this materially within a short time. The Matthew Addy Co. is to act as the sales agent for all operations.

Clute—Officers have been elected and plans perfected by the Belick Knob Coal Co., reference to which was made in *Coal Age* a few weeks ago. The new company will be headed by Thomas M. Davidson, of Huntington, with W. A. Garrett, of Charleston, as secretary and treasurer. Operations will be under the direction of Floyd B. Thompson. The plant of the company, as already indicated, is to be built at Clute, Fayette County, where the company will have its operation. It will require about three months to construct the plant, but at the end of that time the company expects to be able to begin the mining and shipment of coal. While the plant is under way the offices of the company will be located at Clute. New River coal will be produced, the company planning to develop part of a tract of 400 acres of coal secured from the Sewell Valley Coal Co.

OHIO

East Palestine—J. A. Meek, of East Palestine, has purchased the Mollenkopf farm near here and is planning to open a coal mine in No. 6 seam. The vein is 4 1-2 ft. thick.

Wellston—The United Mine Workers recently in session at this place adopted a resolution asking the Railroad Administration to purchase in Ohio coal used on Ohio railroads. It was claimed that some Ohio roads are using West Virginia coal.

INDIANA

Brazil—The Clay Products Co., operating two large plants near here, have leased the Austin Shattuck farm of 300 acres near Hoosierville and will begin at once to remove the coal and clay products underlying the land. By leasing this tract the company will be able to mine its own coa, there being a fair-sized deposit of good grade block underlying the farm.

ILLINOIS

Cuba—Mine No. 1 of the Donk Coal Co. has closed down indefinitely. It employed several hundred men.

Springfield—The state miners' examining board will hold a test in this city Mar. 15. Other dates for examinations are as follows: Mar. 6, Duquoin; Mar. 7, Christopher; Mar. 8, Harrisburg; Mar. 10, West Frankfort; Mar. 11, Herrin; Mar. 13, Belleville; Mar. 14, Staunton; Mar. 17, Danville; Mar. 19, Peoria; Mar. 20, Canton; Mar. 21, Macomb.

Hanna City—Through the efforts of W. E. Kidd, state mine inspector, a permanent organization has been effected of Hanna City miners in first-aid relief work. A class of 52 miners has been under instruction. It is said that the work will be organized in every mine local in Illinois. Alexander Miller, of the United States Bureau of Mines, assisted by Mr. English, of the Illinois State Department of Mines and Mining, were also active in the work.

Du Quoin—Coal mining is practically at a standstill in this section. The 1500 men employed at the respective mines here are putting in only two or three days per week as a result. With the exception of the Kathleen mine, located at Dowell, five miles south of here, the mines have not averaged over three days a week for some two months or more, while without warning, about three weeks ago the Dowell mine joined in with the rest and is now working about half time.

Du Quoin—George W. Leek, financial secretary of the Elkville miners' union, is the author of a resolution, which if adopted by the Illinois miners' organization, will provide a benefit of $2000 for the family of every miner at his death. At this time the family of each miner receives $250 at his death. There are 80,000 union miners in Illinois, and Leek declares his idea will prove to be a practical solution of the problem of supporting the dependents of the members of that organization.

Springfield—Tonnage figures compiled by the Illinois Department of Mines and Miners show the great falling off after the signing of the armistice. In October 8,286,000 tons were hoisted, in November 6,286,000 and in December 6,000,000 tons. For the year ending June 30, 1918, a record of approximately 90,000,000 tons was set; and if the war had continued it was expected that 100,000,000 tons would have been reached for the year ending June 30, 1919. The average normal yearly tonnage is between 50,000,000 and 60,000,000.

Centralia—Because of the congested conditions which have developed between Du Quoin and Centralia in the last year and a half, the Illinois Central Railroad Co. has made extensive improvements in its equipment which will greatly facilitate the handling of coal. A five-stall roundhouse is being erected at the north end of the switch yards at Du Quoin, and this will be completed soon. In addition to this the company has excavated an immense reservoir near the site of its old reservoir at Du Quoin, which is not large enough to supply the demand that will exist as soon as the new roundhouse is in use. The water will be piped underground from the reservoir to tanks near the roundhouse.

KANSAS

Frontenac—The Dittman-Wachter Coal Co. has recently completed a new washhouse at its mines here. The building is modern in every respect and will fill a long felt want.

Foreign News

Minto, N. B.—Nearly all the coal mines in the Grand Lake mining field have been closed because of the unsatisfactory conditions of the coal market. The only mines in operation are those of the Minto Coal Co., which are only kept going because the company has large contracts with the Canadian Pacific Railway Co. The Government has been asked to have the output of other mines used on the Canadian National Railways to make it possible for them to resume operations.

Victoria, B. C.—The total coal production of the coal mines of British Columbia for the month of January, 1919, was 243,516 tons, which represents an increase of 31,509 tons over the production of the month of December, 1918. There was a drop in output tonnage at the Corbin (B. C.) colliery and Princeton (B. C.) collieries, which was due in the former case to weather conditions and in the latter to a fire in the mine. The loss would amount to approximately 3000 tons.

Edmonton, Alta.—The annual report of John T. Stirling, chief inspector of mines for Alberta, shows the production during 1918 of 6,148,620 tons of coal, 100,470 tons of briquets and 32,858 tons of coke. The number of mines in operation during the year was 317, including 70 new mines and nine which had been reopened. The number of mines abandoned was 71. The average number of men employed was 2633 above ground and 6141 below ground. The number of fatal accidents was 21, and there were 16 serious accidents. Of the total amount of coal mined during the year 3,440,154 tons was sold in the province, 101,189 tons in British Columbia, 1,372,439 in Saskatchewan, 511,168 in Manitoba, 629 in Ontario and 133,276 tons in the United States.

Personals

A. A. Straub has been elected vice president and general manager of the Superba Coal and Coke Co., Frick Building, Pittsburgh, Penn., effective Jan. 1, 1919.

William H. Brown, of Gloucester, Ohio, general superintendent of the Ohio Collieries Co., has resigned his position, effective when his successor is appointed.

F. J. Patton, secretary of the Northern West Virginia Coal Operators' Association, Fairmont, Va., has resigned his post in order to devote his entire time to his personal business.

W. T. Miller, formerly of the freight traffic department of the Pittsburgh & Lake Erie R.R., Pittsburgh, Penn., has been appointed traffic manager of the Industrial Coal and Coke Corporation, New York, N. Y.

J. A. Jefferis, of St. Louis, Mo., manager of the Kerens-Donnewald Coal Co., has been appointed fuel agent of the Illinois Traction System, which requires an annual tonnage in excess of 500,000. He will continue to make his headquarters in St. Louis.

W. T. Burgess, superintendent of coal-mining operations of the Bessemer Coal, Iron and Land Co., at Belle Ellen, Ala., has resigned his position to accept one as safety inspector of coal mines for the Republic Iron and Steel Co., effective Feb. 15. Mr. Burgess will have his headquarters at Sayreton, Alabama.

A. B. McLaren, president of the Citizens Trust and Banking Co., Marion, Ill., and manager of the Chicago and Big Muddy Coal Co.'s properties, has accepted the superintendency of the O'Gara properties at Harrisburg, Ill., to succeed **R. M. Medill**. The O'Gara interests have twelve mines in operation in Illinois and Indiana.

George E. Henry, for several years president of the Allegheny Valley Operators' Association, at the annual meeting in Kittanning, Penn., definitely retired and L. B. (Doc.) Lewis, manager of the Acme Coal Co.'s mines at Rimersburg, was elected president in his stead. Mr. Henry stated that he begun business as a miner at $1 a day. He retires with a fortune.

Thomas Houlton, of Gloucester, Ohio, has resigned as electrical and mechanical engineer for the George M. Jones interests, comprising the Ohio Collieries Co. in the Hocking Valley and Cambria Collieries Co. near Bellaire, Ohio, and has opened an office as consulting mechanical and electrical engineer at Johnstown, Penn. Mr. Houlton before going to Ohio about a year ago was for several years master mechanic for the Merchant Coal Co. and the United Coal Co.

Clarence E. Patrick has been appointed district sales manager for Rockford, Ill., for W. P. Rend & Co., who have mines in the Hocking field of Ohio, as well as in the Franklin County district of Illinois. Until recently Mr. Patrick was vice president of the Calloway Fuel Co., of Milwaukee, but resigned, and made a connection with the Rends. Mr. Patrick has been in the coal business for a number of years, having represented Moderwell & Co. in northern Illinois before that concern sold out to the Old Ben Coal Corporation.

Obituary

Charles Albert Bowman, aged 40, superintendent of the Lincoln Highway Coal Co., died Feb. 11, of pneumonia, at his home in Pittsburgh, Penn.

W. P. W. Haff, a well known coal man, with offices at 1 Broadway, New York, N. Y., died in Los Angeles, Cal., Feb. 23. Mr. Haff went to California for his health in December last and was thought to be improving. His home was in Freeport, L. I.

Charles H. Zeller, aged 47, for many years an operator in the block coal and bituminous fields in the vicinity of Brazil, Ind.,

died Jan. 30 of a complication of diseases. He was the son of John H. Zeller, one of the early and most successful operators in the block coal field.

M. J. Murray, Sr., coal operator and banker, of Dunmore, Penn., died at his home on Feb. 26, after an illness of several months duration. Mr. Murray was born in Ireland Mar. 10, 1846, and came to Dunmore at the age of 7. For many years Mr. Murray operated a colliery at Dunmore, and in 1905 leased 464 acres at Bernice, Sullivan, and organized the Northern Anthracite Coal Co. Mr. Murray was interested in several banking institutions, coal properties and other industries.

Samuel Gillies, president of Gillies-Guy, limited, Hamilton, Canada, died in St. Petersburg, Fla., on Feb. 22, aged 78. The company was one of the largest distributors of coal, both bituminous and anthracite, in Canada. It had been established by Mr. Gillies in 1906, who had formerly been in the lumber trade in Saginaw, Mich. He had been one of the leading citizens of Hamilton, but of late years had been out of health. He leaves a widow and three sons, David H., in the coal business at London, Canada, and Samuel R. and John W. Gillies, in business with the father.

Sir Guy Spencer Calthrop, comptroller of English coal mines since 1917, died on Sunday, Feb. 23, in London, England, of influenza. Sir Guy, who was created a baronet in 1918, was born in 1870 in Uppingham, Rutland, and was a nephew of the late Viscount Alverstone, and was general manager of the London & Northwestern Ry. He was general manager of the Caledonian Ry. in 1908, and general manager of the Buenos Aires & Pacific Ry. in 1910. In February, 1914, Sir Frank Lee, the general manager of the Northwestern, died, and Guy Calthrop, then aged 41, was appointed to fill the vacancy, the youngest man who had ever controlled the line.

Trade Catalogs

Green's Economizers.—The Green Fuel Economizer Co., Beacon, N. Y. Bulletin No. 151. Pp. 63, 8½ x 11 in., illustrated. A summary of the facts regarding Green's improved patented fuel economizer.

Local Battery Telephones. Stromberg-Carlson Telephone Manufacturing Co., Rochester, N. Y. Bulletin No. 1024. Pp. 22; 7¾ x 10 in.; illustrated. Contains complete information about the company's wall telephones.

Repair of the German Ships. Wilson Welder and Metals Co., Inc., New York, N. Y. Tells how the wrecked machinery on the German ships lying in American ports was repaired by electric welding with the aid of the Wilson-Plastic-Arc welder.

"C. J." Coal Meter. C. J. Manufacturing Co., Philadelphia, Penn. Folder. Pp. 6, 4 x 9 in., illustrated. Describes the uses and system of operation of a coal meter that can be used on any underfeed stoker having an accessible revolving shaft.

Hercules Products. Hercules Powder Co. Catalog. Pp. 144, 6 x 9 in., illustrated. Book will prove valuable to users and prospective users of explosives. It contains a general description of products manufactured and marketed by the Hercules Powder Co.

A Chain of Evidence. Morse Chain Co., Ithaca, N. Y. Publication No. 16—"Small Power Drives." Pp. 24, 6 x 9 in., illustrated. Enumerates the advantages of Morse chain drives. Illustrated by many photographs of actual applications of medium power drives.

Modern Methods of Ash Disposal. American Steam Conveyor Corporation, Chicago and New York. Catalog. Pp. 160; 7¾ x 10½ in.; illustrated. A presentation of the most economical and efficient methods of moving ashes, soot and combustion waste from boiler room to disposal station.

The Art of Jigging Coal.—G. H. Elmore, Philadelphia, Penn. Bulletin. Illustrated, pp. 13, 8 x 11 in. One of a series of bulletins describing the Elmore jigs. This bulletin concerns the washing of bituminous coal for fuel with Elmore 600-A jigging machines equipped with automatic refuse control.

The Jeffrey Pivoted Bucket Carrier. Jeffrey Manufacturing Co., Columbus, Ohio. Catalog No. 210. Pp. 96; 6 x 9¼ in.; illustrated. Gives details of the carrier and illustrates large power plant equipment. A feature of the catalog is the reproduction of dimensioned blueprints in actual color of typical views for the various sizes of carrier equipment.

Ingersoll-Rand High Speed-Piston Valve Steam Engine, Class FD. Form 9026. Pp. 12, 6 x 9 in., illustrated. Engine is of the horizontal center-crank type, and the steam valve is of the most approved design, permitting the use of the highest steam pressures and superheated steam. Catalog contains cross-sectional illustrations showing the machine in detail.

Geared Marine Steam Turbines. De Laval Steam Turbine Co., Trenton, N. J. Bulletin M. Pp. 32, 8½ x 11 in., illustrated. New publication describing the details of construction of turbines and gears and also various turbine-driven auxiliaries, including lighting sets, circulating pumps, boiler feeders, etc. A new development is the centrifugal pump for the continuous purification of the oil used in the turbine and gear bearings and on the gear teeth.

Industrial News

Auburn, N. Y.—The Columbian Rope Co., manufacturer of Cordage, has issued an attractive poster, in colors, showing the lowering of a lifeboat at sea. The poster is suitable for hanging.

Uhrielville, Ohio—The Walnut Coal Co. has been incorporated with a capital of $10,000 by John W. Lindsay, Archie Stevenson, Freeman Wilkinson, Anna V. Lindsay and Matilda Stevenson.

Cincinnati, Ohio—The Walter-Wallingford Coal Co. has been chartered with a capital of $100,000 by L. F. Walter, B. A. Wallingford, C. S. B. Ward, Samuel H. Whitaker and A. J. McCarthy.

Terre Haute, Ind.—The Vicksburg Coal Mining Co. has been incorporated here with stock of $30,000. The directors for the first year are Horace W. Robertson, Walter Robertson, William H. Kivits and Albert F. Kivits.

Columbus, Ohio—The Mount Cherry Coal Co. has been incorporated with a capital of $600,000 to mine and sell coal. The incorpators are Warren B. Ferris, Herman Eckhardt, Thomas M. Hardesty, Henry J. Mayer and Ernest H. Whiting.

Minneapolis, Minn.—The Reliance Coal Co., of Minneapolis, has obtained the exclusive agency in the Northwest for the Columbus Mining Co.'s "Lafayette" and "Columbus" coals from southeastern Kentucky. It is estimated that the deal will involve about 75,000 tons of coal per year.

Cincinnati, Ohio—The Dickinson Fuel Co., which operate mines in West Virginia, is preparing to enter this territory as a distributor and will construct distributing yards and hoppers at points to be selected on the Chesapeake & Ohio and Norfolk & Western railroads, on both of which it has mines.

Pittsburg, Ky.—W. R. Grant, Pittsburg, has recently completed negotiations for the leasing of approximately 450 acres of coal properties in the vicinity of High Splint, Ky., and is understood to be arranging plans for early development. The property is held by the Cooper Ridge Coal Co., of Evarts, which recently increased its capital to $75,000.

Youngstown, Ohio.—In its annual report to stockholders, it is interesting to note that the Youngstown Sheet and Tube Co has invested a total of about $2,500,000 in the development of its coal properties in Greene County, Pennsylvania. The mine, which fronts on the Monongahela River, has a capacity of about 450 tons daily. James A. Campbell is president.

Ithaca, N. Y.—The Morse Chain Co. announces that it is advised by P. A. Morse, of the Morse Engineering Co., western representatives, St. Louis, Mo., that the Kansas City offices have been removed from the old quarters in the R. A. Long Building, to more commodious rooms, Suite 211-212, Finance Building. W. V. Warner is the office district manager.

Panama, Okla.—The Buck Creek Coal Co. has been organized here, with a capital stock of $15,000, and charter has been filed with the Secretary of State at Oklahoma City. The incorporators are A. W. Breckenridge, of McAlester; Thomas L. Tatum, of Milton; and William T. Harper, of Fort Smith, Ark. The company will develop its coal lands in eastern Oklahoma.

Mobile, Ala.—During the past week a number of boats loaded with steam or bunker coal at Mobile, the fuel being sent by rail and Warrior River barges from the Birmingham district, to supply the demand for the service between Mobile, Cuba and South America. The Louisville & Nashville R.R. has put in a coal-loading device on the Mobile water front, and is prepared to handle almost any amount of coal for the ocean-going steamers.

Charleston, W. Va.—A coal-carrying railroad will top certain coal lands in Greenbrier County, the new road to be known as the Greenbrier & Eastern. It is to be financed by Charleston people who are interested in the coal properties which the railroad will make it possible to operate. The company will have an authorized capital of $50,000. It was organized by B. B. Brown, Angus W. McDonald, O. P. Fitzgerald and L. G. Cunningham, all of Charleston.

Birmingham, Ala.—Coal production for the Birmingham district during the week ending Feb. 15 was 281,284 tons, according to reports turned in at the Alabama Coal Operators' Association. The final report of production for the previous week was 274,442 tons. Coal production for the past two weeks is more than 100,000 tons below the estimates made by experienced coal men. The reduction in output, according to operators, is due to labor shortage and lack of market.

Cincinnati, Ohio—Executive committee of the recently organized Central Coal Association, comprising coal operators in West Virginia, Kentucky and Ohio, has selected as the secretary of the organization Guy M. Freer, for several years manager of the traffic department of the Cincinnati Chamber of Commerce, and a man especially well posted on the problems of the coal trade in this section, especially in the matter of transportation. The offices will be located in Cincinnati in charge of Mr. Freer, who will give all of his time to the work.

Canton, Ohio—C. A. McDonald, president of the Canton Coal Co., has been elected president of the Central Ohio Coal Operators' Association at the annual meeting of the board of directors held recently. He succeeds E. E. Fox, an official of the Goshen Coal Co., Massillon, who has been president of the association for a number of years. John Kite, vice president of the Midvale-Goshen Coal Co., Massillon, was elected vice president, and William H. Haskins, commissioner, was reëlected secretary and treasurer. The headquarters have been moved to Canton.

Louisville, Ky.—Figures relative to coal consumed in Louisville during the year 1918 show that a total of 1,618,021 tons of rail coal came into the city, 89,046 tons of river coal and 4928 tons of anthracite, the latter during the first six months of the year. This makes a total of 1,707,067 tons of bituminous, and a total of 1,711,995 for all grades. These figures show an increase of 1,600,000 tons over the previous two-year average of the Fuel Administration. Kentucky is figured on for 5,600,000 to 5,700,000 tons annually. Some river coal was delivered during each of the ten latter months of 1918, the first two months finding the river blocked with ice.

Charleston, W. Va.—Only one measure affecting the coal industry of the state in addition to the Hale bill reorganizing the Department of Mines was finally acted upon by both houses of the West Virginia Legislature, and that was the Lewis bill. This bill amended Section 17 of Chapter 15ll of the Code. The clause amended read: "And in no case shall more than ten persons ride on any cage or car at one time," the section covering shaft, slope and incline mines. The clause as amended reads: "And in no case where the mine is operated or worked by shaft or slope shall more than ten persons ride in any cage or car at one time," the effect of the amendment being to exempt incline mines from the application of the provision covering the number of persons permitted to ride on a car or cage.

Louisville, Ky.—Kelly C. Cornelius, assistant treasurer of the Liberty Coal and Coke Co., with mines at Straight Creek, Wallshend and Easley, Ky., has opened a new sales office at Room 407 Louisville Trust Building. Mr. Cornelius reports that production will be increased this summer, and that the company is adding to its land holdings in the Straight Creek neighborhood. This company was formerly a part of the old Continental Coal Co., which was disorganized, and the properties taken over by two operating companies, the Knoxville faction operating as the Federal Coal Co. The Liberty company has a large battery of coke ovens, but is not producing any coke at the present time. It now has a daily production of 900 tons, and good selling facilities, making it possible to operate full time. Much of its output is going to Federal cantonments at Camp Jackson, Fort Oglethorpe and Camp Gordon, the latter taking 900 tons daily.

MARKET DEPARTMENT

Weekly Review

Industry Shows Signs of Improvement—Inquiries Being Made for Next Year's Requirements—Bituminous Output Still Decreasing—Prices Maintained—Reasons Why Anthracite Coal Prices Will Not Be Lowered

INDUSTRY is beginning to sit up and take notice. Instead of going to the "demnition bow-wows," as was freely predicted by some cocksure prophets (?) only a few short months ago, Uncle Sam has really turned the corner and before long will be striding rapidly down the wide avenue labeled "Prosperity."

The greatest export business in the history of the United States was done during the month of January. We shipped from our ports in the first month of the present year goods to the value of $623,000,000. This is $57,000,000 better than the export business we did in December of last year and is an increase of $118,000,000 over our foreign business in January, 1918. (Surely this in itself should serve as a refutation of the pessimistic utterances of the calamity howlers!) The steel industry, which is said to be a barometer of business conditions in the country generally, is operating at more than 75 per cent. of capacity. The tin mills are doing even better.

What all this means to the bituminous coal industry is self-evident. Since the signing of the armistice manufacturers in the main have been burning fuel from their stock piles. In spite of curtailments, suspensions, and the shutting down of many industrial plants, a great tonnage of coal was consumed during the past four months. Reserve stocks in the majority of cases are dangerously low, and purchasing agents who have kept out of the market for obvious reasons are now making inquiries. True, there is no pronounced buying movement or contracting activity manifest as yet; but the rippling of the surface shows that the fish are in the depths below, ready to rise to the bait.

Prices of bituminous coal are being maintained firmly, with the exception that off-grade coals are being quoted at considerable reductions to keep them moving and avoid the payment of demurrage charges. It is rumored that there will be a further increase in price of some of the high-grade bituminous coals in the near future. Output is declining, due to half-time operation at most of the mines. This helps to steady the market and really should be a source of worry to consumers with scanty stocks. But as to that, time alone will tell. Only 7,696,000 net tons of soft coal were produced during the week ended Feb. 22, which brings the total output for the coal year to date to 517,479,000 net tons, 23,737,000 net tons in excess of production for the same period last year.

From a number of quarters comes the information that the prices of anthracite coal will surely decline. On what grounds this belief is based it is difficult to see. Nothing, in fact, is more improbable. Not only will the prices of the domestic sizes of hard coal *not* decline, but they are due for an increase. Householders would do well to profit by this warning.

Here are a few of the reasons why the price of the prepared, or domestic, sizes of anthracite will not be lowered: (1) The cost data compiled by the Fuel Administration and recently made public show that 60 per cent. of the anthracite mines were not making any money at the fixed Government maximums. Price control has been removed. These operators, in order to stay in business, will have to raise their prices; otherwise they are faced with the prospect of bankruptcy. (2) To send prepared sizes of anthracite to market it is necessary that the mines screen their coal. Unless the small sizes that result can find a market, the screening of domestic sizes must stop; or else the prepared coal must command a price that will permit of the sale of the small steam sizes in competition with the steam sizes of bituminous coal, which are much cheaper. (3) The present wage agreement in the anthracite field automatically expires with the signing of the peace treaty. The wage scale that would then be in effect is lower than the so-called war scale now ruling. Are the miners going to accept a reduction in wages? (4) The harbor workers at New York are on strike for a shorter workday and an increase in wages. Any of the demands granted will mean an added charge for lighterage and the towage of coal barges. This added cost will be passed on to the consumer.

These are only a few of the signposts that point the way to higher coal prices. It may be that the increase will be postponed until the treaty of peace is actually signed, to enable the operators to refuse any demands for higher wages at this time. But that higher coal prices will come is certain. Every indication points to a raise month by month, as a seasonal differential, until a certain maximum is reached.

WEEKLY COAL PRODUCTION

Bituminous—The production of bituminous coal during the week ended Feb. 22 is estimated at 7,696,000 net tons, and is a slight decrease compared with the week preceding, and a decrease of 3,420,000 net tons compared with the week of Feb. 22, 1918. In previous years the occurrence of Washington's Birthday, like all other holidays, was quite a limiting factor in the production of bituminous coal; but with the lack of demand at this time, the observance of the holiday had practically no effect on the week's output. The average production per working day, estimated at 1,283,000 net tons, not only fell below that of the preceding week and corresponding week of 1918, but also fell considerably below the daily average for the coal year to date, estimated at 1,835,000 net tons, and the daily average for a similar period of last year, estimated at 1,751,000 net tons. For the coal year to date, production of bituminous coal now totals to 517,479,000 net tons and is in excess of the production for the same period of last year by 23,737,000 net tons.

Anthracite—Practically no change occurred in the production of anthracite during the week ended Feb. 22, the output being estimated at 1,113,000 net tons, but 13,000 net tons in excess of the output of the week of Feb. 15. Compared with the corresponding week of 1918, the current week's output is extremely low, falling 741,000 net tons behind. The daily average per working day during the week of Feb. 22 is estimated at 186,000 net tons, as compared with 305,000 net tons during the coal year to date and 316,000 net tons for the same period of 1918. The total production from Apr. 1, 1918, to Feb. 22, 1919, is estimated at 86,020,000 net tons as against 89,238,000 net tons for the period Apr. 1, 1917, to Feb. 22, 1918.

Coal Loading—Reports received from carriers show that the decrease in loading during the week ended Feb. 22 occurred in Alabama and in the central and far western states. Slight increases occurred in all other fields. For the calendar year to date, coal loading is far behind that of last year in all districts, with the exception of Fairmont, where the present year's loading is slightly in excess.

Bituminous Shipments—Shipments of bituminous coal to New England during the week ended Feb. 22 are estimated at 245,231 net tons, and are slightly in excess of shipments during the week preceding. The receipts through the rail gateways during the week are estimated at 102,584 net tons, and are a decrease of 16,456 net tons compared with the week of Feb. 15, while the shipments to New England by tidewater exceeded the tonnage of the preceding week by 20,716 net tons.

Shipments from the North Atlantic harbors and Hampton Roads to all points for the week ended Feb. 22 are estimated at 592,497 net tons, as compared with 526,085 net tons during the week ended Feb. 15. Increases occurred in the shipments from New York, Philadelphia and Hampton Roads, while Baltimore tonnage decreased. At the present time the weekly shipments are but 72 per cent. of the average for the coal year to date.

Beehive Coke—The production of beehive coke in the United States during the week ended Feb. 22 is estimated at 445,700 net tons. This output exceeds that of the week preceding by 24,024 net tons and falls behind the output of the corresponding week of last year by 128,286 net tons. The daily average during the current week is estimated at 74,283 net tons, as compared with 70,279 net tons during the week preceding and 95,664 net tons during the week of Feb. 22, 1918. For the calendar year to date the production of beehive coke is estimated at 3,901,382 net tons, and is a decrease of 145,730 net tons compared with the same period of 1918.

State production figures are now available for the first time, and bring to light the fact that Pennsylvania is the lone state producing beehive coke, for the calendar year to date, in excess of the output for the same period of last year. During the current week, production in all states fell behind that of the same week of 1918. The output of the operators in Pennsylvania, West Virginia, Virginia and Kentucky exceeded that of Feb. 15, while all other states report a decrease.

BUSINESS OPINIONS

Bradstreet's—While the trade and industrial pace is still of a cautious, in some sections, indeed, an even slow, character, evidences of moderate improvement in distribution are now too numerous to be denied. Certain it is that, compared with a month ago, there are fewer poor reports, and a résumé of both wholesale and retail trade, of industrial conditions and of collections reveals the general trend to be rather above than below fair.

Dry Goods Economist—To judge from the number of buyers who have visited the New York market in search of supplies for dry goods and department stores, the business of the country has apparently suffered no reduction. On every hand the report is heard business is good. Labor unrest continues in various fields of industry. The strike of the operatives in New York garment manufacturing plants continues but is no longer considered important. Strikes started this week in shoe factories of New York where operatives have made a demand for an eight-hour day. In other centers nothing of importance has developed to affect the production of textiles.

American Wool and Cotton Reporter—Choice wools, particularly the kind wanted by the worsted mills, are scarce. The woolen mills seem to have more business ahead, and it is intimated that there is a possibility that the worsted mills may also, but not very much is being said about the business of the latter. The great effort being made to cut down the acreage planted to cotton may have some effect, but it never has been of any great importance in the past and it may not be at the present. If any real important result is attained it will seriously affect the wool. The price of cotton will not advance much until conditions change, although there ought not to be any great decline so long as holders are unwilling to dispose of cotton at prices lower than those noted at present.

Dun's—For the waiting policy of buyers, whose potential needs are heavy, the explanation lies chiefly in the price question, but even after many weeks of market defla-

tion, embracing a considerable range of commodities and in some instances of a drastic nature, demand continues hesitant. As a natural outcome of this condition, manufacturing in most lines, and notably in the leading Eastern centers, has receded materially from the extraordinary rate of the war period, and diminution of consumers' purchasing power through elimination of overtime work and increasing unemployment is an influence in retail circles. Yet there are various bright spots apparent, including the strong financial position and the exceptionally light commercial mortality, and sentiment reflects growing optimism as the Spring season, with its promise of enlarging outdoor activities, approaches.

The Iron Age—Current demands for mill products have been larger in the aggregate than commonly appreciated. Those plants which have had to shut down outright or run in alternate weeks have worked off the back log of accumulated orders and others, even where 65 per cent of capacity is engaged, are now almost wholly on new bookings, which keep three to eight weeks' work ahead of the mills. It is those mills which are equipped more particularly to turn out railroad material or are not adapted to supplying the automotive trade which emphasize the light volume of buying. Stocks in hands of producers are low, but distribution has not been affected by manufacturing consumers, notably the agricultural implement makers. Heavy buying is therefore not to be expected in the immediate future from such sources and it is argued that this distribution should not be embarrassed by injecting into it drastic price-cutting questions.

Atlantic Seaboard

BOSTON

Market continues without noticeable change. Inquiry scattering and for small tonnages. Tidewater situation shows no improvement. Uneven prices and lack of buying interest. Higher grades from Pennsylvania held at recent Government figure. Buyers discriminate between grades. Season for legislative "remedies." Room for much adjustment. Water freights easier on certain kinds of barge transportation. Anthracite dull. Only listless demand for domestic sizes. Wide variation in retail prices. Dealers troubled over uncertain outlook.

Bituminous—The present situation in New England has more the characteristics of "midsummer dullness" than any month of March in the history of the trade. All the larger consumers, railroads and other utilities included, continue to have a surfeit of coal on hand, and the much hoped-for "active market" seems as far away as ever. There are no significant developments; things just keep mulling on with light traffic and minimum consumption in almost every direction. Only small inroads are being made in the heavy stocks accumulated under the stress of war emergency, and the movement both all-rail and by water is still in very small volume. The shippers have become reconciled to meager business and buyers are still being canvassed closely, although quotations are now on a better established basis than was the case a month ago. There is still no railroad policy with respect to new purchases, and naturally there is apparent among the roads in this territory a distinct effort to reduce their fuel reserves, before undertaking anything like comprehensive buying.

Among small buyers there is now a scattering demand, but it takes careful combing to uncover it. It is almost wholly confined to those whose storage was small or those who were unable last fall to get forward what was required for early spring consumption. The aggregate of these small current purchases is considerable, and when added to shipments coming forward on contract accounts for the present all-rail movement which, in proportion, is in much better volume than are deliveries by water. With the present wide differential in favor of rail shipment it is plain that deliveries inland from tidewater rehandling plants are being held down to an absolute minimum.

Little is heard as to contracts. One or two of the Hampton Roads factors have had some success in tying up a certain tonnage on a mine price "plus" basis, but when entered into either by consumers or retail dealers such arrangements are usually based upon good service in recent years rather than upon any commercial advantage as yet disclosed. The current market shows no improvement whatever, and there are still cargoes of "distress coal," overshipments on old contracts, etc., to be absorbed by an already overstocked market. Frequently there are instances where cargoes shipped in exact compliance with contract are obliged to wait discharge until current consumption makes room for the coal to be added to storage. Scores of mines are idle in the smokeless districts, and there are few agencies that are not under embargo because of failure to dump at Hampton Roads piers the accumulations now standing to their order.

Producers of the better grades from Pennsylvania show every intention of holding to the recent Government price level of $2.95 per net ton, except in a few cases where the coal is held at figures slightly higher. Many of the operations are down to 25 per cent. or even 10 per cent. of normal output, but there have been fewer instances lately of any shading in prices, except on inferior grades; $2.15@2.40 per net ton is still the range on some of the higher volatiles.

Certainly there is every indication that when comprehensive buying does start in there will be a good deal of discrimination between the grades offering. Large tonnages that were placed here last year through Fuel Administration channels were of inferior grades and the experience is lasting so long that buyers have become well schooled in the disadvantages of poor quality. It is this deep-rooted feeling on the part of so many buyers that makes it possible for a considerable tonnage of Pocahontas and New River to be absorbed on contracts in the face of the much lower quotations that are made on certain Pennsylvania coals that are offered for all-rail shipment.

While the United States Shipping Board has in no wise modified the mandatory rate on requisitioned steamers, there are abundant signs of weakening in such water rates as are not regulated through any Government channel. On Long Island Sound there is now a large surplus of barges and rates have receded very nearly $1 a ton from those recommended a short three months ago. In other words, freights from New York to points like Fall River and New Bedford are $1.10@1.25, instead of $2@2.15. Meanwhile, railroad-owned barges are being held at $1.75 on anthracite between the same ports, and no sign of change. Of course, the few buyers who are taking coal are using outside privately owned transportation.

Anthracite—Retail dealers are having difficulty in shutting off shipments, and one result is a generally overstocked market. The exceptional winter has made a big difference in winter deliveries and the system of anthracite "applications" devised by the fuel authorities only added to the generally mistaken estimates that were made early in the season. Domestic sizes are only in listless demand. A few retailers are quietly accepting what deliveries are made them, partly on the ground that prices will not be reduced, but these are in the minority. Most of the dealers along the coast are expecting at least a reduction in water freights and there will be no active spring buying until the outlook is somewhat clearer and less uncertain than at present.

There is a noticeably uneven retail price line throughout New England, not always following the differences in cost. The range is from $11 in Boston to $14 in Lewiston, Me., and there are similar wide variations within relatively short distances. Naturally the public finds it difficult to reconcile such figures and it is hoped that many needed adjustments can soon be made.

NEW YORK

Consumers await operators' announcement regarding summer prices. Usual reduction will mean good business. Demand for domestic coals continues slow. Tidewater dumpings show decrease. Anthracite steam coals stronger. Bituminous market shows improvement. Embargoes are declared off and docks are well cleared of surplus. Troubles reported in New River and Pocahontas fields.

Anthracite—In addition to small consumption the failure of the coal producing interests to make public their intentions as to what might be expected by consumers on Apr. 1 in regard to prices is having its effect upon the situation. The question of spring and summer prices is one of paramount interest to all users of hard coal, but particularly to New Yorkers. Many who heat their own homes like to know that their next winter's fuel is safely stored away in the cellar before they leave the city for the summer. Failure of the operators to make a reduction in the present prices will likely result in a comparatively small wholesale and retail trade here during the summer, many householders believing they might as well wait until the fall and take chances of getting coal.

It was expected that some announcement might be forthcoming from the operators after their meeting in Philadelphia on Friday last (Feb. 28), but it is understood that no conclusion was arrived at by those in attendance.

The demand for domestic sizes continues to be small, but a better situation exists in the steam coal market, due to the suspension of operations at the mines, resulting in a smaller production of buckwheat, rice and barley coals.

If production is maintained on practically the same basis as it was during the month just closed, the situation will be in a comparatively easy condition on Apr. 1. There is a slow but steady call on the retail trade and just about enough to enable the dealers to begin the coal year with ordinary stocks. Just now no dealer is willing to take in more than he is likely to require with the spring situation uncertain.

Reports of cars dumped during the week and month ending Feb. 28 show a big slump. In the first instance there were 2962 cars emptied as compared with 3732 cars the previous week, a decrease of 770 cars. For the entire month there were 15,137 cars dumped as against 23,756 cars during January, a decrease of 8619 cars.

Wholesale dealers report little business coming from Canada. Stocks are reported as large, and there is little demand. Heavy stocks are also reported in the West and inquiries for business bring the information that only real bargains will be considered.

There is little doing here with regard to the domestic coals. The companies are maintaining their regular schedule of prices while so-called independent coals have been held at 20c. below. Pea coal moves slowly and quotations range from $4.65 to $4.80 at the mine.

There is a stronger feeling in the anthracite steam coals, owing to the slow production. Buckwheat No. 1 was quoted at from $2.75 to $3.25 at the mines; rice from $2.35 to $2.40, and barley from $1.50 to $1.80, all for the better grades. Inferior coals were, it was said, being quoted at about 30c. lower, principally for loaded boats.

The local anthracite situation is not very encouraging. There is some chestnut, stove and egg moving in, but this is nearly all going into storage. The domestic demand is light. The country business on chestnut is fairly good.

It is generally understood here that effective the first of April there will be an increase in the price of anthracite coal.

Bituminous—The situation shows much improvement. The docks are in much better shape and there is not a large amount of surplus coal on hand. There has been a much heavier demand for bituminous than for anthracite, as is noticeable in the report of the Regional Director of Railroads of cars dumped during the week ended Feb. 28. The reports show that 5017 cars were turned over as against 6248 cars the week previous, a decrease of 1231 cars. For the month of February there were 23,668 cars dumped as against 23,769 cars in January, a decrease of 101 cars.

Wholesale dealers report a much better condition of affairs, but there is said to be some coal which has been offered much below the Government maximum in order to save demurrage charges. Even at that it is not always an easy matter to dispose of it, most consumers having large stocks in their yards and no desire to add to them.

It is not expected that many shippers will take advantage of the Fuel Administration order and do business independently of the Tidewater Coal Exchange.

Western sales agents writing to local houses say there is abundant coal in the West and that demand is slow with no prospects of better business for several weeks.

There is a strong feeling that operators in the New River and Pocahontas fields are facing labor trouble which may resolve itself into a suspension of operations, or possibly a strike, by Apr. 1. Reports received here are that some producers have sub-leased storage plants and are storing coal in anticipation of trouble. Coupled with this report was another to the effect that prices for these two grades of coal would soon be boosted, probably as much as 75c.

Locally conditions are much stronger. There is not so much free coal around and not so many loaded boats. Distributors are not sending their product to Tidewater unless there is a buyer in sight, and this helps conditions considerably.

Consumers who buy all-rail coal are particular now as to what grade is sent them and are paying nearly the Government maximum.

Quotations at Tidewater vary greatly, much depending upon the pool wanted. Coals in Pool No. 9 were being quoted the early part of the week at from $5.85 to $6, and from Pool No. 10 at from $5.35 to $5.50.

PHILADELPHIA

Anthracite trade unsatisfactory. No real improvement in sight for a month. Buying both wholesale and retail at low ebb. Some individual price-cutting. Mines on half-time, with production difficult to move. Some slowing up of accounts. Retailers getting ready for spring trade. Retail price-cutters more active. Mine labor restless. Stove and nut in chief demand. Steam coal quiet, with fair outlook for future. Bituminous still draggy. Prices fairly well maintained. Good bunker business.

Anthracite—Philadelphia coal dealers are a disgruntled lot and are gradually losing respect for their business. The month of February was such a distinct disappointment that they have little hope of any improvement during March, and indeed some of them say they do not even look for normal conditions before next fall. The representative dealers show much concern for the future, as they claim that unless some drastic action is taken to force the public to believe that there can be no sharp decline in prices there will be all kinds of trouble next fall and winter. Many householders appear to believe that prices will be lowered several dollars a ton, and we have recently actually heard the dealers called upon to deliver in one-half-ton lots.

The individuals are cutting prices; there is no doubt about that, but it is difficult to judge just how low they will quote. Often a shipper has coal standing at the scales on demurrage and after several days is forced to let go at a ridiculous price. The dealer who buys it will sometimes try to drive a bargain with another operator and quote this price. Such sales form false impressions and of course should not be taken as a basis for estimating current conditions.

We have heard some strange names for coal lately, and it is just possible that some of the smaller houses are for the time being renaming their collieries when making these low prices for quick sales in order to avoid cheapening the reputation of their product. Every house has every available man on the street, and some of them seem to be adopting the method of calling by telephone every possible prospect two and three times a week. Notwithstanding all this effort it must be admitted that sales are few and not substantial. It is with difficulty that the most reputable mines can be worked more than three days a week. One famous coal that for years has been sold at a premium has this week been freely offered at company circular.

As to payments the companies are not complaining about their accounts, but feel they are no longer to enjoy the prompt payments of last year. They claim it is noticeable that the January balances are larger than for many months. Like the retailer, if the shipper forces sales, he soon finds he has a list of slow accounts.

In the suburban districts where the houses are larger and the people more affluent business usually holds up better than in the city proper. Here we also found the dealers complaining and delivering little coal. They, too, are laying off men and selling horses to reduce expenses.

Another price-cutter appeared in the retail trade this week much to the disgust of the representative dealers who have so earnestly tried to influence their competitors to maintain their full rates based on the $2.50 margin allowed when Mr. Lewis local administrator, was in office. The lowest rates now being advertised are egg, $10; stove, $10.25; chestnut, $10.25; pea, $8.25. This is a reduction from the standard prices of 30c. on egg, 35c. on stove, 40c. on chestnut and 80c. on pea.

Some of the larger dealers are considering seeking legislation to reduce the weight of a ton of anthracite in this state from 2240 lb. to 2000 lb. As the legislature is now in session there is no doubt that a bill will be presented. The dealers claim that with the gross ton for anthracite in this State they are placed at a disadvantage when prices are compared with sales in states on the 2000-lb. ton.

Many reports are heard from the mining region about the discontent among the miners because of the short working time. At a recent meeting of union men in the region the statement was made and printed in the newspapers that the operators were cutting down the working time simply to uphold the prices. Of course any one connected with the trade knows how ridiculous a statement this is. One local even went so far as to petition Congress to take over the mines and work them full time. There can be no denying that mine labor is extremely restless, and it is reported that the operators have held a meeting to consider this phase of the situation.

Shippers report the sales of the past week to have been confined chiefly to stove and chestnut. A light tonnage of egg is coming here and practically no pea coal, as some dealers have enough of this latter size to run them for several months; while the average retailer has more than he ever had at this time of the year. The demand upon the dealers for this size appears to be over for the season, although it is thought March may bring business in small lots to finish out the month.

The steam coal prices do not seem to indicate it, but report has it that the small sizes are due for a brace. Stocks are being cleaned up to some extent and some industrial plants which had coal stored, it is expected, will again be in the market before long. Upon inquiry we hear of buckwheat for $2.60 to $2.75, on up to company circular of $3.40. Rice is around $2 and barley dragging along around $1.25.

Bituminous—There is no marked change in the soft-coal situation. All operators continue to work on reduced time and seem simply to be in a waiting mood for the better times which are forecasted. Shippers almost generally insist upon the full price for the good coals, and while some grades can be purchased off price, the sales are not such as to break down the market for the good coals.

At tide there is fair business, especially in bunkering, which is calling for the very best grades. Recently we heard of quite a piece of business for bunker fuel closed at a good figure.

BALTIMORE

Export movement fails to respond in way that December shipments had promised. Soft-coal market over-supplied, but steadier under sale reservations. Hard coal selling lacks interest.

Bituminous—A disappointing feature of the present market, when the supply of soft coal so far exceeds the demand, is the failure of the export trade to materialize. After the first eleven months of 1918 had seen a movement of less than 7000 tons per month for foreign account, December saw a jump and more than 30,000 tons was loaded for foreign delivery. Lack of bottoms, labor disturbances at consuming points, freight rates, etc., however, caused a halt and the January and February movement has been a disappointment to those who had hoped for a decided revival. The foreign bunker business, which during 1918 averaged around 20,000 tons per month, is holding up fairly well, however.

While the run of soft coal to the piers and other points in this district is still in excess of urgent needs, a steadying influence has entered the trading. A producing company handling specialized coal the past week let it be known that none of the particular product would be released below $3.20 net, or about 45c. above the old Government maximum. This news at once strengthened a number of other better coals. Even where there was over-supply here the better fuels were being held pretty firmly at the old Government maximum. Poor coals and gas coals, however, continued to sell much off those figures. The shipment of some coals outside the pool here has begun, although the greater amount of movement is still through the Tidewater Exchange and likely to remain in that channel. The end of the no-reconsignment order also proved pleasing to the trade here.

Anthracite—Little interest is manifested here in the hard coal market. The mild weather still holds and buying keeps up only in ton and half-ton lots for the most part. The main feature of interest to the trade the past week was a banquet given by the retail exchange to the Maryland Fuel Administrator, Ferdinand A. Meyer, and his staff, at the Southern Hotel, on the evening before their official termination of duties with the Fuel Administration, Mar. 1. The first real awakening of interest here will come with the discussion of possible spring schedules—if there turns out to be such a "beastie."

Lake Markets

PITTSBURGH

Stocks still in evidence. Hardly any buying. Production 25 to 30 per cent. of capacity.

Stocks of coal in the hands of consumers have not decreased enough to bring any additional demand into the market, and in consequence the market remains extremely dormant. Shipments of coal are at 25 to 30 per cent. of the mine capacity in the district, and are confined almost entirely to quantity. Less coal is being forced on the market through being loaded and having to be sold at almost any price to avoid demurrage charges, and in this respect the market is on a firmer basis than formerly.

The byproduct coke ovens are operating fairly well and are consuming almost as much coal as formerly. The steel mill consumption of coal is somewhat less, but it is still at a very good rate. Production of steel is at 15 to 20 per cent. less than at the maximum, late last fall. From the coal standpoint the chief difficulty about the steel industry is that it is using up stocks. Railroad consumption of coal is distinctly less. Outlook for the lake shipping season is not particularly good and it seems probable that shipments will be light early in the season, though by midsummer they may be at full rate.

There has been no negotiating as to contracts for the lake season, buyers preferring to hold off. Operators are equally in a waiting mood as to all classes of sales and show no disposition to force an issue. From present appearances it is quite within reason to expect that coal prices will be fairly well maintained, sellers merely waiting until buyers are willing to pay the price. The market at the moment is not closely quotable, as the grade of coal has so much influence upon prices. Generally speaking the market, outside of odd lots of demurrage coal, may be quoted at $2.25@2.35 for mine-run steam coal and at $2.50@2.70 for ¾-in. gas coal, per net ton at mine, Pittsburgh district.

BUFFALO

Little change in the situation. Bituminous possibly a trifle stronger. Trade hopeful, but nothing certain. Mines running at a slow rate. Anthracite accumulating.

Bituminous—Demand is still light, but stocks are running down and more will have to be bought before long or the industries will suffer. It is an odd situation. The consumers of all sorts of goods are waiting for prices to come down, while the producer and labor are engaged in holding them up. Not much can be done till this struggle is over.

Jobbers do not see any trade for them right away. They are waiting about as they were with just trade enough to keep them from utter despair. They do not fear complete annihilation, as some of them did when the Government fuel administrator was after them, for some day normal conditions will come back and then they will be wanted. They have won one battle in the dropping of the rule not to reconsign cars, but the benefit will not be evident right away. As a section Buffalo is apparently faring about as others are. It is a waiting market and must remain so till the industries move normally.

Former bituminous prices are held pretty tenaciously. A few cut prices are reported, but they do not affect trade much, quotations remaining at $4.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump; $4.20 for same, mine-run and slack; $5.60 for smithing and smokeless; $5.60 to $6.10 for cannel; all per net ton, f. o. b. Buffalo.

Anthracite—The coal is accumulating here quite rapidly. Some companies are managing to hold it somewhere else, others are either seeing it stand in cars or are putting it into stock piles. In any case the outlook is not pleasing. The spring is coming on, when the consumption is sure to be small, and then a long summer with little buying; for the consumer is not frightened any longer and still hopes to see prices return to former figures, though it does not look as though he would see lower prices right away.

Some shippers are saying that the logical thing is to put a lot of this coal afloat here, but nothing is done about it. A while ago there was tonnage asked for, but it was not taken and the prospect of any being loaded right away is not good. Shippers appear to be afraid that it will be moved west before any is needed there and the yards there be loaded full of it. The situation is one that could not have been thought possible till quite lately, for it has come to be the belief generally that anthracite would never be plentiful again.

CLEVELAND

Decidedly more snap is being shown by both the steam coal and domestic markets. For the former, depletion of stockpiles is given credit; for the latter, cold weather. The outstanding development is the report that at their meeting at Indianapolis, Mar. 18, the United Mine Workers will propose that the present wage scale be continued for two years.

Bituminous.—Not in months have local operators been stirred by anything as by the report that the United Mine Workers, when they meet at Indianapolis Mar. 18, will propose that the wage scale now in effect be continued for two years. In addition to furnishing a choice morsel for discussion, it has helped stiffen the market and prompted more predictions that No. 8 coal prices will continue at or close to their present level for some time. Operators are by no means unanimous in their views. Some believe that so long as commodity prices remain high, it will be the part of policy to keep wages up. These operators hold to the view that the public foots the bill, in any event, and that greater efficiency and harmony can be attained by maintaining the scale. Other operators are flatly against the present scale, and are insistent that it must be reduced.

Although operations at the mines have not been accelerated, the market, especially for steam coal, is broadening. In some instances the bottoms of stock piles are beginning to show. In other cases, users with fair-sized stocks still on hand are beginning to buy. A great deal of buying that was delayed because of a belief lower prices were inevitable is beginning to be revived. Many operators profess to believe the tide has turned and that the market will consistently become brighter. Hopes for an export outlet for coal all have faded, and this causes considerable disappointment.

The combination of real winter weather and a plentiful supply of much-sought Pocahontas has stimulated domestic demand for bituminous to the highest point of the winter so far. All hopes of doing a winter business have been abandoned, however, and any improvement is only relative. Dealers are getting $7.50 for Pocahontas lump and $7.20 for run-of-mine, and report a fair business at these prices. Retail dealers continue to receive numerous offers of second grade and off coal, but the coming of Pocahontas and the still ample supply of anthracite have pushed bituminous out of the running.

Anthracite—Receipts continue equal to demand, but are lower than a week ago. Pocahontas users are leaving substitute anthracite in the lurch, now that their favorite is obtainable. The delivered quotation continues $10.85.

Lake Trade—Loading machines at Lake Erie docks are being overhauled preparatory to the beginning of the season. Early cargoes are not being sought with much vigor, for dock piles at the head of the lake still are the largest in years—for this period of the year. In the absence of a new price last season's will hold over. The entire lake situation hinges upon the decision of the United States Railroad Administration on the request of lake shippers that demurrage rules be modified in order to permit abandonment of the pool and resumption of private shipping.

DETROIT

Because of the large stocks of bituminous remaining in retail dealers' yards and at many manufacturing plants, the Detroit market is inactive.

Bituminous—Withholding of orders by consumers of steam coal and retail dealers is still accompanied by the explanation they already have more stock on hand than they feel is justifiable, according to Detroit jobbers, who find business is unusually light for this period of the year. Large users of steam coal, who usually have been arranging contracts at this time in previous years, either have stocks sufficient to meet their requirements for some weeks to come or have decided the present is an inopportune time to take on new commitments.

Jobbers find some of the industrial consumers are buying only for current pressing needs and seem to be looking for a reduction in coal prices about April 1. Efforts to convince these customers that they are likely to be disappointed are not altogether successful, though the jobbers argue that with the present high wages of miners and unusual additions to operating costs, the producers are more likely to advance than to lower the price now in effect.

On most of the business that is being done the jobbers say the fuel administration scale of prices is being observed. Some exceptions have been reported, however, where coal on tracks was accumulating demurrage or was not of a type sought by buyers.

Retail dealers are expecting an improvement in demand from domestic buyers to follow the drop in temperature that marks the passing of February. So short a time remains before warm weather may be expected to return that the belated buying is unlikely to relieve the retailers of the necessity of carrying burdensome stocks of bituminous over into the summer.

Anthracite—With all restrictions on use of anthracite for domestic purposes now removed, the larger proportion of inquiry from householders is for anthracite or coke. Dealers appear able to supply either in reasonable amount, although receipts of anthracite are still of small volume. Intimations are given that an increase in price of prepared sizes of anthracite, amounting to 50 to 75c. a ton, may be expected in the near future and that the reduced price usually in effect after Apr. 1 to facilitate early distribution is unlikely to materialize this year.

COLUMBUS

The coal trade has been rather quiet during the past week. A short cold spell stimulated domestic buying, but it was short-lived and the weather is again exceedingly warm. Steam buying is not active, although inquiries are more numerous.

The coal trade in Ohio has continued quiet in all regards. The expected cold wave predicted by the weather bureau arrived, but the temperature was not a great deal lower and it was soon followed by the unseasonable weather that has prevailed all winter. Consequently, the domestic trade is still quiet and continues to be a weather proposition pure and simple. Retail stocks are large and there is no disposition to increase them under present conditions. There is still some demand for Pocahontas and other fancy grades, but the tonnage moving in this territory is not large. Retail prices are still generally maintained, although some cases of price cutting are reported. Household stocks are still large and many consumers will carry over a considerable tonnage until next year.

Steam trade is quiet in most localities. Traveling salesmen and jobbers report a better disposition on the part of purchasing agents to talk fuel, which is taken as a good indication. In other words, one can get the attention of purchasing agents to discuss the fuel proposition where it was almost impossible to get them to do so several months ago. Iron and steel plants are still well stocked and the same is true of rubber factories. Some of the manufacturing plants are slowly getting on a peace basis and are in the market for fuel. But orders are still scarce and are hard to land. Quite a few contracts expire around April 1 and there is some speculation as to what the new contract price will be. All the old steam contracts in this territory carry the Government figures. Some predict that shading will take place, while others believe the price will be maintained generally.

Production is still slow, as is inevitable under present conditions. Some railroad fuel is being mined, but railroads are not using as much as formerly. Steam plants, especially public service concerns, are taking a fair tonnage. It is estimated that the output in the Hocking Valley is about 25 to 30 per cent. and the same figures are reported from Cambridge and Crooksville fields. Pomeroy Bend is credited with 35 per cent. output. The eastern Ohio field is curtailed to about 30 per cent. production.

CINCINNATI

Mild and rainy weather has again reduced consumption. Production is being decreased to meet the situation, pending completion of marketing plans.

The coal trade as a whole is in the throes of readjustment to peace conditions, and to an extraordinary winter, which, after occasional hints of some real wintry weather, always turns again to mildness. This makes the need and the demand for coal very small as compared with the available supply. During the past week mild and rainy weather has prevailed, and consumers of all classes, seeing their stocks still adequate, and with prospects of an early spring, have naturally refrained from further buying. Deliveries of coal on contracts, therefore, have more than taken care of the needs of industrial consumers, as heretofore.

It is fully apparent to the trade, aside from the conditions brought about by heavy storage of coal last summer and a mild winter, that the process of getting back to a basis of normal consumption is still to be worked out, and that the present situation is playing its part in that work. In other words, it is pointed out by clear-sighted coal men that operations brought into activity purely by war business are suffering most by the present lack of demand, and that eventually mines which are without economic justification under normal conditions will have to be eliminated, as far as the ordinary run of business is concerned. This process, it is admitted, is painful, but it is also admitted that it is necessary, unless there are some means found of maintaining the country's industrial machine at the high mark of activity forced by the war, which it hardly considered possible, or at least, probable, just now.

LOUISVILLE

Steam continues inactive, with domestic in fair demand only. Prospects for steam slightly better. Coal operators believe that summer stocking will be light unless steam improves.

There has been no material change in the general situation in the Kentucky fields during the month. Mar. 1 finds the situation about the same as on Feb. 1. Steam coal is draggy, and some operators have been forced to ship steam without orders so as to get it out of the way in order to produce domestic, for which there is a fair demand.

Retail demand shows some slight improvement due to a few cold snaps and the fact that many consumers are beginning to run low on winter stocks, resulting in a fair demand for small lots.

It is believed that steam coal will be in much better demand by Apr. 1, due to the fact that many stocks are beginning to peter out, that some industries, especially the automobile industry, are again busy. Gas plants, public utilities, etc., are taking a fair quantity of coal.

Many operators are of the opinion that even if domestic consumers desire to stock during the coming summer period the retailers will have trouble in securing domestic sizes, unless they stock resulting steam grades. Many operators are now making their domestic sell their steam where possible.

The demand for low grade coals is light, and many of the eastern Kentucky producers of poor grades are at a standstill. The wagon mines are generally down. The larger mines are operating two to thsee days, whereas a few minei with good contracts are managing to keep busy almost full time. Production for the state, however, is figured at about 45 to 50 per cent. normal. Western Kentucky is producing on about the same schedule, but is having trouble in keeping up a demand for low grades.

Prices are holding fairly well, although about 25 per cent. of the operators are cutting somewhat in order to secure business. Domestic is firm, and on new business operators are holding for premiums of 15 to 25c. a ton, but generally supply old customers at Government prices. All grades under 4-in. are hard to sell, and are carrying a cut of from 20 to 75c. in some cases. Straight mine-run is about 25c. a ton off. Screenings represent the hardest problem at this time.

Retailers are generally carrying short stocks, and buying as needed, not carrying more than a few cars of coal on hand at the most, as deliveries can be had on short notice. It is now believed that a good deal of river coal will come in during the summer stocking season, and already a little coal is coming down, while it is reported that a good deal of coal is being loaded at upper Ohio River points.

Coke

CONNELLSVILLE

Less demurrage coke but regular make offered at lower figures. March adjustments in progress.

The furnace coke market is distinctly steadier in the respect that there is now little demurrage coke being offered at any price it will bring, but on the other hand some operators are willing to accept lower prices on regular orders. Thus while there is hardly any coke to be picked up at extremely low prices it is possible to buy coke, still to be made, at lower prices than formerly. Several leading operators are holding $5 strictly as minimum for furnace coke, but a few at least would sell down to $4.50, either a small lot or a run of a fortnight or a month. Regular brands of foundry coke are held fairly well at $6, but there is some shading of this figure. The spot and prompt market is quotable at $4.50@5 for furnace and at $5.50@6 for foundry, per net ton at ovens.

Negotiations are in progress to settle prices at which coke is to be invoiced during March under contracts calling for a negotiation when there is no Government price to control. It is not improbable that these adjustments will be made in most cases at $4.50, though some operators are trying to obtain more. In some instances the operator owes the buyer something

through the adjusted price for February having proved too high to be representative of the market. In some instances this fact was recognized by an extra adjustment in February. A case is cited, for instance, in which the parties agreed upon $5.50 for February, but the market soon proved so much lower that the operator made a concession covering shipments during the second half of the month such that the average for the whole month was made $4.75. Another illustration of market conditions is that one interest which controls both coke works and blast furnaces is billing the coke at $4.50, regarding that figure as fairly representative of the market.

The "Courier" reports production in the Connellsville and Lower Connellsville regions in the week ended Feb. 22 at 233,612 tons, an increase of 33,256 tons. The merchant oven production of 82,490 tons, however, showed a decrease of 3646 tons.

Buffalo—The situation does not look so bright as it did, for the amount of iron ore on the docks is heavier than for a long time and it is going to affect the summer movement of it seriously. The furnaces are not running strong and the demand for coke is less and less. Prices are weak. This market reports that what is needed can be had at about a dollar less than the former Government prices, and that anything of less value than 72-hour foundry is selling at terribly low prices, so low that quotations are hardly possible. Fuel coke is as dull as bituminous coal and will have to continue along with it.

Middle Western

GENERAL REVIEW

Labor difficulties at the mines would lead to coal scarcity. Steam market is dull. No contracting in evidence. Brisk demand for domestic coal.

Coal men are wondering what effect the tremendous decrease in the production of coal will have on the country. The rapid falling off in production since Jan. 1 is worthy of a lot of thought, especially on the part of the purchasing agents who buy large quantities of coal. If production is kept at its present low level, soon there will be a shortage of coal, even taking into consideration the fact that there are still some big storage piles throughout the country. Should any serious labor difficulties arise around Apr. 1, and such a situation is not at all improbable, it would find some of our most important industries practically without coal. In times as unsettled as the present the wise purchasing agent will have at least one to two months' supply of coal on hand.

The steam market is dull, if possible even as dull as last week. The bids made for the Camp Grant business have all been refused, and it is understood that Camp Grant will buy on the open market, for the time being. The big buyers are purchasing a little coal, but not enough to have much effect on current conditions.

Usually at this time of the year the coal man is exerting all his energies toward getting contracts, but this year to date but few new contracts have been made. Those agreements that have been made were entered into on a basis of Government price last in effect. The coal operator is not over-anxious to contract at the present low figures, because he believes that better times are coming. The purchasing agent is not very eager to contract because he thinks that within a short time the market will be demoralized, and operators will jump at any business on any terms. Personally, the writer believes that from the standpoint of the buyer, now is the time to contract.

The railroad fuel situation at this writing does not appear to be any nearer a solution than it was six or eight weeks ago, and criticisms of those to blame for this condition are becoming louder and more pointed from day to day. Coal operators think that somewhere they may have friends, but at all events they are not in Washington.

There has been, considering the past, a brisk demand for domestic coal throughout the Middle West. Most dealers had but limited stocking space, and it appears that what storage of domestic fuel there was in the territory has been absorbed.

Prices continue firm, both on steam and domestic. The operators are showing the public they have no wish to return to the old days of selling their product a little cheaper than their competitors.

CHICAGO

Colder weather stimulates steam and domestic demand. Not as much Eastern coal coming in as was expected. Anthracite moves slowly.

Chicago is enjoying a cold snap; that is, the coal producers are enjoying it. The result of the near zero weather we have been having for the last few days is a decided quickening of the trade, both steam and domestic. During an ordinary winter, times like the present would be considered very dull, but under existing conditions, the coal trade is very grateful.

Some Eastern coal is coming into Chicago and its suburbs, but not merely so much as was expected. The retail trade apparently like Mid-Western coal, and are refusing to go back to the more expensive coals from West Virginia, Ohio, etc. Anthracite continues to move slowly, although sales agencies are combing the territory for orders.

MILWAUKEE

Price-cutting by Illinois operators causes a nervous feeling among holders of large stocks of soft coal. Efforts being made to ward off a general decline in bituminous. A weather market.

Shading in prices by several Illinois operators is causing uneasiness in the Milwaukee market, and holders of bituminous coal are conferring with each other and doing what they can to avert a general decline in the soft-coal schedule. With spring at hand, and operators well stocked, there is no telling when this will occur. The situation is unquestionably dubious.

Retail prices on all grades of coal and coke have been firmly maintained thus far.

Bituminous stocks are heavy for the season, but the anthracite which was received by lake is nearly gone. This grade of coal is coming in freely by rail, however, and there is no trouble in supplying the demand. There are more users of soft coal in Milwaukee than ever before, and should anthracite continue at anything like present prices next season there is no doubt that many will continue to use the soft varieties.

Coal is moving out more freely from the yards, both by wagon and rail, because of a spell of cold weather; but the season is too far advanced to expect zero weather to remain very long.

It is certain that there will be a large amount of soft coal on the docks when the lake shipping season opens.

ST. LOUIS

Heavy market continues on all sizes from all fields with practically no demand for anything. Weather trifle colder than it has been, but nothing to warrant any decided changes in local conditions.

A heavy market with no changes of any kind is the local situation. The latter part of the week there was colder weather, but this was not enough to cause any unusual demand for coal, either steam or domestic. There were some small orders for domestic use and the wagon-load steam business responded slightly, but other than that there was no improvement.

Country business picked up a little on domestic sizes on the strength of a cold wave, but it was not anything to bring about any change in prices or create any shortage.

In the Standard district there still continues to be a surplus of steam sizes and at some mines a surplus of domestic sizes, with mines working one or two days a week. Occasionally some of them get three days.

The railroad tonnage is extremely light, but it is a factor at this time in keeping some of the mines going that would otherwise be idle.

The Mt. Olive field, which is putting in practically no coal in the St. Louis market, is doing exceptionally well on outside business in the northwest and Chicago.

It is understood that one of the last acts of the local fuel committee will be a letter eliminating the classifications made in the early part of the Fuel Administration pertaining to Illinois coals in the St. Louis market. This will help the Mt. Olive district considerably.

The present prices, which are below the cost of production, cannot continue for any great length of time without causing final disaster to some of the operators.

In the Carterville field of Williamson and Franklin Counties, as well as in the Duquoin field, there is a scarcity of orders for both steam and domestic sizes. All of the operating companies have the territory combed pretty closely now with the salesmen, but that does not seem to get the business in sufficient volume.

The Government prices in these fields are being maintained, excepting in Williamson County, where the independent operators are selling at $2.55 and below for domestic sizes. In the Mt. Olive field the Government price is being maintained, while the Standard field shows a continued weakness.

The local anthracite situation is not very encouraging. There is some chestnut, stove and egg moving in, but this is nearly all going into storage. The domestic demand is light.

Statistics furnished by the Tidewater Coal Exchange show that the situation has greatly improved, and on its recommendation all embargoes on coal consigned to all piers in the New York harbor have been removed.

The prevailing market, with the exceptions as noted above, is as follows:

Franklin County		Mt. Olive and Staunton	Standard
Prepared sizes, lump, egg, Nos. 1 and 2 nut	$2.75	.....	.....
Williamson County			
Prepared sizes, lump, egg, nut	$2.55	$2.55	$1.75 up
Mine run	2.20	2.20	1.65@1.75
Screenings	2.05	2.05	1.00

Williamson-Franklin rate to St. Louis is $1.10; other rates 92½c.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Mar. 2, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	142	145
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	38⅜	38⅞
Colorado Fuel & Iron, Pfd	(CF)	99	....
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	25	29
Elk Horn Coal, Pfd	(EH)	....	47
Island Creek Coal, Com	(ICR)	39	....
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	46¾	47
Pittsburgh Coal, Pfd	(PC)	85½	86
Pond Creek Coal	(PD)	13½	14
Virginia Iron, Coal & Coke	(VK)	55	60

*Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd., 6s, 1922	90	....
Clearfield Bituminous Coal, 1st 4s, Ser. A., 1940	71	....
Colorado Fuel & Iron, Gen. 5s, 1943	88	90
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	73⅛	73⅞
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	88	91
Grand River Coal & Coke, 1st 6s, 1919	....	....
Jefferson & Clearfield Coal & Iron, 2d Mtg. 5s, 1926	96½	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	97¼	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79⅛	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s. Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	84	85½
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	87¾	90
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	81½	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	92	95¼
Utah Fuel, 1st Sinking Fund, 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	51½	70
Virginia Iron, Coal & Coke 1st 5s, 1949	87⅞	89⅛

COAL AGE

Volume 15 New York, March 13, 1919 Number 11

Humanizing Industry

By Floyd W. Parsons

TWO kinds of people are a menace to America. They are both extremists. One has too much imagination; the other too little. Both are selfish, unreasonable and autocratic. Both work from different ends toward the same unhappy center. There would be no violent radicals if there were no ultra-conservatives. One is the fruit of the other's planting.

In every industry throughout the United States are men who refuse to advance with the times. They hold steadfast to ideas of the 1890 blend. In their outlook on business they do not recognize any need to study human reactions, although they would not think of building a machine without first getting a satisfactory report on the properties of the materials entering into it from the company's research laboratory.

Industrial troubles in recent years have come largely from an effort on the part of many employers to make workmen act as nearly like machines as possible. A new mine is opened or a factory started, and men are poured in very much the same as metal is poured into a mold. If labor is plentiful, the men pour easily. However, one thing is overlooked, and that is the fact that there is a decided difference between getting a real working force and filling a mine with men.

The employer cries aloud against his large labor turnover. When asked the reason, he attributes it to human perversity. He does not investigate carefully, or he would soon discover that job changing is unnatural; the normal man wants to settle down and have a permanent home and a steady position. One truth is now recognized, that the worth of a management can be determined by the size of the labor turnover.

It is interesting to know why a workman will loaf consistently each day and then work diligently on some task at home after hours. Let the manager ask himself, "Is this the fault of the man or the job?" When a man is more interested in doing something outside than he is in attending to the job for which he is paid, it is a sure sign that the employer has withheld from him all measure of personal responsibility. He has been permitted to work in monotonous fashion without any understanding of his real value in the final outcome of things.

No workman can be efficient unless he knows that his accomplishments will reflect credit or discredit upon him, according to the skill he exercises. He must be permitted to satisfy his creative instincts. He must be taught that the most perfect machine is only a tool; that he is its master and can make it effective or not, just as his skill directs. Not until the workman feels the sense of mastery will he assume responsibility. Idle machine hours and high costs exist where men and machines are equal.

It is all very well to talk of supervision from above, but there is greater efficiency when supervision springs from below. The man who is truly creative does best unde a policy of self-supervision. Stop a minute and investigate the cause of success of certain managements. It will be found that this success is based on a policy of satisfying the natural instincts of employees.

The primary instinct of a man is to preserve his family. This means he must receive a minimum wage that will afford a certain degree of comfort and pleasure besides a mere sustenance. No man can think of his work with pleasure if it provides him with a bare living. And right here it is important to note that a living wage is not measured by the amount a workman receives in any one week, but by the income he receives for his year's labor. As a natural sequence it follows that where consumption has not been curtailed by high prices, the more idle days that occur in an industry the higher the wages must be fixed to afford the workmen in that industry a decent living. A bear can go into his cave and live on nothing for several months, but not so a human being.

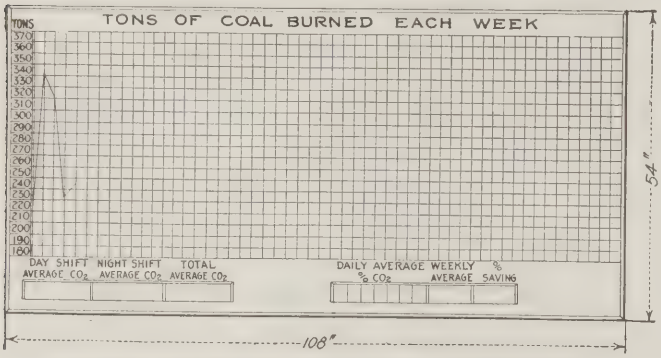
The coal industry is confronted by a serious problem. Plans must be perfected to make the production of coal something more than a seasonal affair. Capital and labor cannot go forward in harmony unless first there is regular employment for the men at a minimum wage. It is useless to discuss ways leading to efficiency and cooperation in and about the mine unless there is a base wage for the miner that will fully cover his cost of living through the full year. After this is a fact we can go on and talk of better results through self-government, and of quality and quantity production through a superior kind of industrial democracy.

IDEAS AND SUGGESTIONS

Coal-Curve Board for Use at Power Plant or Mine Mouth

BY H. H. FINCH
Springfield, Mo.

The accompanying drawing shows a coal-curve board that may be used either at the power plant or the mine mouth. This board is 108 in. long and 54 in. high. It is made of good grade of flooring, scraped smooth and painted black with white lines. There are 52 spaces provided, each space representing one week. This gives a year's curve, which may be painted with white paint one year and another color the next. The board will



BOARD PROVED OF VALUE IN POWER PLANT

thus afford space for curves for three or four years, so that results can be readily compared. Such curves are extremely interesting and should be placed in or near the boiler room. The CO_2, which may be marked up daily for the day and night shifts, is also an interesting feature.

This scheme has been used at the plant of which I have charge since Jan. 1, 1919, and we have found it a fuel saver. The daily CO_2 percentage is marked in chalk and each fireman can see his work; and not only he himself but others can see his percentage. I made a drawing of this board and had it built and painted at the plant. The squares are of 2-in. dimensions.

A board of similar design might well be used at the mine entrance to show the weekly output of the operation. In such a case a second curve might well be drawn showing the number of total employees or miners. The average output per miner or per employee might be drawn as a third curve.

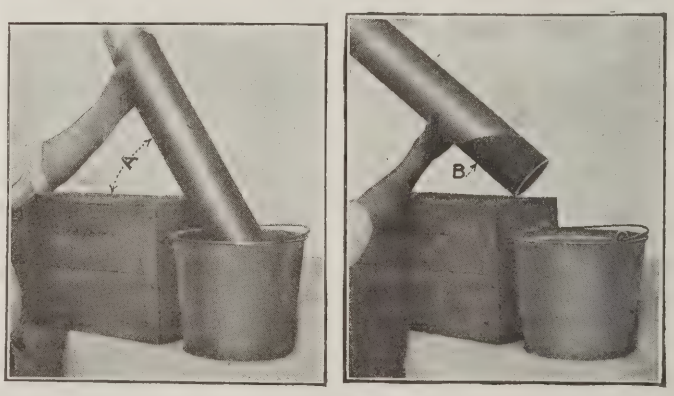
Novel Method of Moving Cars Back and Forth on a Switch

It frequently happens that one industry may with advantage borrow or adopt an idea or device from another with which it has no direct relation or point of contact. The following scheme for moving empty or partly loaded cars might well find application at many mines. In a mill where it is necessary to unload grain from railroad cars at several points, and to load the finished product at different places along the warehouse platform, there is a problem of moving the cars back and forth on the switch. The empty cars can be moved by manpower, but a car that is partly loaded requires a switch engine, which is not always available.

The Pasco Flour Mills Co., of Pasco., Wash., a new mill that has installed electric drive throughout, is utilizing its drive in an ingenious manner to solve the problem of car switching. The mainshaft in the mill is driven by a Westinghouse 40-hp., three-phase motor. A countershaft, driven from the mainshaft, projects through an aperture in the wall of the mill to the loading platform. Attached to the end of the countershaft is a steel spool, or niggerhead, on which a coil of 1¼-in. rope may be wound. The loose end of this rope is attached to the coupling of the car to be moved, by means of a steel hook. By throwing the countershaft in gear the drum revolves and moves the car. The direction of the pull from the drum is made by changing the winding and lead of the rope on the spool. The device is homemade.

Inexpensive Liquid Miter Makes Easy the Cutting of Angles

It is often desirable to cut or saw metal or wood at a special angle. Such an operation would necessitate the use of an expensive adjustable miter, the price of which is often too high for the work in hand. To overcome this difficulty at the least expense a liquid miter

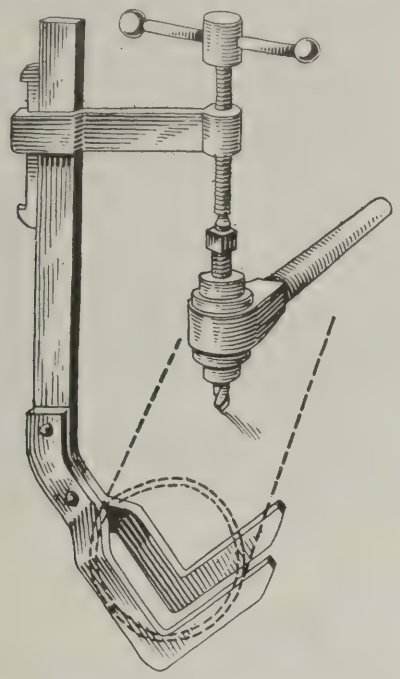


METHOD OF USING LIQUID MITER

may be substituted for use on wood and polished or dull metal. For polished metal, a few crystals of sulphate of copper are dissolved in a suitable container; the end of the piece to be sawed is placed for a few seconds in this liquid, in such a position as to form the desired angle to the horizontal shown at *A*. When allowed to dry, the copper solution will oxidize the piece, as shown at *B* and leave a definite guide line for cutting. For rough metals or wood a solution of lime may be used, thus leaving a clean, white line as a guide for the correct cutting of the angle.

Homemade "Old Man" for Drilling Pipe

The device shown in the accompanying illustration is homemade, and is used for drilling pipe. These are placed on the saddle, which consists of two iron straps, bent and riveted to form a fork-shaped end piece. The



SIMPLE DEVICE AIDS IN DRILLING PIPES

adjustment for the height of the arm on the main bar is made with a wedge, which bears against the bar. The feeding of the ratchet drill is done by means of the feedscrew shown. This device is comparatively light, weighing ordinarily only about 4½ lb., and is therefore easy to handle.

Readers are invited to send in practical and helpful ideas for this department. Help make these pages the most valuable in the paper. Liberal remuneration for all articles published.

Efficient Locomotive Haulage Depends a Great Deal on Motorman

By E. Steck
Hillsboro, Illinois

There has been considerable discussion in the past regarding the proper size of locomotive and motor equipment required to haul a trip of cars where the number of cars, weight of car and capacity have been given, as well as the grade conditions and the distance of the partings from the bottom. Theoretically, this is a simple calculation; but practically it must be considered from many angles. The theoretical formulæ have often been stated, but just as much consideration should be given to the practical end. The following must be taken into consideration: Motorman, sequence of grades, condition of rails, delivery of cars to partings, capacity of bottom, bonding, trolley and feeders.

The motorman can greatly overload a locomotive that is theoretically the correct size by stopping on or at the bottom of grades against the loads, making it necessary to cut the trip in two; whereas a good motorman would take the grades with sufficient speed to enable the momentum to help carry him over. The poor motorman will use excessive sand on grades to keep the wheels from slipping, but at the same time greatly increasing the electrical resistance between the wheels and rails and thereby reducing the hauling capacity. Such a man pays no attention to the number of cars per trip, sometimes coming to the bottom with a very small one and then again with a trip much too large. Either too small or too large a trip will cut down the tonnage capacity of the locomotive.

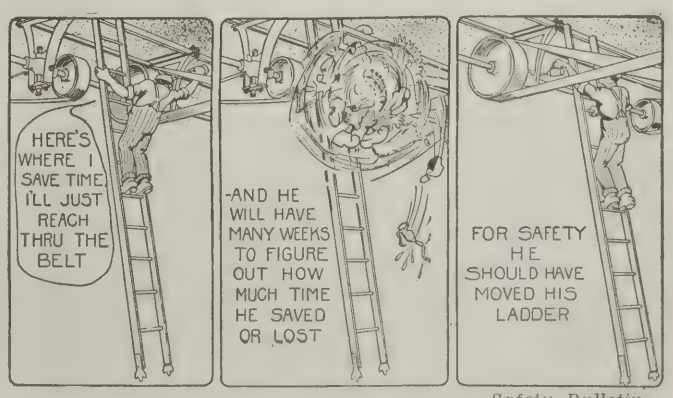
If haulageways are rolling, the grades with the loads can be utilized to some extent to obtain enough momentum to help pull over the grades against the loads. If all the grades are against the loads, a larger locomotive will be required for the same per cent. grades than in the first case. Right here is an opportune time to state that a locomotive operating over an entry which has a short steep grade against the load will not require as large motors as one operating over a perfectly level road.

Where a short steep grade occurs, the size of the trip is limited by the slippage of the wheels on the grade. This trip is obviously much smaller than the one that would be required to slip the wheels on the level road. In the first case the locomotive is only fully loaded on the hill, and while running over the level part of the road it is underloaded; in the second case the motor is fully loaded all the way. As the capacity of the motor is limited by its heating, which in turn depends on the amount of current and the time during which this flows, it is readily seen that the locomotive fully loaded on level track has the hardest work to perform.

A locomotive will pull more over a dry, clean rail than a wet, sandy or dirty rail. If the working conditions are such that the partings from which a locomotive pulls cannot be kept full enough to make a proper trip, the locomotive will be underloaded or, in other words, too large. If on the other hand the parting holds too many cars, the motorman is tempted to pull them all, overloading the locomotive. In either case the locomotive will not deliver the maximum amount of coal possible.

If the bottom is small, or if the hoist is slow, a large locomotive is not practical, as the bottom will become blocked. In such a case a small locomotive could be used to better advantage.

He Tried to "Save" Time



—*Safety Bulletin.*

LIKE ALL WHO GAMBLE WITH THEIR "LUCK" THIS MAN LOST—AND PAID THE PENALTY



FIG. 1. GENERAL VIEW OF NO. 87 PLANT AND TOWN OF IDA MAY

Modern Shaft Development of the Consolidation Coal Company—I

By George W. Harris
Editorial Staff, *Coal Age*

THE old wooden frigate with all sails set looked every inch a sailor—years ago. It loomed up much more imposing at a distance than the modern dreadnaught, deep set and with its decks almost awash. What a transformation time has wrought! The new type includes every mechanical device adapted to the many services required in operating the modern craft. Manual labor has been done away with wherever practicable. Turning from the sea to firmer footing, we have similar examples of time's changes. In the coal fields the old wooden tipples have not usually been scrapped, but were allowed to serve out their term of usefulness. However, when these old structures are to be replaced or when virgin territory is to be developed, the improvements partake more of the modern steel fireproof construction.

A new plant is the joy of all concerned. Here is an opportunity to cut loose from old methods. No patching up of old buildings and fitting in of new machinery on old structures here. The modern shaft development of the Consolidation Coal Co. at the head of Helen's Run, in northern West Virginia, is a typical case of this kind. The improvements started in this section reflect the value of the coal underlying this territory—it is one of the fine deposits of the Pittsburgh seam and worthy of the best efforts of manager and engineer in its extraction. Some 6500 acres of coal are included in this tract, which is to be attacked at two points about two miles apart; provision has also been made so that additional acreage can be mined at these plants if desired.

Mines No. 86 and No. 87, here referred to, are about seven miles due west from Fairmont. Their location is shown on the map of the Fairmont coal field on page 1150 of the Dec. 26, 1918, issue of *Coal Age*. They are practically in duplicate as far as layout of plant and tipple design are concerned, accordingly one only—mine No. 87—will be described and illustrated. This duplication of plant is also found in other coal fields in a limited number of cases. It is entirely in keeping with modern practice in this respect, as witness the history of the Liberty motor of recent fame. When a number of units are to be built which can be practically identical in design, then it would seem to be the part of wisdom to perfect this unit as far as possible and utilize it as a model.

A general view of mine No. 87 and the town of Ida May is given in Fig. 1, the store and surface plant being shown toward the left in the illustration. The surface plant at the mine is shown more in detail in Fig. 2; beginning at the left, and in the order named, are the tipple with the hoist house adjoining, the airshaft headframe and the shop. Mine No. 87 was started in April, 1915, and since that time a full-fledged operation has sprung into existence, only requiring another year's extension of underground work to bring the plant up to full capacity—3000 tons of coal in eight hours. This tipple is shown in perspective in Figs. 3 and 4, and the machinery and chutes are shown in section and plan in Fig. 5.

Coal-preparation buildings—both anthracite and bituminous—have seen many changes in the last 25 years. The modern breaker or the tipple is no longer a dark, barn-like structure. Especially since the free use of structural steel in their construction has great improve-

ment been noticed in the design of the buildings. Greater attention has been paid to the more efficient use of space and the better lighting of rooms where this feature is important. A gradual reduction in the height of breakers and tipples has been the tendency wherever practicable; this was brought about first by the use of elevators and further by the adoption of traveling tables and shaking screens, which replaced chutes and bar screens in part. The traveling tables, with their added refinements, designed to lessen breakage of coal, especially conserve lump and other sizes of bituminous. The dropping of coal is more and more eliminated, the loading boom taking coal from the tables places lumps in the railroad car in good condition; this is the last step in the greatly improved method of handling coal in tipples. If a concrete example was desired to illustrate the last word in bituminous tipples, possibly no better plant could be considered than the Ida May structure shown in the accompanying illustrations. In this tipple the dump hopper and first, or upper, shaking screen only are in the highest part of the tipple proper and the rest of the preparation machinery is in the low shed over the loading tracks. The lighting and ventilation of the interior of this building are largely accomplished by movable skylights—a common practice in modern shops but somewhat of an innovation in tipples. The floors and walks of the tipple are of concrete.

The No. 87 tipple is a strikingly low structure, being only about 43 ft. in height from the surface to the dump. Coal from the shaft is dumped into the receiving hopper, from which it is carried to the shaking screens by means of a heavy pan conveyor feeder. The screens are 8 ft. wide and are designed to handle at least 4000 tons per day. They are operated by the Allen & Garcia center crank drive and are carried on Peterson pendulum hangers, handled by the Allen & Garcia Co., of Chicago, Ill. The upper screen has two screening decks, the upper making lump over 1½-in. lip screens, the lower deck rescreening the 1½-in. slack over ¾-in. lip screens. Either 1½- in. or ¾-in. slack can be loaded on the second track and 1½ x ¾-in. nut coal can be loaded on the third track through a telescoping hinged chute. If the gates are closed, the nut coal or the nut and slack as well as the lump are carried to the lower section of the screen. The upper deck of the lower screen contains one section of 4 x 6-in. oval perforations, which are covered by a bolted veil plate when not in use. Below this point there is an interesting and novel feature consisting of two large vertically lifting gates each half the width of the screen; they are provided with sides and deflectors so arranged that the coal is divided equally between them. These gates are operated by means of handwheels and sliding nuts, so that they can be manipulated without stopping the screen and be held in any position without additional locking.

Thus a great variety of operations are possible: Run-of-mine, 1½-in. lump or ¾-in. lump can be divided between two 5-ft. picking tables and be loaded on the fourth and fifth loading tracks. The entire product can be thrown to either table. Or egg, egg and nut, or egg, nut and slack can be loaded on the fourth track with the resulting lump on the fifth track. In every one of these operations the coal slides easily to the discharge point, and there is no serious drop and breakage anywhere. The whole outfit was designed to handle lump coal especially, with the minimum amount of breakage, and it is questionable if there is another plant capable of making a better record in this respect. As an additional precaution each size of coal goes over a degradation screen just before reaching its loading chute or table, and the product of these screens is carried back into the slack car by means of a degradation conveyor.

When the lump or egg coal leaves the lower shaking screen it will pass over two picking tables and loading booms, where an opportunity is given for the removal of refuse. Only one of these tables has been installed up to date. Men stationed along these tables pick out impurities and throw them into the primary gob conveyor alongside. The primary line delivers to the main gob conveyor running along the outside wall of the tipple and emptying into a rock bin adjacent to the hoist shaft. This main conveyor and rock bin are shown



FIG. 2. VIEW OF THE SURFACE PLANT AT CONSOLIDATION COAL CO.'S NO. 87 MINE

on the plan and section, Fig. 5, and along the outside of the tipple, Fig. 4. When rock is hoisted in the shaft it is dumped into the receiving hopper, but is prevented from following the usual course of the coal by deflecting gates controlled by the lever *C*. Thus rock goes by chute to the rock bin.

When run-of-mine is to be loaded it can either go direct by way of the auxiliary mine-run chute into a car on the first track or be deflected by a gate (opened by the handwheel *A*) from the upper shaking screen into the principal run-of-mine chute. This chute loads by means of telescoping and hinged apparatus either into a car on the first or on the second track, the loading being controlled by a hinged vane. This system of run-of-mine chutes was designed to handle occasional runs of coal which might contain impurities—such coal being thrown to a car on the first track. The gates controlling these chutes are all operated from the dump-house platform, where the coal is inspected as it comes up in the conveyor feeder. The chutes leading to the first track have not been installed yet, but all arrangements have been made to have them placed in position eventually.

At present mainly run-of-mine is loaded at this plant. At times there is interruption to car delivery at the loading chutes and provision was made for such contingencies by providing a controller for the motor operating the feeder at the receiving hopper. This controller is located on the main floor of the tipple over the loading tracks. Outside foreman C. H. Shear devised a scheme whereby this controller is operated by the car trimmer standing on the platform while loading run-of-mine. Wires run from this point, over pulleys at turns, to a handwheel on a vertical shaft at the controller. This arrangement takes the place of the usual hand lever and does away with the necessity of keeping a man at the controller. A car retarder, made by the Fairmont Mining Machinery Co., of Fairmont, W. Va., is installed at each loading track.

Another quite interesting feature of this tipple (the idea originating with the designers) is the concreting of three sides of the hoist shaft from the surface to the dump. The steel members of this portion of the tipple frame are light and the concrete encasement was designed not only to give greatest strength and rigidity to the structure, but to keep coal and dirt from dropping inside the screening portion of the tipple. The concrete also protects the steel members from the corrosive action of the mine gases coming up the shaft. The designers of this tipple claim that they have met with great success with this style of construction and that they are using it on several of their newer tipples.

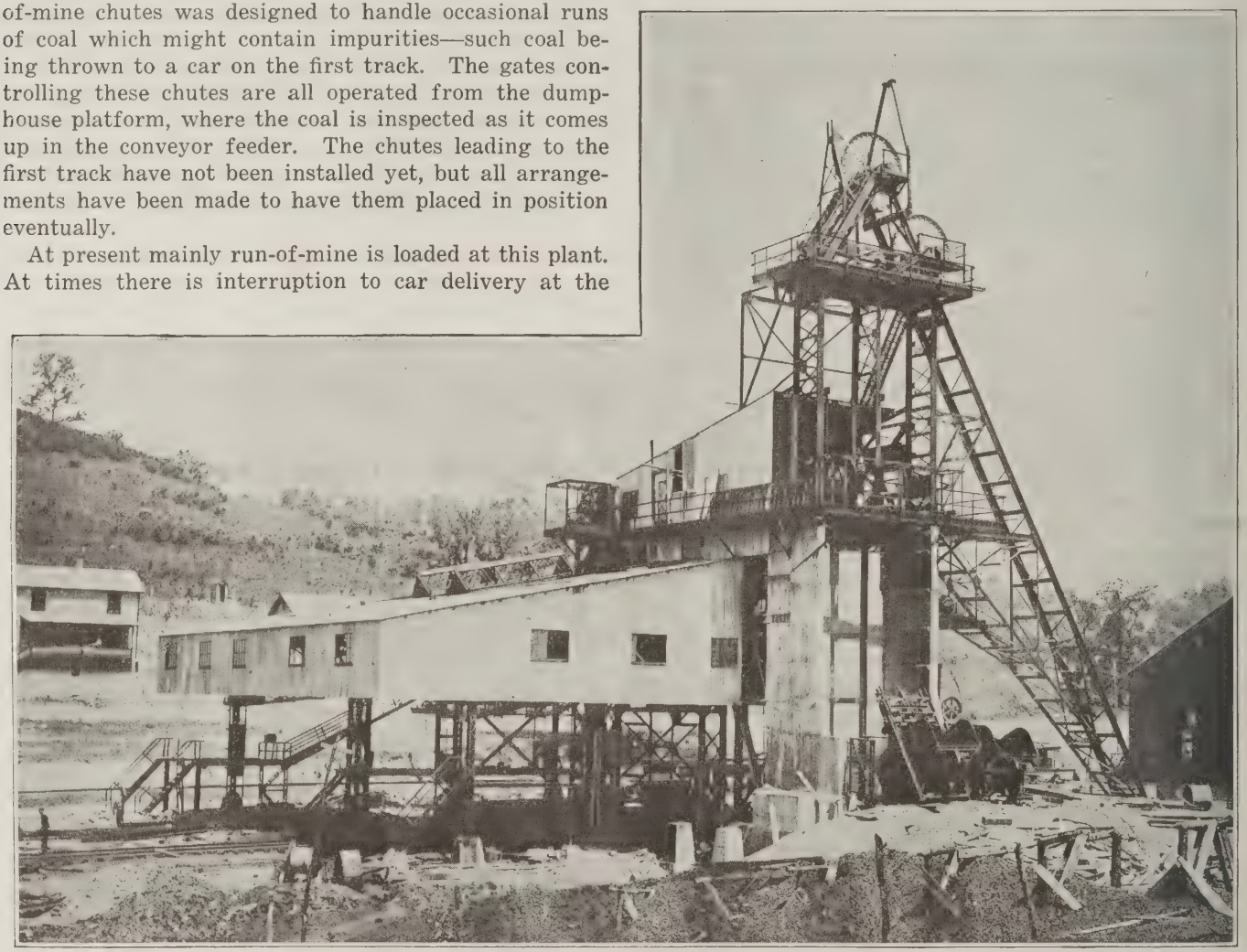


FIG. 3. LOOKING AT THE TIPPLE AT THE NO. 87 MINE FROM THE LOWER SIDE

Modern tipples and towers or headframes are generally equipped with some provision for instant and efficient handling of sheaves; in the No. 87 tipple a derrick combination is provided for this purpose. The derrick details are brought out in Figs. 3 and 4. A different method for handling sheaves is provided at the top of the airshaft headframe as shown in Fig. 2. This is the common method in use for the ordinary placing of sheaves.

Adjacent to the tipple is the house containing the electrically operated shaft hoist, fully described in the July 13, 1918, issue of *Coal Age* under the title of "Motor-Driven Shaft-Hoist Installation," by R. P. Hines. This hoist has a cylindro-conical drum operated

by a General Electric 1400-hp. motor on the Ward Leonard system of control, combined with the Ilgner flywheel method. This flywheel has sufficient energy, in case of the failure of current from the main supply line, to hoist and land a cage; thus it should not be necessary to stop the hoist at any point in the shaft on account of lack of power. It has been stated by Mr. Hines, the electrical engineer of the Consolidation, that this hoisting equipment is believed to be the initial one of its type to be installed in the eastern bituminous coal fields; safety features are provided covering all contingencies for man, load and operating protection. The engine house is of fireproof construction—brick walls and steel roof trusses.

During the early development days of the mine the man and material hoist shaft was used as a temporary coal shaft also; the smaller headframe shown in Fig. 2 is at this shaft. A 22 x 36-in. steam-driven, double, first-motion engine, made by the Connellsville Manufacturing and Mine Supply Co., of Connellsville, Penn., was installed at the shaft and used to hoist coal among other purposes. A counterweight is used to balance the single cage and rope, and runs in an adjoining compartment to the cageway of the shaft. A temporary wooden trestle was built from this shaft to the railroad track to enable the coal hoisted to be dumped into railroad cars for shipment. This trestle is still in place and can be utilized for loading coal should there be an interruption to operations at the main shaft.

In the same building containing the man hoist engine is the power plant for the limited steam requirements of the plant. Installed originally for shaft-sinking purposes, it is continued as a reserve source of power. The steam pipe covering used at this plant is asbestos sponge-felted, furnished by the H. W. Johns-Manville Co. The 6 x 20-ft. Lepley reversible mine fan at present is driven by a 22 x 24-in. steam engine, both made by the Connellsville Manufacturing and Mine Supply Co. It is the intention to equip this fan with an electric motor which will be the prime motive power, the steam drive being held as reserve in case of failure of electric power. It is essential that there be no interruption to the operation of the fan at this mine. The fan was designed to force 300,000 cu.ft. of air into the mine against a total water gage of 3.6 in. Steam is generated at this plant in three 100-hp. water-tube boilers made by the Erie City Iron Works, of Erie, Penn. The exhaust from the fan and the hoisting engine goes through a heater made by the Pittsburgh Feed Water Heater Co., of Pittsburgh, Penn. The feedwater is handled by Snow and Smith-Vail pumps, while a Cameron is held for emergency use. Adjacent to the engine room and under the same roof is a substation; here is a switchboard and a converter to change the line alternating to direct current, the equipment being furnished by the General Electric Co. It is of practical interest to note that the Consolidation company has a number plate attached to every piece of machinery about its plants. In case of necessary repairs to or removal of apparatus from one location to another, the number permits of a definite record being kept of each operation in concise form.

There are few cases where a shop of some description is not an important part of coal-plant equipment. In sections remote from establishments where difficult repairs can be attended to promptly, it may be essential to have a shop at the plant where such work can be done satisfactorily—the size of the plant often influencing the amount of the investment in this direction. A view of the substantial brick building used by the Consolidation at Mine No. 87 for a shop, supply and lamphouse is shown in Fig. 6; it is 35 x 160 ft. in outside dimension and about 18 ft. in height.

The shop utilizes about half of this space and the lamproom about a quarter of it. At present machines are being installed; two underdraft forges made by the Buffalo Forge Co., of Buffalo, N. Y., an emery



FIG. 4. THE TIPPLE AT NO. 87 MINE FROM THE UPPER SIDE

grinder, by the Norton Co., of Worcester, Mass., a drill press, by the Rockford Drilling Machine Co., of Rockford, Ill., and a few other of the usual accessories to mine shops are in place. It is expected to add other machines to this equipment in time, such as lathes, a steam hammer and so on. Smithing, carpenter and machine work are done in this shop.

The miners are required to use an electric mine lamp on account of the presence of gas in the underground workings at Mine No. 87; the Edison permissible portable (Model C) has been adopted for ordinary use. The mining machine runners and the firebosses carry Wolfe safety lamps, the former setting these lamps ahead of their work when undercutting. The electric lamps used by the miners are kept in proper condition and all repairing is done by the company, a nominal charge being made to the miners for the use of the lamp. The miners leave the lamps at the lamphouse on coming out of the mine at the end of the day's work and call for them again before going down the shaft to commence work. Racks holding 100 lamps each are ar-

ranged for holding them when not in use, and all lamps are numbered so that each man gets his own. The lamp is so well known as to need little description here; the storage battery, attached by a "cord" to the lamp, is charged at night for the day shift men and during the day for the men working at night. One hundred lamp batteries are charged at a time with current at 100 volts, the rheostat (furnished by Mine Safety Appliances Co., Pittsburgh, Penn.) being kept at one ampere.

The batteries are regularly inspected and water and solution added when necessary; as a rule the batteries are filled with distilled water twice a week and the solution is changed every eight or nine months. It takes about eight hours to charge the batteries ($2\frac{1}{6}$-volt lamps). There is one man on each 12-hour shift to look after the charging of the lamps and to do the ordinary repair work, such as wire renewals, repairs on the headpiece, and so on.

In the group of buildings about the shafts is the sand-oil-cement house, constructed of tile and cement. An oil-storage system installed by S. F. Bowser & Co., Inc., Fort Wayne, Ind., is used and several grades of

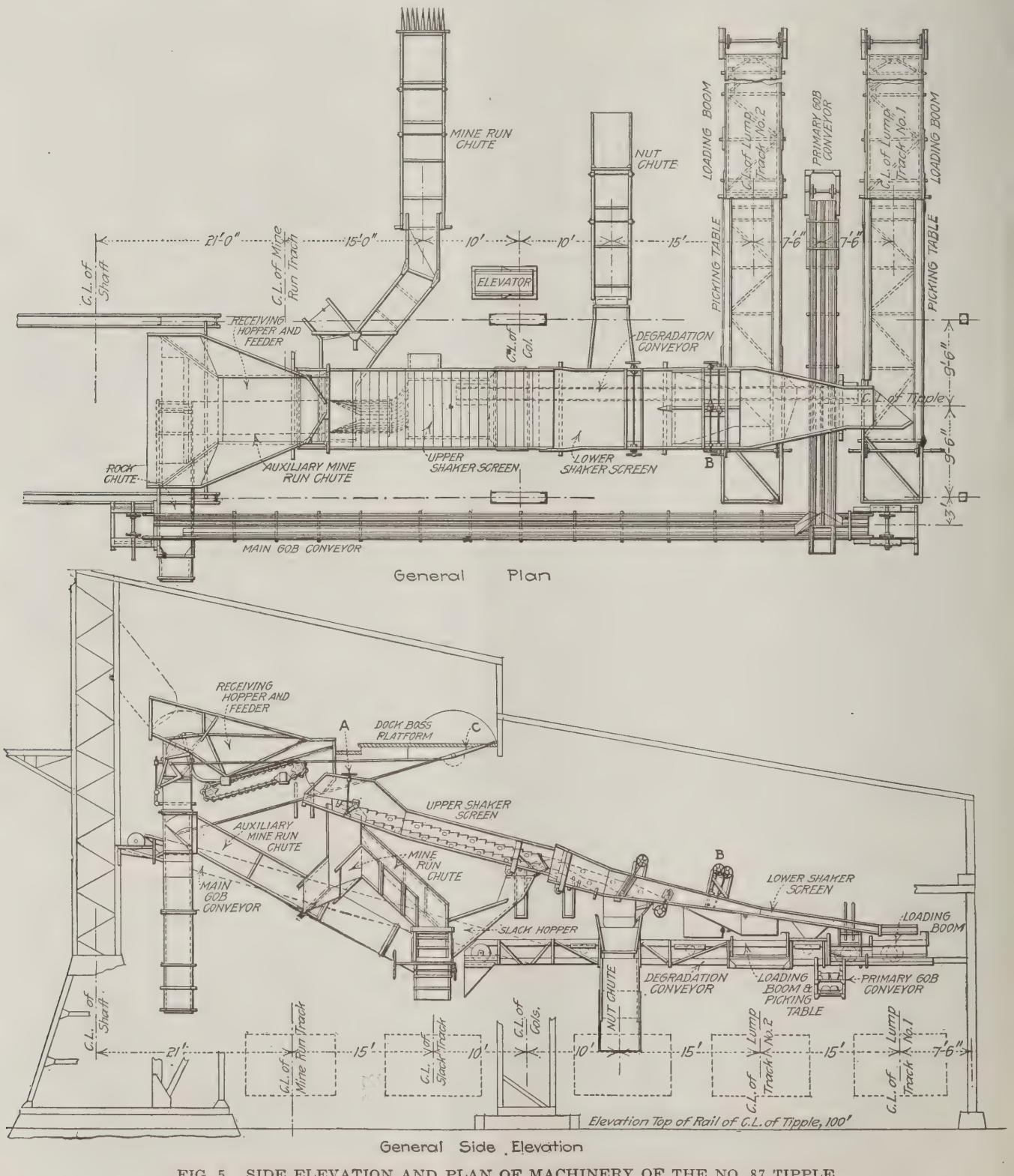


FIG. 5. SIDE ELEVATION AND PLAN OF MACHINERY OF THE NO. 87 TIPPLE

lubricants are kept—heavy black oil, for mining machines, a heavy engine oil and a lubricating oil for cylinders. On the mine cars "pit car oil," furnished by the Galena Signal Oil Co., of Franklin, Penn., is used. The main powder house is located up on the mountain side away from all other buildings, but the distributing house (10-ft. square) is adjoining the oilhouse. In this

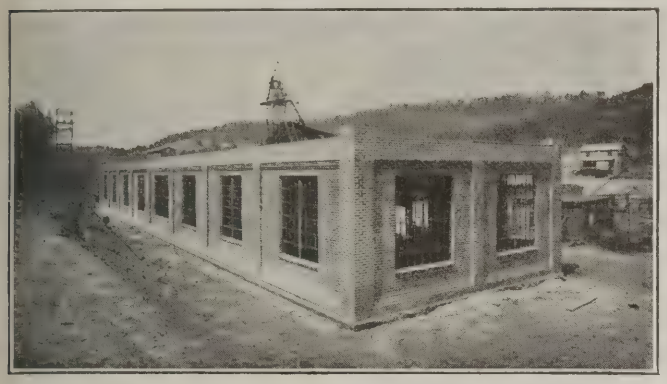


FIG. 6. SHOP AT THE NO. 87 MINE

latter house pigeon holes have been built around the sides of the room, one for each man. Monobel powder (manufactured by E. I. du Pont de Nemours & Co.) is used, and it is never necessary for any miner to take powder home as he can leave extra sticks in his pigeon hole at the distributing house and call for them again the next morning on his way to work.

(To be concluded)

Coal Operator and Central Station

The central power stations in Illinois have encountered many difficulties in the work of electrifying the coal mines along their transmission lines. The responsibility for the trouble rests with both the central stations and the coal operators.

The central stations have two difficulties to overcome. The first of these lies in obtaining the prospective customer's acceptance of the usual primary rate. This is really an arbitrary rate and is not made on any just basis. The usual primary rate is about $1.25 per month per kilowatt of maximum demand occurring during a definite interval of time. This charge is supposed to represent 15 per cent. of the cost of installing 1 kw. of station capacity to serve the consumer. The cost of 1 kw. is taken at $100, and 15 per cent. represents interest, depreciation and taxes or $15 per year.

Assuming that in normal times it does cost $100 per kilowatt to install the plant, and that the 15 per cent. charges are correct, is the central station justified in charging $1.25 per kilowatt of maximum demand, say on a basis of a 15-minute peak? The machinery is generally purchased on the basis of the capacity it will develop continuously, and not on its overload capacity for a short interval of time. The sum of the maximum demands of all consumers will greatly exceed the loads arising from these customers on account of the diversity factor, and because some are distinctively day loads and others night loads. Consequently, the maximum demand or primary charge should be reduced.

The central station will object to a reduction in the total rate due to cutting the primary rate, but this is unnecessary as the secondary rate could be increased to compensate for the loss. With such a readjustment both the central station and consumer would be benefited. The central station could more easily obtain the coal-mine load and the coal operator would not be required to pay the heavy primary charge when the mine is closed down because of labor troubles, accidents or lack of coal orders. The coal operator hesitates to sign the present power contract, carrying perhaps upward of $1000 a month primary charge, while he is confronted by the possibility of long idle periods.

The other great objection from the coal operator's standpoint is the disinclination of the central station to take the hoisting load without making the cost of the necessary machinery prohibitive. What I refer to is this: The central stations insist that large hoist motors must not be alternating current, but must be driven by special motor-generator sets which keep the line disturbance due to hoisting down to a minimum. Such equipment is generally excessive in cost. Where the change is being made from a steam to an electrically operated mine it is practically impossible to change over the hoist, with the result that the boiler plant cannot be entirely closed down; and the boiler plant is generally expensive to maintain.

If the central stations can get their power plants and transmission lines in such shape that large alternating-current motors can be used on mine hoists, they can greatly increase the coal-mine load on their lines.

On the other hand, the coal operator does not use the central station service to its maximum. Often only a motor-generator set is installed to operate locomotives and cutting machines underground, and no thought is given to the operation of the machinery on the surface. It is not unusual to see long, leaky, uncovered steam lines serving uneconomical engines for operating tipple machinery, car pullers, fan, shops, pumps, etc. The motor-generator set is probably operating under the lowest secondary rate, consequently if these engines were replaced with motors they would operate on the low rate, which would be greatly below the cost of fuel alone for running engines.

The central stations must educate the operators along these lines. They have not completed their task with the electrification of the mines, as the operators are liable to object to the payment of the power bills, which they really believe to be excessive. This is due to the fact that the power bills are payable on the first of the month and there is no question as to their amount. The cost of operating the steam-driven units now placed did not show up with such regularity, if at all. The coal burned under the boilers was probably only estimated—and greatly underestimated. The price probably was charged at the cost of production in place of at the selling price, and the cost of labor charged to other items where it did not show up as operating expenses against the small engines.

I have often heard the remark made: "Oh, it doesn't cost us a cent to operate that engine. It can't be noticed on our boilers, and we don't need any additional men as we need several around on the top anyway." Perhaps a dozen such small engines are employed at one plant. It devolves upon the central station to prove that it costs excessively to operate small engines.

American Opportunities in the Foreign Coal Trade

THE article printed below appeared in a recent issue of the *Colliery Guardian*, of London, England. It contains so concise an analysis of the conditions surrounding the exporting of coal and the possibilities of the United States obtaining a hold on foreign coal markets, that all who are interested in the export coal trade should read it. Although treated from the British point of view, there is still so much of truth and inherent sound logic in the article that it has been reproduced in its entirety.

IT GOES without saying that coal exporters in this country [England] are apprehensive just now as to the imminence of a concentrated effort on the part of United States coal operators to capture our pre-war markets. American competition has been heralded at various times in the last fifteen years without anything very serious happening to menace our position in Europe or South America, which are for us the principal zones of enterprise; but there can be no harm in considering whether the events of the past four years have added substance to the tenuous visions of the past.

A European Commission appointed by the United States Fuel Administration has just recrossed the Atlantic, following an investigation of the fuel situation in Europe. Their report, after enunciating the somewhat platitudinous statements that Europe is short of coal, and that fuel scarcity, creating unemployment, provides a fertile field for Bolshevism, records the fact that, whereas the production of Great Britain has fallen from 287,000,000 tons in 1913 to 230,000,000 tons in 1918, the output of the United States in the same period has increased by approximately 100,000,000 tons; further, that there is a considerable demand for American coal in Europe at the present time.

American Coal Output Increases Rapidly

It would be unwise to obscure the fact that the coal production of the United States has increased phenomenally since the opening of the present century, while that of the United Kingdom has done no more than preserve a rather unstable equilibrium; at the outset of that period we were still the world's chief producer of coal; now the single State of Pennsylvania produces more than we do. The moral of that is that a day must come sooner or later when British coal in many quarters of the globe will be supplanted by American fuel, even when allowance is made for the vast industrial development of America and her panoply of raw materials. But it is not easy to decide whether the war has precipitated that situation or not.

At the close of 1917, the United States was threatened with a fuel scarcity as serious as ours, but this was largely the result of car shortage, and, by the introduction of various measures, including "heatless Mondays," the situation was pulled round. In 1918 the output was 689,652,110 short tons, or an increase of 6 per cent. over 1917, and it was proved conclusively that the ability of American mines to produce fuel was greater than the ability of American industries to consume it. In a similar crisis, we more than failed to preserve the *status quo*, but the conditions were essentially different. There was a shortage of labor in America, but in no sense so acute as that from which we suffered in this country; wages rose in both countries, Pennsylvanian miners of the higher grades being able to earn nearly $8 per day in recent months, but this is counterbalanced to some extent by the greater per capita output—in 1917-18 the individual output, in West Virginia, including inside and outside labor, was just over 900 tons per annum, in the Pennsylvania soft-coal region over 1000 tons, as compared with 240 tons in British mines; in both countries the Government restricted selling prices and controlled distribution; there is this point, however, that in the United States every encouragement was given to operators to increase the productive capacity of their undertakings by the adoption of labor-saving machinery and large-scale remodeling of plants; whereas, in this country, Parliamentary and financial restrictions impeded even the work of normal maintenance.

American Operator More Economical

According to what has been known as the Peabody plan, coal operators in the United States were left very largely to deal with the problems of intensified production, so far as their internal affairs were concerned, and it has proved an undoubted success. It is too early as yet to gage the enduring effect of Government intervention in this country.

It is not an easy matter to determine the increased cost of production in America; according to the estimates of the Geological Survey the average value of coal at the mine rose from $1.32 per ton in 1916 to $2.25 per ton in 1917. In 1918, it is probable that the operation of a state-regulated basis may have kept pit-head prices at a level not very much in excess of the figure named. The cost of production has undoubtedly risen, but, due to the increased output per head and the introduction of measures to promote intense production, the ultimate increase may not have been very great. It is only fair, in making comparisons between Great Britain and the United States, to realize that the American coal operator has much greater margins for economy; the high output per head is largely attributable to the fact that there has been no imperative necessity for economy in mining methods; so much is admitted by American mining engineers, who do not make the claim to a monopoly of efficiency which some of our own pessimists attribute to them.

The present position is that stocks of coal in the United States are abundant, and there are signs of an abatement of the internal demand, due partly to the lessened requirements of the navy, and the rail-

roads and munition works, although great activity is anticipated in the iron and steel trades during the present year; labor is not too plentiful and may remain so, for the reawakening of national life in Poland and the other Slav states, from whom the United States has in the past drawn a large proportion of its coal miners, may not only retard the wave of immigration, but divert some of the existing labor to their native soil; during the war period the number of mines in operation increased by over 75 per cent., and it is calculated that overproduction during the present year may amount to as much as 100,000,000 tons; although this surplus will probably not be realized, it is clear that an outlet could only be found for it abroad; the regulation of prices may be relaxed, but there appears to be no intention for the present to abolish the price and zone regulations inaugurated in 1917, and it is not likely, in any case, that prices will return to their pre-war level, for in 1913 and 1914 the industry was suffering severely from overproduction and unremunerative prices.

In the twelve months ended June 30, 1918, exports of United States coal amounted to 21,051,979 tons, or 1,422,888 tons more than in 1916-17, but this increase was due to the fact that exports to Canada—her best customer—increased by 3,607,146 tons for the year; otherwise the expansion has not been very great. In 1911-12, 276,467 tons of American coal were exported to Italy; in 1912-13, 33,264 tons; 1913-14, 776,422 tons; 1914-15, 1,628,279 tons; 1915-16, 2,797,506 tons; 1916-17, 1,099,508 tons; 1917-18, 201,220 tons. In all, the United States shipped only 355,314 tons to Europe in 1917-18, as compared with 1,635,902 tons in 1916-17, and 3,591,281 tons in 1915-16. To the South American countries the decline in exports last year was also heavy; the Argentine took 247,613 tons as against 706,776 tons in the previous year; and Brazil 625,374 tons as against 156,059 tons. South America has been thrown back very largely upon native resources, the curtailment of imports of British fuel being equally great; in both cases the causes were the same—export restrictions and shortage of tonnage.

Important Factor Is American Merchant Marine

But there is one more factor, and it is one of considerable weight, namely, the possession by America today of a considerable merchant marine for the first time since the Civil War. It is estimated that by the end of this year the United States will own some twelve million tons of shipping. This new shipping will require a large increase in bunkers even if a great number of the new ships are constructed to burn oil; but the possibility of using it to capture our markets is qualified by at least three considerations; first, an enormous demand for the freightage of American goods intrinsically more valuable and profitable to the shipper than coal; second, the lower ballast value of American coal owing to the trade of the country being essentially an export and not an import trade; and third, the existing business connections of British firms. In reciting these factors it is not necessary for our purpose to emphasize the longer haul that has to be borne by, say, New River or Pocahontas coal before it can be put on board ship at tidewater, because this is offset by a lower price at pithead, and a lower railway rate per mile, so that it is probable that a good steam coal from these regions can be shipped f.o.b. at not more than $6 per ton.

At one time there seemed to be a prospect that America would oust us permanently from the South American market, but this was not realized even during the war, for eventually, in June, 1918, the United States Shipping Board, which two months earlier had taken over all free tonnage, concluded an agreement with the British government by which we agreed to keep out of Rio, and United States coal exporters out of the River Plate market. The latter was chiefly supplied with American coal—in British bottoms—but American exporters of experience are not too sanguine as to the success of a South American campaign in the near future; on that and other accounts the Administration has been loaded with abuse, exporters blaming the restrictive rates and licensing system instituted in 1917 for their inactivity, but it is only right to remember that British exporters have been called upon to suffer the same and greater evils ever since the outbreak of war.

Hopes and Illusions

The brutal fact is that, notwithstanding the alluring reports circulated by diplomatic and so-called trade emissaries abroad, the American coal trade, although its worship for the word "organize" is almost uncanny, has a lot to learn in regard to conditions prevailing in foreign markets, the fastidious likes and dislikes of customers, and other details which profoundly affect trade relations. In the past the Sherman Anti-Trust Law has been severely repressive of coöperative enterprise. The National Coal Association, an important war-time organization, is now planning the formation of an export association to develop a market for American coal abroad, the project being to pool all deliveries at tidewater and to conduct the further stages on syndicate lines.

Formerly it was contrary to Federal law for merchants to combine for such purposes, but the Webb-Pomerene Bill recently adopted in Congress concedes these facilities. At the same time, there are indications that there are groups of shipping companies that are willing not only to undertake the transportation and docking of the coal, but to offer financial facilities. A difficulty here is to distinguish between trade of a purely temporary character and cases where the exporter proposes to establish a permanent connection. The question of credit is one that has greatly hampered the American coal exporter in the past, but even before the war American banks had been enabled to establish branches in South America and elsewhere; and a large concern, known as the American International Corporation, exists for the definite purpose of financing shipments.

The present position of the United States, as the principal creditor nation, may ultimately prove of great advantage to merchants in their dealings abroad; for the present, however, the great accumulation of gold in the United States is prejudicial to the export of coal, as it will be preferable to pay for imports of such manufactured goods and raw materials as may be required in cash rather than in kind. Yet it is stated that Congress intends to raise customs duties,

in order to reduce importation, and thereby protect home industries. In that case it is probable that the rate of exchange will become even more unfavorable for the exporter; at present there is a premium in Paris of about 5 per cent. on New York drafts, and in Italy it is not less than 10 per cent. But when this excess of capital is dispersed, as it probably will be, by large investments in foreign industrial operations, the very existence of these holdings may assist to some extent in the creation of markets for essential materials.

It is well that we should be alive to such developments, but in the meantime there seems to be every prospect that British exporters will hold their own, especially where the markets are also the centers of an important trade with this country in food supplies, for in such cases it is an imperative necessity to keep open the channels of our import trade. Community of interest between exporter and importer makes a formidable combination, although it may, in this case, have been affected by the extinction of British investments abroad. But, for the present, the necessity to pay for imports by means of exports, rather than by means of interest on holdings in the country of origin, is a distinct advantage to the British exporter. What we probably shall see is a large extension of the American coal export trade through British agencies, a movement that had already gained momentum when the war broke out. Beyond that, it is indubitable that a day will come when the outer ramparts of our trade will be driven in—when British coal will not go, except in ships' bunkers, beyond the Suez Canal. It depends very largely upon the attitude of the working miner as to whether that day comes sooner or later.

That is in the womb of the future. For the present it is probable that the distribution of coal overseas will be a matter more or less of arrangement between the United States and British governments, based largely upon international and humanitarian considerations; the arrangement in South America being of this nature, as is the consignment of 100,000 tons of American coal to Holland.

At the present time, with the coal fields of Europe working far below their normal capacity, it is eminently necessary that full advantage should be taken of America's ability to make good the shortage, but it is equally important that no false sentiment of goodwill should tempt us to surrender permanently a trade that is in the highest sense a necessity to our existence. The greatest danger is that the shortsightedness of the British coal miner may encourage the foreign consumer to seek security by an alliance with the American producer; the latter then would possess just those advantages which have hitherto been ours.

USUALLY THE CHIEF ENGINEER of a large coal company is a man with a sufficiently broad experience to be able to write out practical specifications. However, unless these specifications are carefully prepared, bids submitted on them are not apt to be satisfactory. In one instance a proposal was made on so-called specifications and it amounted to approximately $20,000. On looking over this bid, the company decided to call in an expert engineer to go over the plans. The result was that another bid was asked for and submitted which resulted in a saving of over $6000 on the initial cost.

Did You Ever See a Ladder Like This?

The National Safety Council asks in a bulletin: Did you ever see a ladder like this? The answer is: Lots of them. The cross sticks are weak and shaky, the treads are many of them extremely uneven, the spacing of the rungs is unequal and too great, the ladder has been lengthened out in a manner none too safe; some of the rungs are so inadequate that the nailing of them in place inevitably has split and so weakened them. Play safe and discard all such ladders: A dozen different kinds of accidents may occur in the use of them. "Different accidents," we may call them, but one and all they are alike in one particular. They are all unnecessary and avoidable. Says the Safety Council: "If you use a home-made ladder make it safe. If you see a rung broken or ready to break, fix it or tell the foreman." It does not pay to take chances.



NEVER USE A LADDER LIKE THIS

Legal Department

RIGHT TO ROYALTIES UNDER CONTRACT—Where an owner of all the stock of a mining corporation, which had a five years' lease on certain coal property, transferred the stock in consideration of the payment of a tonnage royalty of seven cents on all coal mined under the lease, he was not entitled to royalties under a new lease granted at the expiration of the old one; the new lease not being intended as an extension of the old one. (Lathrop vs. Clemow, 68 Pennsylvania Superior Court Reports, 116.)

ADVERSE POSSESSION OF COAL IN PLACE—One who takes a deed to the surface of land with notice that the underlying minerals have been conveyed to another can acquire no adverse possession to the minerals by reason of his occupancy of the surface under claim of ownership. Adverse possession of underlying minerals can be initiated only by working them or by exercising some other act of dominion manifesting a purpose to claim them. (United States Circuit Court of Appeals, Fourth Circuit; Midkiff vs. Colton; 252 Federal Reporter, 420.)

OPERATOR NOT LIABLE FOR MINE FOREMAN'S NEGLIGENCE—No recovery can be had against a Pennsylvania operator for death of a miner attributed to neglect to provide him with an adequate supply of posts to prop roof, where it does not appear that the mine foreman ever ordered props from the superintendent that were not promptly furnished, or that the operator's attention was otherwise drawn to any shortage of props. In such case the operator is protected by the provisions of the statute which imposes upon the mine foreman the duty of directing and seeing "that every working place is properly secured by props or timbers," and of ordering the mine superintendent "to keep on hand at all times a sufficient quantity of materials and supplies required to preserve the health and safety of the employees." (Musin vs. Pryor Coal Co., 68 Pennsylvania Superior Court Reports, 88.)

Breaking of Cable in Protection Shaft

By Robert Dunn
Victoria, B. C.

SYNOPSIS—*A breaking rope in Protection shaft caused a heavy loss of life. What caused the cable to break? Tests conducted in Montreal would indicate that a lack of adequate lubrication, particularly in the hemp center, leaving the cable exposed to the attacks of water both from within and without, had much to do with the failure of the rope.*

WHAT was the caus of the breaking of the cable in Protection shaft, Canadian Western Fuel Co., Vancouver Island, B. C., on the 10th of last September, when 16 miners were hurled to death? Is it possible to adopt preventive measures that would make a repetition of such an accident impossible, except through non-compliance with regulations or carelessness in other respects?

These are two questions with which a coroner's jury holding an inquest into the deaths of the aforementioned coal miners at Nanaimo, B. C., are dealing. The inquiry is being thoroughly prosecuted as a result of the keen interest manifested by the Provincial Department of Mines. At the sitting on Dec. 16, William Fleet Robertson, Provincial Mineralogist, placed in evidence a report of investigations he had made at the laboratories of McGill University, Montreal. This document contains information of moment to all concerned in the use of wire cable in mining operations. The details given covering tests of the broken rope, and the conclusions reached, it is believed, will cause some radical changes to be made in present methods of inspection.

As to the cause of the accident under examination, Mr. Robertson's findings are contained, in summary form, in the following excerpt from his report:

The failure of the cable was, in my opinion, entirely due to the oxidizing of the wires, chiefly internally, caused by apparent lack of any internal lubrication, leaving the wires exposed to the action of a more than normally corrosive water and a humid atmosphere.

The hemp core, which under a sufficiently effective lubrication system would serve as a reservoir of oil to keep the wires oiled and protected from corrosion, not being supplied with oil, became a reservoir of moisture and so hastened the corrosion of the wires.

It is a well-known fact that if rust gets started in a steel structure such rust will continue despite any surface application of anything that may exclude the atmosphere.

Hence only a thorough soaking of the hemp core with oil before it is installed and a frequent renewal of the oil supply would be necessary to ward off corrosion.

The fact that the tests showed the cable to be more corroded in certain parts than in others, and these not in any regular procession, may be accounted for by local conditions in the shaft, of which I have no knowledge.

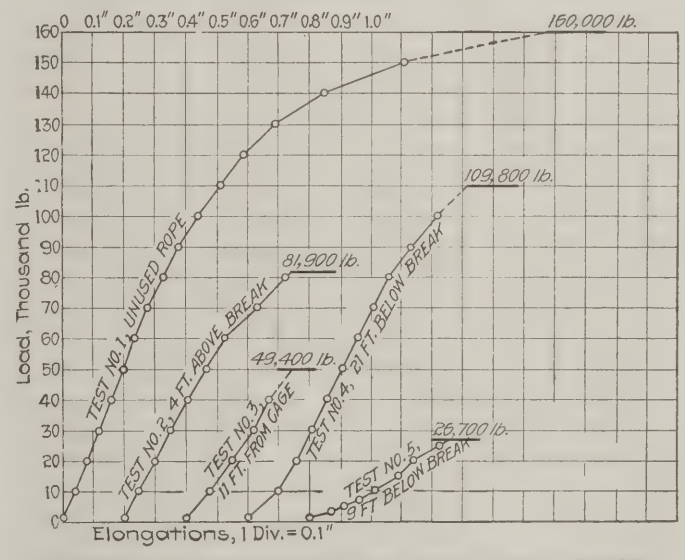
A reference to the sketch showing tests will show that the section of the cable about 4 or 5 ft. from the fracture broke under a load of a little over 13 tons, and it stands to reason that the rope at the fracture had a lesser strength.

The weight of the empty cage is given by the company as 4358 lb.; the rope, 179 ft., weighed about 540 lb.; sixteen men at an average of, say, 170 lb., 2720; making a known dead load of 7617 lb., or approximately 4 tons.

Mr. Robertson gives it as his understanding that the rope broke at a point which, at the time, was passing over the sheave and proceeds to say that "when a cable of this description passes over a 10-ft. sheave, it is by the bending subjected to an additional 9360 lb., or, say, roughly, 5 tons. This, in addition to the dead load as given above, would give a stress in cable, if traveling slowly, of approximately 9 tons, which approaches so near to the breaking stress shown in Test 5 (described hereinafter) that it is scarcely necessary to assume extraordinary rough handling by the hoistman to account for the break.

"As an indication that this sort of interior corrosion is not confined to the case in hand," Mr. Robertson produced "a piece of 1¼-in. cable from a Sudbury mine which was tested at McGill University in my presence. It broke at 58,600 lb., whereas the new cable had a breaking strength of about 128,000 lb. I think you will agree with me that this cable shows but little deterioration discernible, externally, whereas in the broken end, also exhibited, the internal corrosion is excessive."

Before proceeding to give details of the interesting experiments carried out at Montreal under Mr. Robertson's supervision, it should be explained that he was furnished at Nanaimo with all the faulty cable which, for convenience, is divided into three parts: (a) That part which was constantly on the hoisting drum in the engine room; (b) that 100 ft. including the upper end of the fracture and extending upward and (c) that 100 ft. including the lower end of the fracture and extending downward to the cage. He also had the spiral springs designed to bring the safety clutches into action, a jar of water collected as it fell in the Protection shaft, and a bottle of black oil of similar character to that used in lubricating the cable. His directions were



GRAPHS OF THE PORTION OF THE CABLE TESTED

to submit these "exhibits" to "the most critical physical, chemical and microscopic tests practicable in Montreal," with a view, of course, to establishing definitely and beyond cavil the cause of the break.

The result of the tests to which the cable was subjected is graphically illustrated in the accompanying illustration. Of them Mr. Robertson says:

Test 1—This piece of cable [that taken from the drum] showed only very slight wear and only on the outer wires, possibly caused by pressure on the drum. The individual wires were bright and free from rust. The cable was practically as good as new, and had been lubricated, grease oozing out as the strain was applied. The test piece taken was approximately 36 in. between the grips. The load was applied in successive increments of 10,000 lb. each, the elongation of the specimen being taken for each increment.

The elongation for each 5-ton increment was 4/100 in. up to 70,000 lb., increasing gradually until at 120,000 lb. the elongation for the last increment was 8/100 in.—the total elongation under this load being 59/100 in. At almost 130,000 lb. the elastic limit of the cable seemed to be reached and the cable broke under a load of 160,000 lb., after sustaining such load for a minute or so, when three strands broke simultaneously a few inches below the upper grip.

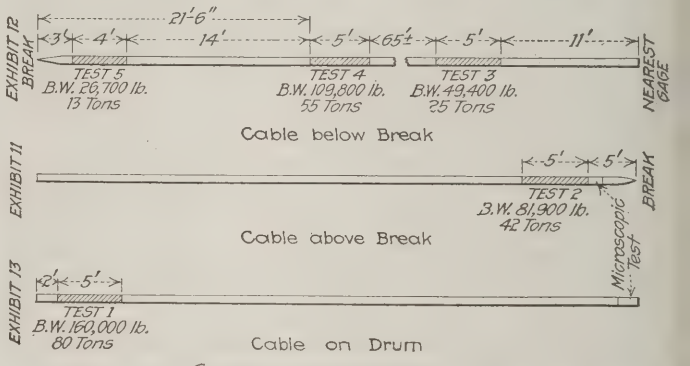
The pull being continued, the other three strands broke near the lower grip. The breaking strength of cable was 160,000 lb., or 80 short tons. As a check and confirmation of this test a 24-in. piece of cable adjoining the test piece was unwound—the individual wires somewhat straightened—and six of the larger wires and three of the smaller wires from each strand were submitted to a tensile breaking strain. These wires showed remarkable similarity in strength. The wires of average diameter of 0.1255 in. had an average strength of 2540 lb.; the wires of average diameter of 0.085 in. had an average of 1165 lb.

The aggregate strength of all the wires comprising the cable, if pulled straight, would be 179,100 lb. The strength of the cable, therefore, was about 89.35 per cent. of the strength of the aggregate of the wires, a result considered as indicating a well built cable. The tensile strength of the steel in the wires would be equivalent to about 208,000 lb. to the square inch. This result, taken with the uniformity in strength of wires, indicates an excellent quality of steel in the cable.

Test 2—This was conducted on sections of cable immediately above the fracture. The test piece was cut starting about 5 ft. above the tapered end of the fractured cable. The exterior showed a certain amount of wear on the outer wires but not at all serious. No broken or torn wire ends were observed on the surface in the whole length of the piece. A serious amount of rust was observable on surface wires. In opening up the end of the test piece, in preparing it for the grip, the small interior wires were found to be badly rusted and eaten away, so much so that several of them were found to be completely eaten through. None of the larger (0.1255 in. diameter) outer wires were eaten through—but they also were badly corroded—a rough estimate being that the steel in these wires had about half the sectional area of similar wires in Exhibit 13 [the good rope].

The cable and the core showed no indications of having been lubricated—both were dry and dusty. This test piece [tested similarly to the former] showed very even elongation for each successive increment of 5 tons in load—up to 60,000 lb.—at about which point the elastic limit seemed to be reached. Under a load of 81,900 lb. four strands of the rope broke, the break extending 12 in. below the grip. In breaking clouds of dust were given off, the doors of the building having to be opened to clear the air, indicating the interior to be very dry, with no indications of having been oiled. The two remaining strands broke under load of 21,000 pounds.

Test 3—This and the following two tests were made on three separate pieces of the rope from the fracture down toward the cage. The test under consideration was of a piece cut 11 ft. from the end nearest to the cage. It was seemingly uninjured by its fall with the cage. It was not untwisted at all and there were no projecting or loose wires on the surface. The surface was somewhat worn and was corroded to at least half



WHERE TEST PIECES OF THE CABLE WERE SECURED

section of the externally visible wires. In the portion opened for the grip several of the small wires were found to be corroded completely through, as were a few of the larger wires. The load was applied as in previous tests. With each 10,000 lb. increment of load the elongation was practically constant up to 40,000 lb., being about 0.07 in. for each increment. At about 40,000 lb. certain of the interior wires were heard to break. At 49,400 lb. the cable broke at about 3 in. below the upper grip. The center core was absolutely dry and dusty, and large quantities of rust dust were given off in breaking.

Test 4—This test piece was cut 21 ft. 6 in. below the fracture. The cable showed but slight wear, but was much corroded both on surface and interior wires, but as far as could be seen few if any of the wires were actually eaten through. No evidence of lubrication was visible in the interior of the cable. This piece was tested as were the former. The elongation for each 10,000 lb. increment was constant at about 5/100 in. up to 80,000 lb., which was about the elastic limit. Under a load of 106,000 lb. some of the interior wires were heard to break. At 109,800 lb. the cable broke, two strands parting about 6 in. below the upper grip. Subsequently the remaining strands were broken by reapplication of the load. The third strand broke under a load of 55,000 lb.; the fourth under a load of 55,400 lb. and the fifth and sixth under a load of 43,700 lb. Three strands broke near each end of the test piece.

Test 5—This piece was cut at 3 ft. below the point

of break. It did not appear to be damaged by the fall. The rope was still tightly twisted and but slightly bent, not enough to materially affect it. This piece was badly corroded, so much so that even on the surface a number of the wires were seen to be completely eaten through and could be picked out with the fingers; but none of the ends projected. In the interior of the cable one of the sub-strands was completely cut through by erosion. There was no indication that the rope had even seen oil.

The condition of the test piece was evidently so bad that the load was applied in smaller increments than in other tests. At 2600 lb. load wires were heard to break in the interior. The successive loads applied were 3000, 5000, 7000 and 10,000 (when elastic limit was reached), 20,000 and 25,000 lb. At 19,500 lb. a number of wires were heard to break and at 22,000 lb. more wires broke. At 26,700 lb. load three strands parted 12 in. below the grip. Three remaining strands broke at 8800 pounds.

The cable in question had been in use for three years. It is described as being originally a first-class cable in every particular, well made and of excellent material, of Lang's lay build and apparently up to specifications.

The amount of rust visible on the surface was serious and showed when the cable was dry, but if the cable as it hung in the shaft was dirty, an inspection by passing the rope through the hand or against a stick would fail to reveal the defect in the rope.

In a shaft where the cable was subjected to heavy and constant work, the wear on the external wires would probably be so great as to wear certain strands through, thus producing projecting ends; and these would be the first indications of deterioration of such a cable. The hand test might then be of value. But in the Protection Island shaft the mechanical wear on the cable was slight, the failure being internal, hence not discernible by the method of inspection in vogue.

Concerning the spiral springs designed to bring the safety clutches into operation these were of excellent quality, capable of a safe extension of about 30 per cent. of their length and having a pulling power when so extended of about 1250 lb. It may be observed here that tests since made at the Canadian Western Fuel Co.'s yards at Nanaimo have demonstrated that such springs and clutches do not give satisfaction on a descending cage, although brought into successful operation on an ascending cage suddenly released.

The oil used in lubrication is declared to have been of a character non-injurious to the steel. Concerning the water, Mr. Robertson says: "There was no free acid in the water that would dissolve the steel, but the water was of such composition as to rust the steel more rapidly than pure water would. It would also be apt to wash off any external lubrication of cable faster than would pure water."

[No verdict had been reached by the coroner's jury at the time the foregoing article was written, and as a matter of record the subsequent findings of the jury empanelled to inquire into the cause of the death of the 16 coal miners is given herewith: "We [the jury] find that the said men came to their death by descending on a defective cable, which broke, owing entirely to the oxidizing of the wires, chiefly caused by apparent absolute lack of any internal lubrication, leaving the wires thus exposed to the action of a more than normally corrosive water and a humid atmosphere." The jury recommended the appointment of an expert inspector of hoisting ropes, cages, safety catches, etc., and that legislation be enacted whereby under such abnormal conditions as obtained in the Protection shaft no new hoisting cable be retained in service longer than some reasonable time to be determined by the Department of Mines.—EDITOR.]

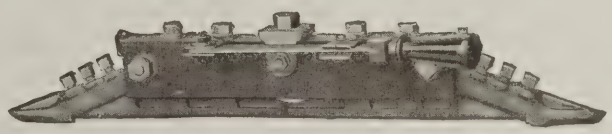
Mine Section Insulator with a Switch

In mines every cross-entry should have a section insulator placed in the trolley wire on the tangent as close as possible to the main entry. As most cross-entry trolley wires are used only a part of the time it would increase safety if current were cut off from it when it is not in use.

A common practice is to use a section insulator similar to that shown in the accompanying illustration. With certain types of section insulator having no switch attachment it is necessary to have a knife-switch connected in the circuit so that the cross-entry trolley wire can be energized. Such a knife-switch should be mounted in a box to protect it from moisture and dust.

It will readily be seen that this arrangement requires a considerable amount of labor and material. It also has other disadvantages, as the locomotive may get stalled with the trolley wheel on the insulated part of the section insulator while pulling a load. Considerable delay will be experienced in such a case unless there is insufficient room to turn the trolley pole. It is often necessary to detach several cars in order to enable the locomotive to pass the dead section in the trolley.

A section insulator should not permit of any leakage whatever if the switch is open. Its construction, as a



COMBINATION SECTION INSULATOR AND SWITCH

whole, should be mechanically strong, yet not so heavy as to add unnecessary weight in case the local conditions are such that it cannot be supported direct from the mine roof. Two supporting lugs with longitudinal adjustment are preferable. Where conditions do not permit of using two supports and space is limited, a swivel boss in the center is highly desirable. The runner of the switch should never obstruct the passage of the trolley wheel, regardless of whether the switch is open or closed.

A metallic runner with air insulation has several advantages. It allows uniform wearing and no parts require renewal. Where treated wood or fiber is used considerable arcing when breaking the circuit takes place. This eventually increases to such an extent that the runner parts have to be replaced quite frequently.

The switch should be independent from the runner and of such section that it will permit a heavy current to be carried without heating the section insulator at any point, as this may damage the insulating qualities of the device.

Direction of current flow in a mine varies and a switch should be made so that it can be opened either right or left hand. The illustration shows a switch that can easily be changed from a right- to left-hand throw by loosening up the machine bolts and interchanging the break jaws with the hinge jaws. Changes of this nature can be made in the mine quite easily. When the switch is open, the break jaw should always be the live terminal. This can be accomplished by interchanging the hinge and break jaws as mentioned above.

The Mindanao Coal Mines

By Monroe Woolley
San Francisco, Cal.

SYNOPSIS — *The Philippines are rich in coal but Mindanao appears to have more extensive fuel deposits than the other islands of the group. These deposits are not now worked to any great extent, but it is hoped that ere long native coal will replace Japanese fuel at Manila and other ports of call for steamers following the routes of world commerce.*

AN AMERICAN mining engineer who has had much experience in China and other Far Eastern countries, after making an extensive investigation of the coal fields in Mindanao, Philippine Islands, pronounced the deposits the greatest in Asia. This means not only a great deal to Philippine industry, but to the world at large, particularly to the United States.

Perhaps the most extensive deposits so far known in Mindanao are located on the Sibuguey peninsula. The National Coal Co. has recently finished an exhaustive survey of these rich fields and is now rapidly preparing to develop its holdings there. The Philippine insular government holds 51 per cent. of the stock in this company. The peninsula contains about 100 square miles of surface underlaid with rich deposits of coal.

The National Coal Co. is confining its present activities to a tract about 10 miles in extent that is especially rich and the product of which can be marketed at a minimum cost. This tract lies inland from Taba Bay and is not far from the Sibuguey River. For eight months of the year this stream is navigable as far as the coal fields, and until the company sees fit to put in its own transportation lines the river will be used for getting the output to market.

Preliminary to development on a larger scale the company is putting out something like 100 tons per day. Before it can materially add to its output from its holdings the company will be compelled to import a considerable amount of machinery from the United States, especially railroad material to get the coal to the coast ports, as well as mining machinery to get it out of the ground. It is known that the river cannot be relied upon continuously, as it is navigable only for a portion of the year. Furthermore, it is remote from the outlying fields belonging to the company. Hence, when development reaches a more extensive scale, as it soon will, railroads must supersede the stream. The company has already bought considerable second-hand equipment from the railroad companies in the islands, such as engines, boilers, pumps and some other apparatus.

The preliminary surveys of the Mindanao fields show considerable amounts of anthracite, especially at the northern end of the National Coal Co.'s tract. Here a bed of this coal 13 ft. thick has been uncovered. But as the islands have no use for anthracite, at the present time, no effort will be made just now to mine this fuel.

Near the middle of the National company's tract there is an excellent vein of bituminous 6 ft. thick. Experiments with this product show the coal to be a good coking quality. It has tested out far ahead of the Japanese coal long imported into the Philippines. There has also been discovered a bed of non-coking soft coal that appears to be about 6 ft. thick and of considerable extent.

Mindanao is said by soldiers who have served there and who have traveled widely over the island to be a veritable mine of coal. In many remote places, almost



DIAMOND DRILL AT BATAN COAL MINE

wholly unvisited by white men, coal is said to crop out of the earth everywhere, and no doubt Mr. Bryan, when he was advocating the retention of Mindanao as a coaling station, in event the Filipinos were given their independence, was aware of this mineral wealth.

A new bed of good steaming coal has been discovered in Albay Province, southern Luzon. A company is preparing to invest $150,000 in modern mining machinery. Vicente Mardigal & Co., the largest coal dealers in Manila, are said to have made an offer to the promotors of this new field for their interests, but it is believed that whatever operations take place will be under the direction of the National Coal Co., as provided by Philippine laws.

The government tried to mine coal from the Batan Island fields in the Gulf of Albay some years ago, but the earlier operations failed. The mines had to be abandoned because it was claimed the formations found would not resist the water pressure, and the mines could not be sufficiently timbered to permit of operation. The new bed is said to be on a higher elevation and is protected from water by a rock formation. The fact that this is absent in most coal regions of the Philippines has already kept several projects of good promise from development.

At present there are two coal mines being operated on the Island of Cebu. One is at Uling, south of Cebu City, and the other at Banao, to the north. At each of these places it is reported that the output is about 30 tons per day and all of the coal mined is readily disposed of. Mr. Betts, who was formerly American governor of Albay Province, is operating a mine near the old government project on the Island of Batan, near the port of Legaspi in the Gulf of Albay. The output of the Betts mine is only about 25 tons daily and the Manila R.R.'s Legaspi line consumes the entire output.

A corporation with a capital of half a million pesos (a quarter of a million dollars), has been organized in Iloilo, capital of Panay, for the purpose of mining coal at Escalante, on the Island of Occidental Negros. This organization is known as the Negros Coal Co. This company at last report had not yet produced coal, but was preparing to do so.

It is a lamentable fact that although the entire Philippine archipelago, particularly Mindanao, is rich in coal deposits, it has, nevertheless, always been necessary to import coal from Japan or China. The American army transport service has always had to make Nagasaki a port of call for coal, and these ships are kept busy carrying coal for their own use back and forth between Nagasaki and Honolulu. Besides, the Philippine government, and many commercial concerns in the islands, import thousands of tons annually from Japan, when, as a matter of fact, there is literally "coal to burn" right in the Filipino's back yard.

The Filipino has the biggest coal fields in Asia, but he has been a long time finding it out; and when he did discover the great truth he was not as energetic in developing his natural wealth as he might have been. Yet it is not altogether the fault of native capitalists



MOUTH OF THE SLOPE AT THE BATAN COAL MINE



NO PRETENTIOUS SURFACE EQUIPMENT HERE

that the Philippine fields have for so long been neglected. The government, too, is in great measure liable for much of the blame.

The Philippine government until lately denied foreign capital the right to do much development of natural resources, fearing that the rights of the natives would be usurped. The natives themselves not only lacked initiative, but what was worse they lacked the money to do things on a big scale. Furthermore, the Filipinos of the past generation knew as much about mining as a society matron knows about cooking; but now a liberal educational system inaugurated in the islands has turned out not a few native mining experts, and, as the Philippines have grown rich through world-war trade, there is no reason now why the extensive coal fields of the islands should not be rapidly and permanently developed. And it is gratifying to note that many of the promoters, in fact the majority, are Filipinos.

Coal is not used in the Philippines in households. The climate is tropical and such fuel is unsuited to the cooking methods employed, while of course house-heating apparatus is not used. But countless ships traversing world routes will call at Manila for coal once the Philippine mines get going in good shape. For many years the Japanese mines have held monopoly of all the coal business in that part of the world, notwithstanding the fact that the mines of China have been worked, after a fashion, for centuries. Both the United States and the Philippine governments will gain huge sums annually when sufficient coal is produced in the islands to meet the needs of the governments in operation there. The coal bill of the army transport service alone now reaches into the hundreds of thousands of dollars yearly.

IN A COMPETITIVE MARKET the impurities in steam coal are severely criticized by consumers. It is not difficult for a competent fireman to maintain steam under certain conditions when these impurities do not exceed 20 per cent. Coal which contains from 20 to 30 per cent. of impurities is frequently burned at the mines; however, as a rule it would be unprofitable to ship this product any distance. It should be burned close to the point of production. Transportation charges are a serious obstacle to the movement of coal containing 30 per cent. or more of impurities. Recently, all steam coal containing 20 per cent. or more of impurities was condemned by the Fuel Administration when it came under its observation.



Replies to Attack on Anthracite Coal Industry

S. D. Warriner, president of the Lehigh Coal & Navigation Co., one of the eight anthracite companies alleged by Senator Vardaman, of Mississippi, to constitute a monopoly of the anthracite business to the detriment of individual operators, on Mar. 4 issued a statement on points covered in the Vardaman statement. The Mississippi Senator, who retired from Congress on Mar. 4, made his address in the Senate as chairman of the Senate Manufactures Committee, which has been taking testimony on the anthracite situation, but which has not made any complete report. Said Mr. Warriner:

Senator Vardaman's remarks in no way bear out the testimony taken before the committee and the fact that the report was signed only by him clearly indicates that it does not represent the views of the other members of the committee. He speaks of a monopoly comprising eight companies. There was no evidence adduced to indicate any concerted action by these companies.

"Shortage of anthracite and high prices, due to monopolistic control," to use the Senator's reported language, are purely imaginary conditions. In the calendar year 1917 the total anthracite production was almost 100,000,000 net tons, the highest output ever reached, while for the calendar year 1918, with a decrease of 4000 employees and a most serious influenza epidemic, the output was within 200,000 net tons of the 1917 figure. The fact that output per employee per year rose from 548 tons in 1916 to 646 tons in 1917 and to 662 tons in 1918, should prove that neither employers nor employees spared any effort or labor to meet public needs.

Existing coal prices at the mines, and these are the only prices with which the operator has to do, have been set by Federal authority, and it is a matter of common knowledge, as well as a fact of public record, that the so-called railroad coal companies during the period of Fuel Administration control were selling coal at 75c. a ton less than the price obtained by the so-called individuals. Under the Lever act, prices fixed for coal were supposed to carry a fair margin for the producers, but Dr. Garfield himself, in his statement lifting all restrictions on anthracite Feb. 1, said that owing to general increases in the prices of labor and materials, the cost of mining anthracite had risen to such an extent that some producers, including so-called railroad interests, were mining at a "cost which resulted in many instances in a loss." Dr. Garfield added that, had he retained control, he would have found it necessary, on the basis of a Federal cost examination, to have raised maximum coal prices as much as 50c. a ton.

Anthracite, even on the basis of today's prices, has advanced less than half a hundred other commodities, in everyday use, when compared with the pre-war basis. Shoes, flour, textiles and many foodstuffs have doubled and even trebled in price, according to figures gathered and published by the Government, while the advance in anthracite has been far below those figures.

So far as freight rates and demurrage charges go, they are being applied by the United States Government through the Railroad Administration, and are matters with which the railroads, as such, have nothing to do, save enforce. Prior to the rule of the Railroad Administration, the established practices, including demurrage, storage facilities and interstate freight rates, were those fixed by the Interstate Commerce Commission.

It is perfectly true that there are coal interests which are affiliated with carrying companies, and it is correct that the Pennsylvania Constitution of 1874 forbids transportation companies to engage in mining. But it must be remembered that companies like the Lehigh Coal and Navigation Co., and others, hold their powers under charters granted long before the Constitution of 1874 was adopted and exercise specifically granted rights.

There is no policy of withholding land leases from independent operators. Senator Vardaman himself heard testimony in Pottsville on that point, where it was specifically stated by witnesses that they had been able to lease without difficulty or that, when a lease was refused, it was because another mine was working into the desired land.

Senator Vardaman, the printed reports indicate, did not mention the fact, also testified to in his presence, that the labor cost alone represents about 60 per cent. of the cost of anthracite on board at the mine, for labor is now receiving about four times as much as in 1901. This testimony is not only on the minutes of the committee, but similar testimony is available in the reports of the Fuel Administration engineers, made to Dr. Garfield.

The possibilities of reclaiming fuel from the culm banks, mentioned by Senator Vardaman, have been greatly overdrawn. In many of these banks there is much fuel, but it is almost entirely small sizes—pea coal and under. During the heavy war demand for coal domestic sizes were chiefly needed. To get this tonnage it was necessary to mine coal. The fact that with 176,552 employees in 1915 the hard coal mines produced 88,995,000 net tons, while with 150,245 employees in 1918 they produced 99,472,800 net tons, is a conclusive answer to any question involving the wisdom and practicability of the policy employed by the anthracite industry during the period of the war.

Failure of Sundry Civil Bill Works Out to Advantage of Fuel Administration

Failure of the sundry civil bill has left many of the Government bureaus in a state of uncertainty with regard to the appropriations which they will have for the next fiscal year. This is not the case with the Fuel Administration, however. The bill proposed to take away practically all of that organization's surplus. Failure of the measure, however, has left at the Fuel Administration's disposal some $750,000, which will provide for the closing of the Administration's affairs and

the compilation of its records without the exercise of parsimony. Of course, the bulk of that sum will be turned back into the Treasury voluntarily. The turn affairs have taken as a result of the failure of the bill is very gratifying to Fuel Administration officials, as the proposed action of Congress would have left them with insufficient funds to draw conclusions from their records, thereby making available to the industry statistics of great value.

Ohio Valley Operators Gain Decision in Important Traffic Case

In the important traffic case of the Ohio Valley Coal Operators' Association versus the Louisville & Nashville R.R., the Interstate Commerce Commission holds that the rates from mines in western Kentucky on the Louisville & Nashville Railroad to Cincinnati, Ohio, are and for the future will be unduly prejudicial to the extent they exceed or may exceed the rates from mines on the Louisville & Nashville R.R. in the Jellico-Middlesboro group in eastern Kentucky and Tennessee by more than 15c. per net ton.

The operators claim that Cincinnati is a natural market for western Kentucky coals and that the experience during the war has shown that it has given general satisfaction in that market. Their plea was for an adjustment of railroad rates so that their product might enter Cincinnati in normal times.

On the other hand, the railroad claims that the movement of coal in western Kentucky is much disjointed and requires an unusual amount of terminal and branch line service. The railroad also features the fact that the haul to Cincinnati must be accomplished against excessive grades. The railroad also declares that the character and grade of western Kentucky coal prevents its successful competition with other coals in the Cincinnati market. It was claimed that the western Kentucky coal was surrounded on all sides by superior coals mined in Indiana, Illinois, eastern Kentucky, Georgia and Alabama. In addition, it has to compete with water-borne coal from Pennsylvania and West Virginia. On these premises was based the conclusion by the railroad that the extensive use of western Kentucky coal during the war was due to the inability to secure the other coals. The commission held, however, that the weight of the evidence to that effect did not support the conclusion.

To Break Up Practice of Unfair Rejection of Coal Consignments

Plans are being considered by the National Coal Association, the American Wholesale Coal Association and the retailers' association to eliminate losses from the unfair rejection of consignments of coal. It is expected that the country will be divided into merchant centers, in which inspectors will be stationed to investigate the cause when shipments are rejected. When it is established that the consignee has unfairly declined to receive a shipment, it is the intention to have him placed on the cash list in the future. The operators and the wholesalers state that they are prepared to make determined efforts to break up the increasing tendency to turn back coal when changing conditions make it to the interest of the purchaser to do so.

Conflict of Opinion Regarding Percentage of Coal Lost in Transit

Conferences with the freight claim agents of the railroads have developed that the retailers are unwilling to allow any difference in weight of the car of coal at the time of its receipt by the railroad company and at the time of its delivery. The American Wholesale Coal Association is willing to disregard losses of 1 per cent. or less, but if the loss in transit is more than 1 per cent. it demands the full face of the claim. The Railroad Administration insists on a 1 per cent. variation in scale weights and 1 per cent. tolerance for evaporation. The National Coal Association has attempted to prove that absorption will balance evaporation, but has made no demands as to exact percentage of allowance.

An effort to harmonize the conflicting views will be made at another conference to be held the last week in March.

The secretary of the American Wholesale Coal Association is recommending that the wholesalers take the fight in their own hands by buying at the mine weight and selling at the delivered weight. The matter of recovery then would be entirely between the railroads and the wholesalers.

Important to Know Why Mines Suspend

Difficulty is being experienced by the statistical division of the Fuel Administration in obtaining information as to the closing of mines. As long as mines continue to operate, most of them are prompt in sending in returns; but when the operation is closed down no further report is forthcoming. It is essential in the compilation of the statistics, designed to help the industry, to know of each cessation of operation and the cause therefor.

Demurrage Rules Upheld on Lake Coal

Demurrage rules enforced in 1915 and 1916 by the Cincinnati, Hamilton & Dayton Ry. on Lake cargo coal have been upheld by the Interstate Commerce Commission. They had been attacked by the Cabin Creek Consolidated Coal Co. The Cabin Creek company, along with other shippers over the Cincinnati, Hamilton & Dayton, declared that five days is an insufficient free-time allowance to permit the accumulation of a cargo. The Commission does not agree and cites the fact that "the Pennsylvania company reports an average detention for all lake ports which it serves of 4.53 days in 1915 and 3.52 days in 1916. The average detention shown by the Toledo & Ohio Central R.R. at Toledo was 4.04 days in 1915 and 4.25 days in 1916; by the Hocking Valley Ry. at Toledo, 3.68 days in 1915 and 2.98 days in 1916; and by the Baltimore & Ohio R.R. at all ports, including the Cincinnati, Hamilton & Dayton R.R. at Toledo, 4.55 days in 1915 and 3.69 days in 1916."

A large number of gas masks, which originally were intended for army use, have come into the possession of concerns who are circularizing the mining industry and fire departments. In view of this fact the Bureau of Mines has issued a second warning against the use of army masks for industrial purposes.

EDITORIALS

Is the Business Man the Only Visionary?

THE convention of governors and mayors called by President Wilson passed a resolution thus worded: "We recommend to the states that they consider means of releasing natural resources from controllers who wilfully withhold such natural resources out of use for speculative profits or for visionary future development; thus contributing to unemployment." As this is addressed to states, evidently no reference is made to the Federal Government; but when reading about "controllers who wilfully withhold natural resources out of use for speculative profits or for visionary future development," one's mind naturally reverts to the Federal authorities who have placed such a high value on coal that it is not being purchased and operated. It is the bureaus of the Government which seek—for the Government, it is true—speculative profits and which have visions of excessively profitable future development. That being the case, why call the governors and mayors and why neglect to call the duly appointed constitutional authorities who have power over Federal matters—to wit, the members of Congress? But for certain unspecified but generally known reasons they have not been called.

The output of ten months in the anthracite fields is not enough to provide for domestic consumption in a year containing a normal number of cold days. As demand is closing the mines, it is quite possible that next winter there will be a coal shortage. The argument is: "Buy now" while anthracite is still down at that low-price level where a frugal, if not fair, Fuel Administration placed it. Later there will be a higher price and a difficulty in securing coal even at that figure. If a consumer will not spread his orders through the year he may expect to go short when the chilly days of 1920 *arrive.*

After the Manner of His Kind

AS WAS to be expected, the flood of destructive criticism indulged in by some of our law-givers at Washington has once more turned to the anthracite coal trade. Senator Vardaman, of Mississippi, chairman of the Manufacturers' Committee of the Senate, who recently conducted an investigation of the cost of producing anthracite, broke loose in the Senate last week with the usual stock phrases condemning the larger anthracite interests, with a few new twists evidently added for variety's sake.

It is hard to understand the motive of Mr. Vardaman, inasmuch as the statements which he made in the closing days of the last Congress were entirely at variance with the evidence as adduced before his committee. Inasmuch as his term of office expired with the expiration of this session of Congress, it may be his swan-song was attuned for home consumption with the hope of a successful come-back soon as an ardent supporter and tribune of the "rights of his dear peepul."

The statement that production had been curtailed during the war on account of the unwillingness of the big companies to develop virgin tracts is foolish on its very face. The facts are that in 1917 a record production of anthracite was made, and this again was almost equaled in 1918. With a shortage of about 30 per cent. in the labor force during both 1917 and 1918, it can be seen what a ridiculous figure the Senator has made of himself. The unfortunate part of the report is that it will be implicitly believed by the great bulk of the people, who have no desire to learn the true facts but are ever willing to believe that an advantage is being taken of them in the price of coal.

There can be no denying that evils at times creep into all big business institutions, and in this the coal trade is not alone. As we see it, one of the best things that could happen to the anthracite trade would be some arrangement whereby the independent operators in times of a flat market, as at the present time, might have the advantage of the storage yards maintained by the larger companies. To have made this statement a few years ago would have been to invite ridicule.

However, since the successful operation of the bituminous pools at seaboard under the auspices of the late Fuel Administration, it would seem entirely feasible for an arrangement of a similar kind to be made in regard to the anthracite storage yards. Such a plan would redound to the benefit of both large and small shippers. For one thing, it would stabilize the prices of coal and prevent its sale by individual shippers at less than the cost of production; further, it would release cars for the carriage of other merchandise and save the heavy demurrage charges which inevitably accumulate on shipments of coal that cannot find a market.

Probably the coal man will be most interested by that statement of Senator Vardaman which urged that the price of coal "be fixed by the Government at a rate which would guarantee a fair return to the mining companies and which would vouchsafe to the people of America an ample supply of anthracite at a reasonable price." That is just the problem the producers of anthracite are wrestling with at this moment. When all at interest can agree what is a "fair return" and a "reasonable price," the millennium will not be here exactly, but it will surely be just around the corner.

It would be pleasant, though futile, to endeavor to believe that in his attack on the practices and prices in the anthracite industry Senator Vardaman was free from a desire to play politics. It would be consoling if we could conclude that, after all, the only reason why his criticism was wide of the mark was because he, like the storied shoemaker who left his last to criticize details not pertaining to his craft, was trying to direct something of which he had no knowledge.

Unfortunately, when we try our hand at excusing, we remember that Vardaman comes from Mississippi, where cotton, which during the war was perhaps even

shorter in supply than coal, remained entirely unregulated and commanded a fabulous price. The senator, enraged at the coal situation, and loudly condemnatory of Government prices, was entirely unmoved by the more grievous cotton situation out of which his constituents were becoming wealthy.

He surely had every reason to believe that the cotton trust was unscrupulous. Had it not combined to raise the price of cotton? and had not the cotton planters in some years even threatened to burn some of the staple which had already been harvested? The senator hypocritically flagellates those who lost money and defends those who made it; he condemns those who have been selling at a loss and leaves without criticism those who profiteer; and he speaks still kindly to those who would burn what they have produced so as to raise prices unduly. Men like the Senator raise grave questions as to the soundness of democracy.

Third Liberty Bonds are yielding at present prices 4.85 per cent. They are the safest of investments, shrinking less than almost any others and sure eventually to sell at large profit. It is a patriotic and profitable duty to buy them and any other Liberty Bonds, new or old, and to keep them if possible when bought until they sell at a price above par. If a bond issue is not floated this spring there will be an excellent opportunity for the operator or wage earner who is able to make savings, to place those savings in old Liberty Bonds, where they will be safe and profitably invested and where they will perform a patriotic service.

Surely in This They Rob Us

SENATOR VARDAMAN, by much patience, has discovered that the anthracite-producing companies are few in number and large. True enough. But what of it? Their prices satisfied the Fuel Administration, and now many of them are selling coal at less than cost. Those who would have everything sold at or below cost should be pleased that there are companies, however large, which will be so accommodating, though surely all of us will realize that the condition cannot last and would not be for the good of anyone if it did.

To work without profit is to put nothing aside, and to put nothing aside is the height of infrugality. To live beyond one's income, as many anthracite companies are doing, is even more to be reprobated. If every person and company expended more than they received then the nation would be impoverished. Surely when the anthracite coal companies sell coal at a loss they rob us, for they are a part of us; and if they waste their resources they reduce the wealth of the nation.

Let us never believe, as some do, that unprofitable industry is fruitful for the nation. Those uncharitable people who go out into their neighbor's fields and wish them a poor crop and a wet harvest are wishing themselves bad luck. When they invite a malediction of Providence on the farmer they are banning themselves as well as the toiler in the furrows. So also do we seek for ourselves an ill when we desire the manufacturer to put out his goods or the operator to sell his coal at a loss, for a loss to one is a loss to all.

But anthracite coal, we say, is selling at a high price. That is true, as compared with former costs. As compared with other articles, as compared with wages and cost of materials, as compared with the average power of purchase and as compared with the price that will have to be paid if the industry is to continue to supply our needs, anthracite coal is not expensive today but unduly cheap, Senator Vardaman to the contrary.

Let every state beware of becoming only a raw-material state. Some states with great opportunities finish nothing, yet begin everything. They ship the raw materials out and ship manufactured articles in, whereas they could fashion the materials and assemble the fashioned parts in their own back yards. West Virginia is an example of a state which performs only the simplest of operations, making little coke, no near-coke, only a small amount of electric power, and no byproducts. It should use more of its coal within its own borders and save the wastes and costs of transportation. Having no iron deposits it cannot, of course, be as self-contained as Pennsylvania could be but is not.

Is the Pyrite in Coal Intrinsic?

SOME recognition is being given at last to the idea that the pyrite in coal is organic and intrinsic. In an article appearing in "The Resources of Tennessee," entitled "Coal Pyrite Resources of Tennessee," by E. A. Holbrook and Wilbur A. Nelson, the authors say: "Because coal in a mine contains pyrite balls, or bands, does not mean that the coal from this mine is high in sulphur or inferior in quality; for often the contrary is true, that the sulphur, having concentrated into definite balls, or bands, leaves the coal comparatively free of sulphur."

It is likely that the sulphur in coal will eventually be found to be but rarely of an outside origin, though it is not safe to assume at the present stage that this is true of all of it. The "sulphur balls," as they are called, may well be considered, as to the authors just quoted allege, signs of desulphurization of the coal. It will be interesting to learn some day what wonderful plant in the ancient days secreted so much sulphur. It must have been as full of odor as the leek or the onion —and as greatly tear-provoking. Some of the coal forests must have been thickly bespread with it. True sulphur appears in concentration, the volatile matters having been removed; but with all allowances and every imagination, how can we explain beds which carry 6 per cent. of sulphur, and even more, in the general run of the coal?

Quite wisely the Government has reopened the opportunity for converting the first and second series of Liberty Bonds into bonds which pay not 3½ or 4 per cent., but 4¼ per cent. This is the conversion privilege which was kept open till Nov. 9 of last year and then closed indefinitely. Now it is opened, the operator should induce his men to avert themselves of the renewed opportunity for exchange. Second, Fours have been selling at a lower figure than the Second Converted Fours, and conversion is the best practice for every one including the mine worker. The most profitable course with First 3½ Liberty Bonds is to sell them on the market and buy a 4¼ issue, putting the difference in the bank.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Mine workers in Illinois are somewhat generally demanding the shorter day, being led in that demand by the president of their branch of the union, Frank Farrington. They argue that shorter hours would keep every one working an equal length of time throughout the industry regardless of the quality of the coal worked. They want the worst coal of Illinois, Iowa and Indiana to be mined as steadily as the best in Pennsylvania and West Virginia. The consumer might well not be pleased with such an outcome of union activity, but that is not the worst objection to Mr. Farrington's proposal.

Should we place the industry on a six-hour basis, if only for a few months, the mine workers would be disposed to try to keep it there. When there would again be a big demand for coal it would be impossible to secure it working on a six-hour basis. As a result there would be another coal shortage and more working men would flock to the industry, in fact they might come before that auspicuous hour. The last state of the industry would then be worse than the first. The flood of men would seem to make it necessary to make a four-hour day when business became slack. More men would enter the mines, and at the next business flood, still more men would be engaged. A three-hour or a two-hour day would be proposed and so on indefinitely.

We should thus have an infinite series of decreasing terms ending in zero. If the Farrington cure for slackness is to be taken at every decline in business, a long-time invigorator should be swallowed whenever business briskened. The reason why the mines are flooded with men is because the regular mine workers did not meet the demand when it came. This, of course, they cannot deny. They will say, however, and say with truth, that a very important reason for not meeting that demand was the loss of the working force due to the absence of men in the Army and munition works.

Farrington has more excuse than the British advocates of shorter time. In Great Britain there is an acute shortage of coal and of working places. No more than a certain number of men can be employed, but each man should get out his utmost in order to meet the emergency. The short day will not serve in Great Britain even during slackness of employment, whereas it might conceivably do little harm here if the mine worker realized it as only a temporary expedient. Everyone who knows the mine worker well knows he would not so regard it but would want to keep his six-hour day and twelve-hour pay indefinitely.

Want Larger Accident Compensation

The presidents of all the five districts that have been established by the United Workers of America in Pennsylvania recently held a meeting with Harry A. Mackey, chairman of the compensation board, and Francis H. Bohlen, the counsel for the board, and discussed with them amendments to the compensation law. The revision of the law thus proposed would raise the compensation, reduce the waiting period after which compensation is paid, provide compensation for disfigurement, eliminate the section providing for the proving of dependency and insert a specified period during which compensation shall be paid for partial disability and for specific injuries.

The increase in compensation has nothing to do with the increased cost of living consequent on the war, for in Pennsylvania the compensation is dependent solely on the wage earned and is not limited to a certain amount, as in West Virginia. The compensation has therefore increased with the advance in wages. Even before the war the mine workers of Pennsylvania argued that the compensation should be larger. At earlier conferences the labor representatives sought an increase that would bring the compensation up to 50 per cent. or 60 per cent. or even 66⅔ per cent. of the weekly wages. The demand is now for 70 per cent. The compensation board approves of an increase, but has not set a definite figure on the compensation to be paid.

The executive boards of the five Pennsylvania districts of the United Mine Workers of America have met and have ratified the work of the presidents, and these presidents on Feb. 20 called on Governor W. C. Sproul and Attorney General Schaeffer and discussed these proposed amendments. Governor Sproul declared that he would favor any changes recommended by members of the compensation board, or agreed on between representatives of organized labor and members of the compensation board.

Representative David Fowler, of Scranton, who is a national organizer of the mine workers' union, has been selected as the man to introduce to the legislature the bill containing the proposed amendments. What the compensation should be is not easy to determine. What is clear is that the compensation should not be made so high as to make any numerous body of men prefer idling under compensation to working without it.

An amendment to the workmen's compensation act was introduced in the House on Feb. 20, by Mr. Deitrich, Allegheny County, which provides that where injury arises from the failure of the employer to obey safety requirements no consideration shall be allowed to affect the liability of the employer. The injured person or his representative or his dependents may either claim compensation or institute civil proceedings.

Militia Gone, Must Have State Police

In West Virginia, the mine workers and particularly their leaders bitterly oppose the proposed police-patrol or indeed any other constabulary bill, although it is generally conceded that the state must have some form of police protection now that there is no longer any national guard available. The Governor will include in his call for a special session the question of state police legislation and it is generally believed that the legislature will enact laws providing for a state police despite the opposition of the mine workers. The Governor and others have pointed out to those opposing the legislation that the quickest way to eliminate the mine guards often employed by individual corporations is through an organized form of police supervision vested in the state. The miners do not seem to be able to see this, however.

District President Implicated in Affray

On the charge of having been implicated in a shooting affray at Glen White in November, 1917, J. R. Gilmore, president of District 29, together with Lawrence Dwyer, international board member for that district, and district board members Stafford and Clendenin, of the United Mine Workers, were placed under arrest at Beckley, W. Va., on Feb. 18, a warrant having been sworn out by Geo. W. Williams. Twelve other warrants were also sworn out against certain mine workers charged with being implicated in the shooting. This is alleged to have occurred during a strike and just at that time of the day when nonunion mine workers were leaving the mine. Refusing to require a bond for $3000 the trial justice released the men under a $1000 bond. No one was injured by the shots fired.

Farrington Plans Shorter Day and Week

Illinois miners are getting ready to demand a six-hour day and a five-day week. This is indicated in a "keynote" letter issued by Frank Farrington, president of the United Mine Workers of Illinois, sent out under date of Feb. 21, in which he frankly says: "Our goal should be a six-hour day, five days per week, for all the miners in the United States, with no double-shift on the coal allowed except as necessity may require. Development for increased tonnage should not be considered a necessity. Every atom of strength of the United Mine Workers of America should be employed to accomplish that end and then we should strive to have the Government prevent the opening of new operations, except as new operations may be needed to supply the demand for coal. If this is done every mine worker will then have a chance to earn a decent living and the matter of equalizing and adjusting wages will be easy of accomplishment, and until it is done unemployment and consequent want and suffering will ever be present among the mine workers of the United States."

Leading up to the demand, Farrington says: "The great evil of mining is unemployment and the absence of uniformity in wages paid as between competing districts. Even now hundreds of thousands of mine workers are feeling the pinch of slackened work, and, as a result, hunger and want are stalking in their midst and threatening their future. True, it is hoped that industrial activity, temporarily suspended, will soon resume a normal status and that the surplus of coal now above ground will soon be consumed and the situation thus be relieved, but even that will not cure the evil from which mine workers suffer and the reason it will not is because the mining industry is fully 50 per cent. overdeveloped, which means that there are fully 50 per cent. more men employed in the mines of the United States than are necessary to supply the normal demand for coal.

"So long as that condition exists unemployment will exist and work will be best where wages are lowest, as the demand for coal will be largely supplied from districts where it can be purchased the cheapest, with the inevitable result that wages in districts having higher wage scales will always be threatened with lack of employment. Therefore we must create a condition whereby districts having low wages will have no advantage over districts having high wages when it comes to the number of days worked. Or in other words we must create a condition whereby a low wage scale will be of no competitive value to an operator when it comes to getting a market for his coal, and the only way that can be done is to create a condition that will make it necessary to work practically all the mines full running time in order to supply the demand for coal, and the only way that can be done is by reducing the hours of labor, and our salvation is in our ability to do so."

Compensation Revision in Missouri

The Workmen's Compensation Committee of the Missouri Legislature, after futile efforts to agree upon a substitute bill which would reconcile differences between employers and employees, has voted to report favorably, with amendments, the bill favored by the employees. As this bill provides for monopolistic State insurance, to which the employers are strongly opposed, and also for other reasons, the employers will make every effort to defeat the bill and are confident that they can do so in the Senate if not in the House. The insurance companies also will fight it.

The principal amendments agreed upon by the committee provide: A waiting period of five days, for which compensation shall be given if the incapacity extends over three weeks and a maximum compensation of $30 a week. The amendments also arrange that the workmen's compensation commission shall decide whether compensation shall be in a lump sum or shall be spread over a period of weeks. It prevents an injured employee from receiving more as compensation than he would have received as wage for an equal period of disability. The salaries of members of the commission are reduced from $7000 to $5000 a year and a fine and imprisonment is provided for any person who is found guilty of making false statements about the condition of the insurance fund.

Block-Coal Company Settles Strike

When the contract was made in the block-coal district of Indiana, of which Brazil is the principal town, a differential of 6c. per ton was provided where the top coal is left. The contract provides that the men receive 67c. per ton for the loading of the coal and that the company drill the shotholes. The men of the Powers Collieries Co. at Mine No. 2, recently, contending that the drilling force of the company was inadequate and too slow in drilling the holes, went on strike. The company settled with the men by providing that they drill their own holes and in return receive 2c. more for loading, or 69c. per ton. The roof is bad and the top coal has to be left to support it.

Want Compensation Act Amended

The coal miners of the Crowsnest Pass District, through the medium of Gladstone Local Union, No. 2314 United Mine Workers of America, are petitioning for amendments to the Workmen's Compensation Act of British Columbia. They declare for a variety of reasons that changes should be made providing for the board being represented in the Crow's Nest District by permanent representatives; for an increase of 100 per cent. in the compensation allowed for dependents; for a clause permitting workmen to take proceedings at common law in case of serious injuries and where it is suspected that the accident was caused by negligence; and for an amendment that will allow appeals from the decision of the Workmen's Compensation Board to the Court of Appeal.

Nova Scotians Don't Stop to Eat

On Feb. 24, the Amalgamated Mine Workers of Nova Scotia adopted an agreement which reduces the working day from 12 hours and 10 hours to 8 hours. The "datal" men who are paid by the day, and not by the hour, will get the full day wage without any reduction, but the "hourly paid" men will receive no change in the hour rate.

The men are well pleased that the operators met with them to discuss terms and are also much gratified that they have secured the eight-hour day. The proposal of the operators which the mine workers have accepted is as follows:

"The operators have carefully considered the proposal of their employees for an eight-hour day, and being most desirous so far as possible to meet their wishes, would submit the following offer:

"1. The collieries will commence to hoist coal at 7 a.m., at which time all the men must be in the mine.

"2. The day's work will cease at 3 o'clock, when all arrangements will be available for conveying the men to the surface.

"3. The surface men around the bankhead and screens associated with the handling of coal are to be on duty between the hours of 7 a.m. and 3 p.m. and for a short time after, if necessary, for the purpose of attending to such duties as will facilitate their own work, such time not to exceed a half hour.

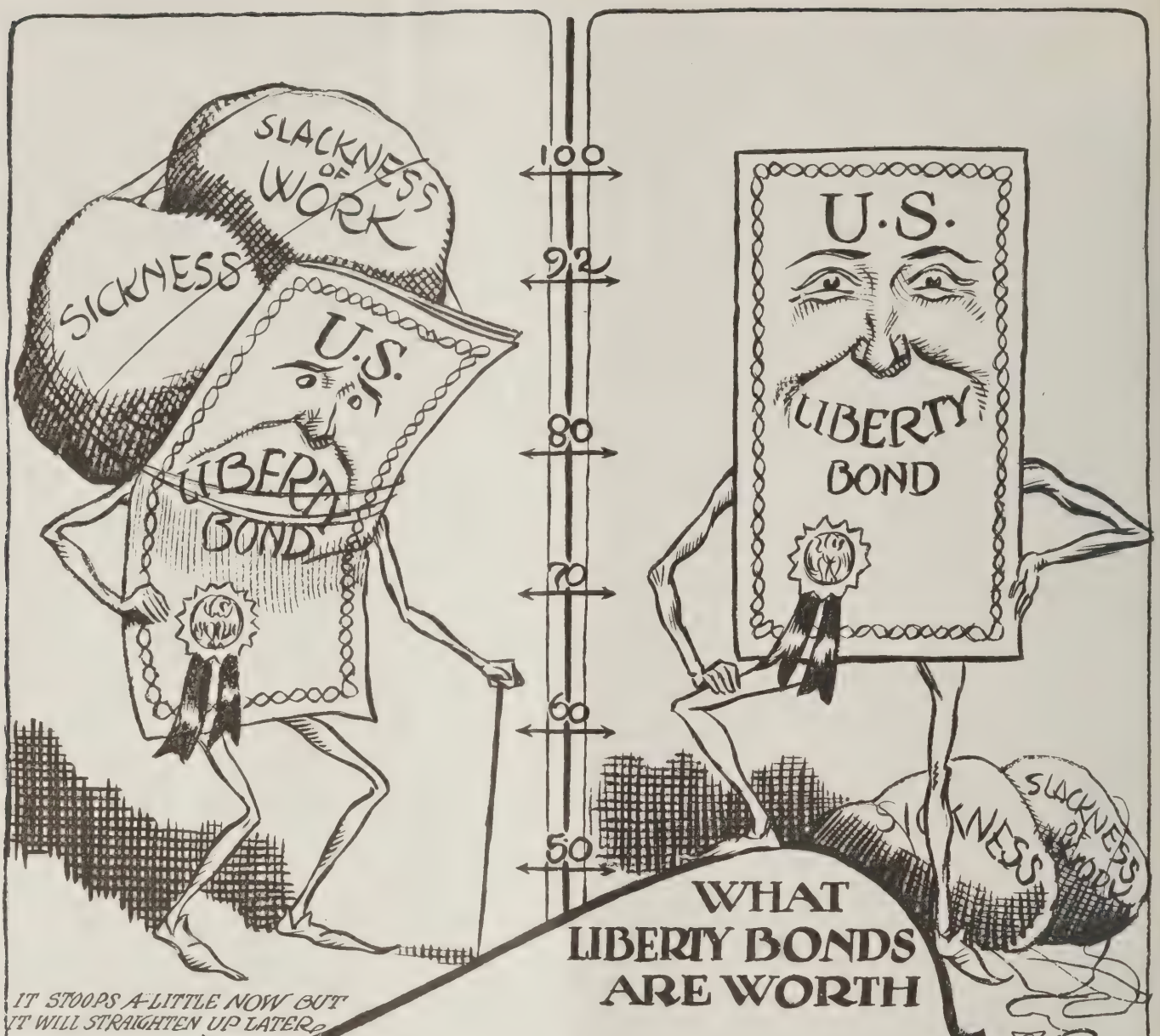
"4. The working day of other surface labor around the collieries to be from 7 a.m. to 4 p.m., with half an hour for dinner.

"5. Where continuous attendance is required, the shifts will be eight hours instead of twelve, both surface and underground at the same pay.

"6. The conditions peculiar to certain localities will be adjusted locally.

"7. The agreement will become effective Mar. 15, 16 or 17, according to the date on which the pay rolls are made.

"Clause 1 means that the mine shall run continuously between the hours named, without any stop whatever."



WHAT LIBERTY BONDS ARE WORTH

Slack work and sickness are making some patriotic men sell the Liberty Bonds they worked so hard to get. No one should sell a bond, if by a little skimping he could keep it. All payments still due on bonds should be made as soon as possible.

But if bonds must be sold, don't sacrifice them for little or nothing. Any bona fide broker will give you at least $92 for a $100 bond and more than that for the 3½ per cent. bond, as first issued.

Liberty Bonds have fallen in value because so many are being sold and no effort has been made to induce any one to buy them from those who want to sell. Patriotic people who will buy new bonds will not purchase old ones, though they cost less and are just as good.

Unless in Trouble Keep Your Liberty Bonds.

DISCUSSION BY READERS

Cost Reduced in Machine Mining

Letter No. 1—Speaking of increasing the output of mines and reducing the cost of their operation, referred to by one writer in *Coal Age*, let me say that, in my short experience as mine foreman, I have been able to greatly increase the output of our mine and at the same time show a lesser cost since installing two Sullivan coal cutters. The performance of this machine has exceeded my best expectations.

The machine we have installed is handled easily and cuts well down to the bottom, leaving from 4½ to 5 in. of bottom coal. I will not attempt to describe minutely the special bit used in this machine, which is one of its valuable features and which, I believe, enables it to forge ahead without bucking, even when operating on a soft bottom; and when a horseback is struck, the machine never stops.

An important point in regard to keeping the cost low is that no machine boss is required to look after the machines and keep them in good condition. So far, our machinemen repair their own machines very easily. Although I have worked in mines where other types of machines have been used, I have never known them to perform the same work with as little trouble.

Our cutters can easily cut from 15 to 20 places in a single night and are not as tired as if they had mined and loaded five cars of coal in that time. I cite this experience hoping that it may prove of value to other young foremen who are making every effort to reduce operating costs in their mines. I believe that the mining of coal by machines, where conditions will permit of their use, is the solution of the cost problem.

Oliphant Furnace, Penn. JOHN H. WILEY.

Correct Accounting

Letter No. 1—Referring to the question of an accountant, which appeared in *Coal Age*, Jan. 30, p. 248, and the reply given by the editor, on the same page, allow me to say that the distinction made between the capital invested in any permanent enterprise and the working expenditures of the business affords some field for discussion among accountants. However, in the case of coal mining and other similarly wasteful enterprises, experience teaches that the field for such a discussion is extremely limited.

Kindly permit me to express the opinion that, after a mine has been developed and equipped to its normal and regular output of capacity, the cost of any additional equipment that may be required to maintain the output, under the increasing length of haul, due to the advance of the working faces in the extraction of the mineral, should be charged as ordinary and necessary expense of operating the mine.

Likewise, also, the cost of additional copper wire, piping, and other conductors for the transmission of power into the extended workings are chargeable to the same account, forming, as they do, a part of the necessary working expenses of the mine. In the same manner, additional mules, mine cars, locomotives, mining machines, pumps, and other appliances supplied to replace those worn out and discarded in the service of the mine, form a part of the legitimate working expenses and, as such, should be charged to the expense account.

REGARDS EQUIPMENT RENEWALS AS EXPENSE

My reason for this opinion, which appears to be at variance with that of the editorial reply to this inquiry, is as follows: The cost of such items as I have named is a constantly recurring expense in the operation of a coal mine and may be regarded as constituting a practically constant factor in the cost of production per ton of coal mined, from year to year. It makes no appreciable difference in the final result of the business whether the cost of these items is charged to operating expense or capitalized and entered as additional equipment, which must then be offset by deductions representing a certain depreciation that would have to be determined, each year, during the life of the mine.

My opinion is that, as a practical matter, it is better to dispose of such costs by direct charge to operating expense, rather than to introduce vexatious refinements of accounting, which would be necessary if such costs were to be capitalized and depreciated.

THOMAS T. BREWSTER, Gen. Mgr.,
St. Louis, Mo. Mount Olive & Staunton Coal Co.

[Regarding the suggestion of this correspondent, it would be interesting to know how the equipment ledger of a large operation is to be kept in a manner that will show the correct valuation of the equipment on hand and in use in the mine, at the close of any fiscal year, unless new purchases of equipment are regularly entered as such when taken into the mine.

It is readily granted that a new pump or other machine may be purchased to replace one that is worn out and discarded. At the same time, the new machine may be an improved type, which it generally is, and have a greater value than the machine it replaces. Again, the change in market values varies widely, from time to time, depending on relative supply and demand, quality of material, cost of labor, style and degree of workmanship, etc., etc.

It is quite clear that a correct method of accounting can only be maintained when the equipment and other accounts are properly charged and credited with each transaction as it occurs. The best business practice requires that a complete inventory of equipment and material be made at the close of each fiscal year, and a suitable valuation placed on the several items of the account. Only in this manner is it possible to show

the present condition and value of an operation, which would have to be done should a change in ownership be contemplated.

Coal Age will be glad to learn the opinions of other managers, superintendents, and accountants.—Editor.]

Safeguards in Trolley Haulage

Letter No. 1—The inquiry of "Motorman," *Coal Age*, Jan. 9, p. 71, is an interesting one, particularly to men who realize that an electric installation in a coal mine is an important factor in its operation. As stated in the answer to this inquiry, the installation of an electric-haulage system should be made by a practical and competent mining electrician, whose contact with various conditions that exist in coal mining will enable him to provide against any contingency that is liable to arise.

When a management, wishing to produce coal at a minimum cost, decides to electrify its mines it is important to consider carefully the necessary electrical appliances that will make the proposition a paying investment. Faulty design and incompetent installation mean either extensive changes, later, or increased operating and upkeep expenses. Knowing this, the competent electrician makes a careful survey of the situation, which enables him to design the installation so as to meet the requirements in the simplest and most economical manner.

Essential Factors in Electric Haulage

The efficiency of electric mine haulage depends upon two important factors; namely, the overhead circuit and the track-return circuit. A first-class, bonded-return circuit always bears a definite relation to the tonnage of coal hauled. Therefore, one of the safeguards of economical haulage is to provide against the serious loss that is sure to follow the poor bonding of the rails. In fact, the return circuit of an electric haulage should be tested, from time to time, if the highest efficiency of the system is to be maintained. In all permanent work the "compressed-terminal bond" should be employed. The channel-pin method of bonding should only be used for temporary work.

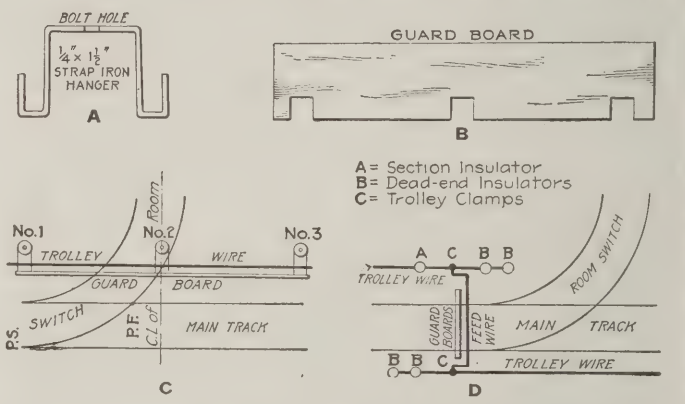
In the installation of the overhead circuit, every precaution should be taken, both outside and inside of the mine, to minimize fire hazard; reduce the cost of upkeep; provide economical operation; and to safeguard employees by eliminating, as far as possible, the danger of contact with live wires. The efficient and economical operation of electric locomotives, cutting machines, pumps, fans, etc., depends on the selection of motor equipment, the capacity of which must be sufficient to perform the required work without unnecessary heating, and yet avoid operating the motor too far under its economical load. Both feeder and return circuits must provide ample conductivity to prevent excessive drop in voltage.

All trolley-wire hangers must be installed true with the track and practically at the same height above the rails, in order to avoid the danger of a trolley pole jumping off the wire, and excessive arcing at the trolley wheel. The center of each hanger should be from 6 to 8 in. outside of the rail, unless otherwise modified by the state mining law or the size and type of locomotive to be used.

The severest mechanical stress placed upon hangers is that encountered on curves, where a sufficient number of hangers and trolley clamps should be installed to prevent them from being bent out of line. No fixed rule can be given for spacing the hangers apart, as this will depend chiefly on the degree of curve. However, in common mining practice, a distance of 8 or 10 ft. has generally given satisfactory results.

On a straight track, some difference of opinion exists as to the proper distance apart of installing hangers, in the use of 250 and 550 volts. But, hangers should never be spaced so far apart as to cause an undue sag in the trolley wire. Because of varying conditions in different mines, this is the only safe rule that can be given. My own practice has been to adopt a distance of 18 ft., center to center of hangers, for 0000-trolley wire, on straight tracks, and from 8 to 10 ft. on ordinary mine curves.

In order to safeguard employees from contact with the trolley wire, guard boards must be installed at all points where men and animals pass under the wire. For



ELECTRIC-HAULAGE INSTALLATION IN MINES

the support of the guard boards, the strap iron hanger, shown at (*a*) in the accompanying figure, is the simplest device to employ. This is made to be supported by the regular trolley-wire hanger, without drilling any extra holes, the same bolt that supports the latter also passes through a hole in the strap-iron hanger.

The form of the guard boards used to protect the trolley wire is shown at (*b*) in the figure. Three hangers should be installed at each roomneck where the trolley wire crosses the mouth of the room. These hangers support two guard boards, 1 x 6 in. and of suitable length to protect the wire. As indicated in the figure, the boards are made with three notches to fit the three hangers.

At (*c*) in the figure, is shown the best location of the three hangers, No. 1 being opposite the point of switch, No. 2 on the center line of the room, and No. 3 beyond the point of frog. When the expansion bolt has been driven into place in the roof the strap-iron hanger is held up against the roof while the trolley-wire hanger is screwed on the expansion bolt, thus holding the strap hanger firmly against the roof. Weather boarding is quite generally used for guard boards, since it is pliable and easily adapted to any conditions.

An important matter, in safeguarding the efficiency in trolley haulage, is the proper location of the trolley frog. It is a difficult matter to give a fixed rule here also, because of the difference in degree of curves em-

ployed and the spread of the trolley frog. I have generally found good satisfaction in locating the trolley frog at a point where the lead rail of the switch has deflected 6 in. from the straight rail on the entry, this measurement being taken between the outside edges of the two rails.

While this rule has given good satisfaction in my own practice, it is well to remember that the test of the proper location of a trolley frog is the freedom with which the trolley pole operates over the frog, without jumping, both when the motor is running over the switch and on the main line. If the trolley jumps off the wire when crossing the frog, the location of the latter should be changed. The jumping of the trolley pole means delay and loss in efficiency.

Hanging Trolley Wire on Room Headings

Where it is desired to install a trolley wire so as to avoid its crossing the roomnecks, it is necessary to transfer the wire to the opposite side of the road, as shown at (*d*) in the figure. A section insulator (*A*) should be installed outside of the first room, where the transfer of the trolley wire takes place. A feeder wire of equal carrying capacity is then used to carry the current across the entry to the opposite side of the track. This feed wire is soldered to two trolley clamps (*CC*) attached to the trolley wires. As shown in the figure, the feed wire is protected by guard boards.

I have only seen one installation of this kind in use and, owing to its inconvenience, it was later abandoned. The locomotive must be provided with two trolley poles and there is much delay in the use of the system. The usual practice, in some of the largest mines, is to install the trolley wire on the room side of the entry. This has given good satisfaction and, practically, no accidents have occurred when the installation has been properly made. In any case, a section insulator located at the mouth of the heading enables the current to be cut off, if desired, when the locomotive is out of the heading.

T. C. Hughes,
Windber, Penn. Mine Electrician.

Letter No. 2—Referring to the inquiry of "Motorman," *Coal Age*, Jan. 9, p. 71, asking for the simplest and best method of protecting the trolley wire in mine haulage, kindly permit me to submit for his consideration a scheme that I have found very practical and which I believe is the simplest device that can be used for that purpose.

My plan is to have the mine blacksmith take a piece of strap iron 1½ x ¼ in., say 20 in. in length, and bend it in the shape shown in my rough sketch. [See Letter No. 1, Fig. (*a*)]. A hole is then made in the center of the upper bend, to fit the bolt that supports the bell or other form of trolley hanger.

The use of this device is clear without further explanation than to say that two or more of these supports having been placed in position and made secure on consecutive hangers of the trolley wire, weatherboards or slats, 4 or 5 in. wide and cut to the proper length, are placed in the supports, a board on each side of the trolley wire.

In my mining practice, this arrangement has been found to give good satisfaction; it is cheap, quickly made and put in place. It has been my custom to have the blacksmith make a number of these supports, which are kept on hand ready for use as needed. The dimensions given in my sketch are only suggestive, as the supports described can be bent so as to fit any hanger in use in the mine, and this should be done to insure the best satisfaction.

Mine Mechanic.
Rosebud, W. Va.

Mule Power in Mine Haulage

Letter No. 1—Replying to H. R. S., who asked, in *Coal Age*, Feb. 6, p. 293, "What is a fair estimate of the work that a good average mine mule or horse will perform when working under average conditions, in a level seam," allow me to give a little of my own experience in respect to mule haulage.

From the records of a few years ago, now before me, a mule hauled 116 wagons and traveled 14 miles; another hauled 94 wagons, traveling 11 miles; and yet another, 27 wagons, traveling 17 miles. These records refer to uneven grades and a 10-hour shift.

My opinion is that, on well-drained roads, in a level seam, the average mule or horse will travel 15 miles, in a 10-hour shift, with one hour to eat and rest, which means 9 hours of actual work. When gathering cars with mules, the longest distance hauled should not exceed 1000 ft., and the shortest distance may be, say, 200 ft., making the mean average one-way haul 600 ft., or 1200 ft. for the round trip. Then, if a mule will travel 15 miles in a single shift, he will make $15 \times 5280 \div 1200 = 66$ trips.

On a level track the mule will haul two 2-ton wagons, or 4 tons of coal, each trip. Expressed in ton-mile hours, therefore, the work of an average mine mule would be $4 \times 15 \div 9 = 6\frac{2}{3}$ ton-mile hours, which is practically the estimate given in the reply to this inquiry by the editor.

The record of the faithful mine mule is one that cannot be idly set aside, where the conditions regarding length of haul and grade are favorable, it is an inducement to keep the mule in harness rather than to harness Niagara.

R. W. Lightburn.
Perryopolis, Penn.

Drawing Pillars in Machine Mining

Letter No. 9—Referring to the inquiry on this subject, *Coal Age*, Jan. 2, p. 32, it is unfortunate that the writer does not give the thickness of the pillars between the rooms, as this is an important factor in the work of drawing pillars with machines. He states that the rooms are 27 ft. wide, which would seem to present the possibility of danger of the roof pressure swinging over onto the pillars and starting a squeeze, which would not only endanger the pillar work but cause a large loss of coal besides. It is possible, however, that the pillars are of sufficient thickness to resist this action.

The seam mentioned here being from 4½ to 5 ft. in thickness and the depth of cover 200 ft., one must be guided, in deciding on the best method of drawing back the pillars with machines, by considering the thickness of the sandrock roof and the nature of the material immediately above it. If this sandrock is, say only 2 ft. in thickness and overlaid with several feet of soft

shale, such a roof can be easily fractured, with much less resistance in the pillars, than if the sandrock above the coal was from 4 to 6 ft. in thickness or even more. It is clear, therefore, that this is an important consideration and one that must be taken into account in deciding the method to be employed in extracting the pillars

If the problem was mine for solution, I would start and make a 60-ft. cut through the rib in the innermost room, following this with a 40-ft. cut through the next rib outby, a 30-ft. cut through the next rib and 20-ft. cuts in each of the three following ribs, making six ribs cut through in all. Assuming the rooms are driven on 40-ft. centers, there would thus be made an open length covering six ribs and seven rooms, which would give a total length of 267 feet.

The next cuts are made in each rib, after leaving an 8-ft. stump for the protection of the men and the machine, and are as follows: A 30-ft. cut in the innermost rib, a 25-ft. cut in the next rib outby, a 20-ft. cut in the next, and 15-ft. cuts in each of the three last ribs. Each of these cuts is protected, as stated, with an 8-ft. stump that is taken out later.

Watching for the First Break to Determine the Angle of Fracture

In my estimation, by the time this extraction is completed, the indications will determine the particular angle of the fracture line that will give the best results. However, let me say that when mining under a strong sandrock roof and with the expectation of drawing back the pillars with machines, the rooms should be driven with a less width, unless the pillars are made equally wide.

The angle of fracture, or the angle that the line of fracture makes with the heading, should not exceed 25 or 30 deg., so as to throw the thrust on the ends of the pillars and not cause the weight to ride over onto them, a distance half-way down the room. It may be wise to still further reduce the angle of fracture to, say 15 deg., under a 40-ft. sandrock cover, or even make the fracture line parallel to the heading, by altering the width of the cuts in the ribs, previously given. I would even suggest using three rows of chocks for support behind the retreating pillars, instead of leaving the 8-ft. stump previously mentioned. These chocks should be moved forward, one row at a time, as the work on the pillars progresses. R. W. Lightburn.

Perryopolis, Penn.

Efficiency of Mine Officials

Letter No. 2—The letter of William Gorman, *Coal Age*, Jan. 16, p. 159, interested me much, drawing attention as it did to the need of greater efficiency on the part of mine superintendents. I agree with the suggestion that there has been too much undeserved criticism of mine foremen, while little has been said in respect to superintendents; but, apparently, even Mr. Gorman cannot resist the opportunity of giving the much abused mine foreman a jab, in his letter.

Let me say, here, that if any good is to come out of a discussion, we must stick close to the point. To my mind, a good superintendent shows his ability by the foremen he employs. Having but one pair of eyes, the superintendent cannot see everything that goes on in the mine. He must rely, to a large extent, on his underofficials; if they are the right kind of men he can trust them to see that his orders are carried out.

In the mining of coal, there is no room for a superintendent who continually wears a white collar and whose knowledge of things in and around the mine is only what has been told him by the mine foreman or the fireboss. There are many things, of course, to be looked after on the surface; but more than all else, in importance, is the development of the mine and the daily operations underground, on the success of which the profits of the mine depend. No one, today, considers a mine superintendent efficient who visits the mine on rare occasions only.

When a Superintendent's Visits to the Mine Do More Harm Than Good

Speaking of superintendents, there is one class of these officials that do more harm than good by going into the mine. The mine foreman would fare far better if they stayed out altogether. They will slip into a mine and, unknown to the foreman, visit the working places and make inquiries of the men regarding the foreman. Such a practice can only have a bad effect on the men, as it tends to decrease the prestige of the foreman and destroy his authority in the mine.

In common with other superintendents, I like to go into the mines alone, visit the working places and chat with the men; but if they start to talking about their claims for yardage, or lost cars, or other allowances that should be made them, I refer them promptly to the foreman, telling them he is the man to see. But it often happens that I mention the matter to the foreman myself, later, for the purpose of informing him of the disposition of his men.

However, when a superintendent expects to be in the mine later in the day, I think it is only right for him to mention the matter to the foreman in the morning. It would have a tendency to disarm any lurking suspicion of his foreman that he was tracking him about the mines, which any man would naturally dislike and which would tend to arouse resentment in his mind where, otherwise, none would exist.

The Successful Mine Superintendent

The successful mine superintendent must be broad-minded and possess a thorough knowledge of all outside work and equipment; but, above all he must be a practical miner rather than an accountant whose chief duty is to keep an accurate record of supplies and costs in and about the mine. The superintendent is the man to whom many questions and complaints are constantly brought by the women of the place, and tact and intelligence will be needed to handle these successfully.

One thing is certain, however, and that is a superintendent will make his foreman either like to see him come around or dread his appearance in the mine. When a foreman, myself, I always tried to keep clear of the superintendent who was continually telling me what he used to do when he was bossing. I have known superintendents who, no matter what bad conditions were presented, could always tell of having experienced worse conditions themselves in mines where they were in charge.

Such a superintendent thinks to spur his foreman on to greater efforts; but, in reality, he is discouraging him. The "super" who never sees anything that a

foreman has done to improve the mine, but is constantly looking for things with which to find fault, is no help to his foreman. Whether consciously or unconsciously, such a superintendent is a hindrance to the work.

When a foreman, with some very pardonable pride, shows his superintendent work that he has accomplished and is told "how it ought to have been done," instead of receiving the commendation he had a right to expect, the effect is to discourage him. It is, also, a bad idea to keep promising a foreman this or that, when the superintendent well knows there is little chance for the fulfillment of his promise, until conditions in the coal trade materially improve.

On the other hand, let a superintendent encourage his foreman in every way possible; commend him for a job well done and never take him to task or reprove him for his faults in the presence of his men. Be on speaking terms with all the men. A good word acts as a tonic and makes them better and more faithful workers. Even the trapperboy smiles to himself after the big superintendent has passed him with a good word. There are a thousand and one things that enter into the make-up of a good superintendent besides cost-sheets and figures. THOMAS HOGARTH.

McIntyre, Penn.

Letter No. 3—The incident narrated by William Gorman, *Coal Age*, Jan. 16, p. 159, regarding a barber who rose to a position of responsibility and trust in charge of a mine, reminds me of a similar case that I observed some time since. A man who had been a good grocer is now in charge of one of the most up-to-date and best producing mines in this vicinity. It is hardly necessary to add that, in his new position, he is making good.

While I am not in as close contact with mine superintendents as some of the other writers in *Coal Age*, I am in a position to observe many of their qualities that count either for good or for bad, in mine management. The results of my observation make me conclude that there is great need, indeed, for more efficiency on the part of the higher mine officials. Too often it happens that, as Mr. Gorman has suggested, these officials lack ability and experience. Frequently, the superintendent has one or more relatives, or friends belonging to his lodge, whom he keeps on the payroll simply because of such relationship and not for the work the man is capable of doing.

Loss in Efficiency Due to the Superintendent Overseeing Too Many Mines

One or two instances will illustrate the point I have in mind. A single large coal company, hereabouts, owns and operates five or six mines. There is but one superintendent in charge of all the mines, and it is a practical impossibility for him to keep in touch with these different operations, which are some distance apart. He is wholly ignorant of many things that are done in the mines and which lower the standard of efficiency by hindering the work and often causing absolute loss to the company.

At each of the mines, there is a mine foreman who has charge below, while a topboss is in full charge on the surface. It often happens that there is but little coöperation between these two underofficials, although the superintendent hears little of their differences.

For example, at one of these mines, it has long been the custom for the topboss to prepare and send down into the mine dry sand for the motormen to use on the sharp grades. One morning, recently, the sand was not sent down as ordered and the motormen were obliged to do the best they could. As a result, one trip got beyond control when descending a heavy grade. There was a wreck that ditched the trip, knocked out many timbers, tore up the tracks and delayed the mine for five hours. The mine foreman, however, knowing that the topboss was a relative of the superintendent, did not report the true cause for the accident. This left the management in ignorance of the real seat of the trouble.

Difference in Ways and Means of Doing the Same Thing in Different Mines

Another instance that can be cited shows a sharp contrast, in the efficient management of two of these mines, in respect to the handling and sharpening of the bits for the coal-cutting machines. In one of the mines, the dull bits taken from the machines are thrown into a box made of 4-in. pipe equipped with a lid, having a hook attached to hold it shut. This is an old-fashioned custom. Each machine may have three or four of these boxes, which are sent to the shaft bottom when full. There they remain until enough of the boxes arrive to be sent up on the cage. At the surface, they are taken to the blacksmith shop and sharpened when the smith has time. The system often causes much delay.

Compare the instance just cited with the arrangement in another mine, where a special truck is provided into which the dull bits are thrown. When full the truck is taken to the shaft bottom, hoisted on the cage and sent to the shop where the bits are sharpened promptly and again sent into the mine. In this case, also, the superintendent has no intimate knowledge of affairs and it would be an accident that would inform him of the different conditions in these two mines.

In the same two mines, also, different methods are in use for delivering power to the electric machines which are employed to cut the coal. In the first mine mentioned, the power is delivered by a separate, independent wire leading to the working face. This wire is poorly hung, lying or resting in any old way on its supports, while the dead or return wire is so covered up with slate, in many places, that it will never be recovered. Contrast this condition, now, with that in the second mine mentioned where the power for the coal cutters is taken directly from the trolley wires, and the return is through the rails which are properly bonded and examined every week.

In closing, let me say that the success of a mine official lies in his experience and education. An efficient and up-to-date superintendent is one who has derived his experience from actual work in the mines, which has made him familiar with what is required. Every good superintendent is constantly reading and studying new methods and, in my opinion, there is no better source from which to obtain this information than the columns of *Coal Age*, where many suggestions and much helpful advice are freely given for the asking.

Clinton, Ind. EFFICIENCY.

INQUIRIES OF GENERAL INTEREST

Pumping Water in a Shaft

I want to ask the assistance of *Coal Age* in solving a question in shaft pumping. The question is as follows:

A double-acting pump has a piston 6½ in. in diameter and a length of stroke of 4 ft. 6 in. The pump is located at the bottom of a shaft 250 yd. in depth. When the pump is running at a speed of 14 strokes per minute, how many gallons of water will it discharge up the shaft, and what will be the horsepower of the pump, assuming a useful effect of 60 per cent.?

This question is a practical one, and its solution has troubled me for some time past. STUDENT.

———, Alberta, Canada.

It is common mining practice to assume, for the purpose of estimate, that the water-end efficiency of a good pump is 85 per cent. of its piston displacement. The diameter of the pump cylinder, in this case, being 6½ in., its sectional area is $0.7854 \times 6.5^2 = 33.18$ sq.in. and, the length of stroke being 4 ft. 6 in., or 54 in., the piston displacement of this pump when running at a speed of 14 strokes per min., is $14(33.18 \times 54) = 25{,}084$ cu.in. per min. Therefore, taking the efficiency of the water end as 85 per cent. of the piston displacement, the discharge of this pump is

$$G = 0.85(25{,}084 \div 231) = 92.3 \text{ gal. per min.}$$

In calculating the "useful effect," which is the power that must be effective in the water end of the pump and which is here assumed as 60 per cent. of the power developed in the steam cylinder, it is not enough to consider the pump as operating under a head expressed simply by the depth of the shaft or, in this case, $3 \times 250 = 750$ ft. The depth of the shaft, or the distance from the water level in the sump to the point of discharge at the top of the shaft, is merely the "static head" or lift of the pump.

When the pump is in operation, there is developed, in addition to the static head, both a friction head and a velocity head. The velocity head, however, is generally small and can be wholly ignored, in mining practice, whenever the diameter of the column pipe, expressed in inches, does not exceed its length in hundreds of feet.

The friction head developed when a pump is in operation, however, depends on the diameter and length of the column pipe and the quantity of water handled per minute. It is necessary, therefore, to calculate the amount of this friction head and add it to the static head, in order to ascertain the actual total head under which the pump is to operate.

The friction head, h_f (ft.), for a discharge G (gal. per min.) and a length l (ft.) and diameter d (in.) of column pipe, is calculated by the formula

$$\text{Friction head,} \qquad h_f = \frac{G^2 l}{800 d^5}$$

Using a 2½-in. column pipe, which will handle the water discharged by this pump at an approximate velocity of 400 ft. per min. according to average coal-mining practice, and substituting the given values in this formula, the friction head developed, in this case, will be

$$h_f = \frac{92.3^2 \times 750}{800 \times 2.5^5} = \text{say } 82 \text{ ft.}$$

The total head against which this pump must operate is, therefore, $750 + 82 = 832$ ft.

Finally, assuming a useful effect of 60 per cent., as stated in the question, the horsepower required to be developed in the steam end of the pump, to perform the work mentioned, will be

$$\text{Horsepower,} \qquad H = \frac{62.5(231 \times 92.3)832}{0.60 \times 1728 \times 33{,}000} = 32.4 \text{ hp.}$$

This proposition is hardly complete without calculating the size of the steam end, or the diameter of the steam cylinder required to develop the estimated horsepower of the pump. The total pressure on the piston when the engine is developing 32.4 hp., and the piston speed is $14 \times 4\frac{1}{2} = 63$ ft. per min., is

$$p = \frac{32.4 \times 33{,}000}{63} = 16{,}970 \text{ lb.}$$

Then, assuming a steam pressure in the pump cylinder of, say 85 lb. per sq.in., the required diameter of the steam end of the pump is

$$d = \sqrt{\frac{16{,}970}{0.7854 \times 85}} = \text{say } 16 \text{ in.}$$

The size of this pump, to fulfill the specified requirements, will therefore be 16 x 6½ x 54 in., and is probably of the plunger type, which conforms better to the large ratio of the steam end to the water end necessary to overcome the great head on the pump, with a moderate steam pressure, assumed here as 85 lb. per square inch.

In order to maintain this assumed steam pressure, at the bottom of a shaft 750 ft. in depth, it will be necessary to allow for a drop of 5 lb. in transmission from the surface to the foot of the shaft, which will call for a gage pressure in the power house of at least 90 lb.

Also, is is estimated that this pump, under the assumed conditions, will consume practically 20 lb. of steam per min. But, if the steam pipe in the shaft is uncovered, there will result a loss estimated as 38 per cent. of the steam, by reason of the condensation caused by the radiation of heat from the bare pipeline in the shaft.

If the pipe is covered with asbestos, 1 in. in thickness, this loss by radiation of heat will be reduced to practically 5 or 6 per cent. In the former case, with the steam pipe uncovered, it will be necessary to provide for the generation of $(60 \times 20) \div (1 - 0.38) = 1935$ lb. of steam per hour, which would require a 60-hp. boiler for the operation of the given pump under the conditions mentioned.

With a covered pipe line, the loss by radiation of heat and consequent condensation of steam in the pipe is much less. Estimating this loss as, say 6 per cent., the steam delivered to the pump is $100 - 6 = 94$ per cent. of that generated, and a 40-hp. boiler would fill every requirement in that case.

EXAMINATION QUESTIONS

Alabama First-Class Examination, Birmingham, Jan. 20-23, 1919

(Selected Questions)

Ques.—What materials are best for tamping shots and why?

Ans.—A charge of powder placed in a drillhole should be protected by inserting a small wad of clay before proceeding to tamp the hole. The clay should be carefully pressed down against the charge and the hole then tamped thoroughly with some incombustible material. There is no better material used for this purpose than the fine dirt scraped from the roadways where the seam is underlaid with fireclay. The fineness of the dust and its incombustibility adapts it to the purposes of tamping a charge of powder.

Ques.—What is essential to the economical handling of coal?

Ans.—Economy in the handling of coal, from the working face to the tipple, depends largely on the style and character of the mine cars in use. They must be well built and mounted on good trucks equipped with roller-bearing wheels. The cars must be dustproof and of a kind that are easily loaded to their full capacity and can be readily dumped when they reach the tipple.

A good haulage system must be employed and the tracks kept in good condition so as to reduce the power required for haulage to a minimum. Wherever practicable, a storage-battery locomotive should be employed to haul the coal from the working face to the inside parting, where the trips are made up to be hauled out of the mine. It is possible, also, to use the same type of locomotive for hauling the cars to the shaft or slope bottom, or to the tipple, as the case may be.

Particularly in large mines with extended workings, a system should be established, in haulage, that will avoid unnecessary delays, both at the working face and on the road. A sufficient number of drivers or motormen should be employed for gathering the cars, and this work should be proportioned to that performed on the main road in hauling the trips to the mine entrance or tipple. A lack of proper proportionment, in this respect, will cause unnecessary delays and increase the cost of haulage in the mine.

The arrangements on the tipple for dumping should be such as to reduce the breakage of the coal to a minimum and load the cars for shipment as uniformly and regularly as possible, with the least expense for labor. The mine cars should be lubricated at regular intervals and inspected on the tipple each time a trip comes out of the mine. All cars needing repairs should be sent at once to the shop, and returned promptly to the mine when the repairs have been made.

Ques.—Describe the different kinds of brattices and overcasts in use; state how each is built; and say which you prefer and why.

Ans.—A brattice for conducting the air forward in a heading or room is built by standing a row of posts 8 or 10 ft. apart and 18 in. or 2 ft. from the rib. The line of posts extends from the last open crosscut forward in the direction of the working face. Thin boards or good canvas is then nailed to the posts on the side where the fresh air is traveling. Sometimes a slat or board is used to support the canvas stretched between two posts, so as to hold it well against the roof and prevent the leakage of air. The term "brattice" is often wrongly applied to a stopping built in a crosscut.

The most common form of overcast is built by blasting down the roof over the roadway where it is desired to construct the air bridge. This being done and the opening thus made being connected with the airway on both sides of the road spanned by the air bridge, iron girders or rails are thrown across the roadway and supported on the solid rib of coal on either side, so as to form a good foundation for the floor of the air bridge. Planks are then laid on these rails and the flooring thus formed covered with a good bed of concrete, care being taken to stop all holes and crevices through which the air would leak from the overcast into the airway below. It is necessary that the sectional area above the air bridge forming the overcast should be equal to the sectional area of the airways connected. An overcast is always preferred to an undercast, because it is free from the danger of being closed by an accumulation of water or gas, which would prevent the passage of men in time of need.

Ques.—What dangers are met in approaching old abandoned workings, and what precautions should be taken to avoid those dangers?

Ans.—There is always the danger that the old workings may be filled with gas, or that water may have accumulated therein to a dangerous extent. When approaching such old abandoned workings, it is not sufficient to examine the old mine maps and compare them with those of the present workings. No absolute dependence should be placed on the accuracy of the mine maps and surveys, particularly those of the abandoned mine, as such maps may not show the actual working face at the time the mine was abandoned, or there may be some error in the connection betwen the two surveys.

For the protection of the men driving a place approaching old workings, drillholes should be kept 16 or 20 ft. in advance of the place and flank holes should be drilled in each rib of the heading, which is kept 15 or 20 yd. in advance of its air-course. These flank holes should make an angle of 30 or 40 deg. with the rib, in the direction of the old works. A careful watch must be kept for any increase of gas or water, at the face of the heading. Where gas is suspected, safety lamps only should be used. Wooden plugs must be kept in readiness for instant use should one of the drillholes tap an accumulation of gas or water. In that case, the hole should be immediately plugged.

FOREIGN MARKETS AND EXPORT NEWS

Possible Market for American Coal in France

The post-war position of France with respect to coal supplies may make it possible to sell American coal in France during the year 1919. However, until there is some certainty regarding ocean freight rates it is impossible to say whether American coal can compete with English coal delivered in French ports.

Before the war the annual consumption of coal in France was over 60,000,000 tons, of which 40,000,000 tons were produced in the country. It is estimated that the consumption of France proper during 1919 will be in the neighborhood of 55,000,000 tons. Allowance is made in this figure for the reduced consumption of coal by reason of the destruction of thousands of manufacturing plants in the north of France. To this figure should be added, however, 8,000,000 tons which is the quantity of coal required to feed the iron, steel, and textile industries of Alsace-Lorraine, now in French occupation. This makes a total estimated consumption for France of 63,000,000 tons for the year 1919, or about the same as before the war.

It is hoped that French mines during the year 1919 will produce at least 30,000,000 tons of coal. This is slightly in excess of the quantity of coal mined in the year 1917. While there may be a slightly greater production for the year, as mines in the devastated regions gradually resume operations, it must be remembered that the labor needed to mine this coal will in all probability have to be taken from mines in the center of France, with a consequent reduction in the output of that section. There is also included in this estimate of 30,000,000 tons the coal that will be obtained from that portion of the Saar Basin lying in Alsace-Lorraine. The remaining 33,000,000 tons must be imported.

France hopes that England will be in position to export to her during 1919 close to 15,000,000 tons of coal. It is also expected that approximately the same quantity of coal can be imported from Germany during the year. However, if England is not able to export this quantity of coal to France this year, and if conditions in Germany should be such that a corresponding quantity can not be delivered to France, the French will have to look to the United States for whatever quantity is still lacking. Under the circumstances, it might be worth while for American coal exporters to look into the French situation a little in order to be in position to assist France in case of necessity.

Brazil Exporting Coal

According to the "Times of Argentina" Brazil has begun to export coal to Argentina. It will doubtless come as a surprise to many that Brazil possesses any coal mines worthy of comment, but the war has served in great measure to persuade the Latin-American countries to exploit their own resources. Quite a large syndicate is working a mine in the neighborhood of Rio Grande, and those interested in the venture express great hopes of being able to compete with English and American coal in the near future. The coal is said to be similar to lignite, but has a decided brownish appearance. It has been used as bunker fuel by some Brazilian steamers and is said to have given satisfactory results.

Argentina's Coal Imports

Imports of coal into Argentina in 1913 amounted to 4,046,278 metric tons, worth $27,332,611; in 1914, 3,421,526 tons, worth $23,112,407; in 1915, 2,543,887 tons, worth $17,192,644; in 1916, 1,884,781 tons, worth $12,721,695; and in 1917, 707,712 tons, worth $4,780,595.

As Argentina produces no coal of her own, a steadily increasing coal famine culminated in 1917, and produced a serious state of affairs for the railways, the industries and the domestic needs. At the beginning of 1917 the price was about $31 per metric ton of 2204 lb., but rapidly rose to $33 and $35 per ton, as against $8 in normal times. By July, 1917, it had risen to $40, and by the middle of June, 1918, to $50. Both maize and wheat middlings were used as fuel, especially the former, the surplus of which could not be exported. Charcoal and firewood rose to exorbitant prices because of the coal shortage, the former selling for $55 a ton and the latter for $17.50 to $18 a ton. Petroleum likewise showed a rapid increase in price, from $29.72 a ton in 1916 to $40.34 in 1917.

English Coal Market

Under date of Feb. 21 a London exchange states that the household coal market is in a critical position. The markets are almost bare, and special efforts are being made to obtain supplies in view of a strike in the mining regions. All descriptions of coal are firm on the Tyne and Wear, and the best Blythes sell readily at 90s. Gas coals are in keen demand.

House coal is still scarce in Lancashire, but more slack is coming forward at disproportionately high prices. Practically no coal is available in the open market in Yorkshire or the Midlands, owing to unfavorable weather and the strike menace. The latter greatly affects the position in South Wales. Production in Scotland is improving, and lessened Admiralty requirements leave a better margin for ordinary export.

In Newcastle the demand for tonnage far exceeds supply, and coastwise rates are firm on the basis of 17s. London. Scandinavian rates are rather easier. Quotations generally are firm in Cardiff.

The Italian Government has decreed the "temporary" abandonment of the projected state monopoly of the coal industry.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Mar. 3 states that shippers to Brazilian and Argentine ports are more than anxious for additional tonnage, but it is most unfortunate that the Shipping Board will not allow neutral steamers to be chartered for this voyage to American coal shippers on rates, as it is causing owners of these neutral boats to charter them on rates from Cardiff to east coast South American ports (some of them having accepted as low as 50/- gross from Cardiff to the Plata); consequently British shippers are selling coal which Americans would sell, if not restricted, as mentioned above.

The West Indian situation is the same as a week ago, and rates on general cargo from United States ports, north of Hatteras, to French Atlantic ports, are $40-$45 per ton net from charter, (on which terms we have recently chartered steamers), and unless coal can stand this freight rate, transatlantic shipments are impractical at the moment.

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis. Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum) — Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates). On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Range, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net; with 1000 tons dis. to Rio, $19.50 net, 1000 tons dis., or $21, 600 tons dis. to Santos, $18.50 net, 1000 tons dis. to Buenos Aires, and $19.50 net, with 750 tons dis. to Montevideo.

England Losing Coal Trade

Normally, coal constitutes between 70 and 80 per cent. of the weight of British exports. Vessels bring bulky raw materials to the United Kingdom and take back manufactured goods of small bulk. Were it not for coal many vessels would have to leave British ports almost empty. In normal times, for example, the United Kingdom imports large quantities of raw materials from Argentina; in 1913 about 7,000,000 tons of British coal were shipped to Argentina. In 1918 British coal exports had fallen to one-half of the prewar standard. There has been a great increase in miners' wages, which accounts for two-thirds to three-quarters of the cost of coal at the pit mouth. Since 1914 the increase in miners' wages in South Wales has run from 87 to 200 per cent. It has lately been frequently pointed out that the higher prices of coal will both increase the cost of manufacture in the United Kingdom and make it more difficult for Britain to sell coal in foreign markets.

Coal and coke are still on the Export Conservation List of the War Trade Board. Individual licenses are not required for export of coal and coke to Canada and Newfoundland. Shipment to these destinations may be made under export license R.A.C.-63.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Feb. 20	Amer. S.S. Ulysses	Cristobal, C. Z	12,011	1,256
Feb. 21	Amer. S.S. Lake Gratis	Cristobal, C. Z	3,232	413
Feb. 24	Nor. Bk. Svavanut	Buenos Aires, A. R	2,813	....
Feb. 24	Amer. S.S. Anna	San Juan, P. R	1,435	382
Feb. 25	Amer. S.S. Castle Point	Antofagasta, Chile	3,940	615
Feb. 25	Amer. S.S. Silverado	Pearl Harbor, Hawaii	2,362	....
Feb. 27	Nor. S.S. Negus	Pernambuco, Brazil	3,683	851
Feb. 27	Am. Sch. Estelle Krieger	Rio de Janeiro, Brazil	1,593	....
Feb. 28	Amer. S.S. Lake Charles	Christobal, C. Z	2,118	500
Feb. 28	Amer. S.S. Bay View	Havana, Cuba	1,998	240
Feb. 28	Amer. S.S. Craycroft	Barbados, B. W. I	2,588	....
Feb. 28	Amer. S.S. Achilles	Cristobal, C. Z	12,011	1,254
Sewalls Point				
Feb. 25	Dan. Sp. Asgerd	Buenos Aires, A. R	1,767	....
Feb. 28	Amer. S.S. Bristol	Montevideo Roads, F. O	5,237	1,349

NEWPORT NEWS

Feb. 21	Am. Sch. Charles M. Struven	Point a Pitre, Guadaloupe	900	....
Feb. 24	Nor. Sp. Marga	Buenos Aires, A. R	1,618	....
Feb. 25	Nor. Bk. Vision	Rio de Janeiro, Brazil	2,370	....
Feb. 25	Nor. S.S. Lysefjord	Santiago, Cuba	998	185
Feb. 26	Amer. S.S. Corsicana	Antilla, Cuba	2,722	276
Feb. 26	Dut. S.S. Ulysses	Amsterdam, Holland	3,441	....
Feb. 28	Nor. Bk. Ragna	Rio de Janeiro, Brazil	1,525	....
Feb. 28	Dut. S.S. Andijk	Rotterdam, Holland	7,557	1,101

COAL AND COKE NEWS

Harrisburg, Penn.

The Attorney General of Pennsylvania has given an opinion to Seward E. Button, chief of the department of mines, in reference to Sec. 14 of Art. 4 of the Bituminous Mine Code of June 9, 1911.

Chief of Mines asked the Attorney General if Sec. 14 could be modified so as to hold that this section should apply only to mines that are gaseous in character. This section of the act of 1911 refers to blasting in the solid and that all holes shall be fired when all the workmen are out of the mine.

On Aug. 29, 1916, Deputy Attorney General Collins ruled that "shooting in the solid" should be allowed in all mines if it had been the practice before the code of 1911 became a law, providing that the mine foreman would allow it.

In the Huntingdon-Broad Top coal field, which is a non-gaseous district, considerable difficulty has been encountered in enforcing this section of the law by the state mine inspector, and several strikes have resulted. It is contended that it is impossible to mine sufficient coal during the night if the shotfirers must do all their work at night, as the veins are thin, of a heavy pitch and contain much slippery coal. The miners object to this method, also, as they claim they cannot mine enough coal, which naturally reduces their wages.

The point which the chief of mines wished to be enlightened on was whether or not the district inspector could use his discretion as to shotfiring at night, if the mine were of a non-gaseous nature, such as are found in the Broad Top field.

The Attorney General said he could not recede from the views expressed in the opinion of the Department given on Aug. 29, 1916, which said the Section referred to meant gaseous and non-gaseous mines.

The Attorney General concluded by saying, "It often happens that legislation, general in its character may work hardship in particular instances, and that its enforcement in special cases is difficult and impracticable. The remedy for such a situation is with the Legislature. The courts cannot construe legislation so as to make it applicable or inapplicable, according to the ease or difficulty with which it may be enforced, and the Attorney General is bound by the same rules of construction that apply to the courts.

"I am, therefore, compelled to advise you that notwithstanding the abnormal conditions in the Broad Top coal field, and the difficulty of enforcing the provisions of the law as heretofore construed, this Department is unable to place any other construction upon it than that indicated in the opinion of Deputy Atorney General Collins, dated, Aug. 29, 1916."

Uniontown, Penn.

Fire of undetermined origin entirely destroyed the coke-crushing plant of the General Chemical Co. at Newell. At this plant coke bought in the Connellsville region was crushed to ½-in. size to be used in filtering chemicals. The crushed coke was sent from the plant to plants of the company in all parts of the county. The plant will be rebuilt.

Shipments of coal down the Monongahela River maintained a high figure during February, the total being 20,271,000 bushels. While that figure is a decrease of 2,938,000 bushels over January, there were three less working days in February, making the daily average almost equal. The Pittsburgh Coal Co. is reported stacking coal at the Duquesne mills in anticipation of the annual conference of miners and operators scheduled for April. The Carnegie Steel Co. now has four boats supplying the Clairton byproduct plant, each boat making four round trips a week and delivering 96 barges containing 2,000,000 bushels. That company expects to put the "Edgar Thomson" in commission in a short time.

Although the Connellsville coke region is operating generally upon a 50 per cent. capacity there has been no labor disturbance and none is expected. The edge has been taken off an unemployment situation by operators turning a percentage of the men laid off to making sadly needed repairs at plants. Curtailment policy adopted when government prices were removed is still in force, although the tonnage of decreased production is becoming smaller each week. When the curtailment was commenced the average decline was 25,000 tons weekly. It has now been reduced to 8000 tons weekly, and it is expected that production will not go much lower than the present 225,000 tons, coke. Prices continue to remain firm with $4.50 ovens as the basis. A number of operators decline to move tonnage for less than $5 ovens, but some scattered coke is being sold as low as $4 ovens.

Charleston, W. Va.

Biding their time, coal producers of West Virginia are shutting down their mines in preference to letting fuel go below a reasonable price, believing that another 30 days will witness a decided change in market conditions.

Mar. 1 still found many mines closed down, as they had been throughout February, and in the first week of the month there was little to mark any change in conditions. Production is not averaging over 50 per cent. in any instance, and in many parts of the state mines are being operated on one-fourth time.

Coal shipments had dwindled to such an extent that the railroads operating in West Virginia have laid off many crews. A survey of the market by West Virginia producers, however, convinces them that reserve stocks which have been drawn on heavily during the last few months are reaching a low point, and at the same time there is no such accumulation of coal at tidewater shipping points as there was a few weeks ago.

Cognizant of such conditions producers feel certain that orders will begin to multiply now within a short time. There is some demand for prepared sizes and also for splint, gas and smokeless coal. No change in prices has been marked in recent weeks.

New York, N. Y.

The failure of the boatmen to come to terms with the private boat owners has led to threats by the longshoremen to tie shipping up completely in this harbor should the owners resort to efforts to break the strike with strikebreakers.

The strike of the boatmen for increased wages and an eight-hour day was half ended last Friday when several thousand of the workers employed on the boats operated by the Railroad Administration, Army and Navy and the Shipping Board agreed to accept a wage increase varying from 10 to 40 per cent.

The privte boat owners were not a party to that agreement and have refused to grant the demands of their employees. Several conferences have been held and it is said that propositions have been made by both sides. In the meantime boats loaded with coal are lying at the docks waiting for the strike to be ended before they can be towed to their destination.

These boats, which were chartered before the strike was declared, will be taken to their proper destination at the rate named in the charter and the rates for future deliveries will be agreed upon as the result of the negotiations between the boat owners and their employees.

Seattle, Wash.

The coal output in the state of Washington in 1918 totaled 4,128,424 short tons, the heaviest coal production in the history of the state, according to the final report of James Bagley, state coal mine inspector. The next biggest output was in 1917, when the total production was 4,002,750 tons. The first year in which the annual production exceeded 4,000,000 short tons was 1917.

The biggest gain in 1918 was made by Lewis County, where the increased production was 44,000 tons more than in 1917. The output by counties in 1918 was as follows: King, 1,331,601 short tons; Kittitas, 1,730,379; Lewis, 174,621; Pierce, 600,197; Skagit, 5897; Thurston, 271,400; Whatcom, 4603. The output by counties in 1917 was as follows: King, 1,314,366; Kittitas, 1,741,237; Lewis, 130,578; Pierce, 606,049; Skagit, 1000; Thurston, 204,688; Whatcom, 4841.

Seventy-two coal mines were operated in the state in 1918, working an average of 266 days and employing 5847 men. There were 34 fatal accidents during the year. In 1917 there were 27 fatal accidents. The increase in fatal accidents last year was due to an accident in the Burnett mine in August, 1918, in which 12 men lost their lives. There were 692 non-fatal accidents last year as compared with 1025 in 1917.

Mr. Bagley says that the present indications are that the output of coal will not be as heavy in 1919 as last year. He attributes the increased output last year as being largely due to high pressure caused by war conditions.

Though it will be easier to secure coal from now on and consumers have been relieved of restrictions that prevented a free use of fuel, it is declared by state representatives of the Federal Fuel Administration that there is no likelihood of an easing off in price regulations.

The withdrawal of numerous Government demands for coal is said to be responsible for the change in regulations in effecting distribution. Some of the heavy requirements of foreign governments also have been satisfied (notably Chile, which has been taking much Washington coal for the past several months), or have been withdrawn, and coal is certain to be more plentiful than was anticipated at the beginning of winter.

Victoria, B. C.

Some interesting new facts were brought to light by Hon. William Sloan, Minister of Mines, in speaking before the Provincial Legislature to the "Settlers' Rights Act, 1918," which proposes giving those holding property within the Esquimalt & Nanaimo Railway Belt, Vancouver Island, a further opportunity to make applications for their coal rights on the land to which they have surface title. He stated that there were some 45 or more applications for such coal rights dealt with under the Settlers' Rights Act of 1904, which measure first opened the question by legislation, and that altogether Provincial titles had been granted to 7166 acres of coal-bearing land within the boundaries of the railway holdings on the Island.

Mr. Sloan pointed out that when the railway was first given title to these Island lands it had been granted an additional 86,346 acres to recompense it for property which had been alienated to settlers prior to 1884. He stated that to repay the company for the 7166 acres of coal-bearing land taken subsequent to 1904 another 20,000 acres had been deeded to the company. Of the total 2,210,000 acres which, it was computed, was included in the Esquimalt & Nanaimo Railway Belt, it was roughly estimated that there were 356,000 acres of a coal-bearing character. It followed that there still remained to the railway company or its successors some 366,000 acres of coal-bearing lands.

The debate on the proposed 1918 act is still in progress, but it is considered likely that it will be carried. Under its terms the settlers, or their heirs, will be allowed to apply for the coal rights on their lands and, if successful in proving that they have a legitimate claim, will be issued Provincial titles. All this, however, is contingent on the stand taken by the Dominion Government. The latter exercised its prerogative last year and vetoed, or disallowed, the 1917 act, which was of an exactly similar nature. The contemplated action of the Provincial Government in taking the earliest opportunity to reënact the legislation which, apparently, is repugnant to the Federal Administration has created an interesting situation. It would seem that a determined fight has been launched between the Province and the Dominion, it being the contention of the former's government that the Dominion is infringing the authority of the Provincial Legislature in assuming to dictate on a subject affect-

ing nothing more than "Property and Civil Rights." Jurisdiction to handle all matters coming under that heading was clearly alloted to the Provinces under the Terms of Union.

PENNSYLVANIA

Anthracite

Mauch Chunk—Instead of the Lehigh Coal and Navigation Co. entering into an agreement with local firms, as in former years, to take the drifted coal from the dams throughout the Lehigh Valley at a certain royalty per ton, the company is erecting a washery here itself and will take out the coal and market it. Thousands of tons of coal have been reclaimed annually for many years in this way.

Avondale—Ten men were almost overcome while engaged in fighting the old Jersey mine fire at the Chauncey colliery of the George F. Lee Coal Co. on Mar. 5. Prompt arrival of the Delaware, Lackawanna & Western, Coal Department, rescue car saved many of the victims from death. The "Jersey Fire" originated about 20 years ago and after several unsuccessful attempts to extinguish it were made the fighting of the fire was given up until a few weeks ago, when its spreading endangered the Avondale colliery workings. The Lackawanna Coal Co. placed a force of men at work, some on the outside and some within the workings.

Bituminous

Somerset — The Loyalhanna Coal and Coke Co. has been investing in tracts of land in Shade township, deeds recorded showing transfers of a number of individual tracts.

Black Lick—The switch points and railroad connection with the siding of the Smith Coal Co. here were made recently, and shipments from the new mines will be begun in a week or so.

Philipsburg—The Lena Coal Co. has recently been organized and has taken over the new Goodyear shaft at Smoke Run. It is the intention of the company to develop the property to its utmost capacity.

Somerset—The Tri-State Collieries Co. has recently completed negotiations for the acquirement of a tract of coal properties in Somerset County aggregating approximately 2850 acres.

Connellsville—According to figures issued by the various mine inspectors located in the coke region the tonnage made large gains in 1918. The 16th district had a production of 8,867,477, the 9th district 7,189,946, the 5th district 7,011,189, and the 2d district 6,484,742.

Washington—The Lilley Coal Co. has purchased 2300 acres of coal lands lying east of this city. It is thought the tract will be mined for shipment over the Monongahela River. This block of coal connects with one already owned by the Lilley company. The company now owns about 3400 acres.

Blairsville—T. L. Eyre, of Chester County, and Wilbur P. Graff, of Indiana County, have pooled their coal-mining interests in this section under the name of the Kiskiminetas Coal Co., with offices at Blairsville. The consolidated company was formed from the old Kiskiminetas and Roaring Run mining companies.

Springhill — The Winstead Coal Co., Springhill Township, Fayette County, has recently completed plans for the construction of a new coal tipple on the right bank of the Monongahela River, about 1 mile above Lock No. 8. The company has been granted permission by the State Water Supply Commission for the erection of the proposed structure.

Ernest—The Roman Catholic church here was totally destroyed by fire on Mar. 6. The fire is thought to have originated from one of the candles which was left burning by the altar boy, probably igniting some of the draperies. By heroic work on the part of the miners the new parish house, which is but a few feet away from the church, was saved. The church was built a few years ago mainly through generous gifts from the leading officials of the Jefferson and Clearfield Coal and Iron Company.

Greensburg—Coal values in the several Westmoreland County fields were fixed here by the county commissioners for the next three years. Connellsville coking seam is assessed at $900 an acre; the Irwin, Youghiogheny and Monongahela basins at $450; the Greensburg field at $600; Latrobe, north of the Pennsylvania R.R. at $550, and south of the railroad at $800; Ligonier basin, $500; Kiskiminetas Valley, $450, while the Freeport vein was placed at $60 to $100, according to the location.

Herminie—Fire broke out in the large store of the Eureka Supply Co. here recently and totally destroyed the building and contents. The loss is estimated at $75,000 to $100,000. The building was a brick structure and modern in every respect. Besides the store on the first floor there were four living apartments on the second floor. The occupants lost everything. The flames spread to the post office on one side and a company house on the other side of the store. Damage was inflicted upon both, but hard work by miners saved them from total destruction.

Brownsville—The Atlas Coke Co. has closed down its mine and 220 coke ovens at Waltersburg, Penn., indefinitely, on account of lack of orders. There are about 500 more ovens in the Connelsville region on the inactive list than a week ago, and no seeming immediate prospect for revival, although there seems to be a general feeling of optimism that the depression will not last for long.

It is rumored that the Pittsburgh Steel Co., operating a large plant at Monessen, Penn., on the Pittsburgh & Lake Erie R.R. and Monongahela River about 40 miles above Pittsburgh, is arranging to take over the coal and coke operations of W. Harry Brown. These operations consist of two plants in Fayette County, Pennsylvania, on the Monongahela R.R. and the Monongahela River, a few miles above Brownsville, and are operations in Greene County. The plants are large and modern.

MARYLAND

Frostburg—Working conditions are improving in the Georges Creek region. The Broken Heart mine of the Union Mining Co., which has been idle for some time, has resumed operations in full, while all mines of the Consolidation Coal Co., with the exception of No. 9, operated in full all last week for the first time in many weeks. Mines generally are now working with more regularity.

WEST VIRGINIA

Wheeling—Fire recently entirely destroyed the tipple and boiler house of the Mound mine of the J. C. McKinley group of mines near here. Mr. McKinley plans to replace the structure destroyed without delay.

Clay—In connection with the construction of a plant near here, the Lima Coal Co. has made arrangements to install a bucket conveyor system in order to get its coal across the Elk River to the Coal & Coke Ry. for shipment.

OHIO

St. Clairville—The Roby-Somers mine has closed down until May 1, it is said.

Martin's Ferry — The Burlington Coal Co.'s mine here has been sold to the Commonwealth Coal Co. of Pittsburgh. The Burlington company employs about 50 men.

INDIANA

Bicknell—The Pan Handle Coal Co. is building a complete new steel tipple, equipped with the most modern horizontal coal screens. The Krehbiel Co., engineers, of Chicago, have the contract.

Linton—The Coal Ridge Mining Co. is installing a coal preparation plant at the No. 1 mine. The plant is being equipped with modern horizontal screens and crusher. A substation is also being installed for furnishing direct current for locomotives.

ILLINOIS

Clinton—The wood tipple at the Keller Klondyke mine, three miles northwest of the city, was destroyed by an explosion on Feb. 27. The blast was of a peculiar nature, presumably a dust explosion. Such was the force of the explosion that the tipple was torn from its anchorage. A force of men was put to work immediately to rebuild the tipple. Splendid progress was made in the work of reconstruction, and at this writing 75 of the employees of the company have resumed work.

Carlinville—The first cage in the Berry mine, or more properly speaking, Mine 1-B, has been hung. The new equipment is being placed in position as rapidly as possible and the company hopes to begin hoisting coal on St. Patrick's Day.

Carlinville—The Standard Oil Co. made an excellent record at Mine No. 1 in February, the best which it has made since it took over the mine. The output was approximately 25,000 tons, which was hoisted in 24 working days.

Rutland—The tower of the coal mine here was destroyed by fire. About 75 men are idle as a result. The loss is covered by insurance.

Taylorville—The Peabody Coal Co. No. 9 mine at Callaway will be ready in about three months for the erection of the new top works, which will be of steel. The mine will be electrically equipped throughout.

Herrin—The Big Muddy Coal and Iron Co.'s mine No. 8 at Clifford is undergoing a thorough overhauling. An entirely new boiler plant is being put in and it is understood that a new washer will be built or the old one entirely remodeled. New motors and extensive work on the haulage system are also being installed. This mine has been idle for some time for repairs.

Maryville—The local record for hoisting coal in this district was broken on Mar. 3 when the Maryville mine of the Donk Brothers Coal and Coke Co., of St. Louis, hoisted 4265 tons of coal in eight hours. The state record, it is understood, is held by the Orient mine in Franklin County, which has produced 6000 tons in eight hours. The Maryville mine had 507 men, including 300 diggers, at work when the record was made.

Mascoutah—The old mine of the Kolb Coal Co. broke its coal-hoisting record recently by making 834 hoists, the old record being 785 hoists. This is the largest amount of coal ever taken out of this mine in one day, the actual hoisting time being seven hours. The coal was all caged and dumped by hand, as the old-fashioned stiff cages are still in use in the mine. This mine has been in operation for 24 years.

Collinsville—The annual convention of sub-district No. 7 of the Illinois Mine Workers will be held in the new Miners' Institute building here Mar. 18. Among the subjects to be discussed will be the six-hour mine day, the daylight saving law, the Mooney case and proposed changes in the safety measures for protection of miners.

Taylorville—Coal has been struck in two places in Mosquito township near here. One of the prospects is on the Emil Watts farm where it is said that seams of five and seven feet have been struck at a depth of 550 feet. The other is on the Loren Butterfield farm, where the conditions are about the same. The company developing the operations has options on 30,000 acres at $15 an acre.

Alton—The Gillettes, coal operators and cattle raisers of Logan County, have been making extensive purchases of coal lands in this vicinity with the understood purpose of doing development work on a large scale. About 1000 acres have been purchased at Miles station, for which about $150,000 is said to have been paid. The Gillettes utilize the surface for stock raising and therefore do not confine themselves to purchase of the coal rights. There are known to be good deposits of coal under the land which has been purchased.

IOWA

Des Moines—Iowa bituminous coal mines are being operated on an average of only two days a week. The failure of many railroads to take more than their minimum contract quotas and the unusually mild winter are given as the two underlying reasons for the condition of slack work at the mines. J. C. Lewis, of Albia, president of the Iowa mine workers, estimates that normally the railroads purchase 10 per cent. of all of the coal mined in the state. The mine workers state that some railroads which in other years used Iowa coal for operating in this state and Nebraska are now consuming Illinois coal and are carrying it into Nebraska for use in that state. It is said that five mines in one section which have a normal daily production of 3500 tons, previously used almost entirely by the railroads, now sell only 300 tons daily to the roads. More than nine million tons of coal were produced in Iowa in 1917, but several months of slack work cut down the 1918 production. The production for 1919 promises to be greatly under the 1917 yield unless there is a marked improvement in the situation. Many miners have left the state on account of the lack of work. Approximately 14,000 miners are employed in the state, and with an average of only two days' work a week they are earning about $10 a week. The slack work offered has proved to be a hardship to many miners and hundreds of them have been forced to part with their Liberty Bonds.

COLORADO

Boulder—Fire which started Feb. 28 in the Centennial mine of the Big Four Coal Co. at Louisville, near here, destroyed surface buildings of the mine. Six men who were inside when the fire began were rescued. The loss has not been estimated.

Aguilar—The new bathhouse of the Royal mine, near here, is proving a boon to the employees. The structure is of concrete, nicely painted, and accommodates 132 individual lockers. The bathhouse is electric lighted and is equipped with 14 showers and hot or cold water-steam baths. It is strictly sanitary, being thoroughly scrubbed and cleansed each day. The building was erected at a cost of $3000. The Royal Fuel Co., of Denver, Colo., which operates a number of mines, has constructed similar houses at its other plants.

Personals

Frederick J. Kandt, of Buckhannon, W. Va., has succeeded Mr. Slattery as Fairmont (W. Va.) manager of the Alden Coal Company.

W. H. Cameron has resigned his position of general manager of the National Safety Council to become manager of industrial relations for the Eastman Kodak Co.

Thomas Richardson, formerly with the Dilltown Smokeless Coal Co. at Dilltown, Penn., has accepted a position as superintendent with the Park Coal Co. at Leechburg, Penn.

C. C. Wallace, formerly manager of the loading of munitions section of the Stenotype Co., Indianapolis, Ind., is now director of development and service of the Powdered Coal Engineering and Equipment Co. of Chicago.

R. E. McLain has been made superintendent of the Peabody coal mine at Stonington, Ill., succeeding Mr. Anderson. Mr. McLain has been superintendent of the Hewittville coal mine for the past two months.

Calvin Horning, formerly mine foreman for the Rochester & Pittsburgh Coal and Iron Co., at Lucernemines, Penn., has been made superintendent of the Coy mines of the Brush Creek Coal Mining Co. at Homer City, Penn.

G. P. Blackston (L. W.) has resigned from the Koppel Industrial Car and Equipment Co., of Koppel, Penn., after having been with the company for nearly twelve years in the capacity of advertising and promotion of sales manager.

George K. Bell, special legal investigator of the Interstate Commerce Commission, has succeeded F. J. Patton, former secretary of the Northern West Virginia Coal Operators' Association. Mr. Bell's title will be that of executive vice president.

Henry T. Bannister, state mine inspector of Franklin County, with headquarters at Benton, Ill., has resigned to accept a position as production manager for the Madison Coal Corporation. His successor as state inspector will be **John O'Rourke,** who is the present county inspector.

Capt. A. U. Wetherbee, who recently received his discharge from the chemical warfare branch of the service, and who was formerly chief engineer and assistant works manager of the Niagara Alkali Co., has accepted a position as chief mechanical engineer with the Powdered Coal Engineering and Equipment Co. of Chicago.

J. William Wetter, chief engineer of the Clearfield Bituminous Coal Corporation at Clearfield, Penn., has resigned that position to become assistant general manager of the various mines in the Pennsylvania anthracite and bituminous fields and the West Virginia field of Madeira Hill & Co. Mr. Wetter will have his headquarters at Philipsburg, Penn.

C. W. Johnson has been appointed assistant manager of works of the Westinghouse Electric and Manufacturing Co. Mr. Johnson entered the employ of the company in 1907 as chief inspector of works. He is a member of the American Society of Mechanical Engineers, American Institute of Mining Engineers and Engineers' Society of Western Pennsylvania.

Henry D. Thompson, formerly superintendent for the Big Muddy Coal and Iron Co.'s properties at Herrin, Ill., has been appointed state mine inspector by Governor Lowden. It is expected he will be assigned to the Williamson and Franklin County fields. His father is the head of the Department of Mines and Minerals in the State of Illinois, succeeding the late Evan John.

C. W. Price, field secretary of the National Safety Council, was elected general manager of the society at a recent meeting of the executive committee, to fill the place made vacant by the resignation of **W. H. Cameron,** mentioned elsewhere in these columns. **Sidney J. Williams,** formerly manager of the accident prevention division was elected secretary and **F. W. Pardee,** formerly business manager, was elected treasurer.

Obituary

Edward H. Vitalius, chief engineer of the American Blower Co., Detroit, Mich., died Feb. 26 as a result of injuries received in a trolley wreck. Mr. Vitalius was well known as an expert in ventilation problems.

Coming Meetings

New England Coal Dealers' Association will hold its annual meeting March 19 and 20 at Worcester, Mass. Secretary, C. R. Elder, Boston, Mass.

Indiana Retail Coal Merchants' Association will hold its annual spring meeting Apr. 23 and 24 at Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Industrial News

Barnesville, Ohio—The Millwood Coal Co. has been chartered with a capital of $50,000 by Ellis G. Eyer, Robert G. Scott, E. M. Johnston, T. S. Lackey and James W. Bell.

Canton, Ohio—The Diamond Coal Co. has been incorporated with a capital of $25,000 by H. G. Winterhafter, L. P. Winterhafter, William I. Zink, Ray F. Harbert and William R. Thom.

Dayton, Ohio—The Robert H. Ball Coal and Mining Co. has been chartered with a capital of $150,000 by Robert H. Ball, James H. Anderson, John Gallagher, Sidney G. Kusworm and Alfred J. Goldshot.

Buffalo, N. Y.—The office of the Youghiogheny & Ohio Coal Co. will move from the Marine Trust Building to the Prudential Building. R. A. Kreuger, sales agent, has resigned to accept a more lucrative position. He will be succeeded by A. J. Kretchmar, from the office of the company in Cleveland.

Columbus, Ohio—Due largely to the opposition of organized miners, the bill introduced in the Ohio Legislature providing for the organization of a state constabulary was killed in the senate. At a recent meeting of sub-district No. 4, United Mine Workers, strong resolutions against the measure were adopted.

Hartford, Conn.—The Terry Steam Turbine Co. makes the announcement that since the death of Charles E. Hague in April, 1917, its interests in the Philadelphia district have been under the supervision of V. L. Sanderson, with headquarters at 605 Widener Building. James H. Weir has recently become associated with the concern as assistant to Mr. Sanderson.

New York, N. Y.—While no formal announcement has been made, it was stated at the Army offices that the Alden Coal Mining Co. would furnish 35,000 tons of coal for the transport service in New York harbor. Bids were opened here on Feb. 10 for supplying about 300,000 tons of coal at the rate of about 60,000 tons a month for five months. There were 20 bidders. The Alden Coal Mining Co. submitted bids on two delivery periods (Coal Age, Feb. 20, page 381).

Seattle, Wash.—The closing down of the shipyards in Seattle and vicinity through a general strike of the metal workers has caused an influx of men to the coal mines, which have been running short-handed several months because of the fact that many coal miners, attracted by higher wages, left the mines for the shipyards. This shortage before the close of the year was as high as 1200 men, but it has now been reduced to less than 200 men. The shipyards have been closed for two months.

Charleston, W. Va.—A total of $1,350,000 is said to have been the consideration involved in the transfer of ninety different tracts of coal land in Nicholas County from the Gauley Coal Land Co. to the new Gauley Corporation, this constituting a sale of the greatest magnitude so far recorded in Nicholas County. It seems likely that some of the coal in this acreage which has changed hands will be developed, as the Gauley company has deeded certain rights of way to the Kanawha & Michigan Railway Company.

Harrisburg, Penn.—Official figures placing the total value of all unmined coal in Dauphin County at $117,499,536 were submitted to the Board of County Commissioners on Mar. 3, by T. Ellsworth Davies, of Scranton, mining engineer, who has completed a survey of the Lykens coal fields in this county. At present the coal field valuation for this county is assessed at approximately $1,000,000. If the new valuation will stand in many little mining towns of a hundred or so population, the tax collectors of the same will receive from $5000 to $19,000 in commissions.

St. Louis, Mo.—Walter A. Zelnicker, president of the Walter A. Zelnicker Supply Co. and affiliated companies in St. Louis, has appointed Cline B. Finnell as his private secretary. Mr. Finnell, who recently returned from the Officers' Training School at Camp Pike, Ark., was formerly traveling secretary to the general superintendent of the Chicago, Burlington & Quincy R.R., and later private secretary to Clarence H. Howard, president of the Commonwealth Steel Co. Mr. Finnell is president of the Junior Chamber of Commerce of St. Louis, an organization of 1000 members of younger business men of the city.

Columbus, Ohio—F. S. Davidson, who has been connected with the West Virginia Coal and Coke Co. for several years in the capacity of office man, has resigned to become sales manager of the Pittsburgh & Bessemer Coal Co., of Pittsburgh, which will establish sales offices in Columbus. The Columbus office will be located in rooms 322-323 Columbus Savings and Trust Building. The company controls the Kehota Mining Co., which has a stripping operation in the Hocking Valley. Curtis T. Posten, formerly with the Consolidation Coal Co. as a traveler, has taken the position of M. Davidson with the West Virginia Coal and Coke Co.

Pittsburgh, Penn.—The Vesta Coal Co. has made announcement that work has recently been completed on the construction of the company's marine way on the Monongahela River, at Floreffe, about 24 miles from Pittsburgh. The new ways are of concrete, the six cradles being of steel, with length sufficient to hoist a 250-ton and a 150-ft. barge at one time, end on end. Seven platforms have also been constructed, providing enough space to accommodate barges of the above-named length or four towboats at one time. The equipment at the new marine ways is electrically operated throughout wherever possible. The company is a subsidiary of the Jones & Laughlin Steel Co.

Quincy, Ill.—The Dayton-Dick Co., manufacturer of centrifugal pumps, has changed its name to the Dayton-Dowd Co. The change was made owing to changes in organization. Capital has been doubled and the business placed directly under the control of those immediately interested. Facilities are greatly extended. The company has recently received many orders for large irrigation and drainage pumps, and it can now build any size from 1½ in. to 30 in. in a split-casing type of pump. It has developed a complete line of fire pumps, complying with specifications of the various underwriters' boards. Furthermore, it has developed high-pressure and hydraulic pumps for boiler feed, elevator pumps and similar high-pressure service, and these lines are to be pushed to the utmost.

Fairmont, W. Va.—There will be no further delay in completing the plant of the Domestic Coke Corporation, capitalized at $5,000,000. A little less than a year ago this concern was organized by people identified with the Monongahela Valley Traction Co. in coördination with the Government not only for the purpose of manufacturing byproducts but also explosives for the Government as well. Upon the signing of the armistice construction work ceased, the Government having no further use for the product of the plant; but it became necessary to determine the Government's financial responsibility before work proceeded further on the plant. Government accountants having audited the accounts of the company, orders have been received from Vice President C. F. Critchfield of the company to proceed with construction work. In accordance with such instructions the battery of 60 byproduct ovens which will become the first unit of the plant will be finished at the earliest possible date at a cost of about $3,000,000, each byproduct oven to cost $50,000. The ultimate cost of the plant will be $5,000,000.

MARKET DEPARTMENT

Weekly Review

Improvement Is Evident in Bituminous Situation—Prices Being Maintained, the Best Grades Having Gone Up—Production of Soft Coal Increases—Anthracite Situation Unsettled—Higher Price Schedule Announced

SIGNS are not wanting that the bituminous coal market is now on the mend, and both prices and production are already beginning to reflect the change in conditions. Coals of good quality are not being sold at less than the recent Government prices, and operators, as a rule, are adhering closely to their policy of producing only what the market will absorb. One of the many indications that the soft coal market is settling down to a normal basis is the fact that the special grades of bituminous coal command much higher prices than they did during the period of Government control. Inferior coals are finding it more difficult to obtain a market, buyers in the majority of instances exercising the keenest sort of discrimination. They have had a sorry experience with poor coal.

Needless to say, operators in all the producing districts are watching the current market conditions closely. Efforts are many to close contracts for the next coal year—Apr. 1, 1919, to Mar. 31, 1920—but no agreements involving any considerable tonnage have been reported.

The continued drop in the output of soft coal for the last six weeks was checked during the week ended Mar. 1 by the production of 8,088,000 net tons, an increase of more than 363,000 net tons over the output for the week ended Feb. 22. As compared to the production of the similar period in 1918, however, this is a drop of 3,519,000 net tons. Total production of soft coal for the coal year to date is 525,517,000 net tons, 20,168,000 net tons in excess of the output for the same period of the preceding coal year. It is recognized that March will be another light month for tonnage, but orders are more numerous than they were a week or two ago. If the situation continues to show the same signs of improvement for another month or so, without the injection of labor troubles at the mines, the soft coal industry will have passed undemoralized through its readjustment period.

"Unsettled" is the word that best characterizes the present condition of the anthracite industry. Even with the mines working only half time the operators find it difficult to dispose of their output. Instead of the decrease in prices loudly heralded in some quarters, the announcement has been made that beginning with May 1 there will be an increase in the price of domestic anthracite of 10 cents a ton each month until a maximum increase of 50 cents a ton is reached on Sept. 1. The so-called "independent" companies will increase their prices during the same period 15 cents per ton, making the maximum for independent coal 25c. higher than for company coal on Sept. 1.

The production of anthracite during the week ended Mar. 1 is estimated at 1,102,000 net tons, a slight decrease over the preceding week's output, but 834,000 net tons lower than the production during the corresponding week in 1918. The total output of anthracite for the coal year to date is 87,122,000 net tons.

WEEKLY COAL PRODUCTION

For the first time during the past six weeks improvement occurred in the output of bituminous coal during the week ended Mar. 1, preliminary estimates placing the production at 8,088,000 net tons, compared with 7,715,000 net tons during the week ended Feb. 22. This increased output, however, is 3,519,000 net tons below the output of the week of Mar. 1, 1918. The average production per working day during the current week is estimated at 1,348,000 net tons, as compared with 1,825,000 net tons for the coal year to date, and 1,755,000 net tons for the same period of last year. Total production for the coal year to date totals to 525,517,000 net tons, and is now but 20,168,000 net tons in excess of the output for the period Apr. 1, 1917, to Mar. 1, 1918.

The production of anthracite in the United States during the week ended Mar. 1 is estimated at 1,102,000 net tons, and while a slight decrease compared with the production of Feb. 22, falls far behind production during the corresponding week of last year when the output was recorded at 1,936,000 net tons. For the coal year to date production of anthracite is estimated at 87,122,000 net tons, as against 91,173,000 net tons for the eleven months ended Mar. 1, 1918.

Carrier's reports for the week ended Mar. 1 show that improvement occurred in all districts with the exception of central and western Pennsylvania and southwestern Virginia. The decreases that occurred in these fields were slight, while the increased loading which occurred in Ohio amounted to 758 carloads, in the southern West Virginia field to 1756 carloads and in the Illinois, Indiana and Western Kentucky fields to 2765 carloads.

Bituminous coal shipped to New England during the week ended Mar. 1 is estimated at 238,885 net tons, and is a slight decrease compared with the week preceding. Shipments by rail were in excess of those of the week preceding, while tidewater shipments fell approximately 14,000 net tons. No tonnage was loaded at Baltimore during the week.

Shipments of bituminous coal from the North Atlantic ports and Hampton Roads to all points during the week ended Mar. 1 are estimated at 567,782 net tons, a decrease compared with the week of February 22 of 24,715 net tons. The coal moved from New York and Philadelphia, estimated at 305,217 net tons, was 46,235 net tons behind the week of Feb. 22, while the tonnage moved from Baltimore and Hampton Roads exceeded that of the preceding week.

Production of beehive coke in the United States during the week ended Mar. 1 is estimated at 436,365 net tons, as against 445,692 net tons during the week ended Feb. 22 and 621,482 net tons during the corresponding week of 1918. During the current week production in Pennsylvania, West Virginia, Virginia and Kentucky fell behind that of the week preceding, while production in the other states was in excess. Compared with the same week of 1918, however, the current week's production in all states falls far behind. The daily average per working day during the week of Mar. 1 is estimated at 72,727 net tons, and is considerably lower than the daily average for the calendar year to date, estimated at 83,418 net tons, and the daily average for the same period of last year, estimated at 89,780 net tons. Pennsylvania is the lone state reporting production, for the calendar year to date, in excess of last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running slightly less than for the same week of 1919. Road sales for at-once delivery also were less compared with the same period last year. Few customers were in the house. Collections continue normal.

Dry Goods Economist—One of the factors which have much to do with the lessened production of all textiles is the unrest of labor. In the cotton mills of New England, the woolen mills of New Jersey and other states, and the silk mills of New Jersey and Pennsylvania, as well as in the knitting mills in and around Cohoes, N. Y., the demands of labor have been such as to curtail production or to increase its cost. In the women's garment industry, strikes have also been a deterrent to normal production, but have not had the effect of retarding business to any marked degree.

Bradstreet's—Conservatism and caution still dominate the general trade situation, but absolute necessity buying and the advance toward spring are visible in the reports of a larger volume of buying at both primary and secondary markets, northwestern and large southern cities sending best reports. Industry, except in a few lines, and these chiefly textiles, also shows a slightly better pace, and many readjustments appear to have been satisfactorily completed. Perhaps the most notable advance, industrially, visible is the swelling of the building trades into a modified form of preparatory activity after over a year of dullness and depression and even starvation treatment forced by war necessities.

The Iron Age—Producers are, if anything, more outspoken in the expectation that labor readjustment will be necessarily long delayed. This and the commonly overlooked fact that this country's industry will not move independently of the rest of the world promise little in the way of drastic price revisions. February's production of pig iron was 2,940,168 tons or 105,006 tons per day. This is 1519 tons less than the daily output of January. On Mar. 1 there were 306 furnaces in blast making iron at a rate of 101,475 tons daily, against 323 furnaces on Feb. 1, operating at 104,405 tons. In the month improved furnace operation was obtained, due probably to better coke. One group made 4000 tons more in the 28 days of February than in the 31 days of

January, notwithstanding there was a net loss of four furnaces in blast by Mar. 1.

American Wool and Cotton Reporter. From orders taken on woolen goods offered in New York, good business seems to be in prospect for the woolen mills. The worsted mills are generally keeping out of the market on account of the labor situation and the lack of choice wools, but a few orders have been received from them. The opinion is expressed that wools from the Middle West which were 65 to 70c. last year will open at 50c. this year. Others feel that prices will be about 50 per cent. of what they were a year ago. News from the South in regard to reduction in cotton acreage is attracting close attention. Although previous attempts have not met with any degree of success, it would seem as if this year efforts will be more effective than they have in the past. Opinion is divided as to to the ultimate result of the strenuous efforts to reduce acreage, both among manufacturers and also in the South. Mill demand for cotton has been small.

Atlantic Seaboard

BOSTON

Signs of a better tone. Transient demand improves all-rail, although tonnages are small. Prices show firmness. Contracts offered, and in some instances accepted. Operators watch market closely. Shipping Board withdraws all rates and will return steamers to owners. No activity on Hampton Roads coals, and none looked for until June. Contracts offered by rehandlers for points inland. Anthracite dull except for scattering demand because of lower water rates. Railroad-owned barges at disadvantage. Rail movement slopes off. More confidence in mine prices.

Bituminous—Unmistakably there are distinct signs of an improved situation. The change is extremely slight, but there is a more hopeful undertone than has been apparent the past 60 days. Things are beginning to settle, if ever so little, and each week now brings us nearer a season basis. The big news this week is the reopening of a competitive market on marine freights, and this will go far to restore confidence in the trade for the new coal year.

Inquiry for spot coal, or rather for transient lots, has improved noticeably the past week. The tonnages are small, but in the aggregate amount to a considerable volume, and are the source of much encouragement to all-rail shippers who are practically without competition from tidewater distributors. Small steam-users and retail dealers have in a great many cases worked off their surplus stocks that were accumulated last season, and now that high grade coals are to be had on short notice there is already a consistent demand from all parts of the territory. Many got into the habit of not buying, and yet the supplies of bituminous, even though mongrel in quality, have been gradually absorbed and stocks need replenishing. We look for an increasing demand of this character, as the outlook becomes more settled and definite.

Prices have already begun to reflect the change in conditions. Most of the quality grades are being held firmly at the recent Government figure, namely $2.95 per net ton f.o.b. mines in Central Pennsylvania. Occasionally this price is shaded to provide spot orders, but as a rule the operators are adhering to their policy of producing only what the market will absorb at what they consider to be a fair price. A few of the special grades are commanding higher levels, and it is one of the many indications that the market is resuming normal conditions that there is today almost an increasing differential between these and the inferior coals. The latter are druggy at prices not very much in excess of $2 per net ton, and without doubt buyers in New England are discriminating more than it has been their privilege to do for the past three years.

Progress has also been made in the tidewater situation. Just at the moment when New England industries were beginning to focus a widespread campaign to impress the Shipping Board with the great need of changing steamer rates on the coast the announcement was made, on Mar. 6, that effective that day all rates were withdrawn and that individual ship-owners and charterers were free to agree upon their own rates in the open market.

No activity in coals from Hampton Roads is expected in this market until June at the very earliest. Curtailments in manufacturing have considerably lengthened the period first estimated, and the railroads, too, because of extremely light traffic, are by no means using their normal tonnage of coal.

The only contracts being made today on the Southern coals are by producers who also own rehandling plants at tidewater for distribution inland. These are based upon $2.35 per net ton f.o.b. mines for Pocahontas, plus charges, and are being entered into by those who secured good service from the distributors last season and are convinced that Pocahontas, for instance, is worth a considerable differential over such Pennsylvania coals as are accessible all-rail and can be depended upon for regular deliveries.

Bituminous at wholesale is quoted about as follows, f.o.b. mines and at loading ports, per gross or net ton as designated:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.05@2.75	$2.80@3.20
Philadelphia, gross tons	4.15@4.90	5.00@5.45
New York, gross tons	4.50@5.25	5.35@5.80
Alongside Boston (water coal), gross tons	6.00@6.85	6.90@7.80

Georges Creek is quoted at present only f.o.b. mines for this territory—namely $3.20 per net ton—and its use is being confined to smithing purposes.

Pocahontas and New River are quoted at $4.70 @5.25 f.o.b. Norfolk and Newport News, Va., for spot coal, and $7.20 @ $8.60 alongside Boston, these prices being on a gross-ton basis.

Anthracite—The market for domestic sizes continues generally dull. Lower water rates from New York to points on Long Island Sound and to Boston have caused a scattering demand, however, since retail dealers feel that $1 freights to Providence and $1.25 to Boston may not continue indefinitely. There is no doubt about there being a surplus of tonnage and a great surplus of all the popular sizes at all the loading piers. In fact, it is stated that several of the larger companies have been embargoed because of their inability to move accumulations at the different New York loading ports.

Rail movement of domestic sizes has sloped off materially the past fortnight. Retail distributors know that any size or kind can be had on short notice, and there is also a disposition to wait until through tariffs are adjusted. There are many points in New England where coal originating on certain roads has the benefit of a differential that ranges from 30c.@50c. a ton. It is notable, however, that buyers have more confidence in prices and there seems to be a well-defined sentiment now that the present program attributed to the anthracite companies will carry through.

Current prices per gross ton f.o.b. New York loading ports rule as follows on company coal:

Egg	$7.80@7.95
Stove	7.95@8.15
Chestnut	8.05@8.35

NEW YORK

No change to be made in anthracite prices on Apr. 1. Ten cents per ton to be added for five months. Some tradesmen disappointed and retail dealers do not expect a large summer business. Demand continues slow. Buyers willing to take small cargoes to tide them over. Anthracite steam coals stronger. Better tone in bituminous situation and prices stronger. Tidewater surplus in good shape. Many inquiries regarding contracts.

Anthracite—The announcement that there would be no discount in the mine prices of the domestic sizes of anthracite on Apr. 1 was no surprise to the local trade, it having been anticipated for several weeks back that because of the high wages paid to the mine workers the operators would not make the usual April reduction of 50c. per ton. Accompanying the announcement was another that beginning May 1 prices would advance 10c. per ton for five months which means that on Sept. 1 prices for the domestic coals will be 50c. higher than they now are. It was reported that independent operators would add 15c. per ton for five months to their price.

Retail dealers are slowly cutting their stocks and some have come into the market for small cargoes of certain sizes to fill in the gaps. As an inducement to prevent an accumulation at the tidewater docks it is reported that shipments made early this month were made on the basis of prices to be quoted by the producers on Apr. 1. Even this opportunity to replenish their stocks failed to cause a heavy movement. Company product is being held firmly at full prices while bargain seekers have been able to pick up stray lots of so-called Independent coals at about 20c. below.

The slowing down of the washeries adds strength to the steam coal situation. These sizes are not so plentiful and prices are a trifle stronger. Prices at the mine ranged from $3 to $3.25 for buckwheat No. 1, $2 to $2.35 for rice, and $1.35 to $1.80 for barley, all of the better grades.

Dumpings of anthracite for the week ended Mar. 7 were 2414 cars, as compared with 2962 cars the week previous, a decrease of 546 cars.

Current quotations. White Ash, per gross tons, f.o.b. Tidewater, at the lower ports are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	5.85	7.70
Stove	6.10	7.95
Chestnut	6.20	8.05
Pea	4.80	6.55
Buckwheat	3.40	5.15
Rice	2.90	4.65
Barley	2.40	4.15

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—A better tone exists in the local market following the cleaning up of much of the surplus coal that was here a few weeks back. However, the situation is not entirely satisfactory. More of this loose coal must be got rid of before it will be safe for unsold product to be sent forward.

The Tidewater Coal Exchange reported that on Mar. 5 there were on hand at the New York docks 2715 cars of coal as compared with 6119 cars on Feb. 5. Precaution against a reoccurrence of an oversupply of coal at this tidewater was taken by the placing of embargoes against shipments as soon as the strike in the harbor was declared, with instructions that they be lifted as soon as the strike was off.

Consumers here are using their reserve stocks and the longer the demand remains slow the greater will the demand be when the reaction comes. There is no great urgency on the part of the wholesale dealers to dispose of their wares. They feel that consumers will soon come into the market of their own accord. A heavy demand is looked for when the reaction does set in, and this is likely to create higher prices.

Operators are not letting their coal go at low prices, just for the sake of keeping it on the move. Most coals are bringing substantial figures at the mine but are much easier at Tidewater based on the mine price. Coal in Pools Nos. 10 and 11 were heard quoted recently at from $2.30 to $2.50 on the mine price basis, while Pool No. 18 coals in loaded boats were quoted at from $3.65 to $3.95.

One bright feature is the resumption of inquiries for contract coals. Many more queries are now being received and prices based on twelve-month shipments have been quoted. In some instances these figures are practically the same as those quoted for spot coal at the mine, but in most instances show a substantial increase.

The report of dumpings at the local docks for seven days ending Mar. 7 show 4201 cars of bituminous coal dumped as against 5017 cars the week previous, a decrease of 796 cars.

The following are current quotations on the various grades of bituminous coals, at the mines, for spot delivery and contract:

	Spot	Contract
South Forks	$2.90 to $3.50	$3.10 to $3.50
Cambria County (good grades)	2.80 to 3.10	2.95 to 3.10
Clearfield County	2.65 to 2.95	.....
Reynoldsville	2.65 to 2.95	2.85 to 3.00
Quemahoning	2.85 to 3.10	2.95 to 3.10
Somerset County (best grades)	2.80 to 2.95	2.95 to 3.10
Somerset County (poorer grades)	2.50 to 2.75	2.75 to 2.95
Western Maryland	2.50 to 2.75	2.65 to 2.85
Fairmont	2.00 to 2.35	2.35 to 2.50
Latrobe	2.25 to 2.40	.....
Greensburg	2.35 to 2.40	.....
Westmoreland ¾-in.	2.60 to 2.75	2.65 to 2.75
Westmoreland run-of-mine	2.40 to 2.65	2.40 to 2.65

PHILADELPHIA

Anthracite spring price plan announced. Present circular to May 1. Ten cents increase each month to Sept. 1. Little increased buying. Prices vary. Some consumers show desire to put in spring coal, but dealers expect dull summer. Retailers think pea price a mistake. Price cutters reduce pea. Individuals have much coal on demurrage. Some contract inquiry. Bituminous in poor condition. Trifling contract business. Railroads buying on monthly basis.

Anthracite—On Mar. 6 one of the largest operating companies announced its price policy for the spring. While the plan as

decided upon was far from being a surprise, yet the early date of its announcement caused much comment. It was believed that any price announcement would be deferred until the last minute before Apr. 1. As announced the present circular prices will remain in effect until May 1, on which date 10c. per ton will be added to the present figures, increasing the same amount each month until Sept. 1, when the maximum increase of 50c. per ton will be reached and will continue in effect for the winter. The new schedule includes all of the sizes from broken to pea inclusive. Up to this time no action has been taken in regard to the steam sizes.

With the lead being taken by the big companies the smaller concerns naturally fell into line with practically the same terms as to prices. As a matter of fact many of the individual shippers had been trying to force sales for the past two weeks by offering to ship coal, guaranteeing to protect the dealer in the event that there should be a decline in April prices. In the case of one of the larger individual shippers announcement was made that they would increase their prices 15c. per ton for five months, which would bring their coal to a point 25c. a ton higher than the company shippers by Sept. 1. On the other hand, another indivldual shipper circularized the trade offering to ship egg and pea coal during this month and April at 20c. less than the present so-called circular prices. On stove and nut coal they still ask the full price.

Regret is expressed that the price of pea coal has not been revised, and it is held that even buckwheat should share in a downward revision. Pea never can sell at the present high rate and the operators realize it. The price is too near that of chestnut and cannot hold. Pea is at present stocked in greater quantities in the dealers' yards than any of the other family sizes. It has been the main point of attack by three or four notorious price cutters. This week saw its lowest level for many months when one firm turned its wagons into the streets displaying large signs announcing a reduction to $8 per ton. This is for 2240 lb. it must be remembered.

The individuals continue to be worried with coal standing on demurrage and the coal is being sacrificed. We have heard of sales being made in some instances at 30, 40 and 50c. off circular. Much depends on the conditions prevailing at the time and the reputation of the coal. Not a whisper is heard of any of the larger companies cutting prices.

There is some interest stirring in the contract situation, for the limited number of contracts made by the companies last year mostly expire on Apr. 1, and the consumers are making inquiry as to the price likely to be effective after Apr. 1. What few contracts were taken a year ago were with particularly large users, such as public service plants. This year, with a large surplus of all the sizes smaller than buckwheat accumulating, it would seem that contracting would become much more general. While the present spot price of buckwheat is $3.40, many individual shippers are known to have made sales at $2.75 and in between that figure. The gas companies using broken and egg coal are also coming into the market for the renewal of their contracts and some idea of the prices of these sizes can be obtained from the circular prices of these sizes just announced. It is believed that there will be considerable competition for the business on both the small steam sizes, as well as broken and egg.

The price per gross ton f. o. b. cars at mines for line shipment and f. o. b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.30	Buckwheat	$3.40	$4.45
Egg	5.85	7.20	Rice	2.90	3.80
Stove	6.10	7.45	Boiler	2.70	3.70
Nut	6.20	7.55	Barley	2.40	3.30
Pea	4.80	6.05	Culm	1.25	2.15

Bituminous—There is not the least sign of a change in the bituminous market. Little coal is moving and as a consequence the business is far from profitable, with the mines working on a short schedule. While some of the larger companies have expressed a willingness to contract at a figure around $3.50, it can safely be said that there is only a slight tonnage likely to be closed at this price. The producers seem to have based this price on some profitable bunker business which they have been able to close. The railroads are buying their requirements on a monthly basis, asking for bids for each month's requirements.

BALTIMORE

Bituminous market poor; growing demand of spotty nature. Hard coal men await April and figure on plans for next coal year.

Bituminous—The soft coal market is poor, with each handler developing a quiet line of new inquiry. The call is for small lots for the most part, but the fact that there is a resumption of call, even in spotty form, from customers who have been out of the market for some time, is encouraging.

There is a determination on the part of the mine operators not to sell at a loss except when caught on some particular shipment. Thus it is that the quotations at the mines are for the most part much higher than some of the sales, mine basis, at tide. The irregular arrival of vessels here has added to the necessity at times of coal being sacrificed. The Shipping Board coal, too, had clogged the port and was forced out for all foreign bunker trade, but this is rapidly clearing now and leaving an open sale market. It is rather difficult to quote sales prices under the circumstances. Very best coals, except for one particular line that is held at $3.20, are selling for the most part around $2.75 to $3. Good coals, in fact excellent coals at times, are to be had at from $2.60 to $2.75. Poor to fair coals are running all the way from $2 to $2.50. Gas coals are below even the $2 mark here at tide under forced sales at times.

The trade is discussing the report that the entire Tidewater Exchange is to go out of business on Apr. 1. Such a plan, while possibly favored by a few big shippers, is hotly opposed by the majority of small handlers who say that the heavy demurrage charges and short free time allowed will not enable them to do business successfully except in some method of quick dumping and quick securing of coal for waiting bottoms. It is planned to urge some other plan for interchange of coal to prevent demurrage of ruinous nature should the Tidewater Exchange be ended.

Anthracite—Hard coal men are simply awaiting Apr. 1. No effort has been made to cut prices here to induce buying in the market where consumers are taking but small lots to tide over the balance of winter. The various reports in the trade of a spring schedule that will start off at the present price, with a 10c. increase per month after Apr. 1 is arousing much interest.

Lake Markets

PITTSBURGH

Market drags, but no weaker. Production 25 to 30 per cent. Steel industry revival in prospect.

The coal market has continued to drag, but there are no signs of increasing weakness on the part of operators. Production is running at 25 to 30 per cent. of capacity, and the continued curtailment is having a beneficial effect upon the situation. Stocks of coal have been reduced materially, despite the lower rate of consumption, and heavier requirements on the part of consumers are in near prospect.

Steel mill operations have deceased slightly in the past week, and are marked for heavier decreases in the next few weeks, as buying has been particularly light since it became generally believed that prices would have to decline. Secretary Redfield's plan for price deflation was unanimously adopted by trade representatives at a meeting in New York, and by Apr. 1 greatly reduced iron and steel prices will probably be in effect, stimulating buying and bringing about heavier mill operation. The steel producers will insist upon a wage reduction in connection with the reduced selling prices and it is possible they will propose that reductions be sought in the materials they buy, such as coal.

Demand for byproduct coal keeps up very well, as the byproduct coke ovens are operating almost full. Decrease in coke demand has fallen, and will in future fall, chiefly upon the beehive ovens.

Demand from retail dealers has continued poor, domestic consumption being light. Scarcely any coal has been used as a substitute for natural gas in the home the past winter, as the domestic gas supply has been practically adequate.

The market remains fairly firm at $2.25@2.35 for steam mine-run, with 1¼-in. domestic at but little more, and ¾-in. gas coal at $2.50@2.70 depending on grade, all per net ton at mine, Pittsburgh district.

BUFFALO

Not much improvement. Both anthracite and bituminous dragging. Some towns heavily loaded with coal.

Bituminous—The situation is about as unfavorable as ever. The supply of coal is still in excess of consumption. This is especially unfortunate, as it is now time to make spring contracts and nobody has much idea as to what prices will be.

The bituminous market is quite as steady as the light demand warrants, quotations remaining on the old Government basis of $4.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump; $4.20 for some mine-run and slack; $5.65 for smithing and smokeless, $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—The only new feature of this branch of the trade is that the lake-shipping companies are taking tonnage quite liberally and already some cargoes have been loaded. There is no demand for the coal at upper-lake ports, but coal began to accumulate here so fast that something had to be done with it.

The demand is light. Some colder weather has set in lately, but the season is too far gone to be affected by a drop in temperature that cannot now last any length of time. The consumer is buying only from hand to mouth. Natural gas can again be used in furnaces on the 15th, and is preferred to coal generally.

Anthracite prices are as follows in the city:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8.55	$10.35
Egg	8.45	10.20
Stove	8.70	10.10
Chestnut	8.80	10.50
Pea	7.00	9.05
Buckwheat	5.70	7.75

An addition to the car prices of 25c. per ton is made on coal loaded into lake vessels.

CLEVELAND

Steam-coal users appear to have lost interest. Lake shippers looking for announcement restoring five days' free time on cars at Lake Erie ports, thus making possible abandonment of Great Lakes coal pool.

Bituminous—Contrasted with the slight impetus given the market last week by the interest shown by several large steam-coal users, the present lull—or rather the recurrence of the one that has abided for the last three months—seems all the more pronounced. The slight picking up all around last week proved a snare and a delusion. The "feelers" put out by several interests proved short-lived, even for "feelers," and virtually no buying has resulted.

The weather continues mild, and retail dealers cannot get away from the post. Many dealers are inclined to accept the present stagnant market as "part of the game," but are more pessimistic when figuring that the open winter will permit many consumers to start next winter with bins fairly well supplied. Pocahontas lump at $7.50 and mine-run at $7.20 are not proving alluring because of the weather.

Anthracite—Domestic consumers can now have all the egg they want at $10.85 and chestnut at $11.05, but the takers are few.

Quotations on coal in Cleveland in net tons, delivered, are as follows:

Anthracite:		Steam Coal:	
Egg	$10.85	No. 6 slack	4.60
Chestnut	11.05	No. 8 slack	4.95
Pocahontas:		Youghiogheny,	
Lump	7.50	4.95 to	5.05
Mine-run	7.20	No. 8 ¾-in.	5.55
Domestic Bituminous:		No. 6 mine-run.	4.60
West Virginia		No. 8 mine-run.	4.95
splint	7.15		
No. 8 Pittsburgh	6.35		
Massillon lump	7.10		

Lake Trade—Nothing official has come out of Washington so far, but it is understood that the United States Railroad Administration will shortly amend demurrage rules so as to permit the abandonment of the Great Lakes pool and let lake shippers and upper dockmen get back to the old indivdual buying basis. Free time at Lake Erie ports now is limited to three days. Formerly it was five days, and before that seven days. It is felt that the five-day free time limit will be evoked again. This is the outstanding development in the lake trade since the close of last season, inasmuch as all concerned are anxious to forsake pooling.

DETROIT

Sales of bituminous coal in the Detroit market are still restricted by abnormally large stocks in the hands of buyers.

Bituminous—Demand for bituminous coal in the Detroit market falls far short of the volume of business handled at this season in preceding years. Jobbers and wholesalers report that it is a difficult task to interest buyers, though the high-grade coal they are now able to offer includes the product of several districts that could not be obtained in Detroit while the Government's zone regulations were in operation. The predicament of the retail dealers arouses sympathy of the jobbers and wholesalers. A large proportion of the retailers are holding heavy stocks of bituminous, bought in complying with recommendations of the fuel administration and with the expectation that the greater part of their customers would be unable to obtain other forms of fuel. The dropping of various restrictions made it possible for the customers to use coke and later obtain additional supplies of anthracite. Weather conditions, also, failed to stimulate demand and it is probable the dealers will have to carry heavy stocks through the summer.

The Government scale of prices is still being maintained on practically all the local business, the jobbers say, though it is admitted a few sales of slack have been made at a lower price to escape railroad demurrage.

Anthracite—The receipts of anthracite, though not of large volume, are said to be sufficient to provide for domestic requirements. Some of the dealers are reported to have made attempts to reduce delivery on orders previously given. There is also a plentiful supply of domestic coke.

COLUMBUS

The coal trade in Ohio continues rather quiet. More activity has developed in domestics as a result of lower temperatures. Steam business is still slow, but reports show that many consumers are cleaning up and will soon be in the market.

Little change has taken place in the Ohio coal trade during the past week. Buying is still limited to actual needs and there is no disposition to buy for the future. Purchasers are still playing a "waiting game" so to speak, and are only placing orders for current needs. The tone of the market is not good although some increased activity is noted in certain localities. There are a larger number of inquiries received showing a disposition on the part of purchasers to talk fuel.

The domestic trade is probably the most active. Colder weather which prevailed early in March caused a small spurt of buying on the part of retailers. Dealers stocks are not large and there is a general disposition to clean up. Demand for Pocahontas and other fancy grades is fairly good under the circumstances. Retail prices are generally well maintained and instances of cutting are rare. Dealers in northern Ohio and Michigan are fairly well stocked up and are not in the market to any extent. It is ascertained that the amount of coal that will be carried over by householders is not as large as was generally supposed. While the winter has been a mild one, coal consumption has been higher than was generally believed.

The steam business is quiet in every section. Larger consumers are cleaning up preparatory to the expiration on their contracts. Screenings are the weakest feature of the market. Railroads are now taking a larger tonnage as a result of recent orders of the Railroad Administration. These orders provided that a larger fuel tonnage must be purchased for current needs and reserve stocks shall not be depleted as rapidly as formerly.

LOUISVILLE

Weather conditions approximately the same, with demand for domestic and steam generally quiet. Conditions at mines showing no material change. River coal moving more freely.

The general tone of the coal trade is approximately the same as it has been, with domestic not quite so keen, probably, and at the same time just a slight shade of improvement in steam demand. Nothing much can be expected of domestic under such weather conditions, and steam cannot possibly improve materially until heavy industrial stocks are lowered.

River coal is again becoming a factor. The Pittsburgh Coal Co. last week received a ten-barge shipment from the West Virginia fields, this being the largest shipment to come in to one concern in many months. It is said to be the forerunner of heavy shipping later on. However, the river companies are taking full advantage of the rail rates, which does not make such coal profitable to many retailers.

From the best information available it would appear as though eastern Kentucky prices for the various fields are on a par level at the present time. These prices are as follows, per net ton:

	Eastern Kentucky	Western Kentucky
Block and egg	$2.85@3.00	$2.60
Mine-run	2.40@2.50	2.35
Nut and slack	2.00@2.10	2.05

These are fair prices, although there is some cutting being done. Some eastern Kentucky block and egg is selling at around $2.65, and some nut and slack at as low as $1.85 to $1.90; with some mine-run at $2.20.

Western Kentucky is striving to hold prices, as western Kentucky prices were already so low that coal could not be mined profitably at less per ton. However, eastern Kentucky in order to meet the competition on the lower grade western Kentucky has been cutting prices more or less.

BIRMINGHAM

Market conditions quiet, with little demand for steam fuel. Domestic trade has also eased up as result of warm weather. Prices remain stationary. Production curtailed 25 to 30 per cent.

The past week has not shown any improvement in trade conditions here, and steam coal is in slight demand. Cotton mills, brick plants and industries generally are either idle or operating on reduced schedules, and stock accumulations are keeping them out of the market. Railroads and other interests having contracts are not taking the maximum deliveries in many instances. There is a fair demand for blacksmith coal, which is not produced to any great extent by the mines in this district. Prices have not been affected by the soft trade conditions and are being maintained on basis of Government schedules for steam grades, quotations being as follows per net ton mines:

	Mine-Run	Prepared	Slack and Screenings
Big seam	$2.45	$2.75	$2.40
Black Creek and Cahaba	3.45	3.75	3.05
Jagger-Pratt Corona	2.85	3.05	2.45
Blacksmith	....	5.25	....

Domestic quotations, slightly increased, are as follows:

	Lump and Nut
Black Creek and Cahaba	$4.50
Corona	3.75
Jagger	3.50
Montvallo	5.00

Continued warm weather has caused a falling off in the demand for domestic grades, though there is ample business available to absorb the output of the mines at this time.

Coal production is lagging in about proportion to the requirements of the trade and is on a basis of 70 or 75 per cent. normal.

Coke

CONNELLSVILLE

March adjustments on contracts. Spot market lower.

Adjustments of prices for March shipment of furnace coke on contracts that call for periodic settlement of price when there is no Government price have practically all been made. One contract was adjusted at $4.50 for the month, but the usual settlement has been at $4.25. These settlements are not altogether conclusive as to market values, however, for two reasons. In the first place, contract coke is recognied as worth more than odd lots that are picked up in the open market as the operator renders service by shipping coke just as the furnace needs it and the quality is regular. On the other hand, some of the February adjustments proved unsatisfactory, the open market declining during the month more than had been expected when the settlements were made, and in a number of instances furnaces had something coming to them in the March adjustment, to equalize.

Operators holding contracts calling for "last Government price" have made no further adjustment. In the majority of cases a voluntary adjustment was made to $5, the Government price having been $6, but some contracts have thus far not been adjusted at all. Operators who made the $5 adjustment are hoping that pig iron prices will be reduced so that demand may be stimulated and coke consumption increased.

The spot and prompt market has declined farther. Several fair-sized lots of furnace coke for March shipment have been offered at $4, and odd lots for spot shipment are easily picked up at this figure in the few cases in which they are needed, while $4.25 appears to be the highest price that is seriously quoted. So much more 72-hour coke is made, especially with the present four-day and five day operations, than is needed by the foundries that some operators are offering foundry coke at $4.50 or possibly at less. One or two established operators making a specialty of foundry coke are still adhering to $6 as they have contracts to protect and are not interested in the small lots they could sell by cutting prices. The market for spot and prompt coke is quotable as follows: Furnace, $4@4.25; foundry, $4.50@6, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Mar. 1 at 224,872 tons, a decrease of 8740 tons.

Middle Western

GENERAL REVIEW

Better feeling in Middle West due to an improvement in market conditions. Peculiar situation in Iowa.

During the past week there has been an improvement in market conditions. This change for the better is noticeable, although it is not much to brag about. The demand for both steam and domestic coals has been better since Mar. 1 than at any time since the beginning of this year. Briefly, the reasons for this slight strengthening of the market are—first, the weather has been cold, and considerable domestic coal has moved as a consequence; second, storage piles are being rapidly depleted, and buyers have come to the conclusion that it is a wise plan to have plenty of coal on hand during these times of labor unrest; third, the contract season is upon us, and some trial coal is being shipped. It is believed that the market will improve a little from now on, although it will take a tremendous amount of improvement to put the market back into anything resembling a satisfactory condition.

Contrary to prevailing opinions outside of the coal industry, prices are firm, with no signs of weakening, so far as good coal is concerned. The buying public has adapted itself to the new and advanced prices, effective Feb. 1, for coal from southern Illinois, and the fourth vein Indiana fields. It is expected that other coal fields in the Middle West, now marketing their product on the basis of the late Government prices, will raise their prices. These increases are logical, and to be expected. The selling prices set by the Government allowed only a small margin of profit on full running time, and with conditions as at present, with mines operating at from 30 to 50 per cent. capacity, the operators cannot hope to break even unless they charge more for their coal. So far as the buying public is concerned, it is becoming more and more suspicious of bargains in coal. When an operator or jobber, during these times, is forced to sell his coal below cost, there is a reason for it; and that reason is—the coal is usually off grade.

Taking the coal operators as a unit, they are all confronted at this time with the same problem. That problem is, what shall they do with their steam sizes or screenings? Manufacturing today is at a low ebb. The mines, therefore, have little demand for steam coals. The competition for steam business is consequently keen, and there is a natural tendency toward price cutting. To overcome this, some of the operators' associations are talking of storing coal for themselves, rather than selling their product to a factory at a less price and allow others to store the coal and make a profit. The operators figure that it will be but a short time before the country will absorb all the steam coal available.

Some progress is being made on the railroad fuel question, and the operators in this territory are more than pleased over the progress made at Washington by the Railroad Fuel Committee of the National Coal Operators' Association. It is generally felt that this question, so long a thorn in the side of the industry, will soon be settled on a basis fair to all.

Eastern coal is moving more freely into this territory. Iowa and South Dakota seem to be ordering the most liberally, with northern Illinois a close third. A rather curious situation has developed in Iowa. During the war but little Eastern coal reached Iowa, but that state was given the highest grade products from Illinois to replace the temporarily absent southeastern Kentucky block, Pocahontas and West Virginia splint. Besides Illinois coal, Iowa consumed a large tonnage of coal mined within her own borders. The native fuel was used for the cheap domestic trade and for steam purposes. The Illinois coal was utilized by the trade, both steam and domestic, who wanted the best to be had. The native coals have a low freight rate, while the fuel imported from Illinois has a comparatively heavy rate. Men closely in touch with trade conditions freely predict that Iowa, from now on, will purchase its cheap coal from its own mines, and its high-grade fuels from Kentucky and West Virginia. To sum up the situation, if Iowa wants cheap coal, it will use the most inexpensive it can get—namely, its own—and if it wants expensive coal, it will draw on the highest grade fields of the East.

While it is admitted the situation in the Middle West is a little better, it is due to national conditions, and not the individual efforts of coal companies, who have covered the territory with salesmen and advertising matter.

CHICAGO

Little signs of activity. Cold weather helps domestic trade, but has no effect on steam business.

Conditions in this city are not so favorable to the coal industry as at other points throughout the Middle West. There are no signs of renewed industrial activity. On the contrary, factories are closing down, or running from two to three days per week. The weather has been cold, with a good snow storm, but this has only served to help out the domestic trade, having little or no effect on steam business. As is true with the rest of this Middle West territory, Chicago is ordering out more eastern coal than heretofore. This undoubtedly is because the various retail dealers throughout the city have succeeded in reducing the storage coal they have on hand.

Current prices per ton for Illinois and Indiana coal are as follows:

ILLINOIS

	F.o.b. Mines	Rate to Chicago
Southern Illinois		
Franklin, Saline and Williamson Counties,		
Prepared sizes	$2.75	$1.55
Mine-run	2.35 @ $2.50	1.55
Screenings	2.05	1.55
Central Illinois		
Springfield District		
Prepared sizes	2.55 @ 2.75	1.32
Mine-run	2.35	1.32
Screenings	2.05	1.32
Northern Illinois		
Prepared sizes	3.25	1.24
Mine-run	3.00	1.24
Screenings	2.75	1.24

INDIANA

Clinton 4th Vein District		
Prepared sizes	2.55 @ 2.75	1.27
Mine-run	2.35	1.27
Screenings	2.05	1.27
Knox County Field		
Prepared sizes	2.55 @ 2.75	1.37
Mine-run	2.35	1.37
Screenings	2.05	1.37

MILWAUKEE

Little improvement in the coal situation so far as demand is concerned. Prices still maintained, however.

The coal market continues dull and uninteresting. The demand is light all around and stocks are not dwindling to any great extent. The interior country is fairly well off in supplies, because of the mild weather. It is estimated that the wood-burning campaign of last fall saved 20,000 tons of coal on farms and in schoolhouses. Prices are well maintained as yet, nothwithstanding reports of cutting by western producers.

Milwaukee city authorities have decided to make a test of Illinois and eastern coal before letting contracts for the fuel supply for the various city institutions. Last year the bids of western producers were turned down, notwithstanding the same were $31,832 lower than the offers submitted by the dock companies. The action was taken mainly because of the uncertainty of rail transportation. The efficiency of western coal since tried out at one water station was 12 per cent. greater than that of eastern coal. On this basis Mayor Hoan declares the city was a loser to the extent of $62,172 by discarding the bids of Illinois operators last year.

Following are the coal prices at Milwaukee, per short ton, effective Mar. 1. The prices given include delivery. At the yards the prices are 50c. per ton less:

Domestic

Anthracite—	Short Ton
Egg	$12.20
Stove	12.40
Nut	12.50
Pea	11.00
Buckwheat	10.60
Bituminous—	
Pocahontas mine-run	$8.15
Hocking, screened	7.90
Youghiogheny, screened	7.90
Pittsburgh, No. 8, screened	7.90
West Virginia, screened	8.40
Splint, screened	8.40
Kentucky, screened	8.40
Illinois, screened	7.25
Coke—	
Solvay, large sizes	$11.50
Solvay, small sizes	10.25
Smithing	8.40
Steam—	
Youghiogheny, Hocking and Pittsburgh	
No. 8, screened	$7.18
No. 8, pile run	6.93
No. 8 screenings	6.68
West Virginia, Kentucky and splint	
Screened	7.68
Pile run	7.43
Screenings	7.18
Illinois and Indiana, screened	6.50
Pile run	6.25
Screenings	6.00
Smithing	7.68

ST. LOUIS

Warm weather continues, with no market for either steam or domestic. Standard coal going at below cost and demoralized conditions prevail in all fields, with nothing optimistic to look forward to at present. Country business slow. Light demand for anthracite and smokeless, and coke is heavy.

There is no demand for any kind of coal locally except in small quantities. The domestic tonnage is extremely light and this condition is not only representative of St. Louis proper, but is general throughout this section of the country. This has kept the dealers from laying in any large stocks.

With coal that continues to go down in price and rumors of the situation in the Fifth and Ninth districts, the steam trade on Standard coals will not lay in any supply and only buys from day to day.

The tonnage of steam coal, however, is light. Storage piles continue to be cleaned up and the manufacturing industries in a general way throughout the Mississippi Valley are below normal in their coal requirements.

Locally, the demand in a domestic way for anthracite is extremely light. The dealers have good supplies on hand. There is some dissatisfaction over the high prices and the poor preparation and quality.

There is a little smokeless from West Virginia coming in, but the demand is easy on this and dealers are going to go slow on storage supplies. Gas house and byproduct coke is heavy. The price seems too high, for the public buying is light and in small quantities only.

Operating conditions in the Fifth and Ninth districts are at low ebb. The mines that work for the most part are selling below the cost of production. There is considerable dissatisfaction among the miners on account of not being able to get sufficient working time to make actual living expenses. Many of these have bought Liberty Bonds and are being pushed for payments.

Screenings keep many of the mines from working and some of these plants have screenings on hand as long as four and five weeks. Nut sizes are also heavy, and the lump is not moving any too well. Car supply is good and transportation fair. Prices on all Standard coals are below the Government price.

In the Mt. Olive field working conditions are not all that could be desired, but the price is being maintained in a general way. There was a cut made by the Consolidated Coal Co. on local shipments to $2.30 on domestic sizes. This is the first break in price in this field. A fairly good tonnage of this coal is moving north and west, but steam sizes are heavy.

The railroad tonnage out of both the Standard and Mt. Olive fields seems to become lighter, but it helps considerably even at that.

In the Carterville field of Williamson and Franklin Counties, as well as in the Du Quoin field, steam sizes from No. 1 nut down are piling up on the tracks with no place to move them. At some mines even lump and egg are slow, and in a general way the market is not available for the tonnage from these fields. The mines, however, for the most part are getting from three to five days a week and conditions are more satisfactory in these fields than in other sections of the state. Car supply and transportation are good. There is no great dissatisfaction among the miners in these fields, but there is an oversupply of labor.

The prevailing circular per net ton f.o.b. mines is as follows:

Franklin County	Mt. Olive and Staunton	Standard
Prepared sizes, lump, egg, Nos. 1 and 2 nut	$2.75	.....
Williamson County		
Prepared sizes, lump, egg, nut	$2.55	$2.55
Mine-run	2.20	2.20
Screenings	2.05	2.05
3-in. lump	....	2.30
2-in. lump	....	....

	$1.90@2.25
	1.60@1.70
	.95@1.10
	.....
	1.75@1.90

Williamson-Franklin rate to St. Louis is $1.10; other rates 92½c.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Mar. 10, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	143	146
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	41⅛	42
Colorado Fuel & Iron, Pfd	(CF)	99	125
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	27½	28
Elk Horn Coal, Pfd	(EH)	....	47
Island Creek Coal, Com	(ICR)	39	....
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	49	49⅛
Pittsburgh Coal, Pfd	(PC)	85⅓	86⅔
Pond Creek Coal	(PD)	13	14
Virginia Iron, Coal & Coke	(VK)	56	60

*Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd., 6s, 1922	90	....
Clearfield Bituminous Coal, 1st 4s, Ser. A., 1940	71	....
Colorado Fuel & Iron, Gen. 5s, 1943	89	90
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	73½	75
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	88	91
Grand River Coal & Coke, 1st 6s, 1919	....	....
Jefferson & Clearfield Coal & Iron, 2d Mtg. 5s, 1926	96⅛	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	97⅛	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79⅛	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s. Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80⅛	....
Pocahontas Coal & Coke, Joint 4s, 1941	83⅛	89
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	81¼	83
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	81½	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	92	95¼
Utah Fuel, 1st Sinking Fund, 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	50	70
Virginia Iron, Coal & Coke 1st 5s, 1949	87⅛	89¼

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations are f.o.b. cities named, unless noted otherwise.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$35.85	$37.60
Northern Basic	31.80	34.80
Southern Ohio No. 2	32.80	35.80
NEW YORK, Tidewater delivery		
Penna. 2X	36.15	39.55
Southern No. 2 (Silicon 2.25 to 2.75)	39.95	.....
BIRMINGHAM		
No. 2 Foundry	31.00	34.00
PHILADELPHIA		
Eastern Pa. 2X	36.15*	39.15*
Virginia No. 2	38.10†	40.50†
Basic	33.90*	36.90*
Grey Forge	33.90*	36.90*
Bessemer	.....	39.10*
CHICAGO		
No. 2 Foundry Local	31.00	34.50
No. 2 Foundry Southern	37.20	39.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	31.00	35.40
Basic	30.00	34.40
Bessemer	32.20	36.60

*F.o.b. furnace. †Delivered

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill	New York		St.	Chi-
	Pittsburgh	Current	One Year Ago	Louis	cago
Beams, 3 to 15 in.	$2.80	$4.07	$4.19½	$4.14	$4.07
Channels, 3 to 15 in.	2.80	4.07	4.19½	4.14	4.07
Angles, 3 to 6 in., ¼ in. thick.	2.80	4.07	4.19½	4.14	4.07
Tees, 3 in. and larger	2.80	4.12	4.19½	4.14	4.07
Plates	3.00	4.27	4.44½	4.14	4.27

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
2.90	4.04	4.65	4.20

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birming-ham	San Francisco	Dallas
Wire	$3.50	$4.37	$5.11	$4.37	$4.50	$5.35	$4.75
Cut	5.00	6.50	5.61	6.50	.....	6.75	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pitts-burgh	Cin-cinnati	Chicago	St. Louis	San Fran-cisco	Birm-ingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.70	$6.00	$4.50	$5.04	$6.15	$5.65	$5.55
Track bolts	4.90	8.90	5.50	Prem.	7.50	8.00	6.55
Standard section angle bars	....	....	4.45	Prem.	5.15	....	4.95

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List +7%	List +9%	+15%	+30%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cin-cinnati	Chicago	St. Louis	Denver	Birm-ingham
Straight	$6.25	$7.75	$6.50	$7.25	$8.50	$7.60
Assorted	6.40	7.75	6.50–7.00	6.40	8.75	7.85

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York					
	Current	One Month Ago	One Year Ago	Chicago	St. Louis	San Francisco
4-in.	$65.70	$65.70	$58.35	$64.80	$58.00	$82.50
6-in. and over.	62.70	62.70	55.35	61.80	55.00	79.50

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh		Chicago	
	Current	One Year Ago	Current	One Year Ago
Standard Bessemer rails	$55.00	$55.00	$67.00	$60–65
Standard openhearth rails	57.00	57.00	65.00	63–65
Light rails, 8 to 10 lb.	3.135 (100 lb.)	3.125*	3.135 (100 lb.)	3.135*
Light rails, 12 to 14 lb.	3.09 (100 lb.)	3.125*	3.09 (100 lb.)	3.09*
Light rails, 25 to 45 lb.	3.00 (100 lb.)	3.125*	3.00 (100 lb.)	3.00*

*Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$17.00	$15.00	$17.00
Stove plate	15.00	15.00	16.00
No. 1 machinery cast	22.00	20.00	20.00
Machine shop turnings	6.50	6.00	7.50
Cast borings	9.50	7.00	10.50
Railroad malleable cast	13.50	15.50	17.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.13	$0.18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	13c.	15c.
Hollow	24c.	...	...

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜	47%	20½%	¼ to 1½	36%	20%
½	51%	36½%			
¾ to 3	54%	40½%			

LAP WELD

2	47%	34½%	2	29%	15%
2½ to 6	50%	37½%	2½ to 4	31%	18%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	43%	25½%	¼ to 1½	36%	21%
½	48%	35½%			
¾ to 1½	52%	39½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	45%	33½%	2	30%	17%
2½ to 4	48%	36½%	2½ to 4	32%	20%
4½ to 6	47%	35½%	4½ to 6	31%	19%

Stocks dicounts in cities named are as follows:

	New York		Cleveland		Chicago	
	Black	Gal-vanized	Black	Gal-vanized	Black	Mal-vanized
⅛ to 3 in. steel butt welded	43%	27%	43%	26%	44.9%	29.9%
3½ to 3 in. steel lap welded	38%	23%	39%	23%	40.9%	26.9%

Malleable fittings. Class B and C, from New York stock sell at list + 12½%. Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+17½%
Galvanized cast steel rigging	+2½%
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	List

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Chicago Current
*No. 28 black	4.70	6.22	6.22	6.45	5.75	6.22
*No. 26 black	4.60	6.12	6.12	6.35	5.65	6.12
*Nos. 22 and 24 black	4.55	6.07	6.07	6.30	5.60	6.07
Nos. 18 and 20 black	4.50	6.02	6.02	6.25	5.50	6.02
No. 16 blue annealed	4.10	5.37	5.37	5.65	4.95	5.37
No. 14 blue annealed	4.00	5.27	5.27	5.55	4.85	5.27
No. 10 blue annealed	3.90	5.17	5.17	5.45	4.75	5.17
*No. 28 galvanized	6.05	7.57	7.57	7.70	7.15	7.57
*No. 26 galvanized	5.75	7.27	7.27	7.40	6.85	7.27
No. 24 galvanized	5.60	7.12	7.12	7.25	6.70	7.12

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 15c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Hot pressed square	$0.80	$1.00	$1.25	$1.40	$0.98	$1.05
Hot pressed hexagon	.80	1.00	1.10	1.20	.78	.85
Cold punched square	2.50*	1.00	1.00	.75	1.00	1.00
Cold punched hexagon	2.50*	1.00	1.00	.75	1.00	1.00

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	50—10%	40%
Chicago	50%	50%
Cleveland	60%	60%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	40—10%	50%	40%
Larger and longer up to 1 in. by 30 in.	25—5%	30%	25—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York..$1.25 Cleveland..$1.25 Chicago..$1.75

For cast-iron washers the base price per 100 lb. is as follows:
New York..$6.00 Cleveland..$4.25 Chicago..$4.50

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	40%	45%	45%
Tinned	30%	45%	40%

Boiler, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York..$6.60 base Cleveland..$5.15 Chicago..$5.47 Pittsburgh...$4.65

Structural, same sizes:
New York..$5.67 Cleveland..$5.25 Chicago..$5.57 Pittsburgh...$4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.50	$1.31	$1.65	$1.35	$1.66	$1.36
5-gal. cans	1.63	1.41	1.80	1.50	1.86	1.46

WHITE AND RED LEAD—Base price.

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	13.00	14.50	12.25	12.50	13.00	12.25
25 and 50-lb. kegs	13.25	14.75	12.50	12.75	13.25	12.50
12½-lb. keg	13.50	15.00	12.75	13.00	13.50	12.75
5-lb. cans	15.00	16.50	14.25	14.00	15.00	14.50
1-lb. cans	16.00	17.50	14.25	14.50	16.00	14.50

500 lb. lots less 10% discount. 2000 lb. lots less 10–2½% discount.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati..$15 and 16 Birmingham..$15.00
St. Louis, salmon..12.00 Denver..12.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.I.	L.C.I.	C.I.	L.C.I.	C.I.	L.C.I.
No. 1 grade	$1.35	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.45	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $2.10 per roll in carload lots and $2.35 for smaller quantities.

Shingles, red and green slate finish cost $5.75 per square in carloads, $5.75 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots		Less Than Carload Lots	
	N. Y.	Chicago	N. Y.	Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$54.00	$52.00	$55.00	$53.00
Tar pitch (in 400-lb. bbl.)	21.00	18.00	22.00	19.00
Asphalt pitch (in barrels)	36.00	36.00	41.50	41.50
Asphalt felt	67.50	67.50	72.00	72.00

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0.056	$0.11	$0.162
Cincinnati	.086	.165	.218
Seattle	.09	.175	.30
Los Angeles*	.074	.144	.181
New Orleans	.16	.20	.29

*F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$38@41	$38.00	$40.00
Birmingham	32.00	34.00	32.00
Denver	43.25	35.00	43.00
Cincinnati	43.00	42.00	37.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder
New York	.....	$0.29½	$0.34½	.....	$2.40
Boston	$0.22¼	.26¼	.31¼	$0.35¾	2.65
Cincinnati	.18¾	.22¾	.26¾	.....	2.35
Kansas City	.20¼	.25¾	.30¾	.38¾	2.45
New Orleans	.20¼	.26½	.31½	.37½	2.60
Seattle	.....	.25½	.32½	.....	.....
Chicago	.18¾	.22¾	.30	.36	2.35
St. Paul	.19	.25¾	.30¼	.....	2.45
St. Louis	.19	.25¼	.30¼	.36¼	.....
Denver	.17¾	.24	.29	.35	2.45
Dallas	.21	.25	.29	.39	.....
Los Angeles	.25	.31	.36	.42	.....

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7.2	8½	14½
Fiber or sponge	8	13	9	18
Transmission	7	13	9	20
Axle	4½	4¾	4½	5½
Gear	4½	7½	7½	8
Car journal	22 (gal.)	4.9	9¾	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	87.00	70.00	77.00	93.00	75.00	70.00
Commercial	42.00	40.00	18.50	22.00	15.00	25 @ 30

HOSE—Following are prices of various classes of hose:

	Fire
	50-Ft. Lengths
Underwriters' 2½-in.	80c. per ft.
Common, 2½-in.	30%

	Air		
	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.40	$0.30

Steam—Discounts from list
First grade..25% Second grade..35% Third grade..40%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	50%
Denver	35–5%	30%
Birmingham	30%	35%
Chicago	45%	35%
Cincinnati	40–10%	30%

RAWHIDE LACING—50% for cut; 45c. per sq.ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.60
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.80
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.32	Birmingham	$0.38
New York	.30½	Denver	.32
Cincinnati	.33	Kansas City	.32½
Chicago	.30½	Seattle	.24
St. Paul	.32	St. Louis	.21½
San Francisco	.29		

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard List Per Lin. Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1-in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2-in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3-in.	.90
10-in.	1.30	3½-in.	1.05
85% magnesia high pressure			List
For low-pressure heating and return lines		4-ply	58% off
		3-ply	60% off
		2-ply	62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½ lb. rolls	48c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
	Single	Double		Single	Double		Single	Double	
No.	Braid	Braid	Duplex	Braid	Braid	Duplex	Braid	Braid	Duplex
14	$15.00	$19.00	$35.00	$12.00	$16.00	$33.00	$12.00	$17.35	$29.90
10	23.15	29.05	51.70	27.20	31.00	69.00	23.10	23.60	52.80
8	32.60	39.20	71.05	38.00	42.00	78.00	32.10	41.10	.....
6	54.40	54.60	.....	.....	65.00	130.00	55.40	65.90	.....
4	77.50	76.85	.....	.....	93.00	.....	72.65	90.00	.....
2	115.30	111.10	.....	.....	140.00	.....	115.00	129.50	.....
1	150.05	145.60	.....	.....	182.00	.....	155.50	168.50	.....
0	.....	176.80	.....	.....	242.00	.....	199.50	219.00	.....
00	.....	217.60	.....	.....	290.00	.....	245.50	261.50	.....
000	.....	295.95	.....	.....	360.00	.....	299.50	317.00	.....
0000	.....	323.10	.....	.....	435.00	.....	365.00	378.50	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates per 100 lb. are effective:

Boston	$0.30	New Orleans	$0.38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	.49½
Denver	.99	Pacific Coast (all rail)	1.25
Kansas City	.59		

Note—Add 3% transportation tax. *Minimum carload, 80,000 lb.

COAL AGE

Volume 15 New York, March 20, 1919 Number 12

Health and Industry

By Floyd W. Parsons

MINE officials in many localities are having a little rest from the strenuous war days of last year. This affords them an opportunity to analyze their industrial situation and lay plans to improve conditions and eliminate danger spots.

There are other matters of importance besides prices, wages and markets, and one of the things that might be studied with profit right now is the question of health as it relates to industry. The degree of health that employees enjoy determines largely their degree of happiness, contentment and efficiency.

No other machine compares with the human machine in industrial importance, and yet the average corporation manager is often more concerned about the grade of oil that is fed into the company's mechanical equipment than he is about the quality of the water that the employees drink.

No company should approach the problem of maintaining and improving the workman's health in a spirit of philanthropy. It should be viewed purely as a matter of good business, not of kindness. Company officials may use their corporation's funds to increase operating efficiency, but not to engage in acts of benevolence. Furthermore, workmen are resentful and suspicious of plans that appear to be based on charity.

Careful investigations show that the time lost by workmen through illness is far greater than that lost as the result of industrial accidents. Some day the money losses to employees from sickness will have to be borne by the employer or the state in the same way that losses through accidents are now borne. Workmen's compensation was originally established to insure the individual against losses he is unable to bear, and it is only a matter of time until other misfortunes than accidents will be included in the list of things for which compensation shall be paid.

During the war there was a serious let-up in safety and welfare work on the part of many corporations, due to the urgent demand for increased production. In the mining industry, as well as in other fields, the various companies have been rather slow in getting back on a pre-war basis. This situation is regrettable because of the fact that professional trouble makers are now taking advantage of every opportunity to point out the weak spots in our present industrial system. No time should be lost and no effort spared to bring first-aid and welfare work back to a pre-war basis of efficiency.

Not only is this desirable, but company officials should not stop there. The time has arrived when the successful manager should make a study of human physiology and endeavor to find ways whereby such knowledge may be applied to working conditions in and around the mines. Ninety per cent. of the problems of health have to do with matters of prevention, while 99 per cent. of the Nation's doctors devote themselves, not to prevention, but to curing the ills of mankind. One company employing several thousand men has seen the light of coming events and has established a system whereby the chief efforts of the company's doctors are devoted to keeping the employees in good health. When sickness does result to one of this company's workmen, or to any member of his family, the company foots the bill. Over a period of a year the cost of the plan to this corporation was a little less than $12 per workman, or about 4c. per day per man.

Other investigators are now getting facts concerning the cost to their company of various deficiencies, such as a poor water supply, unsanitary surroundings, inadequate washing facilities, poor ventilation, insufficient drainage and sewage, and dozens of other conditions tending to affect, not only the health, but the moral well-being of the men and their families. It is doubtful if any class of work that a mining company could do would show better results in the way of reducing operating costs than a properly conducted campaign designed to encourage the observance of strict personal hygiene on the part of employees. The average workman has very little idea of what may be termed a balanced diet on which he can do his work with greatest efficiency and least effort. An investigation of the dinner pails of employees at a southern mine showed an astonishing situation. Not one man in ten had in his bucket the proper rations on which to base a maximum physical effort.

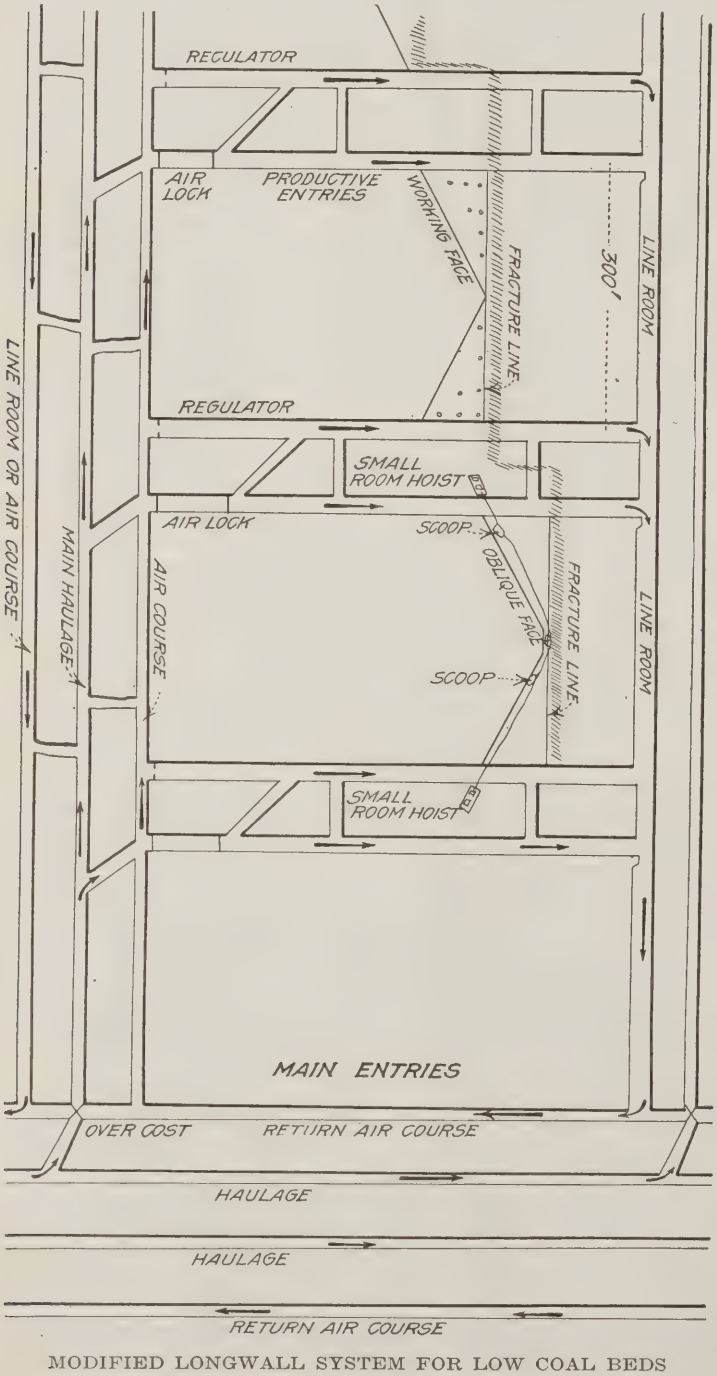
This matter of health right now is of such vital importance that this first page in Coal Age will be devoted to a discussion of the subject for several weeks to come. Above all things, at the present moment, we need sound minds, and these we cannot have unless first we have sound bodies. Contentment and health grow on the same tree. Ill-health and unrest are fruits of another vine.

IDEAS AND SUGGESTIONS

Longwall System for Low Coal Seams

By Charles Martin
Seward, Penn.

The accompanying illustration shows a modified longwall system for working low coal beds that I would like to submit to the readers of *Coal Age* for criticism. This proposed method, as shown on the drawing, permits the use of all machinery formerly employed in the room-and-pillar method and does away with any extra expense for new equipment. There is no big, heavy, cumbersome machinery to be moved in following up the face, and little or no expense will be connected with its installation as compared to the present systems. I feel satisfied that quite a large tonnage could be handled by a few men.



MODIFIED LONGWALL SYSTEM FOR LOW COAL BEDS

One of the advantages I think this system possesses over the old methods is the oblique face, which gives protection to the workmen and machinery and keeps the line of fracture behind the active face. Another big advantage is high recovery, as with this method I can see no reason for losing any coal. Furthermore, it eliminates to a considerable extent the possibility of a squeeze or creep.

I would like to hear from some one who has had experience with some of the late methods of longwall or the new methods where scoops are used.

The following is a description of how this system works out in theory: The productive entries are driven practically the same as in room-and-pillar working except that both headings are driven as haulageways, having either the bottom or top taken to give the required height. These can be driven on any centers suitable to conditions. I have shown these on the drawing as being 300 ft. apart, which gives little better than a 150-ft. face on either side of the fracture line. Then by using two small room hoists, one on each heading, as shown, and two scoops of about one-ton capacity, these can work in conjunction in moving the coal down to the loading platform, working alternately back and forth. Practically any of the late type shortwall mining machines used in the room-and-pillar system can be adapted to this system to good advantage, by either cutting clear across the face (and when this is cleaned up reverse the bits and cut back across the face) or using two machines, one on either side.

The main entries can be driven on either the three, four or five-entry system, according to the size of the field.

A Spring-Operated Frog

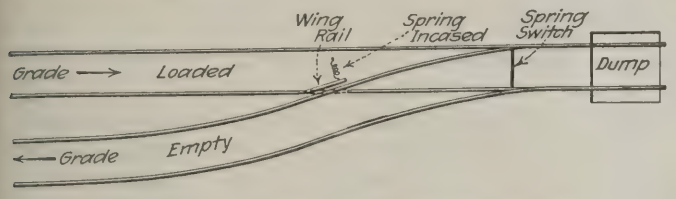
By H. C. Cockill
Jacob, Penn.

While a crossover dump is no doubt economical and satisfactory where a large output is obtainable, we sometimes run across an "old-fashioned dump" where the dumper is required to pull the empty car back up the grade until after it passes the frog on the loaded track. This is a hard and laborious process where only one man has the task to perform.

In order to do away with this tiresome operation the company with which I am connected has installed on the tipple at its Jacob mine the spring frog shown in the accompanying illustration. The wing rail shown is about 4 ft. long. The spring may well be a heavy door spring. The loaded cars, after leaving the scales, come down the grade, throwing the wing rail against

the action of the spring in line with the rail or the loaded track. This springs back into the position shown in the diagram immediately after the loaded car passes over it on its way to the dump.

After the car is emptied of its contents the dump, if properly balanced, will come back to its original



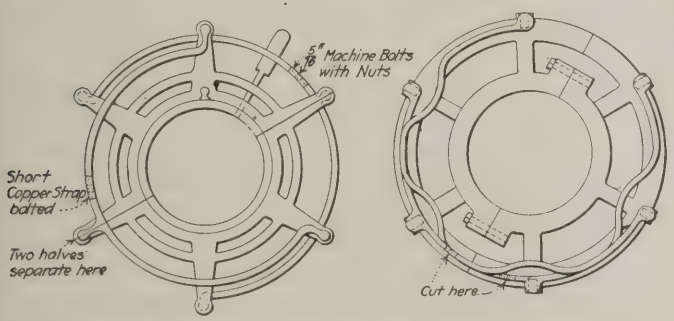
SPRING-OPERATED FROG INSTALLATION

position. The resulting jar will give the car a start which, with a slight pull on the part of the dumper, moves the car through the spring switch close to the dump and thence down the grade of the empty track. The diagram shows how easily the empty track can be placed at a lower level than the loaded track when the frog trouble has been eliminated. The spring should be planked over to avoid damage. This spring frog has been in use for the past three years and has been found quite satisfactory.

Disconnecting Generator Brush Yokes

By J. J. Nolan
Linton, Ind.

No doubt many readers will recognize in the accompanying illustration the two brush yokes used on two old types of generators frequently seen in mining plants even yet, and usually doing good service too. Those having charge of them possibly have had occasion at some time or another to dismantle the yoke and brush holder arrangement for such a cause as the bearing getting hot, burned out, or worn out, or perhaps to repair or turn up the commutator. We will assume that previous to this time the machine had been giving no trouble from poor commutation or other cause and required little attention, and that after reassembling



BRUSH YOKES USED ON OLD GENERATORS

with care and precaution, it did not give as good results as formerly. The firm with which I am connected has several of these types to care for and has had occasion to dismantle them for the reasons above enumerated. The drawings show how, by proper care, a considerable amount of work and worry may be avoided.

The cutting of the copper bar connector does not necessarily need to be done until occasion requires this yoke to be taken off for some cause. Then with a hacksaw cut each one through as shown, then take the piece to the drill press and bore the holes shown. A breast drill will do the work just as well.

It will be observed in the left hand figure that only two brush holders are disturbed, these being the two in the joint where the yoke separates, while in the right-hand figure none is disturbed.

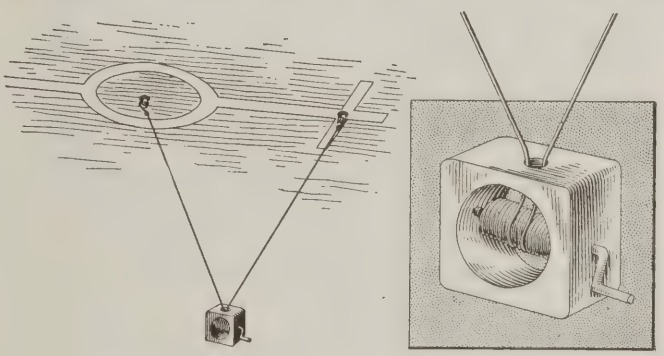
The whole operation of dismantling and reassembling can be done in this way in a short time, while with the old method when one is compelled to hurry through the job on account of the generator being needed proper attention is probably not given to care in spacing and fitting the brushes and holders. This often results in the holders getting misplaced owing to confusing marks. Each brush must then be sanded to fit.

In many instances the proper attention and care is not taken in spacing and adjusting all holders the same distance from the commutator. The proper space between brush holder and commutator should not be over $\frac{1}{8}$ to $\frac{5}{32}$ inch.

Homemade Double String Plumb Bob

By C. W. Stafford
Stone, Ky.

The illustration below shows a homemade double string plumb bob which supplies a long-felt want among mine foremen and their assistants. The particularly attractive features of its construction are its concentrated weight (being made of lead) and the fact that the two strings are wound upon the spindle inside the



DETAILS OF AN EASILY MADE PLUMB BOB

block. They are thus not liable to get tangled up among themselves or with the other plunder in a man's pocket. This device is alweays ready for use and certainly beats the piece of rock or spike used by many. It can be made in any mine shop in a few minutes. So far as I know, the first one was made by Mine Foreman Tom Mitchel, of Hardy, Kentucky.

Incombustible Matter in Mine Air

The old method of computing the amount of incombustible matter in the air of coal mines and quarries was to proceed by analysis, arriving at differences after evaporating moisture and burning what could be burned. In 1912, J. Taffanel introduced his volumetric system, recently severely tested by the Bureau of Mines.

The Taffanel volumeter as constructed was found wanting in accuracy. But by enlarging the diameter of the tube and lengthening it by 20 per cent. it was possible to increase the weight to be tested to 20 grams, twice the former quantity. This gave excellent results.

The Mines of Bruay, France

By Gaston Libiez
Peru, Illinois

SYNOPSIS — *The deep shafts tap several coal beds of varying thickness. The thinner measures are worked longwall, while the thicker ones are worked in panels. Hydraulic flushing is practiced with considerable success.*

AT THE present time a few words about the French collieries located at Bruay, Pas-de-Calais, 30 km. (18½ mi.) northwest of Lens, the great mining center, and 12 km. (7½ mi.) southwest of Bethune, the seat of large mining developments, will be of interest. The mining company operating at Bruay has several large up-to-date mines, as may be seen from the accompanying illustrations. I will give some explanation of the working methods employed at the No. 3 shaft, as I feel sure it will interest many readers.

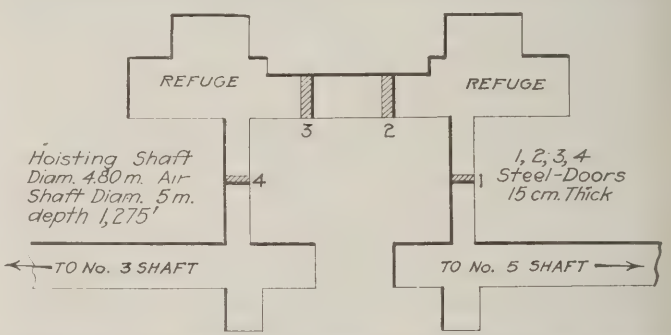
The No. 3 shaft is 1275 ft. deep, eleven beds are worked, the first one being reached at 839 ft. The beds pitch about 7 deg., the largest bed being about 12 ft. thick. The longwall system of mining prevails in the small beds, but the larger ones are worked by the panel retreating system. The gob is filled by flushing with culm or a mixture of water and sand as soon as the pillars are removed.

From the main shaft a main gangway is driven on both sides along the strike until the boundary is reached. Inclines are driven on the rise to meet another gangway starting from the first incline. This gangway is used as the main return when both roads have reached the property limits. It contains a pipe line for hydraulic filling and also telephone lines. Additional inclines are only started in retreating, when the removal of pillars tributary to the last or farther one is well under way. These are spaced 60 m. (197 ft.) apart. From these inclines roads are turned toward the workings at 15 m. (49 ft.) center to center.

The removal of pillars is accomplished by taking steps 5 m. (16.4 ft.) wide with a little airway well timbered alongside on the rise. The pillar being 15 m. (49 ft.) long measured on the pitch, there are 75 sq.m. (90 sq.yd.) to be filled at the start. Next the passageway timbers are removed, while the next pillar or step is taken out and the timbers used again.

The filling material is brought by pipes 130 mm. (5 in.) in diameter and arranged at the head of the place to be filled in two branches with a valve between to control the flow in either branch. This arrangement facilitates the flushing and work is not unnecessarily stopped.

About 2000 hectoliters (261 cu.yd.) of material are stowed per hour. Along the passageway props and timbers are strongly set to resist pressure, and plank or boards 10 to 15 cm. (1½ to 4 in.) wide by 1.5 to 2 cm. (⅜ to ½ in.) thick are nailed to their bases. Upon these boards a piece of canvas 1 m. to 1.5 m. (3 ft. 3½ in. to 4 ft. 7½ in.) wide is nailed from one road to the other. Additional boards are nailed in place above to keep the first roll of canvas taut; another roll is then nailed above the first, and so on to the full height of the workings. The canvas is loosely woven and full of small holes, thus permitting the excess water to gravitate and relieve pressure. Men employed at this bratticing keep striking lightly along the brattice to assist water in flowing out. The water returns to the sump, where it is pumped out again.



REFUGE CHAMBERS IN PASSAGE CONNECTING MINES

The bottom of the main shaft is provided with a sump about 30 ft. deep. A little below the level of the bottom a ditch 1200 m. (3940 ft.) long by 1.80 x 2 m. (7 x 8 ft.) is driven in solid rock to accommodate the excess water in its return from the workings. A small pump or a siphon draws the water from local sumps into this road.

All this water is handled by a powerful centrifugal pump and discharged on the surface into a large reservoir, to be used anew. The pump discharge is about 3.35 m. (985 gal.) per minute against a head of 360 m. (1180 ft.). It is driven by an electric motor operating at 5000 volts, 44 amp. and 1500 r.p.m. Culm banks from nearby coke ovens belonging to another company were bought at transportation cost. The present system has been in use for the past 15 years. Sand and gravel coming from the seashore is also employed as a stowage material.



VIEWS OF MINES NOS. 1, 3 AND 6 AT BRUAY, PAS-DE-CALAIS, FRANCE

In the mining at and near the boundary, ventilation is secured mainly with compressed air. The main pipes are 150 mm. (6 in.) in diameter. These are decreased to 100 mm. (4 in.) in diameter at the boundary of each district. On the cross roads or close to the working places pipes 70 and 50 mm. (3¾ and 2 in.) in diameter are taken off for drilling machines and punchers, while 30-mm. (1⅛-in.) pipes are used for small ventilators or blowers necessary to ventilation. When driving an incline or a main gangway, large tubes are used to convey the air. They are connected in lengths of 2 m. (6½ ft.), the joints being well calked to avoid short-circuiting of air. At the mouth of each entry or road a connection is made from a supply pipe of 30 mm. (1⅛ in.) in diameter and a nozzle arranged to produce an injector effect. A valve is placed at each of such connections.

On tunnel work a small fan is used to advantage. But little gas is encountered. However, where small quantities are given off or fear of meeting gas is entertained, a more powerful fan is used in connection with tubes at least 50 ct. (2 in.) in diameter.

Punchers are used to undercut and shear the coal, and permissible explosives are used to bring it down. Where shooting is done the bottom of working places is covered with fine clay or lime 1 in. thick, to cover and neutralize the coal dust. Also at the mouth of a hole or in its immediate proximity a piece of thin sheet steel is suspended in order to receive the first blow of the shot. This sheet measures 1 m. x 80 cm. (3 ft. 3 in. x 2 ft. 7 in.). It is claimed that this scheme gives good results. As a further precaution against dust explosions boards loaded with pulverized cinders are hung 30 ct. (1⅛ in.) center to center between the timber sets by iron rods and so arranged as to upset at the shock of a light explosion.

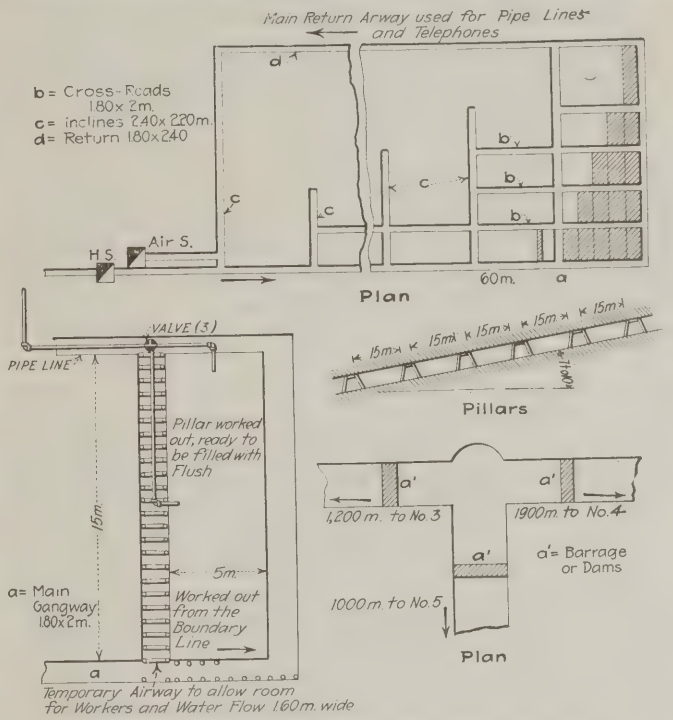
It is a law in France that all underground workings be connected, and as a precaution the company has developed a scheme to prevent an explosion from propagating into the next workings. When the two roads to be connected are close to each other a narrow passage is turned at right angles and driven 90 ct. (35 in.) wide and 5 m. (19½ ft.) long; when this distance is reached, another right-angle turn is made and a passageway the same dimensions as the former is again started to meet the other connection from the other shaft. The height of these passes is 2.50 m. (8 ft. 3 in.). Four doors of steel 6 in. thick are put in place, opening against each other. At the four corners wide rooms are excavated as refuge places. All this work is heavily reinforced with concrete.

Connection with the drainage ditches for water is also made between the shafts. These meet at a common point where any one of them can be closed by a suitable dam so that either may be cleaned out. The three shafts connected have ditches 1200, 1900 and 1000 m. (3940, 6250 and 3280 ft.) long respectively. The dams or barrages shown on the drawing are operative only when needed for cleaning.

The operation here described has an output of 3000 to 3700 cars daily. These cars contains eight hectoliters (28¼ cu.ft.) and are not topped. The cages hold eight cars. The number of men employed is about 1000, of which number 300 are on the night shift. There are 26 bosses for both shifts under a mining engineer.

It is needless to say that only safety lamps are in use. An explosion occurred in a mine located only few miles away that impressed upon everyone the advisability of using these lamps. This happened in 1912, if I remember rightly. A fire started in a certain coal bed and was well smothered. But I think that the stoppings were not properly made as a disastrous explosion occurred as the result.

The Bruay mines have suffered from the shelling of the Germans. The whole town was evacuated when the enemy drove toward the coast last spring. Many homes were wrecked and the people had to wear gas



DETAILS OF THE METHODS OF WORKING

masks day and night for months. The miners have worked nine hours a day during the war.

I am much pleased to read Arthur J. Baldwin's statement in *Coal Age* that "it will be a worth while result if ancient practices are abandoned and mining machines introduced." Indeed there are many coal beds in France that I believe could be worked successfully with coal cutters, as in driving roads to the property limits and in drawing pillars.

As the result of the Lens devastation one can readily believe that Bruay has been crowded for the past 4 years. In peace time the population is well over 18,000 inhabitants, all miners. Thank God that these mines are saved to France intact!

In the event of a mine disaster provision must necessarily be made for receiving the bodies of those killed or preparing the bodies for burial. The improvised morgue should be within a building that is well ventilated and has good drainage facilities. Men may be found alive within the mines, severely burned or so injured as to requre hospital treatment, and a building should be selected that can be readily used as a hospital. In the selection of the morgue and the hospital the advice of the local surgeon or physician and undertaker should be sought.—*Rescue and Recovery Operations in Mines.*

Details of Important Mining Bill Before the British Columbia Legislature

By Robert Dunn
Victoria, B. C.

SYNOPSIS—*An important bill is before the British Columbia Legislature proposing many changes of statute affecting mines. Among the more important of these are provisions concerning miners' examinations, the treatment of hoisting ropes and the practical elimination of all but safety lamps for miners' use.*

REGULATIONS of great importance to the coal-mining industry of the province have been laid before the British Columbia Legislature by the Hon. William Sloan, minister of mines, in a bill entitled "An Act to Amend the Coal Mines Regulation Act." These will radically change for the better the present system of conducting examinations for first, second and third class coal-mining certificates, removing much of the present superfluous administrative machinery by placing the new widely distributed authority in the hands of one competent and responsible board of examiners. These regulations apply also to the existing methods of examining and issuing certificates of competency to coal miners. It is proposed that one traveling board of examiners shall have charge of this important work, the duties of which shall be to go from colliery to colliery throughout the province for the purpose of passing upon the proficiency of coal miners applying for certificates.

Various other changes are provided for, having in view making the mines safer and removing, as far as possible, the chief dangers with which the underground workers have to contend. In some of the latter legislation British Columbia is setting the pace for America, notably in respect of the proposal that all wire cables shall be given hot oil baths at regular intervals and in a provision which, in its application, will practically eliminate all but safety lamps in underground coal workings.

Would Appoint a Minimum Wage Board

The initial provision of the bill is under the subtitle "Constitution of Coal Miners' Minimum Wage Board." The text of this section is clear in itself. The board is to consist of the chief inspector of mines as chairman and "two other members to be appointed by the minister, one of whom shall be appointed to represent the mine owners and one to represent the coal miners." The duties of this board shall be to "define and redefine any portion of the province as a minimum wage district for the purposes of this section; to impose conditions and exceptions to which the application of the minimum wage in any district shall be subject; and to regulate the time and manner of giving notice of the sittings of the board and the conduct of business thereat."

Having fixed a district to which a minimum wage shall apply its duty, naturally, shall be to decide what the minimum wage, within the bounds of the area, shall be, proper consideration being given to general conditions as may be shown by evidence or representations made by the parties affected. For the latter purpose a full opportunity is to be given for hearing at a public sitting of the board of all interested. Any order made shall go into effect on the minister's approval and its publication in the *Provincial Gazette* "at least 30 days before the day named for its coming into operation."

If any coal miner is paid less than the minimum wage to which he is entitled he may recover from his employer in civil action that which is justly due him. This will commend itself to all miners of British Columbia, and, in any event, it cannot be considered otherwise than a step in the right direction, evidencing on the part of the Government an active and direct interest in the question of the remuneration received by underground workers.

Board to Conduct Miners' Examinations

The appointment of a board of examiners "to conduct the examinations in any part of the province of applicants for certificates of competency" is another important innovation. At present this board consists of three coal-mine managers and three representatives of the men from different parts of the province, together with the chief inspector of mines. Its headquarters are in Nanaimo, B. C. Two of the men's representatives are from the Crows Nest Pass coal district, and in the past five years, on one occasion only has one of these representatives been able to attend a board meeting. While provision is made to pay the traveling expenses of those who have to come from a distance, this reimbursement by no means covered the loss of time that trips from various parts of the province to the coast entailed.

The result has been that the board often found it difficult to obtain a quorum. Its duties, too, have been merely of a supervisory character in connection with examinations. It called a meeting, set a date for examinations, appointed outside parties to prepare examination papers, forwarded these on their receipt to the various coal-mining centers, and, having received the papers, duly marked and passed upon by the appointed examiners, forwarded the results to the minister of mines.

It is felt that much of this procedure is useless and besides has had the effect of leaving functions of vital importance in the hands of a few, it being impossible in many instances, as has been shown, for the men's representatives to be in attendance at regularly called meetings. The proposal now is that the new board shall be composed of three members only, one being the chief inspector of mines, as chairman, and two others to be appointed by the minister "one of whom shall be appointed as representing the mine owners and one as representing the coal miners." It will be the duty of

this body, which will be small and by reason thereof able to move easily from point to point if necessary, to conduct the examinations.

The bill makes provision for another alteration in the conduct of examinations of miners applying for certificates of competency. Under the Coal Mines Regulation Act as it stands most of the collieries have their own boards for this purpose, the membership of which consists of a secretary appointed by the Lieut.-Governor-in-Council, a representative of the mine management and a representative of the men.

This arrangement, it is pointed out, was satisfactory so long as there were only a few large operating mines in the province. Conditions, however, are changed. There are now a considerable number of small collieries and, if each of these were given a board to which they are entitled under the act, there might be almost as many members of examining boards as there are miners coming up for examinations monthly.

The situation at the moment is that there are small mines such as that at Telkwa, in northern British Columbia; Coalmont and Princeton in the interior, and Granby and Nanoose on Vancouver Island that are without boards. Consequently, miners applying for certificates to work in any of the latter mines must travel considerable distances in many cases, to take their examinations. Telkwa miners, for instance, must come to Nanaimo; those of Coalmont to Merritt; and those of Nanoose to Nanaimo. In other words, if the method now in vogue were continued, it would be necessary to appoint at least five boards in addition to the nine now organized and some of these would have to be maintained in camps where the number of miners employed is exceedingly small.

Personnel of Examining Board

The board proposed to handle all examinations for miner's certificates of competency will eliminate this cumbersome machinery. Its personnel will be fixed in the same way as that of the board of examiners for "managers of mines, overmen, shiftbosses, firebosses, shotlighters and mine surveyors," except that the "inspector of mines for the district in which the examination is held" will be the chairman instead of the chief inspector of mines. The other two will be named by the minister of mines, one as representing the operators and the other the men. This board will have jurisdiction throughout the province and will move from colliery to colliery at frequent intervals in order to facilitate the issuance of certificates to those who can show that they are properly qualified. This will have the effect of fixing a standard of knowledge for coal mines throughout British Columbia; it will obviate the present difficulty of too much board representation at one point and too little at another; and it will be an added convenience both to the men and the management of collieries.

Another improvement in this connection is that no man will be admitted to a mine to work as a coal miner for a temporary period, pending his examination, as is now allowed. If a man applies for work as a miner and an examination immediately is impracticable he must go before the inspector of mines of the district who, having satisfied himself of the man's qualification, will issue him a temporary certificate. In such cases, however, those affected must go before the regularly constituted board at the first opportunity. The position taken by Mr. Sloan here is that it is a manifest absurdity to allow an uncertificated man to assume the responsibilities of a miner for 30 days without his knowledge being tested, it being possible in that period for an incompetent person to endanger, not only his own life, but that of hundreds of others.

Furthermore such a system, it is considered, will facilitate the control of the practice, where it has been followed, of permitting aliens to work underground. This is a matter on which Mr. Sloan feels strongly and he is confident that, when it is necessary that every man going to work as a miner for any period, no matter how brief its duration, shall prove his qualifications the employment of this class will be effectively checked.

A clear definition of the duties of a fireboss in a coal mine also is given by the amending measure, it being set forth that "the district of a mine assigned to any fireman shall not be of such size as to prevent him from carrying out his inspection duties under this rule in a thorough manner." It has been a standing complaint on the part of men holding this position as well as coal miners generally, that firebosses are handicapped in the faithful discharge of their duties by being required, in addition, to attend to haulage, pumps and various other matters with the result that often their duties at the working face have been neglected.

Defines Duties of Fireboss

It now is to be made law that this official shall "devote his whole time to his inspection duties," the exceptions being only "where the duties assigned to or undertaken by him in addition to his inspection duties are not such as to prevent him carrying out his inspection duties in a thorough manner." It is laid down too that this "shall not prevent the fireman being employed in measuring the work done by persons in his district, or in firing shots in his district, nor shall this provision apply in respect of any mine in which the total number of persons employed underground at one time does not exceed 30." It further is provided that "where any question arises as to whether any additional duties are such as to prevent a fireman carrying out his inspection duties in a thorough manner, the inspector of the district shall decide the question, and his decision shall be final."

One of the most vital of the amendments from the viewpoint of the safety of the mines and of the miners is that which states that, where the mine air in any working place is found to contain more than 2½ per cent. of inflammable gas, it shall be deemed dangerous and the men forthwith withdrawn. The Coal Mines Regulation Act now reads that at any time that the air is found by the person for the time being in charge to be dangerous the miners shall be withdrawn. Thus it is left to the individual judgment of one person to decide what is or what is not the danger point.

This is considered to be too indefinite and to leave too great responsibility on the shoulders of an official. Therefore it is proposed, as has been done in Great Britain, to fix a definite withdrawal point. It may be said, incidentally, that the percentage named as that at which danger commences has been applied by the department of mines, under agreement with the Crows Nest Pass collieries, to the latter coal field for some time.

The succeeding amendment is one which, it is thought, will mean the introduction of safety lamps in practically all the coal mines of the province. Such lamps, it is stated, shall be used, and none other, "in

any mine where the air current in the return airway from any ventilating district in the mine is found normally to contain more than ½ per cent. of inflammable gas." The wording then follows that of the Coal Mines Regulation Act as it now reads to the effect that such lamps must be used in every working approach to any places where there is likely to be found an accumulation of inflammable gas.

In addition to this, provision is made against any possibility of argument or misunderstanding as to how the percentage of gas in mine air is to be arrived at by the following sub-section: "The average percentage of inflammable gas found in six samples of air taken in the air current in the return airway from the ventilating district at intervals of not less than two weeks shall, for the purpose of this section, be deemed to be the percentage of inflammable gas normally contained in the air current."

The provision that "every winding rope shall be given a bath in hot oil before being installed; that every winding rope shall be recapped at intervals of not more than six months, and that no winding rope which has been in use for more than two years or which has been spliced shall be used for raising or lowering persons" no doubt is the direct result of the lamentable accident of last September at Protection Shaft, Western Fuel Co., Nanaimo, when a number of miners lost their lives through the breaking of a cable. The verdict of the coroner's jury, it will be recalled, was that the evidence indicated that the cause of this break was internal corrosion, the primary origin of which was lack of lubrication.

The question of the life of a steel cable is a matter which has been under discussion with no result for many years. Men of the highest technical qualifications have made investigations but no fixed standard as to the life of such cables has been yet arrived at. In Great Britain they may be used for 3½ years so that British Columbia is increasing what is considered an adequate margin of safety in England by 1½ years.

To try and prevent crystallization of chains it also is provided that "all cage chains in general use shall be annealed once at least in every six months, and detaching hooks shall be cleaned and refitted once in every three months."

Minecdotes

"Windy" Thought He Could Fire

Gibbs, the mine inspector, was always good for a story; so when he seated himself comfortably on the bumper of a loaded pit wagon, we knew that he was going to pass something along.

"You know, boys," he began, "that an inspector runs into all kinds of people. Today, I ran across a fellow that was so full of conceit, and so wise, that I offered to sell him my job for a cent. But talking about conceit puts me in mind of a fellow that I knew years ago, in fact I am still acquainted with him. He used to work for the Consolidated at the time when I was assistant superintendent.

"We had an up-to-date equipment in the power house. In the boiler room we had four 150-hp. return-tubular boilers. When we were hoisting coal good and lively it required a pretty good man to hold steam; but fortunately we had just that kind of a fellow, and he always had the pressure up pretty nearly where it belonged.

"There was a fellow dropping in empties under the tipple that we nicknamed "Windy"—and the name was not a misnomer either. Windy was continually pestering the life out of 'Slim,' the regular fireman. He was always telling him just how this and that should be done; how he used to 'burn 'em up' when he was steamboating on the river, and giving him a similar line of bull. He was such a pest that everyone was hoping that he would get the chance to prove his self-proclaimed ability in a practical manner.

"Well, one Saturday, and pay day at that, all the young fellows and a few of the married men wanted to attend a circus at a nearby town, and everybody was going to put forth his best efforts so that we would 'load out' about two o'clock. This would have given us ample time to have caught the local passenger train at 4 o'clock that afternoon.

"As it happened, Slim did not show up at the plant on the morning in question, and as I was temporarily in charge on account of the superintendent being on a vacation, I put Windy in the boiler room. And since he was more or less familiar with the duties that he was supposed to perform, no one gave him any particular attention.

"Everything went along about as usual until near 8 o'clock. It took 'Fat,' the hoister, about that long to warm up. When he did—well, he made that pair of hoisting engines eat steam. I had been pretty busy that morning and had forgotten all about Windy, when Fat gave my call on the signal whistle. When I poked my head into the hoistroom, Fat was sitting on his stool taking things easy. He pointed to the steam gage and nodded toward the boiler room—60 lb. of steam, blocked out on the bottom with loads, and top of this that bunch of men thinking of that circus.

"I went into the boiler room and tried to open the first firedoor that I came too. It was hotter than blazes, as were all the rest of them. Using a shovel, I got some of them open; the fires were banked on the dead plates and front of the grates clear up to the boiler shell, and the heat was terrific.

"What in the thunder is the matter?" I asked Windy. "I thought that you could fire boilers?"

"Fire!" he exclaimed, "of course I can fire, did you ever see a hotter fire in your life? Say, man, if these old kettles had any draft I could burn 'em up."

"Well, I fired Windy out of the place, bag and baggage, for the boys would have mobbed him after his getting us in such a mess as that. However, with the help of the oiler, we got things started again, but we didn't load out until about quitting time. Windy left the camp and it was a long time before I saw him again. He is still full of conceit, the same as always."

"Where's he at now?" asked Williams, the boss hauler

"Oh, that is the fellow that I ran into today up on 2d East entry, the fellow that I offered to sell my job to for a cent," answered the inspector.

Modern Shaft Development of the Consolidation Coal Company—II

By George W. Harris
Editorial Staff, *Coal Age*

THE underground development at the No. 87 mine is entirely in keeping with the surface improvements—nothing for show but everything substantial and carefully thought out. In this connection the comment of a progressive coal man comes to mind—he always endeavored to secure the best talent he could find to fill the position of mine boss. On the surface all was open to the light of day, but underground there was infinite opportunity for leakage and it was considerably more difficult to keep track of matters—the running of the whole plant is affected by the movement of coal to the shaft.

In a section with a topography like West Virginia the first consideration in locating a mine opening is to place it so that the tipple taking the coal from it can be reached by a railroad. In the case of mine No. 87, the location of the shaft being decided upon, the layout of the mine came up for consideration.

The faces and butts of the coal determine the course of the entries. The face headings and rooms are on the line S 12-30 W, and the butt headings are S 77-30 E or the reverse—N 77-30 W. The next important consideration influencing the layout of the mine is the location of old and new gas wells—it is necessary to have the mine workings miss them all. An adequate pillar of coal must be left around each well, the size of this pillar being determined by the amount of cover over the coal at the well. The Consolidation company has adopted the following rule governing this matter:

Cover	Size of Block of Coal
200 ft. or more	200 ft.sq.
200 to 100 ft.	Decrease 1 to 1
100 to 20 ft.	Decrease 1 to 2

For example:

225 ft. cover requires a block 200 ft. square
165 ft. cover requires a block 165 ft. square
100 ft. cover requires a block 100 ft. square
80 ft. cover requires a block 90 ft. square
50 ft. cover requires a block 75 ft. square
20 ft. cover requires a block 60 ft. square

It was decided that no protecting block should be less than 40 ft. square and none more than 200 ft. square.

A number of gas wells are located on the map of the territory to be covered by mine No. 87, some of them being shown in Fig. 9. Here the protecting pillar of coal is outlined. The proper protection of these gas wells is a matter of interest to coal operator and gas well operator alike, and coöperation between these two interests is the rule. When a gas well is to be drilled both parties discuss the situation and its final location is determined after consultation. Its exact location is then noted on the maps by the engineers. The Pittsburgh seam at this mine runs from 7 to 8 ft. thick and is reached by the main shaft at a depth of 482.5 ft. The main shaft bottom is shown in perspective in Fig. 7 and in plan and profile in Fig. 8; the top rock was taken down on either side of the shaft and the top and sides were concreted for some 115 ft. with a clearance over the rail of about 15 feet.

It is an exceptional shaft bottom. There is ample room for all operations—the handling of cars and materials. A 34-ft. rail can readily be transferred from the cage to the workings, a result greatly facilitated by the height of the top and its shape at this point. A free use of whitewash and electric lights decrease the chance of accident and increase the speed of handling cars at the bottom. The method of car movement at this point is shown on the plan and profile, Fig. 8, which notes track grades and the disposition of machinery. A car feeder (made by the Fairmont Mining Machinery Co.) moves loads to the scales, where they are weighed, after which a 3 per cent. grade handles them to a Lepley automatic car cager (made by the Connellsville Manufacturing and Supply Co.) which places



FIG. 7. MAIN SHAFT BOTTOM OF NO. 87 MINE

them on the cage at the right moment. On the empty side of the bottom favorable grades handle empties to a car pusher which facilitates the making up of trips for the motors.

Before going into mine No. 87 a person can notice signs placed at critical points about the plant which read, "Be Careful Here"; workmen and others are cautioned to be on their guard at possible danger points. On alighting from the cage at the main shaft bottom, or when attending to the many duties about this spot, men are again confronted by the same good advice. On one wall facing the shaft is the notice "Safety First," as shown in Fig. 7; on the opposite wall on the other side of the shaft has been painted "Be Careful." This should be the most active spot in the whole mine, and danger signals can be made prominent here to great advantage.

The details of railroad yards are matters of grave

concern to the management of transportation systems, for here trains of loads and empties are made up and congestion at this point cripples the efficiency of the railroad. There is greater necessity to plan an underground yard carefully at the start than one on the surface, for mine tracks cannot always be changed at will. When a mine is once opened up and entries driven, the pillars of those entries around a bottom are required to protect the shaft and should not be weakened by extensive changes in plan. The No. 87 mine development is given in Fig. 9; the heavy lines indicate the opening on Dec. 21, 1917, and the light lines the projected extensions. The main development of this mine is planned to go to the north, east and west, and the coal is to be worked out on the room-and-pillar panel method developed on the block system.[1] The mine was projected to follow the plan shown, but conditions may be such that fracture lines will be reversed when robbing starts.

The development, as shown in Fig. 9, was not simply a place to secure coal; a number of conditions influenced

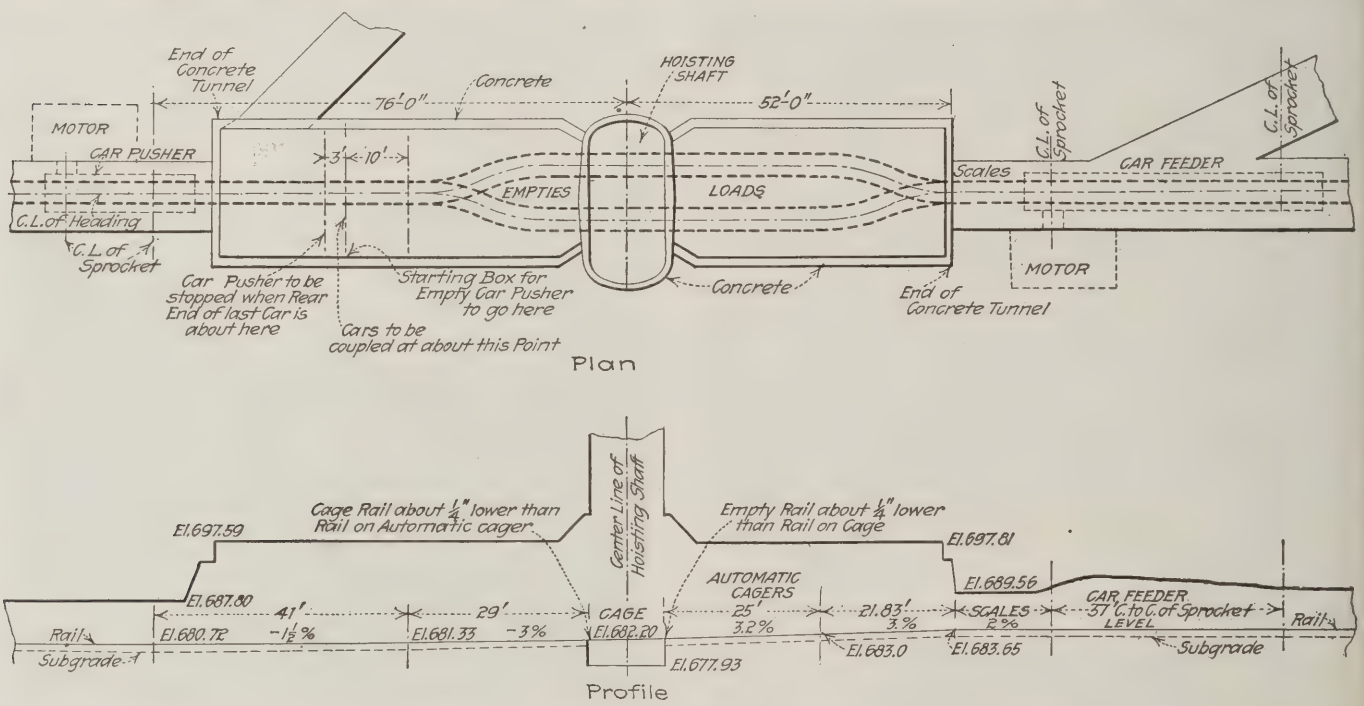


FIG. 8. PLAN AND PROFILE OF THE SHAFT BOTTOM AT NO. 87 MINE

the mine layout, as previously noted. Furthermore the mine was opened up so as to have as much room in the intake as in the return. It was thought that at least seven intake entries should be planned; with an entry cross-section of 6 x 10, this would give a total area of 420 sq.ft.; it would permit a capacity of 420,000 cu.ft. of air per minute for the seven entries, with a velocity not greater than 1000 ft. per minute. It was not desired to have a great excess of air, as it would tend to dry out the mine, but sufficient area was planned to allow for falls of rock in the main air courses and still have an adequate area. Provision was made so that two or more additional entries could be driven if a larger volume of air was found necessary and still not interfere with the present development.

When the No. 87 plant was opened up the intention was to pull the loaded trip direct to the shaft bottom, but on account of adverse grades encountered the trips are pulled past the shaft and backed in to it. The grades shown on the profile, Fig. 8, required little grading to establish them; it would have been impracticable to have reversed them, placing the loaded siding where the empty tracks are now and vice versa.

A person will be rewarded by a study of the mine map, Fig. 9, with information regarding the method of development, an idea as to lines of haulage, ventilation, and so on. The course of the air current is indicated by arrows. In a number of instances where two intake airways cross return airways, and crossovers are required, then the intakes are merged into a single opening of enlarged area to save the expense of making two concrete crossovers.

The successful transportation of coal underground depends on good tracks and rolling stock much the same as on the surface. As contributing to serviceable tracks it is planned to use 60-lb. rail on main haulage roads, 40- and 30-lb. on butt entries, 30-lb. on some rooms and 20-lb. on the rest of the rooms. The motive power is to be 10-ton General Electric locomotives on main lines and Goodman storage motors with Edison batteries for gathering cars.

Power is taken from the surface down the shaft by cables which are suspended in fiber conduits. The conduits were placed in the concrete lining of the air shaft when it was concreted, additional conduits being provided at the time to be available should extra cables be required later. These conduits were furnished by the Fibre Conduit Co., of Orangeburg, N. Y. Good transportation of coal is further strengthened by the types and number of mine cars used. Here a 3-ton mine car with iron sides and ends, and wood bottom, made by the Fairmont Mining Machinery Co., is used; Enterprise Foundry and Machine Works (Bristol, Tenn.) roller bearings are employed.

The coal is undercut mainly by Goodman breast min-

[1] A description of this system was given in the Dec. 26, 1918, issue of *Coal Age*, under title of "The Consolidation Coal Company."

ing machines, although a few of the shortwall type are used. All mining machines are driven by inclosed, explosion-proof, direct-current motors. The company is experimenting with a coal drill made by the Fairmont Mining Machinery Co., the drill being mounted on the motor case of the mining machine; this drill readily can be taken off when it is not in use, and it also has an explosion-proof motor. The mine is unwatered as follows: A number of small 2-hp. Fairmont No. 1 portable pumps mounted on a truck and driven by a small motor gather water from local dips and deliver it to a main sump; from this point the water is pumped to the surface by a four-stage, 100-hp., 2300-volt induction motor-driven centrifugal pump.

On coming over the hill from Carolina, or mine No. 86, toward Ida May, one would see the latter town spread out before him as shown in Fig. 1 (see first installment of this article, page 480, Mar. 13, 1919, issue of *Coal Age*). The most prominent features in this scene are the plant around the two shafts toward the left, the store in the immediate foreground, the tipple and the long rows of miners' houses on the hillsides and ravines. Among these latter are the homes of the local officials of the company, in the foreground at the right. In the foreground in the center is the basement of what will be a new school, whose completed outlines are shown in Fig. 10. It is a town with great possibilities, and the company's plans call for improvements which will furnish an incentive for the better class of men to bring their families to this town and make their permanent homes there.

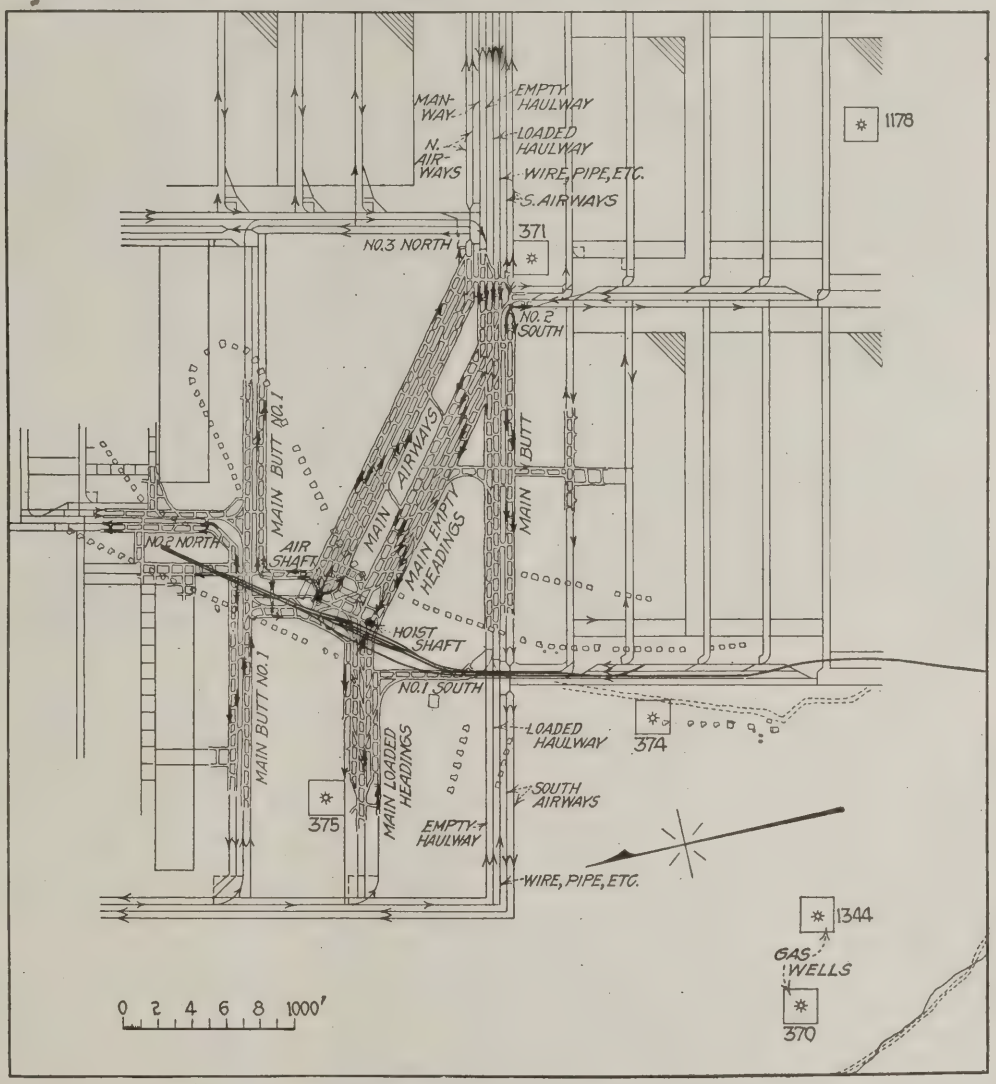


FIG. 9. DEVELOPMENT AND LAYOUT OF NO. 87 MINE

There are several types of houses in the Ida May town, from the three-room single house to the larger double one. However, all are piped for water and natural gas and wired for electricity. A pure water supply is furnished the population of this mining town and sanitary conditions are further looked after by a comprehensive drainage system, which conducts waste water from each home to the creek by which it is carried off. A dozen or more homes have fully equipped bathrooms; they include the superintendents' and doctors' houses, six 6-room cottages and five 5-room houses. These buildings are shown at the extreme right and left in the foreground of Fig. 1. The water supply for the town comes from Taggarts Valley River and is furnished by the Monongah Service Co. A reserve supply is maintained near the town in three tanks on the tops of adjacent hills; a water pressure of 125 lb. is thus maintained and can be fed to boilers when the steam pressure is slightly below water pressure.

Of almost equal importance to an adequate and pure domestic supply of water is up-to-date means of handling waste water. Open drains generally conduct sewage from the miners' homes at this town to main drainage lines which finally empty into the creek; catch basins are built at points where they are required and glazed pipe carry the main sewage system under roads. The type of plumbing installed in all the company's houses is simple, with 4-in. connection to the drain. The open drains seem to be working out satisfactorily and are simple of construction. At the houses they consist of a 3-brick section; a brick at the bottom is laid lengthwise of the drain and one brick at each side forms the slopes; the latter are set with the length at right angles to the bottom line of brick. To protect the drain against disturbance from frost, the ground is excavated to a depth of about 10 in. below grade, then a foundation is built of 6 in. of broken stone or cinder, on top of which is placed 4 in. of concrete; the surfacing brick are set in this concrete. Main open drains are similarly constructed, but with a larger cross-section and foundation. Cement finds free use in and about mines today. At Ida May the top soil contains considerable clay in places, and those who have encountered this ob-



FIG. 10. ARCHITECTS' DRAWING OF IDA MAY SCHOOL

stinate impediment to foot travel in the country at certain seasons of the year should rejoice with those who have cement sidewalks. Such walks are planned to be laid on the principal streets of Ida May, connecting the houses with the store and other parts of the plant; a good beginning has been made in this direction. A 4-in. sidewalk is built of a 1:2:4 mixture on a foundation of 10 in. of cinder.

This town is lighted by a modern series street lighting system, including pipe bracket fixtures, porcelain enameled reflectors and Mazda incandescent lights. A time switch is installed which automatically turns on the light at dusk and extinguishes it at dawn. A "white way" has been established in the center of the plant by the use of two floodlights so placed in the vicinity of the tipple on high poles that a considerable section is well illuminated. New possibilities for lighting large outdoor areas have recently been brought about by the use of floodlights with high power (tungsten) lamps. The type of installation, according to the *Railway Review*, must be carefully selected to suit each individual case, and whereas flood lighting has recently come to the front as an economical means of lighting large areas, it must be used correctly to be effective. It has been used recently for protective lighting to enable watchmen to detect trespassers; under favorable conditions it is said that a 400-watt floodlight will show up a man in dark clothes at a distance of a thousand feet. This system is economical in quantity of current required, in cost of installation and in maintenance. It is not so new as to be an innovation, and yet it is not in such general use as it may become in the near future. Such lights are furnished by the Crouse-Hinds Co., of Syracuse, N. Y., and the Western Electric Co., of New York.

Natural gas is a boon to the domestic user of this convenient form of fuel, although it seems something like "carrying coals to Newcastle" to pipe fuel to a community living around a coal mine. Four-inch gas mains are laid all around the town of Ida May and connect with the gas wells of the Monongahela Valley Traction Co. The 6-in. water mains not only furnish a supply of water for domestic purposes, but also make possible adequate fire protection to the town. At every sixth house along a street there is a hosehouse in which there is a reel of 250 ft. of hose. This length of hose covers half the territory between fire plugs, and with an ample head and supply of water this equipment should do good service in emergencies.

A large proportion of the population about many of our coal mines is often foreign-born, as witness the make-up of the employees at mine No. 87, which includes: Italians, 22; Hungarians, 35; Poles, 7; Croatians, 4; Russians, 2; Spaniards, 2; or 72 out of a total of 187; the remaining 115 being made up of American white, 75; and American colored, 40. There is every reason why the children of this foreign-born element should be properly educated and also that the parents should be Americanized. The Consolidation company does not neglect this great opportunity and provides or assists in the maintenance of educational facilities at its mines, many of which compare favorably with city schools of like grade. A view of the Ida May school now building is shown in Fig. 10. In the basement of this building there will be three rooms for manual training, domestic science and gymnasium work respectively; on the first floor there will be two rooms for the regular schoolwork, one of the rooms having folding doors so that it can be used as a double room when necessary. The school will be heated by gas stoves. It is a substantial brick fireproof building of pleasing appearance.

Improving Recreation Facilities

A nearby store at which the employees can trade is a practical necessity at Ida May; the building, which is shown in Fig. 11, houses the various departments of the store and office at this new town. An interior view of this store is shown in Fig. 12. This company has over forty stores in the various districts in which it is operating, and prides itself on the advantages it thus offers to its employees. The recreation features of the Ida May community are under development. One of the original houses on the property before improvements began has been fitted up as a temporary recreation building; pool and billiard tables have been placed in it and it is also used as a general lounging room. Plans have been made for a new building which will include facilities for many forms of indoor amusements. This company has built extensive recreation halls at several of its operations remote from large towns; several of them have a theater where some of the best moving pictures are shown. In season outdoor sports are encouraged. The local baseball team has a fine diamond on which to practice, and it improved the opportunity to such an extent that it won the championship for three counties during the past season—21 games were won and only four lost. All the men on this team are employees in the No. 87 mine. An illustration of this team was shown on page 57 of the Jan. 9, 1919, issue of *Coal Age*.



FIG. 11. CONSOLIDATION STORE AT IDA MAY

The official family responsible for the smooth running of mine No. 87 includes C. H. Tarleton, manager of the West Virginia division of the Consolidation; W. J. Wolfe, superintendent of both Ida May and Carolina; William McMahon assistant superintendent; C. H. Shear, outside foreman; O. L. Bush, pitboss, and J. E. Jeffries, chief clerk. In addition to those noted previously in the text of the article, the following have placed the stamp of their individuality on this plant:



FIG. 12. INTERIOR VIEW OF FIRST FLOOR OF THE IDA MAY STORE

The Allen & Garcia Co., of Chicago, Ill., designed and erected the tipple, and the machinery was furnished for the tipple by the Fairmont Mining Machinery Co., of Fairmont, W. Va. *Coal Age* is greatly indebted to the Consolidation officials and to the designers of the plant for information, photographs and drawings which were used in the description of an operation which possesses features of unusual interest.

Treatment of Acidulous Feed Water for Steam Purposes

By E. A. Reilly
Pottsville, Penn.

In the treating of water for steam purposes, whether it be only slightly impregnated with organic acids or strongly acidulous with mineral acids, it is recommended that soda ash or caustic soda be used in their neutralization. The use of soda ash is preferred because it is less difficult to handle and will give practically the same results as caustic soda. Any water that is properly treated with either soda ash or caustic soda can be used in boilers without any corrosive effect, either on the boiler shell or on the tubes. It is the opinion of many that the addition of caustic soda or soda ash to a water will cause it to have a corrosive effect on the tubes of the boilers, and make them leak. This idea is absurd and untenable, arising as it does from an unreasonable theory.

The only reason for having leaky tubes from a water that has to be treated with an alkali is that an insufficient amount of the alkali is being added to the water to neutralize its acidity; or it may be that the tubes contain sand spots, or small holes that have been covered over by scale or oxides of iron, and the alkaline water coming in contact with these will have a tendency to loosen such scale from the tubes, causing them to leak. This, in no way, can be blamed to the use of the alkali, as the tubes were defective before the use of the treated water was started.

An idea of the process of treating an acid water for use in boilers might well be given here. First, the amount of water used per day (24 hours) must be known; secondly, the acidity of this water is determined, and from this acidity is calculated the amount of alkali required to neutralize the water. After learning how much alkali is needed for every 10,000 gal., or whatever amount of water the supply tank holds, the alkali is dissolved in warm water and added to the water in the supply tank. The whole is then thoroughly mixed and then tested to see whether it is properly treated.

After the water is properly treated, it is run off into settling tanks and allowed to stand until the precipitate settles; the clear solution is then decantered and is fit for boiler use. Before the water can be said to be properly treated, it should show Na_2CO_3, $NaHCO_3$ or NaOH. It might be mentioned that the foregoing directions apply to the treatment of a mine water, the occasion for which occurs seldom. Waters that are only slightly acid in nature can be treated by the addition of a small amount of alkali (calculated) in three portions at different times of the day. This may be dissolved in warm water and injected either into the tail pipe of the pump or into the supply tank. This will give quite satisfactory results and will be less expensive than other methods in use.

To show that waters of strong acidity, after having been properly treated, can be used without causing trouble, a few examples will be given. One water before treatment showed: Total solids, 384 parts per million; total acidity as sulphuric acid, 44 parts per million. The same water after treatment showed: Total solids, 499 parts per million; alkalinity as $NaHCO_3$, 168 parts per million. The use of this treated water in the boilers gave satisfactory results; but if the water had not been properly treated, trouble from leaky tubes would have been experienced. This, in the opinion of some, no doubt would have been attributed to the use of the alkali, whereas the real trouble would be due to some of the acid remaining in the water and going into the boilers.

As another example of the use of acid water which gave no trouble after having been properly treated the following is given: Before treatment the water contained a total acidity as sulphuric acid of 461 parts per million. As can be seen, this was a very bad water, but after treatment it was used with good results.

A third example is the following: Untreated water, total acidity as H_2SO_4, 894 parts per million; total solids, 3655 parts per million.

This water, while very bad, was successfully treated with soda ash and no trouble from corrosion was experienced. The treatment required about 68 lb. of soda ash per 1000 gal., showing that the water finally contained a large amount of sodium salts.

When a water such as this must be used, blowing off of the boilers and cleaning as often as possible is a necessity. When the boilers are pushed too hard, and a water like that mentioned above is to be treated and used, foaming may occur, this condition being due to the large amount of dissolved salts in the water and to the overworking of the boilers. This will not, however, cause corrosion. As this article only intends to deal with the corrosion end of feed water, the foaming of waters will not be taken up.

To make the effect of acids and alkalies clearer to those who have any doubt about the corrosion of iron by soda ash, or caustic soda, the results of a few practical tests will be given. These tests were made on iron strips of the same constituents as that of which the boiler tubes are made.

Water No. 1

Carbon dioxide (CO_2)	2 parts per million
Calcium carbonate ($CaCO_3$)	5 parts per million
Methyl red	Alkaline

From this water there was a slight corrosion.

Water No. 2

Carbon dioxide (CO_2)	2 parts per million
Calcium carbonate ($CaCO_3$)	3 parts per million
Methyl red	Acid

From this water there was a pronounced corrosion of the iron.

Water No. 3 (treated with soda ash)

Sodium hydroxide (NaOH)	16– 4 parts per million
Sodium carbonate (Na_2CO_3)	784–85 parts per million
Methyl red	Alkaline

This water was noncorrosive.

Water No. 4 (treated with caustic soda)

Sodium hydroxide (NaOH)	424–92 parts per million
Sodium carbonate (Na_2CO_3)	424–11 parts per million

This water was noncorrosive.

Water No. 5 (treated with soda ash)

Sodium carbonate (Na_2CO_3)	11 parts per million
Sodium bicarbonate ($NaHCO_3$)	8 parts per million

This water, after a long test, showed but the faintest signs of corrosion; that is, it showed corrosion by giving it the benefit of the doubt.

This water, it might be said, was just about alkaline.

Water No. 6 (untreated)

Carbon dioxide (CO_2)	Trace
Calcium carbonate ($CaCO_3$)	5 parts per million
Methyl red	Alkaline

This water was corrosive, though only containing a trace of weak acids.

Water No. 7 (untreated)

Total acidity as sulphuric acid (H_2SO_4)	1,588 parts per million

This water resembles a mine water and had a most active reaction on the test piece.

From the foregoing tests, it can readily be seen that acidulous waters to be rendered noncorrosive must be treated with an alkali, and by using an alkali the waters will not have a corrosive effect on the tubes or on the shell of the boiler.

To those who do not use methyl red as an indicator in water purification work, I recommend its use for determining the nature of a water as far as corrosiveness is concerned. With this indicator one can learn whether there are acid salts in the water, which are highly corrosive agents, and which must be neutralized by an alkali.

Orient Mine Smashes All Records for an Eight-Hour Hoist

There is a race on between the American Coal Mining Co. at Bicknell, Ind., and the Chicago, Wilmington and Franklin Coal Co.'s Orient mine in Franklin County, Illinois, for the honor of making the largest hoist of coal in an eight-hour day. The last high record of the American mine was 6128 tons in eight hours, which is of course a wonderful record for a single-car self-dumping cage.

The Orient mine on Mar. 5 hoisted 6422.20 tons of coal in 1401 dumps. The hoisting time totaled 7½ hours, the approximate length of hoist being 570 ft. On Mar. 6 the same mine hoisted 6776.75 tons in 1502 dumps. The hoisting time was eight hours, only eight minutes being lost during the day.

During the month of February the Orient mine averaged over 5200 tons per working day. This mine also steadily increased its output during the war when other mines in the same field were losing tonnage due to labor shortage and other troubles. The operation is remarkably efficient and the fine results are due to the well-directed efforts of the management—G. B. Harrington, president; T. F. Holmes, general superintendent, and Joseph Louis, mine superintendent. Not the least factor in the record hoists is the splendid coöperation of the employees.

TO FACILITATE THE BURNING of the finer particles of anthracite coal and coke, mixtures of these fuels with bituminous coal have been tried. In this connection it has been found that non-coking bituminous coal is considerably inferior to the coking variety. The coking coal is better adapted to this use on account of the coal fusing at a comparatively low temperature; the particles of culm are taken up by the fusing coal and a homogeneous mass of fuel formed which burns uniformly. Tests show that a mixture containing 30 per cent. of culm, or coke, and 70 per cent. of coking bituminous coal produces the best results in burning.

Will Wages and Prices Remain Stable?

By Arthur F. Rice
Commissioner "Coal Merchants' Association, Inc."
Room 608, 90 West St., New York City

IN THE issue of *Coal Age* of Mar. 6 appeared an editorial entitled "A Clever Augur Can Find Whatever He Will." The writer of that editorial takes issue with me relative to my prophecy that there would be a reduction in the price of coal. As I had good reasons for the opinion I offered, I make the following statement, which explains why I have taken the stand which the editorial criticized.

First let me say that I prefaced the remarks to which the editorial refers by saying that he would be an optimistic man who expected these downward changes to take place at once. It is undoubtedly true that prices for the essentials of life must be lowered before there can be a substantial decrease in wages. I realize that when labor has made agreements with employers, those contracts must expire before new wage scales can be made effective. Employers must keep their promises even if labor does not.

We have seen an instance of the irresponsibility of labor in the boatmen's strike in New York harbor, where the men absolutely agreed to abide by the decision of the War Board and then coolly repudiated that contract. Such contract breaking does not in the long run help labor, and capital is not likely to imitate it. Even labor cannot continue to treat an agreement as binding when favorable and as a scrap of paper when unfavorable.

However, the anomaly of unemployment and contemporary high wages never had a long run. The law of supply and demand may not work quite so suddenly as the law of gravity, but it works just as surely, irrespective of what anybody wants or thinks.

For reasons which have seemed good and sufficient to the present administration in Washington, labor has had anything and everything it wanted; and there appears to be no present limit to this Government subservience. However, giving too much candy to children is likely to make them sick, and too lofty flights result in the most fatal falls. I fail to find in economic history any instance where, with two men for every job, one continued to get double pay while the other got nothing. Even unionized labor cannot lift itself over a fence by its boot straps.

When the editorial states that "prices of materials will not decline and wages will remain where they are," it expresses a conviction that is not borne out by the facts of commercial history; in fact, the prices of many commodities are already coming down—for instance, copper, which was selling at 26c. is now around 15c.; the other metals are on the same downward scale. To a huge surplus of wheat another tremendous crop is about to be added, and cold-storage warehouses are bursting with pork and beef. The only way to make money is to sell goods and produce more goods, and if the supply exceeds the demand, the remedy lies not in high prices but in lower prices, Mr. Hoover to the contrary notwithstanding. His prediction of $3.50 wheat is the "phantasmagoria of a diseased imagination." When you throw a stone out of the window and it goes up instead of down, you may then believe that prices in a heavy and glutted market will rise rather than fall. Anyhow, I will stake my judgment against that of the writer of the editorial that before the appearance of the April issue of *Coal Age* building materials and a lot of other commodities may be easily bought at lower prices than those prevailing today.

A reduction in living costs will render a reduction in wages logical even if not, at present, practicable; and a reduction in wages and materials which enter into the cost of producing coal would enable many an operator to make a profit where he now claims to be taking a loss. The editorial takes the ground that "it is just as well that the high level of wages remain stabilized," which necessarily implies that the high prices for coal shall also continue; but there I take direct issue, having in mind solely the good of the business itself for the immediate future.

Speaking of anthracite alone, and with especial reference to the steam sizes, the prices have been too high to enable this form of fuel to successfully compete with gas, electricity and soft coal, and they are too high here today, notwithstanding the fact that the retail dealers in New York, on the day after the Fuel Administration went out of business, reduced the prices on an average of 35c. a ton and now seriously contemplate making them lower. With gas at 80c. and gas stoves being practically given away, with the electric companies making a systematic (and successful) campaign to get their current into hotels and office buildings, and soft coal and coke in abundance at constantly falling prices, what can the ultimate outcome be, except a huge and permanent loss in anthracite tonnage? There is, in my estimation, but one way in which these tremendous inroads upon the business can be stopped, and that is by lowering the prices on anthracite steam coals, with the added proviso that their preparation be so improved that they may contain a lot more British thermal units and vastly less slate and dirt. The editorial says, "let us pin our faith on facts, not on visions"; and so say I. But let us be mighty sure about our facts! nor forget that a little "vision" and foresight are as essential in the coal business as in any other. A temporary loss of profits is bad enough, but the permanent loss of business is much more serious.

Anthracite culm, slush or silt contains approximately 70 per cent. of combustible material. For some time experiments have been conducted by the large anthracite companies to reduce the impurities in this material to a point permitting of transporting it to a distance. Some of the devices employed in bituminous washeries have been successfully used in anthracite operations. Recently, concentrating tables such as are used in metal mining have been discussed and experiments are about to be tried as to their efficiency in the preparation of smaller anthracite sizes.

Extending the Coal Operator's Field for Profits

By George H. Cushing
Managing Director, American Wholesale Coal Association, Washington, D. C.

AN EDITOR of a daily paper overheard one of his reporters delivering an oration to his fellows. It was vigorous to the point of being vicious. He was overworked, he said, because the management was unfair. He pictured everything was going to the demnition bow-wows. At the conclusion of the diatribe, the editor said quietly:

"My boy, sometimes you talk as though you had a hair in your mouth."

Then he called the reporter into his office and said:

"I am glad to hear you talk that way. It doesn't prove, as you claim, that the paper is going down hill or that the management is bad. It merely proves that you have become discontented because you have outgrown your present job. It is time for me to give you a promotion."

Then he inquired patiently into the young man's ambitions. Before the week was ended, he had satisfied them. This is a true story. I know it is because I was the reporter.

The Coal Industry Wants a Change

The coal trade these days talks as though it had a hair in its mouth. It condemns everything which was, is, or is likely to be. It is not satisfied with anything. It wants a general change. According to the old editor's philosophy, that is a hopeful sign. It is an indication that the trade is dissatisfied because it has grown. It indicates that it needs a promotion. That being true, it is high time to discuss quietly the trade's ambitions to see whether they can be satisfied.

Frequently today one hears it said that coal should be under one control from the face to the smokestack. That is, the man who produces it should wholesale and retail it.

That is a good idea—if it can be carried out. It is a good idea because it rests on the theory that no industry is ever really profitable until it reinvests its money several times and, thereby, comes to get a profit on each process in the business.

To put it another way, it means that there should be a profit on mining, a profit on wholesaling and a profit on retailing. The operator, therefore, having made a profit on mining should reinvest it in wholesaling. When he has made a profit on both mining and wholesaling, he should reinvest it in retailing. Thus, in the end, he would come to have three separate profits on the original investment. In the end, therefore, he would have a business three times as profitable as it was in the first place, but without inviting any new capital into his enterprise.

You may multiply this process *ad libitum* by saying that the operator should also invest part of his profit in a coking plant. This starts another pyramid. That is, having a profit on mining and on coke making, he might reinvest that in the development of byproducts. This latter expansion can go on indefinitely.

The theory is perfectly sound because it has been worked out in other lines. That, in fact, is exactly the foundation of the fortune of John D. Rockefeller, who treated oil in that way and made therefrom America's greatest fortune.

It was precisely the same theory which constituted the foundation under the great department stores. Also, it is the foundation under the packing business. There is therefore no need to justify the theory. It is the established truth of business that the reinvestment of earnings assures larger earnings—if each department of the expanded business is independent of the basis department, and if each department makes a separate profit.

Before coal can launch successfully upon any such an expanding program, a few vital preliminaries must be attended to. The most important of these is to establish the essential distinctness of the operating functions, the wholesaling functions, the retailing functions. As a natural corollary, it must be recognized that since each has its separate capital, service and expense, there should be a profit commensurate thereto. We must come not only to the theory of three profits rather than one on the coal business. We must deliberately set out to make each department actually profitable. That is a condition precedent to the success of any such an expanding venture as the coal men now propose. In a word, the operator does not want to reinvest his mining profits in either wholesaling or retailing until those departments are profitable. To do so would be only to make money in one way to lose it in another. Thus, the best thing to do is to make these other departments profitable, to pave the way for a safe reinvestment of mining profits.

May Bite Off More Than It Can Chew

There is necessary another quite important preparation for any such an expanding program. Before the mines generally dare launch themselves upon any such an enterprise, they will want to be reasonably sure they can finish what they start. Otherwise they might find themselves in the position of the hopeful son who went forth one evening to propose marriage to a girl and took out a license first.

That is, if the operator is going into the wholesaling business, he must first make sure of enough tonnage to keep his wholesale organization busy. Along this line, I often recall the sound advice of a minister of the gospel, to wit:

"If you are thinking of marrying, there are three necessary preliminaries—good health, a visible means of support and a girl."

So, if the mines are to venture beyond the zone of production into wholesaling, they want to be sure that they have the tonnage, the money to finance the deal and the market.

Going back over the history of the trade, a few conspicuous cases will develop an important truth or two at which the coal trade has arrived as a result of broad experience.

At first the Pocahontas operations were small,

naturally. They could not sell their own coal so they entrusted the selling of it to a wholesale concern. After a while, it became apparent that the wholesale company was making more money from its efforts on all of the coal than was any producer from operating his mine. This didn't seem quite the thing to encourage.

In the meantime, each producing unit was growing. Some grew through natural expansion. Others through consolidations of individual mines into good sized companies. After a few years of that sort of thing, the operators decided to break away from the wholesaler. The enlarged mining companies decided to undertake the selling end of their business. Thereupon, they had the choice of two methods: They could buy out the merchandising concern; or, they could establish their own sales organization.

The decision along the latter line was made for two reasons: First, in a central selling syndicate supported by a number of mines which are financially independent of each other, it is hard to convince each operator that when business is poor the orders are being equitably distributed. Second, each company in that field had grown to a point where it produced a tonnage big enough to justify it in maintaining its own selling organization. The lessons learned by that experience are that small mines must depend on wholesalers. But they naturally break away so soon as they are independent of that agency which helped them to grow. This seems a harsh doctrine, but it is obviously the law of business.

Centralization of Sales and Distribution

Originally, as is commonly known, the mines now embraced in the Consolidation Coal Co. were controlled by a diversified ownership. Some mines were quite small and had to depend upon wholesale merchants for a market. Others were somewhat larger and were struggling to maintain their own sales organizations. It was decided, finally, to try to sell all of the Fairmont coal direct or without the aid of wholesale merchants. Thereupon arose the old question: "How can we centralize sales and satisfy the producers that orders are equitably distributed?"

The answer to that question was: "Consolidate the companies which control the mines and thereby get into one organization an annual tonnage big enough to support a separate selling organization."

This was done. After a little experience, the management learned two things which enabled it to adopt a distinctive policy for this concern. These two things were: First, the major portion of its tonnage was sold to the steam and gas trade. This coal had to be sold but once to put it into the hands of the ultimate consumer. There was little need—when the tonnage was large—to ask for help in selling this coal. Second, a very small percentage of the tonnage, relatively, was moving to the retail trade. And this coal was sold in such a restricted area, it justified that company in the ownership of retail yards. That is, only a few yards were needed to distribute this retail coal. Therefore, the producer's investment in retailing was not out of proportion to his business.

The lessons from this experience are: A central selling organization is safe when the mines which feed it are consolidated. A producer can safely retail his own coal when his tonnage in a given locality is large enough to support a retail yard.

The Pittsburgh Coal Co. is another example of the same kind of an experiment; and the development of its business has been along almost identically the same lines, with almost identical results. Two experiences are more convincing than one. But they become a safe criterion only to those facing similar situations—namely, a large volume of steam coal going to highly specialized use and a volume of retail coal moving into a few big centers.

A fourth and a far more complex example of direct selling comes in the case of the mines in Franklin County, Illinois. The area under development there is relatively small. At first the number of separately owned producing companies was relatively large. The coal from these mines was sold over eighteen states. On these various accounts, it was a financial impossibility for a single mine, with relatively a small tonnage, to sell its coal profitably at wholesale by its own agents over those eighteen states.

Even to think of each mine putting its own retail yard in each one of the cities in each one of those states to handle that coal was so far out of the question as never to have entered the mind of any producer. The investment in the requisite retail yards would have been immeasurably larger than the total investment of all mines in the producing district.

After about five years of discussion, however, it was finally decided to consolidate some of the mines in the Franklin County field. The result was one large company with a producing organization yielding a big enough tonnage to warrant it in wholesaling its own coal over its entire market. But even this experiment was not financially justified until competition had been limited by the sale of most of the other mines to concerns which had need for all the coal they could produce and which, accordingly, would have no commercial coal for sale.

An Instance Pertinent to the Discussion

This case is quite important to this discussion for this reason: This company has about 6,000,000 tons of coal per year to sell. It is making a success of selling it over eighteen states. That being true, the sweeping decision is likely to be that a company with a tonnage of 6,000,000 annually can safely decide to sell its own coal over all of its own market, no matter how big that market may be. Before any such sweeping decision is made, I advise the coal men to take seriously into account the fact that this producing company is fortunately situated in that its principal competitors have been absorbed by steel mills and other companies which use all the coal they can produce. The conditions are so unusual they are not a safe criterion.

Even when a company is so fortunately situated, it is a big question whether it can afford to venture into the retailing field to market its own coal to any great extent. It will be well to examine the figures.

For easy figuring, we will say that the production of that field is now 20,000,000 tons per year. We will assume—which is not the case—that that entire production is controlled by one selling organization. That would mean that there would be about 8,000,000 tons a year available for distribution through retail yards. If we say that this coal is sold over eighteen states and that there are fifty counties in each state, that would mean that the mining organization would be required to maintain 900 retail yards in order to have but one yard in each county. This would give to each retail yard, so owned, a tonnage of but 6666 per year.

However, one retail yard cannot distribute coal over an entire county and succeed in competition with the

dozens of yards located in that county. If it could, the equipment necessary could not be supported on a tonnage of 6666 per year of one grade of coal.

Clearly, therefore, the unit control of even such an important field as Franklin County, Illinois, cannot, on the tonnage it produces, maintain retail yards in all the enormous markets.

Identically the same thing is true of the smokeless field of West Virginia and of all other individual coal fields the product of which travels over an extensive area.

Going back over the rather large field covered by this inquiry, several conclusions are obvious, namely:

The desire of the coal producer to retain control of his product through the stages of wholesaling and retailing is a natural ambition. It is an ambition which is commercially sound because it conforms to the efforts which have brought success to business men in other lines.

Before, however, the operator can hope even to enter the wholesale field, he must have a tonnage big enough to support his sales force in a big market. And this tonnage is most safely provided when the producer controls financially the mines which feed the central sales organization.

If an effort is made to extend the enterprise of the producer into the field of retailing, it is obviously true that he must have enough tonnage to support his retail yard. Also, he must have in his tonnage enough of a variety of coal to appeal to the trade in that district.

But, even granting that these exacting conditions have been fulfilled, the operator is not even then warranted in venturing into these other fields of action until, first, the business of wholesaling and of retailing has been made reasonably profitable. If the operator ventures before this is done, he may awaken to the fact that he has reinvested the money made in producing coal only to lose it in his marketing ventures.

Clearly, then, this question is so big the coal man dare not decide what to do without careful inquiry. I am inclined to advise caution, without, of course, advising against the effort as a whole.

Legal Department

MINE LESSEE'S RIGHTS IN SURFACE—A clause in a mine lease entitling the lessee to make use of the surface in removing the coal, ventilating, etc., conferred the right to drill a hole ten inches in diameter to release explosive gases which had accumulated above the coal in place, and which could not be removed by ventilation, especially where the presence of the gases endangered the mine and the safety of miners working therein. (Pennsylvania Supreme Court, Oberly vs. H. C. Frick Coke Co., 104 Atlantic Reporter, 864.)

RIGHT TO FORFEIT COAL LEASE—Ordinarily, courts will not declare a forfeiture of a coal-mining lease for breach of its terms, where there is no provision in the lease for forfeiture and where the lessor has a remedy by suit for damages. So, where a lessee paid the minimum royalty specified in his contract, mere failure on his part to remove coal expeditiously was not ground for forfeiting the lease. Nor will the fact that a mine is not worked as skillfully as it might be sustain suit to forfeit the lessee's rights, no substantial damage being entailed against the lessor. (Kentucky Court of Appeals, Haden vs. Continental Fuel Co., 206 Southwestern Reporter, 8.)

COMPUTING AWARD UNDER COMPENSATION ACT—Where a miner, injured by a fall of rock, suffered a fracture of the base of his skull, resulting in impairment of his sight and hearing and in dizziness, headaches and general disability, with a probability of permanent inability to resume his occupation of mining, it was proper, in computing an award to be paid him under the Colorado Workmen's Compensation Act to allow him on the basis of at least a 25 per cent. permanent disability, subject to modification on proof of his physical improvement. (Colorado Supreme Court, Employers' Mutual Insurance Co. vs. Industrial Commission of Colorado, 176 Pacific Reporter, 314.)

VIOLATION OF RULES BY EMPLOYEES—A mining rule adopted by an operator for the safety of his employees is subject to waiver or abandonment when not a statutory regulation. But, in any event, a mine employee's violation of a rule forbidding riding on tramcars cannot be regarded as the cause of his injury, through wheels of a tramcar passing over his foot, when it appears that the operator of the train saw the injured man's position and caused the accident by a sudden and negligent acceleration of the movement of the cars. Nor does the fact that the injured employee attempted to board the train while it was moving bar his right to recover for any injury attributable to such unexpected negligence of the operator of the cars. (Alabama Supreme Court, Bearden vs. Sloss-Sheffield Steel and Iron Co., 80 Southern Reporter, 42.)

VENTILATION IN KENTUCKY MINES—The Kentucky statutes require that breakthroughs between entries be made air-tight, as far as practicable, by brattices or otherwise, so that the current of air in circulation in the mine may sweep to the interior of the excavations where miners are at work. Held, that where a place of work of a mine laborer had been driven more than 60 feet beyond a breakthrough, and two of four breakthroughs controlling the air current at that place had not been bratticed, and others were insufficiently bratticed, there was a violation of the law, making the operator liable for injury to such laborer, caused by collision with a machine truck due to a dense smoke obscuring his lamp from sight at a point more than eight feet away. (Kentucky Court of Appeals, Elam vs. Hazard Coal Co., 205 Southwestern Reporter, 945.)

ACCIDENT AS EVIDENCE OF NEGLIGENCE—The fact that a miner is injured through a fall of rock at his place of work is of itself insufficient to raise a presumption of actionable negligence on the part of the employing operator. When an operator has discharged all of his common-law and statutory obligations concerning the safety of his employees, the latter assume the risk of injuries incident to their work. The Indiana statute, which places the burden on the operator to prove that he did not know of a danger resulting in injury to a miner in time to have prevented it, is satisfied by showing that the danger arose in the course of the work, although that fact be developed by testimony of witnesses for plaintiff in an action brought to recover damages for the injury. (Indiana Supreme Court, Snapp vs. Steinbaugh, 121 Northeastern Reporter, 81.)

POWERS OF BANKS—The Montgomery Coal Co., a retail coal company, being insolvent and indebted to defendant bank, it was agreed between them that the bank should buy sufficient fuel to supply the company's trade; the company's president acting as the bank's agent in retailing the same, and the net proceeds being applied to the company's indebtedness to the bank. The plan was put into execution and plaintiff, another creditor of the coal company, levied on coal which had been so purchased by the bank, on the theory that it belonged to the debtor coal company. Held, that although the contract may have been invalid as providing for business transactions beyond the scope of those objects for which the bank was incorporated, still the title to coal purchased by the bank under the arrangement was its property, and not subject to seizure as property of the coal company. (Texas Court of Civil Appeals, Spadra-Clarksville Coal Co. vs. Security National Bank of Dallas, 206 Southwestern Reporter, 200.)



Coal Industry Can Make More Use of Trade Acceptances

The successful outcome of the negotiations looking to the financing of the railroads until the required appropriations are made by Congress makes it certain that there will be no unusual delay in the payment of the railroads' fuel bills. The possibility that some months would pass, during which no money could be paid on coal accounts, has brought clearly to the attention of operators the advantages of the use of the trade acceptance. The Federal Reserve Board, since its foundation, has been urging the more extended use of this kind of commercial paper. Since this class of paper is readily acceptable at the Federal Reserve banks, it is being urged that the coal trade can make more generous use of it.

Fuel Administration Actively Engaged on Statistical Work

No change will be made in the conduct of the Fuel Administration at the end of the coal year. It will run along as at present until July 1, it is expected. The work on records and statistics now constitutes the Administration's principal activity. Dr. Garfield continues to spend practically all of his time in Washington and will do so until after the Easter vacations, at which time it is understood he will give a larger portion of his time to his educational work.

New Railroad Appointees Meet with Approval of Coal Men

Announcement of the appointment of Swagar Sherley as director of the division of finance of the Railroad Administration meets with much favor among the representatives of the coal industry in Washington. Mr. Sherley is from a coal-producing state and, as chairman of the appropriations committee of the House of Representatives, has been in close touch with the public's viewpoint as to the railroad fuel question. It is regarded as highly improbable that Mr. Sherley will stand for a policy which will allow the railroads to foist a portion of their fuel bills onto other consumers. Mr. Sherley has represented the fifth Kentucky district in Congress since 1903.

Coal men generally, judging from advices reaching here, are convinced that John Skelton Williams, who has had charge of finance and purchases, was entirely out of sympathy with the principles advocated by coal producers in the matter of purchasing railroad fuel. His resignation came as a decided relief to the representatives in Washington of the coal industry who foresaw a continuance of difficult situations if Mr. Williams remained in office.

Under the new order, separate divisions have been created. Finance and Purchases each has a separate status. Henry B. Spencer is to head the Division of Purchases. He also is highly acceptable to the coal industry. He formerly was president of the Railway Fuel Co., which operated in Alabama. He has been in charge of the Railroad Administration's end of the conferences with the National Coal Association with regard to railroad fuel. He is given credit for having made possible the satisfactory results which came from those conferences.

Mr. Spencer is a native of Long Branch, N. J. He was graduated from Harvard University in 1895. Most of his career has been spent in the service of the Southern Railway. He rose from a humble position in the operating service of that system to be successively its general manager, vice-president and a member of its board of directors.

Demurrage Rates Cut by Federal Railroad Administration

A cut of $1 per day in demurrage rates and a recommendation to shippers to continue their shipments to the Tidewater Coal Exchange during March was the outcome of the first meeting held by the committee of operators, wholesalers, tradesmen and consumers appointed at the meeting held in Washington on Feb. 14, with the committee representing the Federal Railroad Administration. The meeting took place in Washington on Thursday of the last week in February and it was announced that the demurrage rates would be reduced from $3 to $2 per day for this month at the ports involved—New York, Philadelphia, Baltimore and Hampton Roads, and that it would be recommended that all shippers continue their shipments to the Tidewater Coal Exchange during the month. In the meantime further consideration will be given the matter, and it is expected another meeting of the joint committees will take place in March.

Consumption Records Prove of Value to Large Users of Coal

When the large consumers of coal first were called on by the Fuel Administration to make a return on the amount of coal being used, there was some protest. This was based principally on the assertion that it would be too difficult to keep account of the exact amount of coal burned. After having made the report for seven

months, however, many consumers have found the information of such value to themselves that they will continue to measure the coal burned. One of the largest consumers, in a recent letter to the Fuel Administration, says the cost and trouble of securing the information is negligible, when compared with the saving in fuel consumed. That company has ordered the report continued for its own use.

During the seven months that the consumers' reports were required, the cards containing the information, if piled in a single stack, would be twice the height of the Washington monument, one of the Administration's statisticians has calculated.

National Coal Association Sending Out a Questionnaire on Demurrage Rules

Announcement by the American Railroad Association that its national car demurrage rules are being revised has led the National Coal Association to send out a questionnaire through the local associations. Operators and others interested are asked to indicate whether they desire that the mine rating and car distribution rules of the Railroad Administration should apply during times of car surpluses, as well as during times of car shortage; whether demurrage should be assessed on unbilled loads held on mine tracks and whether they regard it as advisable for the National Coal Association to exert every effort to carry out their will in the foregoing propositions, even to the point of filing a complaint with the Interstate Commerce Commission.

Will Reduce Transportation Rates to Help American Foreign Trade

Exporters of coal soon are to enjoy much lower transportation rates. The cut is to apply to the rail haul to ports as well as to the ocean carriage. This is a part of a plan, affecting all exportable commodities, which is being perfected by the Railroad Administration and the United States Shipping Board to aid American industries to extend foreign trade. The reduced rates will apply to all the more important ports of the Atlantic, Gulf and Pacific. The State Department and the Department of Commerce are coöperating with the Railroad Administration and the Shipping Board to work out plans best suited to meeting foreign competition.

New Chairman of Mining Committee of House of Representatives

Mahlon M. Garland, who has been selected by the Republican Committee on Committees, to be chairman of the Mines and Mining Committee of the House of Representatives, has spent his entire life in close contact with the coal-mining industry in his native state of Pennsylvania. Through his association with labor movements he has been brought in frequent touch with other classes of mining. He is the ranking Republican member of the Committee on Mines and Mining and has taken part in the handling of bills pertaining to mining during the ten years he has been in Congress. Mr. Garland formerly was vice president of the American Federation of Labor. From 1892 to 1898 he was president of the Amalgamated Association of Iron, Steel and Tin Workers.

Anthracite Shipments for February

The anthracite shipments for February as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 3,871,932 tons, this being, with exception of the strike years, 1902, 1906 and 1912, the smallest in a period of eighteen years, or since December, 1901.

As compared with the preceding month, when the shipments were 5,934,241 tons, the shipments in February showed a decrease of a little over two million tons, while as compared with February of last year the shipments showed a decrease of 1,940,000 tons.

The very low record for February of this year may be attributed to the exceptionally mild weather which has prevailed during the entire winter. The shipments by companies were as follows:

	February, 1919	February, 1918	Coal Year, 1918–1919	Coal Year, 1917–1918
P. & R. Ry.	725,809	1,107,982	13,359,828	13,459,445
L. V. R.R.	643,551	1,042,784	12,586,368	12,865,850
C. R.R. of N. J.	334,697	526,292	5,928,059	6,249,024
D. L. & W. R.R.	597,604	997,550	10,233,528	11,372,936
D. & H. Co.	629,929	600,799	8,162,731	7,892,860
Penna. R.R.	272,031	459,271	4,755,812	5,123,695
Erie R.R.	371,033	614,210	7,588,336	7,975,611
N. Y. O. & W. Ry.	108,029	177,047	1,749,351	1,865,556
L. & N. E. R.R.	188,249	286,147	3,384,836	3,670,561
Total	3,871,932	5,812,082	67,728,849	70,475,538

Will Take American People Twenty-Five Years to Pay Off War Debt

It will cost the American people about $1,200,000,000 a year for the next 25 years to pay off the war debt, according to estimates of the Treasury. The calculation is made on the assumption that the net war debt, with deductions for loans to the Allies, will be in the neighborhood of $18,000,000,000.

Interest on this amount, at the rate of 4¼ per cent., would be $765,000,000 a year, to be raised by taxes, and then repaid to bondholders. In addition, about $417,000,000 would have to be provided every year as a sinking fund to redeem all bonds in 25 years.

This would require a cumulative sinking fund provision of 2.32 per cent. Congress has not yet authorized establishment of a sinking fund as recommended by Secretary Glass.

New Chairman of Mining Committee House of Representatives

Of late there has been much interest manifested in the use of more up-to-date mining machinery in the coal mines of New Zealand in the interest of the health of the miners, since the dust evil was becoming quite a serious item and miners were objecting to work unless something was done to better the conditions.

The minister of mines agreed that everything possible should be done to minimize the loss of life, and it seems that something definite will be done to introduce the best up-to-date drilling machinery as well as other preventive means.

A special rock drill is now on trial in some of the mines, but as yet it has not proved satisfactory, but additional trials are to be made.

The coal mines of the country have been operated at fair profits during the past three years, but have fallen far short of supplying the demands of the Dominion.

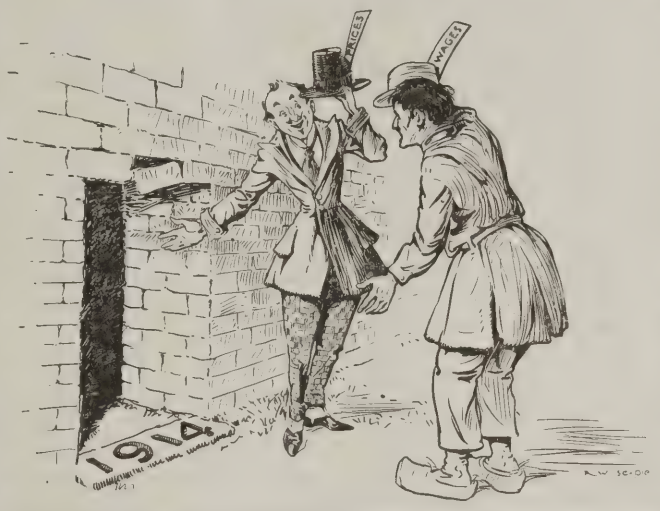
Representatives of the coal trade in the Baltimore region are planning a banquet to be held about Mar. 21.

EDITORIALS

Touching Faith of Wage Reductionists

WITH accord of word and unison of voice the wage reductionists urge that wages must (and will) come down with prices. But if prices will not come down first, if prices depend on wages, which stay up, what happens then, wise wage reductionists? If wages and prices bow to one another and say, "After you, my dear Alphonse," nothing will be done to make either stoop to their lower level in 1914.

There are profiteering prices, of course, and these can be clipped; but large reductions cannot be looked for till wages have dropped. As long as Alphonse waits on Gaston, and Gaston on Alphonse, there will be nothing done. Why should either scramble through the scuttle-way at the bidding of the consumer?



GASTON (Prices) to Alphonse (Wages): After you, my dear Alphonse.
If they continue polite they will never re-enter the low portal of 1914.

As for the coal industry participating in a general reduction of prices and wages, it may be well to recall that the industry is now well organized. It seems quite possible that without violating any agreement the anthracite operators could make a new and lower contract as soon as the war is over; and it is certain that the bituminous operators could do so also—but what of it? They won't do it. The mine workers would not permit of it, to begin with. There is not enough labor, free of the unions, to make the unions consent to a reduction, and prices have not come down enough to justify such a lowering of wages.

Short-time work is sufficiently trying to the mine worker without having a short day-rate or a short tonnage schedule to make the sustenance of life impossible. For these and general reasons the operators are heartily out of accord, as far as all signs go, with the suggestion that they should cut hours and schedules at the same time. It is enough to strike down the mine worker with the club of short days. By all means, spare him a blow with the cudgel of short pay. He could hardly survive them both.

But some suggest that anthracite wages must come down before that fuel can hold its own in the market in competition with bituminous coal. In this regard the anthracite industry has occasionally had qualms of fear. As regards competition in small sizes that fear is now, as in all normal times, well justified; especially now that the consumers of bituminous coal have been emboldened by the recent laxity of municipal inspectors. These functionaries are not studying Ringelmann's charts with the old-time assiduity, to judge by the grayness of the skyline of most of our large cities. But now that anthracite is getting plentiful the public will begin to bring pressure for the use of smokeless coal or, at least, for the smokeless consumption of such coal as is naturally smoky.

Some anthracite operators are afraid also of coke, near-coke and gas, all of which are actively pushing, as the case may be, to a place, or a larger place, in the domestic trade. But all three are being made from bituminous coal, which has lately become increasingly expensive, and competition is consequently not so fierce as might be feared. The sale of coke and near-coke threatens the anthracite industry not more, but rather less, than before, because owing to the increase in wage rates bituminous coal has risen in price more than anthracite. As for gas, that has more nearly remained stationary; but the stability has been due largely to franchise restrictions and the control exercised by public-service commissions. Time will see a lifting of those conditions. Certainly the gas men are not advocating cheaper gas but trying to put the price higher in order to restore their failing dividends. If anthracite proves later in the year to be in short quantity, then there will be no reason for anthracite men to cut wages and reduce prices. If anthracite continues in excessive supply—the notion seems ridiculous—then the natural thing will be to keep the wage scale and shut down the unprofitable mines rather than award the mine worker low wages and short time.

As a rule wages fall first and prices afterward, or both fall together, for no considerable price reduction can come without a wage decrease, the profits in an industry being rarely comparable in any way with wages. This is why a wage increase in all the trades employed by an industry can almost never be absorbed by the industry without inevitable bankruptcy. Certain it is that most anthracite men, especially in the southern anthracite field, are not so placed that they can help in the general price reduction for which the wage reductionists so fervently pray and so confidently hope.

The automobilist, by the use of goggles, guards his eyes from dust. The miner has, so far, not seen fit to do so in his dusty work underground, though the occasion is at least equal. Such goggles should be fitted so as to help vision and should only be of plain glass when protecting perfectly normal eyes. Many a short- or long-sighted man who would wear such prescribed goggles would never thereafter go back to a life made burdensome by the deficiencies of his unaided vision.

Mine Inspectors' Institute of the United States of America

AT THE close of the Joplin (Mo.) annual meeting of the Mine Inspectors' Institute, June 13-15, 1916, it was decided to hold the next meeting, which would be the decennial meeting of the Institute, at the place of its organization (June, 1908), Indianapolis, Ind. The constitution was amended, making the time for holding the annual meeting, thereafter, the second Tuesday in July, instead of the second Tuesday in June, as previously.

Before the time arrived for holding that meeting, however, the imminent prospect of this country entering the European war decided the Executive Committee of the Institute to postpone further meetings until conditions resumed a more nearly normal state and the duties of mine inspectors would permit of their temporary absence from home.

July of the following year (1918) afforded no improvement, and the increase in war activities left no opportunity for inspectors of mines to get away, if it was only for a day. The urgent demand for an increased production of coal, together with the employment of many unacquainted with mining conditions, required the constant watchcare of every inspector.

The war is now over and conditions in the mines are rapidly assuming their normal aspect. The year 1919 should find the mine inspectors from every state and the provinces of Canada gather in July at the old stamping ground, in Indianapolis, to greet each other and confer on the many questions of growing importance in the coal industry.

There have been many changes in the mine inspection departments of the different states, and inspectors who are not already members of the organization should address the secretary, James W. Paul, Bureau of Mines, Pittsburgh, Penn., for application blanks. On request, *Coal Age* will send copies of the last report of the Institute, gratis. Let every member take an active interest in securing new members, and making certain his own presence at Indianapolis July 8-11, 1919. Let every state department and governor see that delegates from their own states are in attendance.

When technical men are gathered together, a so-called practical man usually wanders in and has something true, but uncharitable, to say about engineers' estimates, from which it appears that the engineer knows as little about costs of construction as the practical man knows about costs of production; and that an engineer's forecast is as defective as the operator's vision of what is right before his eyes.

The New England Problem

NEW ENGLAND, because of its geographical position and concentrated business activity, has always been the greatest problem of the coal industry. To keep this small but highly congested industrial section adequately supplied with fuel throughout the whole twelve months, even to the detriment of the just and deserving demands of other parts of the country, has been particularly trying during the past few years. It not only worried the Administration quite a little last winter, but threatened to become a most serious problem of national significance. Fortunately it was overcome before the deluge came.

Roughly estimated, New England consumes thirty million tons of coal annually, one-third of which comes all-rail and the rest by tidewater. It is a physical impossibility to increase the rail shipments by any substantial amounts, so any increased tonnage must be supplied by the water route. While it is true that New England enters this year with a larger stock on hand, perhaps, than any year before in her history, it is also true that the current receipts of both rail coal and tide, particularly the latter, have been so far below normal the past three months that the one condition is offset by the other. Should the current receipts keep falling below the usual monthly quota a few months more—and all indications point that way—the problem of furnishing New England with her adequate supply of coal will again become one of serious consideration.

The problem will probably be of a more local nature this time, because the crux of the matter lies in the discharging facilities of the New England ports and not because of a possible shortage of coal or ships. There is a maximum limit to the tonnage that can be discharged at these ports, and while their present facilities are such that twenty million tons of coal can readily be handled, the task can only be accomplished by being spread evenly over the entire year. The job cannot be done in a few months, or six, or even more perhaps. Trying to do so last year showed plainly that it was not feasible or wise. Had New England industries been actually dependent upon the current requirements they then claimed were needed to keep running, and had not had on hand stocks of coal which were measured through the wrong end of a telescope, this impossibility would have been more clearly and painfully demonstrated.

As seems quite natural, New England consumers have been holding off in their buying of coal in the expectation that coal prices and water freights would be reduced. Meantime they are making all efforts to use up what poor coal they had left in their stock piles. While this is quite a logical procedure, it nevertheless has upset the regular clockwork-like arrangement by which New England is harmoniously supplied with fuel. The machinery has been thrown out of gear, and trouble, more or less serious, is bound to come of it. It is unlikely that the rest of the country will also suffer with New England in her possible difficulties this year, providing the other sections will not carry the "watchful waiting" policy too far also, although there may be a temporary interference in the regular flow of coal.

Of more than passing interest, therefore, will be the attitude New England consumers manifest during the next two months toward replenishing their diminishing stock piles and in preparing for the coming winter.

Governor Sproul of Pennsylvania says that after a mild winter, like that just experienced, the prices of anthracite should not be increased. The public, in general, when worried by the large coal bills of arctic winters, says anthracite should not go up in price when the demand for it makes such a large consumption of that fuel necessary. Any reason is enough as basis for the contention that anthracite should be sold below cost, and it will satisfy almost any one but the anthracite producers and those few old-fashioned people who still hanker after justice for everyone.

THE LABOR SITUATION

General Labor Review

Lacking steady work, all kinds of evils arise to trouble the waters, and the only way to cure them is to remove the source and not to apply emollients of doubtful value. When once we again get a demand for coal the problem of keeping idle miners at work will be solved. Let the operator keep this fact in mind. He is apt to think that his chief hope is in parsimony, in restricting tax levies and in preaching caution. It is not so. His hope lies not there, but in encouraging national expenditure, and in inducing states and municipalities to expend money in permanent improvements. Then the wheels will turn and the very heat of the mechanism will keep it from freezing, and its very movement will prevent it from corroding.

Always the basal infirmity is the one to be corrected. Medicine is forever alleviating the symptom and overlooking the real cause of ailment. Our policy at the mines is the same. The six-hour day can be met only by offering the possibility of steady work with the eight-hour day and we can only do this by proper political action.

Our cartoonist has produced this week a poster of merit, but it is clear that the workman will say that for six hours he should demand the pay granted for eight. That being allowed to the workman, the price of everything would go up 33 per cent. It is difficult for any one to understand that a defense taken by one man becomes no defense if used by all. The gas attack helped the Germans till the Allies used it. The six-hour day will help the mine worker admirably till the shoemaker, the baker and the butcher use it.

Hence it is that a six-hour day is to be combated. The workman wants his standard of living maintained and will make trouble if he does not get it. The only way he can make that standard possible is by working a full day. It would be a wrong to let him reduce the means by which alone his standard of living can be maintained.

Umpire Neill Delivers Two Decisions

Charles P. Neill, the umpire of the Anthracite Conciliation Board, has given two decisions, one recognizing the rights of the employers and another the rights of the employees. The engineers, firemen and cranesmen, engaged on the steam shovels in the Jeddo stripping, of the G. B. Markle Co., believed themselves to be of such a class as to be entitled to the eight-hour day with a three per cent. increase. They had been given by the company a flat seven per cent. increase on the basis of a nine-hour day. The shorter day, though accompanied by a smaller increase in wage, made the wage increase per hour 16 per cent. instead of seven per cent., which would be all they would get if nine hours constituted a day's work.

The change is a basal one. The revisions made recently do not modify it. It modifies the wage schedule way back to May 5, 1916, and being retroactive will provide for a payment of thousands of dollars. The decision was made on March 11.

The decision which has been mentioned as made against the employees was rendered in reference to the operation of the Dunmore vein at the Diamond Colliery of the Delaware, Lackawanna, and Western R.R., Coal Department. The gangway miners declared that the charge for lifting bottom rock was $3.60 per lineal yard regardless of its thickness. This rock usually runs from 44 to 48 in. thick. The company contended that the rate was eight cents per inch, the $3.60 being evidently based on a thickness of 45 inches.

Glen White Shooting Affray in Court

A crowd that taxed the capacity of the circuit court room in Beckley, W. Va., was present Mar. 8 for the hearing then to be given the twelve men charged with complicity in the Glen White shooting affray. Just as the stage was set to proceed with the inquiry, attorneys of the accused men announced that their clients would waive examination, and all were placed under bond to appear at the next term of criminal court.

The men under arrest are James R. Gilmore, president of the United Mine Workers of District No. 29; Lawrence Dwyer, international board member; Obe Clendenin and Toney Stafford, district board members; Ed. Snyder, Toney Sarazzo, Will Owen, Tom Murphy, George Lucas, Tom McGinnis, Dorr Snuffer, and Tom Lethco.

All are charged with complicity in a shooting affray that took place at Glen White on Nov. 16, 1917, at a time when there was trouble between the E. E. White Coal Co. and a part of its working force. Eight of the twelve accused men are alleged to have been active participants in the shooting and the other four—Gilmore, Dwyer, Clendenin and Snyder—are held as accessories before the act.

Increase Is Not Based on Quality of Work

Special Umpire Allison O. Smith, of Clearfield, Penn., sitting in Charleston as a judge of disputes between the miners and operators of the New River and Winding Gulf fields, has handed down decisions in three cases which will be of much interest to the operators in those districts. Two of the decisions sustained the contentions of the men and the third was favorable to the operators.

The first decision was in the case of B. F. Tarleton vs. the New River Coal Co. The facts brought out in this case were that Tarleton accepted work at the Summerlee mine as engineer in the month of May, 1918. He was paid $105 per month, which he claimed was not the proper wage for that job. He based his contention on the fact that the man who was performing that work during October, 1917, was paid $85 per month. The Washington award of $1.40 per day would make the proper wage for that employment for the months that had 30 days, $127.00, and for the months that had 31 days, $128.40. For this reason Tarleton asked that the company be directed to pay him the shortage in his pay envelope during the whole period of his employment.

The judge's decision sustained Tarleton's claim, and ordered that he be paid the difference between the $105.00 and $127.00 or $128.40 per month for which the contract called. The judge remarked that the advance figured out in the production of coal was figured at what the job was paid prior to the granting of the advance. Therefore, it was his decision that, as long as the operating company received the extra 45c. in the selling price of coal, it should pay the advances that the increase was based on.

In the case of Warren Sizemore vs. the Coal Run mine, Sizemore claimed he was discriminated against and discharged for belonging to the union, and he asked that he be compensated for 18 days, the time he was idle on account of his discharge. Judge Smith sustained this claim and directed that the company pay Sizemore for the 18 days' idleness at the rate of $4 per day.

In a car-pushing case the judge's decision sustained the operators. A voluminous amount of evidence was presented by both sides, the operators contending that the 10c. differential paid in the mines on the New River was paid to the men to compensate for car pushing, while the miners contended that it was paid on account of the low coal.

The judge pointed out that the evidence of both the miners and operators was that this 10c. was given years ago. Though the miners testified that it was their understanding that it was paid on account of the lowness of the coal, but none of them could give positive evidence.

On the other hand the operators presented the evidence of Mr. Beury and Mr. Caperton, who had been operating coal at the time. They were able to testify that they knew just why the differential was granted.

Judge Smith ordered that this decision should in no way change any of the present customs throughout the field, that where men are paid for the pushing of cars or tracklaying they shall continue to be paid; and that in cases where the pushing of cars over long distances or over extra steep grades is necessary, the miners have the right to take such cases up as grievances.

British Columbian Miners Exhibit Excellent Judgment

One of the important questions discussed at the recent annual convention of District 18, United Mine Workers of America, was the renewal of agreements. One of these, that between the miners and the management of the Crow's Nest Pass Coal Co., Fernie, B. C., being due to expire on Mar. 31. It was announced, in this connection, that a policy committee meeting would be held at Indianapolis on Mar. 18, which would be attended by representatives of all districts. It was decided, therefore, that the operators should be approached with a view to arranging for an extension of the present contract, modified, of course, as has recently been provided, by the awards of the commission on cost of living. This was agreed upon in order that the demands of District 18 could be made to conform, in some degree, with those of the miners of the United States and possibly those of Great Britain. Representatives appointed to represent the district at this meeting are: P. M. Christopher, district president; Robert Livett, international board member; Frank Wheatley and Alex. Susnar. International Organizer David Rees also will attend. These delegates were instructed to indorse the proposals contained in a circular by Frank Farrington, president of the Illinois miners, for a six-hour day and a five-day week.

In the conference with the operators, which took place subsequently, Fuel Director W. H. Armstrong presided and the utmost good feeling prevailed. The operators agreed to postpone negotiations pending the meeting of the policy committee, and a further meeting with the operators is to be arranged as soon as possible after the return of the District 18 representatives.

Two noteworthy changes made in the constitution of District 18 by the Convention were that conventions and elections of officers should be held biennially instead of annually.

Mine Workers Attack Girard Royalties

The mine workers in the anthracite region are getting official recognition of their attacks on the operators' practice of closing mines which are not being profitably operated. Their executive board in the Hazelton district has decided to make a request for a tridistrict convention of the men of the anthracite field. This meeting is to be held, if the board gets its way, about the middle of August.

It will frame new demands to be presented to the anthracite operators when the basic agreement expires in April, 1920, till which time the mine workers are not at liberty to change the scale, though it would appear that the operators could change it, if they would, at any time after the signing of the peace without becoming subject to a charge of violating their agreement.

However, everybody concedes that the scale will remain unchanged till April, 1920, when the mine workers will probably make some demands, if the will of the international convention that will meet in September of this year is favorable to changes. Among the demands will possibly be the one just mentioned. The shutting down of unprofitable mines has been quite a general practice of late, and the dispossessed mine workers are determined that the equal turn shall apply not only as to single mines but as to all the mines of one company. The desired rule is not to be commended on general principles. The nation is not helped by the operation of inefficient mines.

The required output should come by working briskly the most suitable mines having regard to ease of working, quality of coal and propinquity to market. The Kansas men have sought in the past a like restriction of the option to close unprofitable mines. The idea is, therefore, not new. In fact the anthracite miner has less to complain about than some other mine workers, for in other states work is far less steady, there is less other work, and, the mines being further apart, moving is more of a problem and commuting to work not possible.

No one can help, however, growing a little angry about the predicament of the mine workers of the Lehigh Valley Coal Co. who are laid idle by reason of the high royalties charged by the Stephen Girard Estate. Strange to say the trustees of that estate do not seem to realize how improper are the charges they are making for coal in the bed. One trustee actually ventured some time ago to criticize the conduct of the anthracite operators and question their prices. His criticisms furnished the basis for an informal indictment of the anthracite industry made a few years ago in the Brooklyn City Hall.

The royalty collectors have an air of self-satisfied pride when they point to the profits, real and imaginary, in coal mining, but for this there is no justification whatever, the holding of coal land being of no benefit to the public, whereas the mining of coal is of benefit, yet in the anthracite region the holding of coal has been the source of larger profit. The mine workers are not without knowledge of the true conditions, and, on Mar. 13, the mine workers' officials made the following statement:

"We find that the Girard estate is more responsible for the shutdown than the coal company, for the high cost of the coal at the mines shut down is due to the large royalty charged the Lehigh Valley and to other coal companies operating colleries on the estate. We are reliably informed that the estate is charging a royalty of from $1.05 to $1.22 per ton on all sizes of coal, and that it has a sliding scale which is raised according to the price at which the coal is sold.

"From the rich fields of coal in Schuylkill County the estate has reaped a great harvest of wealth in the obtaining of which the poor miner has been hardly dealt with. The miners have had their homes badly damaged by the mine operations. These homes have, in many cases, been made untenable. Miners have labored all their lives to develop the rich deposits on the estate, the wealth of which is spent in Philadelphia and other places. Little consideration has been shown to the poor mine worker who has produced enormous wealth for this heartless estate.

"In the opinion of the miners, Stephen Girard never intended in his will to discriminate in such a manner against the producer of the valuable mineral on his estate, the value of which he did not realize though he commenced to mine it before he died.

"We would ask the State Legislature to take notice of the conduct and management of this estate, and look into this matter of big royalties which prevent tenants from working steadily and have caused a general shutdown in part of the anthracite region, causing suffering to thousands of mine workers and their families."

A complete tie-up of all mines of the Delaware, Lackawanna & Western R.R. Co. Coal Department is threatened unless the company agrees to the demands of the miners for a more equitable distribution of work at its collieries. If the demands of the men are not granted more than ten thousand mine workers may strike.

Some weeks ago the D. L. & W. R.R. Co. shut down several mines because of there being no demand for coal, and thousands of men were thrown out of work. Those who are idle claim that the company is hiring men from outside districts to operate the mines that are working and is refusing to hire men who are out of work as a result of the shutdown.

Sure, the Full Day and the Whole Dollar Have Always Been Friends



A Short Day Means a Short Dollar

What we don't dig out of the ground or manufacture we'll never have. That's a cinch. We're having short running time this year and it's going to cut in on our comforts. We all know that short running time makes hard sledding for the miner. A short working day, as a permanent institution for everybody everywhere, would do the same for everybody and for ever unless we could somehow contrive to do as much in the short day as we have been in the habit of doing in the long day.

Discussion by Readers

Waste of Coal

Letter No. 3—I was glad to read the letter of Russell Exline, *Coal Age*, Dec. 26, p. 1176, which drew my attention to a previous article that I had missed and which showed that the annual waste of coal, in this country, was equal to a solid cube 1785 ft. on a side and containing 150,000,000 tons. It was not stated whether this waste occurs in the mine or after the coal is taken to the surface.

However, let me ask, Does it ever occur to coal operators how much coal is wasted and lost beyond recovery in their mines? An operator buys or leases a tract of land, in the latter case paying the owner a fixed price per ton of coal mined and brought to the surface. In either case, the cheapest coal is extracted first, and that which can only be secured at a much higher cost is left and, perhaps, never recovered.

If my information is correct it is not the custom, in the British Isles, to lease coal land at an agreed price per ton of coal mined. The prevailing custom is to lease a tract of land on the basis of an estimated tonnage, per foot-acre, which required the operator to pay a fixed price for the coal whether or not the estimated tonnage was mined.

Much waste occurs by reason of the method of mining adopted. Longwall mining involves a less loss of coal than any other method and affords good ventilation at the working face. There are no pillars to be drawn, all the coal being taken out in the first working. I recall an instance of my boyhood, in Scotland, where a coal seam 5 ft. in thickness was worked by longwall and the operator was obliged to secure sandstone rock from a near-by quarry, for the purpose of building the packwalls in the mine. The rock was sent down into the mine every night.

In many coal mines, today, coal is blasted off the solid and it is safe to say that a considerable percentage of this coal is thrown into the gob and lost. The practice is both dangerous to life and wasteful and should be prohibited by a law that would require every shot to be undermined before the coal is blasted.

Wasteful Methods in Machine Mining

Where the coal is mined by machines, more or less of it is wasted, according to the type of machine employed. When the mining is done in the clay underlying the coal, which is usually the case where the puncher type of coal cutter is used, very little of the coal is wasted. The puncher machine is mostly operated by air and, in that event, has the advantage over electric coal cutters for working wet places going to the dip. When such places are worked with electric machines, it is often necessary to leave several inches of coal on the bottom.

It is customary for a superintendent, in placing an order for electric coal cutters, to specify that they must cut coal 4 in. or less from the bottom. In some cases, the cut is made higher up in the seam and the bottom coal is then lifted later, the machineman paying the digger for that work. With some types of electric chain cutters, it takes an expert machine runner to cut the coal less than 4 in. from the bottom. It can be done with the ironclad Sullivan machine, but it takes time and is a disadvantage where the machinemen are paid by the ton.

Machine runners seldom stop to consider how much coal is wasted when 4 or 5 in. of bottom coal is left, in cutting a room 25 ft. wide and 300 ft. long. Taking the weight of the coal as 80 lb. per cu,ft., the amount of coal left in 4 in. of bottom is $\frac{1}{3}(300 \times 25)80 \div 2000 = 100$ tons. The loss of 4 in. of bottom coal, in mining out 1 sq.mi., would mean the loss of over 370,000 tons.

Again, when pillars are being drawn, miners are frequently allowed to take a skip off the rib, with the result that a cave occurs that overrides much of the pillars still remaining, and it is not uncommon for 100 or 200 tons of coal to be thus lost in a single pillar.

Pillars should always be drawn with a straight face across the pillar, at right angles to the track, so that the break will not injure the pillar by causing the pressure to override and crush the coal remaining. Pillar coal is often lost by reason of timbers left standing in the gob, which prevents the settlement of the roof and throws the weight forward on the pillar.

Notwithstanding the fact that there is sufficient coal in the United States to last for two or three thousand years, it is a shame to see the unwarranted waste that occurs in the mining of coal today. The time will come when coal will be scarce and difficult to mine. Let us strive to conserve this natural supply of fuel.

———, Colo. FOREMAN.

Firebosses as State Officials

Letter No. 1—In arguing the question of attaining the highest efficiency in firebossing, recently, it has been claimed that this can be best attained by placing the fireboss under the jurisdiction of the state. I am not in favor of firebosses being employed by the state; nor do I think that they should be considered in any other capacity than that of a *mine examiner*, whose duty is not only to examine the mine for gas but to discover any other dangers that may arise on the roads, travelingways or working places of the mine.

Miners are exposed to a great variety of dangers, many of which require constant watch and a very close inspection, in order to detect them before an accident occurs. If we are anxious to protect the lives of miners and make the mining of coal more safe a law should be enacted in every coal-producing state that would make it necessary for each mine to employ one or more local mine examiners.

These men should be in the mine during the entire day and devote their time to a close inspection of each working place and give such instructions to the men as would make their work more safe. It is my belief

that many men are killed every day, in coal mines, because of lack of proper instruction in regard to safe methods of performing their work.

Speaking of the employment of firebosses, by the state, I fail to see what benefit would arise by so doing. It has been suggested that when acting under state authority, the fireboss would be held in higher regard by the mine foreman who would fear to go contrary to his orders or to operate the mine in any way that would not comply with the state mining law. My own idea, in this respect, is that it would make little difference with the mine foreman, except to increase his dislike of being compelled to obey the orders of the fireboss, and the natural result would be that many foremen would be disposed to make life miserable for the fireboss, by entering complaints against him to the deputy mine inspector, who would be compelled to make constant investigations to ascertain the true situation of affairs in the mine.

The employment of firebosses by the state would, in my opinion, be very apt to raise some questions in regard to the liability of the state in the compensation for accidents occurring in mines. It would certainly have a tendency to raise the standard of qualifications for the position of fireboss. That being the case, many of the men now holding that position would be found incompetent and their certificates revoked.

Taking everything into consideration, therefore, it is my belief that the opinion of the large majority of practical mining men who have held positions as fireboss, assistant foreman and foreman, in coal mines, if candidly expressed, would be opposed to the suggestion of the employment of firebosses by the state. Let us hear what arguments can be advanced for and against this proposition. ROBERT A. MARSHALL.

Farr, Colo.

Engine-Plane Haulage

Letter No. 1—Kindly permit me to suggest two solutions to the engine-plane problem presented in *Coal Age*, Feb. 6, p. 293. As there explained, an incline 400 ft. long and having a grade of 25 per cent. leads from the tipple to a point in the mine entry where the grade suddenly changes to 1½ per cent. and continues at that for a distance of 1000 ft., to the inside parting where the trips are made up to be hauled out of the mine.

My first suggestion, however, will not be practicable, unless the output of the mine exceeds 500 tons per day, as the expense would hardly be warranted for a less tonnage. It is to construct a trestle and drive a new slope leading from the tipple to the side track in the mine and having a uniform grade throughout. But, for the reason just stated, we will leave this suggestion without further remark.

My second suggestion assumes that no change is to be made in the grades given. My plan, now, would be to estimate on a tonnage 50 per cent. greater than that stated, or say 750 tons per day, which will provide against all contingencies. In order to haul longer trips at a reasonably low speed, I would use a duplex second-motion engine, geared about 4 to 1. By the use of the common formulas, I would calculate the size of engine required to haul loaded trips of 10 cars each, basing this calculation on the maximum grade of 25 per cent., or an inclination of about 14 degrees.

The weight of coal hauled in a single trip is $10(5000 - 1500) \div 2000 = 17.5$ tons, and to put out 750 tons in a day of 8 hours will require $750 \div 17.5 =$ say 43 trips. The time of making one round trip is, therefore, $(8 \times 60) \div 43 = 11.16$ min. Then, allowing 2 min. for changing ropes at each end gives for the actual running time slightly more than 7 min. The total distance covered in this time is $2 \times 1400 = 2800$ ft., which makes the average speed of hauling $2800 \div 7 = 400$ ft. per minute.

In practice, the speed of hauling would be somewhat greater than the average on the lesser grade and considerably less when hauling up the incline. Thus, on the 1½ per cent. grade, the speed of hauling might vary from 500 to 600 ft. per min., while on the incline it might average 250 ft. per minute.

Suggests Installing a Tail-Rope System

Allow me to suggest, here, that a modified tail-rope system of haulage strikes me as being best adapted to the conditions in this mine. For example, I would use a ¾-in., crucible-steel wire rope for both the main and tail rope. This rope will weigh 0.88 lb. per ft. Starting from the side track in the mine, the main rope hauls the loaded trip out to the foot of the incline, dragging behind it the tail rope, which is attached to the rear end of the trip. At the foot of the incline the tail rope is detached from the trip and left lying in the road, while the main rope pulls the trip up the incline. The weight of the rope resting on the incline is $400 \times 0.88 = 352$ lb., while the weight of the loaded trip is $10 \times 5000 = 50{,}000$ lb., which makes the total moving load when the trip is at the foot of the incline 50,352 pounds.

Now, for a 25 per cent. grade, the sine of the angle of inclination is 0.24249 and the cosine, 0.97015. Then, assuming a track resistance of 20 lb. per ton, the total load on the rope at the head of the incline when a loaded trip is starting to ascend is

$$L = 50{,}352\left(0.24249 + \frac{0.97015}{100}\right) = \text{say } 13{,}000\ lb.$$

Finally, estimating the power of the engine that will haul this load at the average speed previously calculated, we have, allowing 80 per cent. as the efficiency of the engine,

$$H = \frac{13{,}000 \times 400}{0.80 \times 33{,}000} = \text{say } 200\ hp.$$

Returning, when the empty trip has been lowered to the foot of the incline, the tail rope lying there is attached to the head end of the trip and assists in pulling the empties back into the mine. Let me say, here, that in making such estimates it is always a good plan to submit the proposition to manufacturers of haulage and hoisting equipment in mines and receive from them their bids on plans that they consider adapted to meet the requirements. STEVE GOSNELL.

Hallidayboro, Ill.

Letter No. 2—Interest has been aroused here by the inquiry of W. M. Q., *Coal Age*, Feb. 6, p. 293, regarding a proposed engine-plane haulage combining a 25 per cent. grade 400 ft. long, which was followed by 1000 ft. of a 1½ per cent. grade. In addition to what has already been said in reply to this inquiry, I would like to add a few comments and offer some figures that may be of interest to this correspondent.

In the first place, in order to provide an output of 500 tons of coal per day of 8 hours, as desired, and hauling three-car trips, having a total capacity of $3(5000 - 1500) \div 2000 = 5\frac{1}{4}$ tons, I find that it

would be necessary to haul at a speed of 8 miles per hour, in order to allow 4 min. For making each round trip, with 1 min. to spare for changing ropes, assuming another trip of loads or empties is ready on the arrival of each successive trip on the tipple or in the mine. This is assuming, as was previously estimated, that there will be 500 ÷ 5¼ = 95 trips a day, or say a trip each 5 min.

Allowing such arrangement to be possible, for the sake of argument, the question then resolves itself into whether or not the empty trip will pull the rope back to the bottom, at the estimated speed of 8 miles per hour. Neglecting the weight of the rope, that of the empty trip is 3 × 1500 = 4500 lb. A speed of 8 miles per hour is (8 × 5280) ÷ 3600 = 11.7 ft. per second. Moving at this speed, the empty trip would have a kinetic energy of (4500 × 11.7²) ÷ 2 × 32.16 = 9577 ft.-lb.

Now, in order to simplify the calculation, let me assume that a 1½ per cent. grade is just sufficient to overcome the track resistance, which will permit the entire kinetic energy to be applied in pulling the rope attached to the end of the empty trip. I will further assume that the 400 ft. of rope lying on the incline will gravitate easily under its own weight and still have sufficient reserve force to unwind the rope from the drum.

There will then be an average length of 500 ft. to be pulled a distance of 1000 ft., on the lower grade, by the kinetic energy of the empty trip. The weight of this average length of rope, previously estimated as 0.39 lb. per foot., is 500 × 0.39 = 195 lb.; and, taking the rope friction as 1/40 of its weight, the work performed in pulling the rope 1000 ft., on the 1½ per cent. grade, will be 1000(195 ÷ 40) = 4875 ft.-lb.

Now, taking the assumed data as more or less closely approximating the fact, it appears that it will be possible for the empty trip to gravitate the entire distance of 1000 ft., from the foot of the incline to the side track in the mine, and drag the rope behind it, while maintaining the estimated speed of 8 miles per hour.

However, allow me to suggest that, in order to provide against all contingencies, particularly the necessity of stopping the trip at some point on the lower grade, before it has reached the side track at the end of the haul, it would seem advisable to adopt some type of tail-rope haulage by which the empty trip could be pulled back into the mine, instead of relying wholly on the proposed engine-plane system.

It should be observed, here, that the assumed speed of hauling (8 miles per hour) is greater than what can be safely estimated, under the conditions presented in this inquiry. Also, the time allowed for changing ropes being 1 min. for each round trip, or ½ min. at each end of the haul, is hardly sufficient and provides no margin for delays that may, and invariably do, occur in mining practice.

Moreover, if the cars must be dumped and returned at once into the mine, it will be necessary to provide a rotary dump of three cars' capacity, into which the trip can be hauled without removing the rope. Such an arrangement will permit the three cars to be dumped at once and returned promptly into the mine.

Pittsburgh, Penn. SHELDON SMILLIE.

In connection with the above estimate, it may be well to draw attention to the high speed with which the empty trip would reach the foot of the incline if unrestrained by a brake applied to the drum. Starting from rest at the head of the incline and ignoring the weight of the rope, that of the empty trip being 4500 lb.; and, further, assuming the track resistance as, say, 20 lb. per ton, the velocity attained at the foot of the incline would be

$$v = \sqrt{2gs\left(\sin a - \frac{\cos a}{100}\right)}$$

$$= \sqrt{2 \times 32.16 \times 400\left(0.24249 - \frac{0.97015}{100}\right)}$$

$$= \sqrt{25{,}728(0.23279)} = 77.4 \text{ ft. per sec.}$$

This would mean a speed of (77.4 × 3600) ÷ 5280 = 52.7 miles per hour. The chief difficulty on this first steep grade is, therefore, to hold the descending cars in check by means of a good brake on the drum.

Attention should also be drawn to the manner of computing the result of applying the stored energy of the empty trip (9577 ft.-lb.) to the work of dragging an average length of 500 ft. of ½-in. rope, weighing 500 × 0.39 = 195 lb., a distance of 1000 ft. Assuming the resistance of the rope to be 1/40 of its weight, the work to be performed is 1000(195 ÷ 40) = 4875 ft.-lb.

In performing this work, the velocity of the empty trip is gradually reduced, assuming the initial velocity, as estimated, to be v_1 = 11.7 ft. per second, and calling the velocity with which the trip reaches the side track, 1000 ft. distant, v_2, we have

$$\frac{4500}{2 \times 32.16}(v_1^2 - v_2^2) = 4875$$

$$v_2 = \sqrt{11.7^2 - \frac{64.32 \times 4875}{4500}} = 8.2 \text{ ft. per sec.}$$

However, had the calculations made proper allowance for the effect of the 1½ per cent. downgrade, it would have been found that the empty trip would arrive at the side track with a slightly increased velocity, owing to the effect of the grade, which here exceeds the resistances of the rope and the track combined.

Carbon as a Fertilizer

Letter No. 1—I read with surprise the item in *Coal Age*, Jan. 9, p. 52, drawing attention to a statement made in a previous German publication—the *Zeitschrift fur Angewandte Chemie*—claiming that "carbon is gradually converted into carbon dioxide when added to the soil in a finely divided state," and suggesting that the waste heaps in the neighborhood of collieries could be used, with a possible addition of lime, as a fertilizer to take the place of manure where that is scarce.

Being interested to learn what value, if any, there might be in this suggestion, I wrote to the Pennsylvania State College for their opinion, and beg to submit the reply of Charles W. Stoddart, professor of agricultural chemistry at the college, which is as follows:

Replying to your inquiry regarding the value of coal dust, preferably mixed with lime, as a producer of carbon dioxide for benefiting plant life, permit me to say that, since the earth's atmosphere contains sufficient carbon dioxide for the use of all plants, it would be a waste of material to employ coal dust for that purpose. The mixture of coal dust and lime would be of absolutely no more value than the lime alone. Although this information may be disheartening, it must be accepted as based on facts.

It has occurred to me that the reply of Professor Stoddart, in this connection. will be of considerable

interest to many who read the item to which I have referred. It may, perhaps, at least prevent some useless experimenting on the part of persons who are always anxious to make use of waste products wherever this is practicable. E. S. S.

Shickshinny, Penn.

[*Coal Age* published the item to which reference is here made and gave its authority, believing that that was sufficient. Like everything else that has come from Germany in recent years, this bit of information bears the stamp of camouflage, being interesting if true, but ostensibly untrue and without value. Like the stamp "Made in Germany," German authorship, today, renders all information from that source doubtful. We are glad our correspondent has exploded this bomb hidden in the waste heaps of collieries.—EDITOR.]

Efficiency in Mine Management

Letter No. 3—Admitting the fact that the present coal market is weak, this is a mighty good time to study the question of efficient management of mines, and to winnow from the chaff a great many facts that will be of service to the man who acts upon them within the next few months when the coal business will again come into its own.

Merely *thinking* of efficiency gets us nowhere. There are hundreds of labor-saving devices and expense-reducing equipment now on the market that cannot fail to put dollars into the pockets of every producer of coal, but which are now absorbed in expense items.

In his article on "Expediting Locomotive Haulage," *Coal Age*, Jan. 30, p. 244, Maverette Ashley gives some thoughts that are capable of being transformed into dollars by the man that reads and acts. Speaking of the use of roller-bearing wheels for mine cars, Mr. Ashley presents facts that are conclusive.

Efficiency Shown in Choice of Equipment

A friend recently told me that, seven years ago, he adopted roller-bearing cars hauled by a 13-ton electric locomotive, which has since traveled 40,000 mi. in its service in the mine. He has employed the usual type of motor runner, and states that it has been necessary, in all that time, to purchase but one new set of tires and replace but one armature. He attributes this remarkable performance to the low draft required to start and haul trips of cars equipped with these bearings.

In another instance, a storage-battery locomotive, hauling modern equipped mine cars, brought out of the mine 600 tons of coal, in a single shift. Facts like these prove that efficiency in mine equipment pays. In still another instance, where a large company operated two mines, located on opposite sides of a creek, it was found difficult to hold the men in one of these mines, owing to their preference to work in the other mine. Investigation showed that the only cause for this preference was the fact that the first mine was equipped with cars having plain-bearing wheels, while roller-bearing cars were in use in the other mine across the creek.

There is no use denying the fact that men seek work where it is most easily performed. Operators are face to face with this condition today. But, instead of discouraging this attitude of the men, it should be encouraged, and every effort should be made to lighten manual labor if we desire to increase the efficiency of that labor.

I thoroughly agree with the statement made by "Observer" on page 246 of the issue to which I have previously referred, where he ascribes the success of a certain mining man to the fact that he had learned long ago that "his job is not an office job." I call to mind now three mining men, each in charge of big interests in this state, who never acted on the motto, "Let George do it." Out on the job all day long, inside the mine and everywhere that work was being done, these men were present observing and directing. The results can be well imagined; the dividends were satisfying and there was no need of apologies based on unprecedented prices for equipment, increase of labor rates, shortage of cars, etc., etc.

Speaking of mine-car wheels, I recall, one company who spent $7000 for repairs, in replacing 20 per cent. of their wheels, in a single year. The same company objected to placing modern cars in their mine alongside of the old cars in use. They stated that it would cause dissatisfaction among their men, and they would be obliged to change their entire equipment and throw out the old cars. The argument is but a weak apology for the failure to recognize the great gain in efficiency within their grasp. I have even known operators to refuse to install labor-saving equipment capable of producing known economies, claiming that more intelligent labor would be required for its operation.

Profiting by the Experience of Others

The kind of efficiency that I am urging is the ability to see and act on a suggestion that will produce from 1¼ to 5 tons, for the same money that was formerly required to produce 1 ton. I refer to the kind of management that considers it worth while to reduce the cost a quarter of a cent per ton, when this can be done by improved equipment.

It is such efficiency that led one of the best mining men in this country to build his mine cars a few inches lower than the other fellow's, and yet make them to hold the same weight of coal. He has no trouble in holding his men, who find they can load a car and a half in the same time that is required to load a single car at the other mine.

That superintendent was a practical man; he designed his own cars according to his own particular needs, without attempting to follow any other type. It would be difficult to estimate, in dollars and cents, what such efficiency on the part of a superintendent is worth to the company who employs him.

Too often the efforts of an efficient superintendent to reduce prospective costs, by the purchase of a better type of equipment, are not appreciated or supported by the management, who find too late that it would have saved them heavy losses had they acted on the suggestion. It is gratifying, however, to know that many companies are now beginning to see that it pays to study real efficiency and to act on the many practical suggestions made along this line.

Many companies, however, fail to properly correlate their efforts. Let me ask, of what use is a 3000-ton tipple, unless there are cars and motors capable of handling this output of coal? Of what use is it to build 600 cars when 400 cars of another type will handle

the same output of coal? Why employ two 10-ton locomotives to do the work of two 8-ton machines? Why use 1000 lb of lubricant on mine cars when it is possible to employ cars that will operate as well and better with 300 lb. of lubricant? It is important to *correlate* our ideas of efficiency. ECONOMIST.

Hunting, W. Va.

Efficiency of Mine Officials

Letter No. 4—In the discussion of efficiency, much will depend on the accepted meaning of the term. For example, from the operator's standpoint, the efficiency of an official is determined by his ability to produce a large tonnage at a low cost of operation, without regard to the actual conditions.

According as conditions are favorable or unfavorable to production, one official will produce results that mark him as "highly efficient," in the estimation of his employer. On the other hand, another man may do far more creditable work and yet be unable to make the same showing, in a low cost per ton of coal produced. As a result, in the estimation of the management, the latter is "less efficient" than the former. But, the real underlying causes were the favorable conditions that assisted the one official and the unfavorable circumstances that retarded the other.

Development Under Favorable Conditions Is No Proof of Efficiency

By way of illustration, let me assume that a company is about to open a mine in a 6-ft. seam of coal, which is overlaid with a good sandrock roof at the start. We will suppose that the preliminary work has been done and the mine put on an operating basis. The company is willing to furnish anything that is necessary to push the development to the point where a good output will be secured.

With this purpose in view, the headings are double-shifted and rooms are opened, in good coal, as quickly as there is space for them to be turned on the entries. The height of the seam is such that there is no necessity to brush the roof or lift bottom, in order to provide the required headroom on the haulage roads. Also, all the rooms are standing in good thick coal. Finally, with proper management, there will be little trouble from roof falls and the cost of timbering in both rooms and headings is low.

Under these favorable conditions, the work of development proceeds rapidly, and the mine becomes a large producer, while the costs of operation are comparatively low. The management give little thought to the future prospects of the mine, or dream that these favorable conditions can hardly be expected to continue always. But, in the meantime, the length of haul is extending and it becomes necessary to make provision for the installation of suitable haulage facilities, drainage systems, and other equipment that will provide adequate ventilation in every section of the mine.

About this time, moreover, there are indications, at the faces of some of the headings, that predict changes in the roof conditions. In one section of the mine, the sandrock has given place to a weak shale containing slips and faults. In another section the headings, which have been gradually dipping, take a sudden rise and the coal is getting thinner. Evidently, the palmy days of the past two or three years are giving place to the time when the management must devise the easiest methods for overcoming the growing difficulties.

Now is the time for the mine superintendent to prove whether or not he has any real efficiency. His fitness will be shown by his ability to adopt more adequate means of drainage and ventilation and improve the system of haulage in a manner that will overcome the increased cost of hauling from greater distances than before. Siphons and pump lines must be arranged to afford good drainage of the roads, which must be maintained in the best possible condition. The ventilating system must be arranged to shorten the distance of air travel, and the air current must be split so as to produce the largest air volume with the least power.

Ability to Master a Situation the True Test

Failure to meet such a situation as the one here described and which must develop sooner or later in every mine, will prove the inefficiency of a superintendent whom the management had been prone to regard as "highly efficient" while things were coming his way. As previously remarked, herein lies the test of true efficiency—the ability to contend successfully with untoward circumstances and conditions.

But, let me suppose that this same mine changes hands, just at the time when it has reached its point of decline. The new officials take hold at a most inopportune moment in the life of the mine. There is much work to be done in cleaning up and starting headings that had been stopped in low coal. Ripping will be required in driving these headings and they must be timbered and graded, all of which increases the cost of operation, while the output becomes less and less owing to the thinning out of the seam.

The proposition here presented is a difficult one. The company must practically open up a new mine, besides cleaning up the old one. Yet *efficiency* on the part of the man in charge will tell. Many supplies in the way of rails and timber will be recovered from abandoned workings; and, finally, the mine will be put on a fair working basis, notwithstanding the increased length of haul and the difficulties of ventilation and drainage. This work of recovering a mine is practical work and requires the highest kind of efficiency on the part of the man in charge.

Again, there are instances on record where changes have been made in the management of mines just as the mine was on the very verge of producing better results than formerly, and the palmy days of large tonnage and low costs were yet to come. The new management then receives the credit for greater efficiency than is their due. Instead, the real credit for putting the mine on its present basis belongs rightfully to the party first in charge.

The point I wish to emphasize, here, is that efficiency must be studied in the light of the practicability of the work in charge. Results are largely determined by coöperation on the part of mine officials, who should be governed by the same purpose of making the mine pay. There should be no quarrels. It is unnecessary for the superintendent to tell the foreman that he is the boss, which the foreman already knows. Coöperation should be the watchword if we expect to succeed.

Rossiter, Penn. J. T. JONES.

INQUIRIES OF GENERAL INTEREST

Comparative Costs in Salt Mining

Kindly permit me to submit the following problem, regarding the comparative cost of two proposed methods, in the mining of salt. One proposition is to pump the salt to the surface in a saturated solution, using for that purpose a centrifugal pump discharging through a 6-in. wood or cast-iron column pipe, the lift being 60 ft. from the sump to the surface. The second proposition is to hoist the rock salt in solid form, using, for that purpose, a self-dumping bucket.

What is desired is to ascertain the comparative cost of handling 60 tons (2000 lb.) per hr., by these two methods. Alternating current of 220 or 440 volts is to be used for driving the motor. When pumping the brine, as in the first proposition, the concentrated solution is to be discharged through a vertical column pipe to a height of 60 ft. In the second proposition, when hoisting the solid salt in buckets, there is first a vertical lift of 15 ft., which is followed by a 20-deg. incline 150 ft. in length. A ¾-in. cable is used in this hoist. The bucket, which is self-dumping, weighs 500 lb. empty and 1500 lb. when loaded to its capacity with salt.

We submit this proposition to *Coal Age* and its readers, hoping for their advice and suggestions, which will be greatly appreciated.

Oakland, Calif. ENGINEER.

So much depends on conditions when considering two propositions of this nature, that *Coal Age* is able to give but a suggestive outline of the relative cost, assuming average efficiencies and other data that can only be taken as approximating more or less closely the actual facts.

1. In the first proposition, rock salt will require about 2½ times its weight of water to form a concentrated solution of brine. The handling of 60 short tons, per hr., of solid salt in a concentrated solution, will require the pumping of 7000 lb. of brine to a height of 60 ft., each minute. In estimating the power we will assume an over-all efficiency in the pump and the motor of, say 60 per cent., and ignore both the velocity head and the friction head, which are inappreciable when discharging 700 gal. through a 6-in. pipe 60 ft. long. The power required, in this case, is

$$H = \frac{60(7000 \times 60)0.746}{0.60 \times 33{,}000} = 950 \text{ kw.-hr.}$$

2. In the second proposition, the bucket holds 1000 lb. (½ ton) and, to handle an output of 60 tons per hr., will require two full hoists or round trips each minute, hoisting practically 1500 lb. to a total vertical height of $15 + 150 \sin 20° = 15 + 150 \times 0.2588 =$ say 69 ft. Here, so much depends on the mechanical arrangement and equipment, that it is only possible to guess at the efficiency of the hoist, which we will assume as 50 per cent. Making two hoists per minute, or 120 hoists per hour, and assuming an efficiency of 50 per cent., the power required will be, approximately,

$$H = \frac{120(1500 \times 69)0.746}{0.50 \times 33{,}000} = \text{say } 560 \text{ kw.-hr.}$$

It is difficult, however, to see what arrangement can be adopted, in the second proposition, to permit of making a round trip in 30 sec., including the time of dumping and changing buckets below.

Exhaust from Steam Pump

Recently, I have had quite an argument with our pumpman, in regard to the proper method of connecting up the exhaust of a steam Cameron pump, so as to avoid the annoyance caused by the exhaust steam.

Our pump is located at the foot of the slope and the exhaust steam often makes the place so hot that it is difficult for the men to work there. We have decided that something must be done to improve the condition. Either we would have to turn the exhaust into a barrel, or make connection direct with the pipe line.

In talking over the matter, I claimed that this connection should be made with the suction pipe. The pumpman, however, claimed that the exhaust should be conducted into the column pipe through which the pump was discharging, making the connection at a certain distance from the pump. The pump is operating under a boiler pressure of 120 lb. gage.

Kindly state which method is correct—whether the exhaust should be connected with the suction or with the column pipe, and why.

———, Mo. ASSISTANT SUPERINTENDENT.

The exhaust from a steam pump located in a mine can be, and often is, connected with the suction pipe, using the precaution to enter the exhaust at a point sufficiently below the pump to insure the steam being injected into the water. In a short suction lift, this connection should preferably be made close to the top of the pipe. It is only where the suction lift approaches the theoretical limit, as determined by the atmospheric pressure acting to lift the water from the supply basin to the pump, that it is necessary to use the precaution just mentioned, in order to make sure of the direct contact of the entering steam with the water in the pipe. Should there be any tendency to spasmodic suction, the entrance of the steam at the top of a long suction lift would possibly cause a back pressure, or give rise to water-hammer due to the sudden condensation of the accumulated steam. This condensation should always take place uniformly, as quickly as the steam enters the pipe if the trouble is to be wholly avoided.

Should the exhaust connection be made with the column pipe, not only would the pump be compelled to exhaust under the head due to the water in the column pipe, but the condensation of the steam in that pipe would have a tendency to interfere with the uniform discharge or flow of water from the pump to the surface and disrupt, to that extent, the action of the pump, with the result that water-hammer would often occur, which would be both annoying and harmful.

We shall be glad to have the suggestions and comments of our practical readers regarding this point.

EXAMINATION QUESTIONS

Mine Examiners' Examination, Springfield, Ill., Dec. 17, 1918

(*Selected Questions*)

Ques.—What are the duties of a mine examiner?

Ans.—The primary duties of a mine examiner, as his title indicates, are to examine the mine for any possible danger that may exist on the roads, travelingways, or air-courses, or in the working places. The examination must include all void and abandoned places and falls where gas or other dangers may exist.

The first examination is made in the early morning, within two or three hours of the time set for the men to enter the mine for work. At that time, the examiner must visit each working place and travel the air-courses and roads, following the air current throughout his section of the mine and stopping to make the necessary tests for gas and to examine the roof and timbers to ascertain if there is any danger present. When this examination is finished, the examiner must return to the mine entrance and enter, in a book kept for that purpose, a full report of his work, stating any dangers that he may have found, by describing their nature and location. It is his duty to withhold the checks of any miners whose places he has found unsafe for work and to deliver these checks to the foreman.

The second examination of the mine is made more in detail, and when the men are at work in their places. At that time, it is the duty of the examiner to observe more carefully the condition of each working place and to give any needed instructions to the miners to insure their safety. The coal-mining laws of Illinois require the mine examiner to see that the air current is traveling in its proper course and quantity, and to measure the air passing in the last crosscut, in each pair of entries, or in the last room, in longwall mines, and at any other necessary points and to note the results in a book kept for the purpose. He must mark the date of his examination on the wall of each place examined.

Ques.—What is a regulator and when can it be used to advantage?

Ans.—A regulator is a device for properly proportioning the quantity of air between two splits, according to their requirements. This is accomplished by obstructing the flow of air in that split taking more than its proper proportion. A mine regulator consists of any device that will reduce the area of passage in an airway and, by that means, regulate the quantity of air circulated in that split.

Regulators are used to advantage where the requirements in any section of the mine or in any air split are such as to demand more air than such section or split would receive in the natural division of the air current. For example, in natural division, the larger portion of the air will pass out through the shorter split, while it is the longer airway that will generally require a greater proportion of the air. In such cases, a regulator placed in the shorter airway will obstruct the flow in that split and cause a larger quantity to pass through the longer split.

Ques.—In a certain coal mine in this state, there are 576 men employed, who are using 22 mules to haul the coal. (a) What quantity of air must be entering the mine to comply with the state mining laws? (b) How many splits will be required?

Ans.—(a) If the mine is not generating gas, the quantity of air required by law is 150 cu.ft. per man per min., and 500 cu.ft. for each mule per min., which makes the quantity required, in that case, $576 \times 100 + 22 \times 500 = 68{,}600$ cu.ft. per min. On the other hand, if the mine is generating gas, the law requires that there shall not be less than 150,000 cu.ft. per man per min., which would make the total required circulation not less than 97,400 cu.ft. per min. In any case, the law authorizes the mine inspector to order that these quantities be increased, if he thinks that more air is required, which order must be made in writing.

(b) The law further provides that the main air current shall be so divided as to give a separate split of pure air to each 100 men employed in the mine. This would require, in the present case, six splits of air, unless the mine inspector exercised his power to require a greater number, which he is authorized to do by law if, in his judgment, this is necessary.

Ques.—(a) Where would you expect to find blackdamp and firedamp in a mine? (b) How could you detect the same?

Ans.—(a) In either case, the mixture will be more apt to be found in places where it is generated, provided the mine is properly ventilated, and the quantity of air passing is sufficient to carry away the gases produced and prevent their accumulation in quantity. On the other hand, where the gas generated in a mine is not promptly swept away with the air current but has an opportunity to accumulate, the heavier blackdamp may be expected to be found at the face of dip headings or rooms and in other low places where the circulation is not sufficient to sweep them away. The lighter firedamp mixtures, under similar conditions, may be expected to be found in cavities of the roof or at the face of pitch headings and in rise workings where the circulation of air is insufficient to keep such places free from the gas.

(b) A blackdamp mixture is easily detected by observing its effect on a lamp flame, which is dimmed or completely extinguished by the gas. A firedamp mixture is detected by observing its effect on the flame of a safety lamp, which must be raised cautiously toward the roof. The presence of firedamp causes a small nonluminous cap to form above the flame when small quantities of the gas are present. As the quantity of gas is increased, the height and volume of the flame is increased, and the flame becomes more or less agitated and, frequently, slight explosions will occur within the lamp chimney as the firedamp mixture approaches its maximum explosive point.

Book Reviews

Truth About the Cost of Living

WARTIME CHANGES IN THE COST OF LIVING. Research Report No. 9, National Industrial Conference Board. Pages viii + 81; 6 x 9 in.; no illustrations. National Industrial Conference Board, 15 Beacon St., Boston, Mass.

This impartial and accurate account of the effect of the war on the cost of living may be commended to all parties, whether viewing matters from the standpoint of labor or from the standpoint of capital. It is not based on wholesale but on retail prices. As the report says, the advance in wholesale prices is not reflected in retail prices until months later. It quotes the United States Bureau of Statistics, which in 1901 found that expenditure for food was about 43 per cent. of the total income; for shelter about 18 per cent.; for clothing nearly 13 per cent.; for fuel and light nearly 6 per cent.; and for sundries a little over 20 per cent.

The report sums up food costs as follows: "Although it is true that standards of living, transportation, accessibility to supply and other factors cause some local variations, 60 per cent. to 65 per cent. fairly reflects the advance in food prices from the outbreak of the war in the summer of 1914 to the middle of June, 1918." The figure 62 is taken by the Conference Board to represent a fair average percentage for the increase in costs in food from the outbreak of the war till June, 1918.

Rents have gone up and down. The report, however, says, "On the whole it appears that an estimate of 15 per cent. for the increase in the rent of workingmen's houses is sufficient, except for communities subject to peculiar conditions."

The cost of clothing has soared higher than either rents or food. "It appears," says this monograph, "that a fair estimate of the increase in the cost of clothing for a wage-earner's family between July, 1914, and June, 1918, would be 70 to 80 per cent. As the increase for lower-cost budgets tends to approach 80 per cent. rather than 70 per cent., the average increase has been placed at 77 per cent."

In summing up the cost of fuel and light the report says: "The cost of fuel and light in different cities varied so greatly in response to a number of local conditions, and the price changes have been so divergent, as to make even an approximation of the increase very difficult. It would appear, however, that in June, 1918, the average price of anthracite was 30 to 35 per cent. higher than in 1914; the advance in bituminous coal was considerably greater. The price of gas showed a much smaller percentage of increase and in many cities remains unchanged.

"The increase in the cost of fuel and light has been placed at 45 per cent. This estimate has not the same validity as have those for food and clothing. For the latter the data secured were not only more extensive but more uniform than was the case with fuel and light, for which local conditions determine many of the factors entering into the increased cost. Since, however, fuel and light constitute less than 6 per cent. of the total family expenditure, a considerable variation in the percentage of increase has but little effect on the budget as a whole."

The concluding remarks of the Board are as follows: "Taking into consideration all of the factors in the problem, the evidence points strongly to the conclusion that for the great majority of American communities the average increase in the cost of living between July, 1914, and June, 1918, lies between 50 and 55 per cent. Clothing showed the most marked advance of any of the major items in the budget—77 per cent.—but quantitatively this is less important than the 62 per cent. increase in the cost of food, since food represents about 43 per cent. of the average expenditure, while clothing represents only 13 per cent.

"It should be repeated that in certain localities, particularly where there have been unusual advances in rent, the increase in the budget has been as a whole somewhat greater. Since rent requires about 18 per cent. of the ordinary family expenditure, each further increase of 5 per cent. in this item means the addition of about 1 per cent. to the budget. It is thus a simple matter to adjust the board's estimate to fit communities where unusually large rent increases have occurred. Similar adjustments to allow for local conditions affecting the cost of fuel would not result in an important modification of the general average."

The estimate for the advance in sundries, which sundries make 20 per cent. of the wage-earner's budget, include the advance in carfare, furniture, insurance, medical service, books, recreation, religious and charitable expenditures, luxuries and incidents. The report assumes (really it would appear without believing it to be true, to judge by its comments on each item in turn) that an average of 50 per cent. will represent the increase in cost of sundries. This "sundry" estimate is the lame leg of the whole report. The argument for 50 per cent. could, however, have some show of justification if the item "furniture" were given a place in the elaboration of the argument—for furniture has certainly soared.

Moreover, a further justification would have been found if the board had said, as is in fact true, that insurance has gone up as much as the workingman's budget. Instead the board says lamely, "Insurance has shown practically no change." It is true that $10 will buy as much life or accident insurance as before the war, but when the money is delivered what will it buy?—not so much as before the war but only 66⅔ per cent., assuming that prices have gone up 50 per cent. A workingman is no longer as well insured as he was before the war unless he has increased his insurance premium.

It is the same with savings. Savings, like insurance, represent deferred purchases. If the cost of the things to be furnished, the food, shelter, clothing, fuel and light rise in price, the savings and insurance should be higher to meet them. British figures of increased cost of living as quoted recently by the United States Bureau of Labor Statistics are similarly vitiated.

However, the report is unbiased and in every way excellent. It is an authoritative statement, capable of amendment for certain local conditions, and it will show which wage increases had a degree of profiteering taint and which wage increases were too small. It will show who were profiteers and who the sad victims of wage profiteering. All who received increases in wage above the increase in cost of living and cost of transferring their labor were profiteers. All who received advances in wage less than the advances in cost of living were victims of the profiteering on the part of other laboring men.

More Short Monographs Wanted

MINE TRACKS, THEIR LOCATION AND CONSTRUCTION. By J. McCrystle. Pages x + 102 + 3 index, 23 ill. McGraw-Hill Book Co., Inc., 239 West 39th St., New York City. Leather. Price, $1.50 net.

An extremely welcome reprint of articles appearing in *Coal Age* is J. McCrystle's "Mine Tracks," treating briefly and well of the materials used and the principles involved in the design and installation of mine tracks and containing rules for standard practice. We need a series of inexpensive monographs of this sort on all the many phases in coal mining, and we trust that one so capable as Mr. McCrystle may soon venture to meet in one or more directions the public's urgent need.

FOREIGN MARKETS AND EXPORT NEWS

Output and Distribution of British Coal in 1918

The following table, which has been prepared by the Department of Coal Supplies of Great Britain, shows the output and distribution for 1918, as compared with 1917 and the pre-war year 1913. The reduction of 16½ million tons—about 10 per cent. in home consumption in 1918, as compared with 1913—in spite of the increased requirements of industries and transport connected with the production of munitions, was brought about by the curtailment of supplies to less essential industries and for domestic consumption. Exports were at the same time restricted to the quantities necessary to supply the requirements of the Allies, and to meet obligations to neutrals in connection with agreements, under which they furnished England with shipping and other services essential to the successful conduct of the war.

	1913	1917	1918
	— Millions of Tons —		
Output	287½	248	226½
Withdrawal from stocks at pits	....	....	1½
Additions to stocks at pits	....	2	....
Mine consumption and miners' coal	22½	22½	22½
Net output distributed	265	224½	205½
Bunkers (foreign and coastwise) and Admiralty shipments	25½	27	25½
Exports	77½	38½	34½
Home consumption	162	159	145½
Totals	265	224½	205½

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Mar. 10 states that freight market conditions are practically the same as a week ago, and the few charters completed for export coal during this period were at the Chartering Committee's maximum rates. There is little demand for steamers to take coal to West Indian ports, but the demand continues for tonnage for South American ports. Tonnage is difficult to obtain to latter destinations. The Chartering Committee's rates are as follows:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis., Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum) — Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates). On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Range, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net, with 1000 tons dis. to Rio, $19.50 net, 1000 tons dis., or $21, 600 tons dis. to Santos; $18.50 net, 1000 tons dis. to Buenos Aires, and $19.50 net, with 750 tons dis. to Montevideo.

Danish Coal Imports in 1918

In November, 1918, Denmark imported 72,086 tons of coal from the United Kingdom; 19,254 tons from Germany; 156 tons from other places. In October, 1918, the coal exports to Denmark from the sources enumerated above totalled 61,167 tons, 42,512 tons and 156 tons respectively. For the period January to October, inclusive, 1918, the Danish coal imports amounted to 889,742 tons from the United Kingdom, 620,792 tons from Germany and 2227 tons from other places.

During December, 1918, the importation of coal virtually ceased, due to the disturbed conditions in Germany and the fact that England temporarily stopped coal shipments to Denmark following the armistice.

The "Calcutta Gazette" reports that only 1,014,993 tons of coal were exported from Calcutta in 1918, as against 3,017,180 tons in 1913-14.

Hampton Roads Coal Exports

NORFOLK

Lamberts Point			Cargo	Bunkers
Mar. 1	Nor. S.S. Roar	Manzanillo, Cuba	1,710	202
Mar. 1	Amer. S.S. Lake Chelan	Cristobal, C. Z.	2,325	238
Mar. 1	Nor. Sp. Protector	Rio de Janeiro, Brazil	2,775	....
Mar. 3	Nor. S.S. Nepos	Barbados, B. W. I.	4,034	1,471
Mar. 4	Swed. S.S. Hermes	Havana, Cuba	2,305	134
Mar. 4	Amer. S.S. Lake Markham	San Juan, P. R.	2,328	328
Mar. 5	Ital. Bk. Rosa M.	Bagnoli, Italy	1,956	....
Mar. 5	Nor. Bk. Hero	Montevideo, Uruguay	3,660	....
Mar. 5	Amer. S.S. Randolph M. Warren	Rio de Janeiro, Brazil	2,701	1,284

NEWPORT NEWS

Mar. 3	Amer. S.S. Lake Desha	Cristobal, C. Z.	2,965	464
Mar. 3	Brit. Sch. Edith M. Dawson	Fort de France, Martinique	723	....
Mar. 4	Dan. S.S. Henry Tegner	Nuevitas, Cuba	1,959	166
Mar. 4	Dan. S.S. Erik II	Antilla, Cuba	2,654	204
Mar. 4	Amer. S.S. Lake Arline	Santiago, Cuba	2,027	563
Mar. 5	Am. Sch. Augusta G. Hilton	Pernambuco, Brazil	2,370	....
Mar. 5	Amer. S.S. Kennebunk	Sagua la Grande, Cuba	1,108	....
Mar. 5	Nor. S.S. Ryvarden	Santiago, Cuba	1,444	182
Mar. 7	Am. Sch. Calvin P. Harris	Gibara, Cuba	559	....

To Construct Barge Fleets for Shipping Coal South

The Mississippi Valley Association, which represents commercial and shipping interests, is planning extensive development of the inland waterways, especially the Mississippi River and its tributaries, as a means of promoting the expansion of foreign trade, particularly in coal. The plan contemplates the construction of barge fleets for the transportation of coal to the South American markets. It is believed that coal cargoes originating on the Ohio, Monongahela, Kanawha and Warrior Rivers and the tributaries of the Mississippi, can be shipped to New Orleans and thence to foreign ports at a lower rate than is now given in all-rail routes to the seaboard and from Atlantic ports to the South American countries.

Coal and Coke Exports from New York in January

Comparison of the coal and coke exports from the Port of New York during the month of January this year shows a decided gain both in tonnage and valuation as compared with January of 1917 and 1918. The table also shows that the markets for anthracite and bituminous coals have changed considerably, while the markets for coke remain, with a few exceptions, practically the same. The tabulations follow:

To	Anthracite						Bituminous						Coke					
	1917		1918		1919		1917		1918		1919		1917		1918		1919	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Argentina	1,075	$8,600	..	.....	.....	.....	....	.....	..	.....	700	$5,600	.....	.....	....	.....	..	.....
Barbados	50	625	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	..	.....
Bermuda	.....	.....	99	$792	.....	.....	128	$940	..	.....	....	.....	.....	.....	....	.....	..	.....
Bolivia	96	1,366	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	..	.....
Brazil	290	2,197	..	.....	.....	.....	987	4,935	..	.....	....	.....	18	$440	....	.....	..	.....
British West Indies	1	13	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	..	.....
Canada	3,676	$28,329	...	.....	8,375	$69,839	....	.....	..	.....	524	4,223	.....	.....	....	.....	..	.....
Chile	57	495	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	60	$1,410	..	.....
Costa Rica	14	145	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	..	.....
Cuba	93	800	200	$2,200	.....	.....	8	$80	..	.....	....	.....	24	234	....	.....	..	.....
Colombia	....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	4	43	....	.....	15	$430
Danish West Indies	....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	20	520	..	.....
Denmark	169	2,269	..	.....	.....	.....	....	.....	..	.....	508	3,404	.....	.....	....	.....	..	.....
Ecuador	....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	..	.....
France	....	.....	4	40	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	11	360
French West Indies	....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	1,555	9,522	1,370	13,700	..	.....
Italy	....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	20	200	143	3,790	6	168
Jamaica	2	12	..	.....	.....	.....	....	.....	..	.....	1,349	10,117	.....	.....	....	.....	..	.....
Mexico	2	21	..	.....	.....	.....	926	3,341	..	.....	32	463	14	196	....	.....	2	80
Newfoundland	.....	.....	177	1,101	87	702	....	.....	..	.....	....	.....	.....	.....	....	.....	..	.....
Panama	90	675	10	90	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	..	.....
Paraguay	....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	..	.....
Peru	....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	....	.....	8	15
San Domingo	2,319	19,521	..	.....	1,905	13,734	....	.....	..	.....	55	1,301	13	120	5	135	55	1,650
Salvador	....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	3	35	....	.....	..	.....
Trinidad	.....	.....	..	.....	.....	.....	....	.....	..	.....	....	.....	.....	.....	1	27	3	63
Venezuela	....	.....	..	.....	.....	.....	....	.....	30	$285	....	.....	.....	.....	....	.....	..	.....
	....	.....	..	.....	.....	.....	....	.....	500	3,150	....	.....	9	112	....	.....	470	13,225
Totals	7,934	$65,068	490	$4,223	10,367	$84,275	2,049	$9,246	530	$3,435	3,168	$25,108	$1,660	$10,902	1,599	$19,582	570	$16,091

COAL AND COKE NEWS

What Happened in February

[The bracketed figures in the text refer to pages in the present volume and should the reader desire further information he can obtain it by reference to the pages indicated.]

Feb. 1—Mine Workers' representatives meet presidents and secretaries of New River Association and Winding Gulf Operators' Association at Charleston, W. Va., who refuse to discuss a new scale regarding demand as in violation of contract [XV, 370]—Maximum prices on anthracite and all the coal and coke regulations, except three, are suspended [XV, 282]—Allison O. Smith, special umpire of Fuel Administration, makes several decisions for New River and Winding Gulf fields [XV, 411].

Feb. 3—Florence and Sydney mines of Nova Scotia Steel and Coal Co. closed down owing to alleged interference of Dominion Iron and Steel Co. with its workings [XV, 339. 456].

Feb. 5—Annual banquet of Engineers' Society of Northeastern Pennsylvania [XV, 364].

Feb. 7—White mines of H. C. Frick Coke Co. are abandoned [XV, 382]—River tipple and trestle of Hecla Coal and Coke Co., Isabella, Fayette County, Pennsylvania, destroyed by fire [XV, 382].

Feb. 10—Store of Federal Coal Co. at Cary, Ky., burned down [XV, 382].

Feb. 11—Alicia mine of W. H. Brown, with 400 coke ovens, all located just above Brownsville, closed down indefinitely [XV, 382]—Coal price regulation in Canada ends [XV, 422].

Feb. 14—Southern Appalachian Coal Operators' Association meets at Louisville, Ky. [XV, 397, 398]—Mine workers of West Virginia parade at Charleston, W. Va., as a protest against "Red flag bill" [XV, 457].

Feb. 17—American Institute of Mining Engineers meets at New York City, adjourning Feb. 20 and changing its name to American Institute of Mining and Metallurgical Engineers [XV, 237, 448, 449].

Feb. 18—J. R. Gilmore, president District 29, and Lawrence Dwyer, international board member of same district, arrested as implicated in shooting affray [XV, 498].

Feb. 20—Mr. Deitrich, representative from Allegheny County, Pennsylvania, introduces bill providing that where injury arises from failure of employer to obey safety requirements no consideration shall be allowed to affect liability of em ployer [XV, 498].

Feb. 21—Frank Farrington advocates 6-hour day, 5-day week, as cure for shortage of demand for coal [XV. 499]—Fire breaks out in the South Wilkes-Barre No. 5 colliery of Lehigh and Wilkes-Barre Coal Co., and is walled in on Feb. 23 [XV, 469].

Feb. 23—Sir Guy Spencer Calthrop, controller of British Coal mines, since 1917, dies of influenza [XV, 471].

Feb. 24—The Amalgamated Mine Workers of Nova Scotia sign contract providing for 8-hour day with no suspension for meal [XV, 499].

Feb. 25—V. Everit Macy announces that the National War Labor Board awards the marine workers of New York an 8-hour day, 6-day week and a week's holiday a year, the short day to be paid for at the same rate as the long day. No retroactive provisions or increase in wage incorporated in decision.

Feb. 27—Meeting of New York State Coal Merchants' Association—Wood tipple at Kellar-Klondyke mine near Clinton, Ill., is blown down by explosion [XV, 510].

Feb. 28—William C. Redfield announces formation of Industrial Board of Department of Commerce to stabilize prices at a lower and "equitable" level.

Harrisburg, Penn.

On Mar. 13 Governor Sproul addressed a letter to Attorney General Schaffer asking what powers are vested in the State government to inquire as to the cause for the proposed advance in the price of anthracite, after a mild winter and when mines are on short time because of a lessening of demand, and suggesting that, if necessary to secure authority, the matter be referred to the Legislature, which is now in session. The Governor's letter follows in part:

I know there have been investigations of one kind or another by committees and commissions from different authorities and that the first result of the recent intervention of the Federal Government in the matter was an immediate and wholesale increase in prices, especially to the small consumer. Our Legislature now being in session, it has occurred to me that, if we lack the legal machinery to make the proper inquiries and to protect our people against any unreasonable profiteering in this necessity of life here in Pennsylvania, now is the time to establish such machinery. If we have the power to regulate the prices of food and other essentials of life for our people, have we not some rights in the question of fuel prices in case we should be able to establish the fact that hard coal costs are unreasonably high?

Coming right at this time, when the efforts of patriotic people everywhere are directed toward restoring the cost of living to a normal basis and when we are all bending every energy to provide means of employment in order to help stabilize labor conditions in the country, it would seem to me that there would have to be extraordinarily good reasons to justify an increase in the cost to our people of such a necessity to comfortable existence as anthracite coal.

If it is necessary to have a legislative commission investigate the matter, or action is required in other lines to make the power of the State effective in the situation, I am prepared to recommend such action upon the receipt of your advice as to how best to accomplish the results we desire. I shall, therefore, be greatly obliged to you if you will give immediate consideration to this communication.

Uniontown, Penn.

The Pittsburgh Steel Co. is now the owner of the Alicia No. 1 and No. 2 mines, 2400 acres of Fayette and Greene County coal, the marine ways adjoining the mines on the Monongahela River and a fleet of three river tugs and 50 barges. The property was sold by Capt. W. Harry Brown, one of the largest independent coke operators in the Connellsville region, for a consideration of approximately $4,000,000. The deal has been pending for several weeks and several times has been reported consumated. Confirmation of its closing in Pittsburgh last Saturday morning was made a few hours later at the Brownsville office of the Brown interests.

The deal represents one of the largest transfers of coal property in recent years and removes from the market one of the best brands of coke manufactured in the Connellsville region. The entire output of the two plants will be used to supply fuel for the mills of the Pittsburgh Steel Co. Heretofore the steel concern has been securing the major part of its coke supply from the W. J. Rainey interests.

Involved in the deal is the Alicia No. 1 works at Brownsville and the Alicia No. 2 works at Grays Landing, on the Greene County side of the Monongahela River. The output of the two Alicia plants will be hauled in barges down the Monongahela River to the Monessen mills of the Pittsburgh Steel Co. about 15 miles distant.

The Alicia No. 1 plant is reputed to be one of the most modern and best equipped coking plants in the Connellsville region. Construction of that plant was commenced in 1908. The plant includes 400 rectangular ovens equipped with the Mitchell McCleary doors. The pusher, leveler and conveyor installed is the product of the Connellsville Machine Car Co. There are 500-hp. Buckeye engines and the power plant has a capacity of 600 kw. One of the features of that plant is a large steel traveling bridge which spans a double railroad track and joins a river tipple. A coke crusher is located at the upper part of the plant and has a capacity of 15 to 18 cars of crushed coke daily. The traveling steel bridge represents an investment of $200,000. At the works are 150 dwellings for workmen as well as the administration building which contains the company store, post office and offices.

Coal land involved in the sale was purchased in 1912 from J. V. Thompson. There were originally 1000 acres at the Alicia No. 2 plant, but Mr. Brown later acquired 800 acres. There yet remain 1000 acres undeveloped in the Alicia No. 1 field. Shipments from Alicia No. 2 are entirely by river, but facilities both for rail and river shipment are maintained at Alicia No. 1.

Charleston, W. Va.

It was rather startling to learn that a car shortage was developing during the week ending Mar. 15 in all districts through which the Chesapeake & Ohio Ry. passed. This has been expected for some time, because it was realized that when orders for coal did become more plentiful it would be found that many cars were tied up with unloaded coal or else scattered to the four winds, as is now the case. Of course, this means in West Virginia that there is an augmented demand for coal and that mines are beginning to be operated on a more regular schedule.

So far, however, there has been no material increase in the output, production during the first and second weeks of March averaging about the same as it had during the latter part of February. It was significant, also, that there had been no further decreases and that if anything there had been a further advance, although the trade had not had an opportunity to fully respond to an improvement in market conditions.

What caused operators to look for an increase in orders was the significant improvement in the New England market and the fact that an accumulation of coal at tidewater points had been greatly reduced. However, there seemed no prospect of any large volume of export business. West Virginia producers also observed a more insistent call for coal in the Western market.

Surplus stocks of coal are being so rapidly depleted that West Virginia coal men feel assured that just as soon as lake navigation is resumed, in a few weeks, it will be a signal for the resumption of general activity in the mining business. The prediction is even made that by July there will be such a stiff demand that there will be an increase of at least a dollar per ton on coal. During the first part of the week beginning Mar. 10 mines were being operated on about a 50 per cent. schedule, as against about 40 per cent. for the previous week. That meant some mines at least were running three days a week as against one and two days during previous weeks.

Dallas, Tex.

Texas lignite beds will soon be developed and the lignite produced therefrom used as fuel by the industries of this state, thus eliminating the necessity of shipping coal for fuel from long distances to industries situated on extensive lignite beds in east and northeast Texas. The Federal Government's Bureau of Mines is preparing to locate an experimental plant in Texas in close proximity to the lignite producing areas in an effort to work out some plan by which the Texas lignite may be dehydrated and rendered more fit for fuel.

The difficulty with the Texas product has been that it has such a high water content that its use as fuel has been thereby rendered impractical, and industries situated over extensive lignite beds have been forced to ship coal from Oklahoma or Colorado for use in their furnaces. Experts of the Federal Bureau of Mines believe that by a carbonizing process the lignite may be made fit for fuel. This process, it is explained, is similar to coking and leaves as a residue a gas which also has value

for its commercial use. The coal or lignite remaining can be burned in an open grate, in furnaces, or made into briquets approximating anthracite coal.

The location of this experimental plant has been taken up by the Texas Lignite Operators' Association, and at a meeting last week at Waco the situation was discussed. It is considered likely that Waco will get the plant, as the Government has announced that the location will be largely determined by nearness to lignite beds and to a city at which the gas produced from the plant could be marketed, and Waco offers both of these. Lignite can readily be delivered from the beds in Milan County, some of the most extensive in the state, to Waco for $2 a ton, the cost at the mine being $1.50 a ton, and Waco at this time is planning the erection of a municipal artificial gas plant. The by-products from a ton of lignite, it is estimated by the lignite operators, would be worth $22.

New York, N. Y.

A committee composed of J. R. Thomas, president, Carbon Fuel Co., Charleston, W. Va.; W. G. Ireland, sales manager, Jamison Coal and Coke Co., Pittsburgh, Penn.; Harry Boulton, president, Central Pennsylvania Coal Producers' Association, Clearfield, Penn.; John J. Tierney, vice president and general sales manager, Crozier-Pocahontas Coal Co., Philadelphia; John J. Brophy, treasurer and general manager, Piedmont and Georges Creek Coal Co., Frostburg, Md.; Arnold Gertsell, sales manager, Percy Heilner and Sons Co., Philadelphia, and Wilbur A. Marshall, president, Wholesale Coal Trade Association of New York, was appointed to revise the rules of the Tidewater Coal Exchange, and particularly the classification of mines, at a meeting held in Washington, D. C., on Mar. 14 and 15. The meeting, which was held at the Shoreham Hotel, was called by the Executive Committee and Permanent Railway Committee of the Tidewater Coal Exchange to consider objections which had been made or were to be made to the rules, regulations and practices of the Exchange. It was attended by about 150 operators, trans-shippers and consumers.

After the various complaints had been discussed, and new recommendations had been considered, Charles S. Allen, secretary of the Wholesale Coal Trade Association of New York, offered a resolution providing for the appointment of a committee to revise the rules of the Exchange, and also the classification of mines.

During the meeting F. M. Whitaker, of the U. S. Railroad Administration, read a statement which showed the saving to the railroads, from Aug. 1, 1917, to Jan. 31, 1919, to have been:

Tonnage dumped	48,785,967
Number of cars dumped	967,800
Car days saved on gross detention basis	1,747,600
Saving effected on per diem	1,048,560
Cars saved	47,035
Investment necessary to have procured 47,035 cars at $2900 per car	$136,401,500
Interest on above investment at 6 per cent	$8,184,090
Credits extended to members (excluding Government members), tons	3,000,000

As a result of the meeting it is more than likely that the Exchange will be continued in operation, it being favored by the Railroad Administration and a large proportion of the coal operators and shippers. The committee is to meet in Philadelphia, Friday, Mar. 21, at the offices of the Tidewater Coal Exchange.

Victoria, B. C.

There has been a revival in Vancouver, B. C., of the agitation against the coal dealers because of what is termed the excessive cost of fuel to the consumers in view of the fact that the coal mines of Vancouver Island, the sources of supply, are only some sixty odd miles distant. The discussion arose through the statement of T. D. Bulger, Dominion Fair Wage Officer, that the Island miners obtained their domestic coal for $4.50 a ton, with an extra dollar a ton for delivery. This was the same coal which was selling in Vancouver for $10.15 a ton. The dealers declare that their profit at the latter selling price is not more than from 40 to 47c. a ton. They say that they buy their coal at $6.45 or $7.20 a ton loaded on the scow at Vancouver Island, but that added to that figure are such expenses as freight charges, insurance, unloading, screening, sacking and delivery. These items, with the wages of all engaged in the operations at from $4 to $5 a day and a loss in screening of from 10 to 15 per cent., accounted for the difference between the purchase price at tidewater on the Island and in the cellars of the consumers.

If the coal miners were getting their coal for $4.50 at the pit mouth the opinion was expressed by the dealers that they must be obtaining it below cost. It was further explained that the reason that some dealers were able to sell at $10.15 and others were forced to charge $10.50 a ton was that the Fuel Controller had issued an order requiring the Canadian Western Fuel Co. to sell at not more than $6.45 per long ton loaded on scows, while the Canadian Collieries (D), Ltd., were permitted to dispose of its coal at a higher figure, which it had fixed at $7.20 per long ton on scows. This decision had been reached after an investigation into the cost of production in the cases of the different collieries of the Island. The dealers' contention is that the prices to the consumers are based on expenses and a profit to them of not more than from 40 to 47c. a ton.

PENNSYLVANIA

Anthracite

Hazleton—The G. B. Markle Co. has announced that the war gardens which were a great success for the past two years will be continued this summer. The plots, 30 x 100 ft., are rented for $1 a year, which includes plowing and fertilizers.

Hazleton—Plans considered by the Lehigh Valley Coal Co. to electrify a number of additional operations of that company have been given a setback, because of the high price of materials and labor, it was learned on Mar. 10. Especially was work planned for the Lehigh region, and this has been halted by the holding up of prices for materials. This condition makes future plans of the company rather uncertain.

Shickshinny—A recent fire which destroyed bridges spanning the Susquehanna River has made it necessary for the West End Coal Co., across the river from Shickshinny, to place a number of large boats in service so that the mine employees living on the opposite side of the river from the mines can get to work in the morning. Over 500 men a day are taken over in small rowboats. The county and the coal company are arranging to place several ferry boats in use as soon as they can secure them.

Hazleton—H. M. Crankshaw, former manager of the Cranberry Creek Coal Co., has been retained as consulting engineer by the G. B. Markle Co. With the appointment of Chief Engineer J. B. Warriner, of the Lehigh Coal and Navigation Co., to succeed H. M. Crankshaw as manager of the Cranberry Creek Coal Co. and Alliance Coal Co., the office formerly held by Mr. Warriner was abolished and several other departments of the Lehigh Coal and Navigation Co. were merged. Mr. Crankshaw has postponed his return to England until he has completed an investigation of the Markle holdings on the North Side and has submitted a report showing the best means for extending the operations and increasing the output.

Wilkes-Barre—The Court of Luzerne has handed down appointments of mine inspectors' examining boards for Luzerne and Carbon Counties, and mine foremen's boards. The members of the mine inspectors' examining board succeed themselves for another term, being as follows: E. R. Pettebone, Dorranceton, consulting engineer of the Hudson Coal Co.; John M. Humphrey, of Wilkes-Barre, chief mining engineer of the Lehigh Valley Coal Co.; Cornelius McLaughlin, of Avoca; John Larkin, of Nanticoke; and Thomas Gallagher, of Lansford, practical miners. Few changes were made in the personnel of the mine foremen's examining boards, mainly owing to the removal of mine superintendents from one district to another.

Bituminous

Brownsville—The H. C. Frick Coke Co. is putting about 2000 beehive coke ovens out of blast this week in different parts of the Connellsville coke region and curtailing its coal output accordingly.

Savan—The tipple for the new operation of the Hess Coal Co. near here is in course of erection. The railroad siding has been graded and the public road changed, which was necessary for the erection of the tipple. A tramroad about one mile in length will be built from the mines to the tipple. Shipments will be made over the Buffalo, Rochester & Pittsburgh R.R.

Waynesburg—The Cumberland Coal Co. has purchased an interest in the J. C. Garard tract of coal land containing about 300 acres. The same company has purchased from Thomas B. Semans, of Uniontown, an interest in 19 tracts of coal land in this county for $154,876.53.

Mrs. Josephine Moore Heft, of Bridgeport, Conn., has purchased one-half interest in two tracts of coal in Jackson township from R. E. Kent and J. B. Gordon. Mrs. Heft also purchased a one-half interest in 79 acres in Gilmore township from E. C. Fordyce and Mrs. Louisa M. Fordyce.

WEST VIRGINIA

Fairmont—Construction work at the plant of the Domestic Coke Corporation, the new $5,000,000 coke byproduct concern, for the time being will be under the direct supervision of C. V. Critchfield, of Ohio, vice president of the concern. As, told in a recent issue of "Coal Age," construction work is to be resumed without delay and the installation of 60 byproduct ovens at a cost of $3,000,000 is to be rushed to completion.

Ansted—A revival of market activities has been reflected in the business of the Gauley Mountain Coal Co., whose plant is located at this place. Instead of operating its mines only three days a week the company is now able to employ its miners on an average of five days a week. At the same time the company has been able to increase its coke loadings and on a recent Sunday 22 car-loads of coke were pulled and loaded. In fact the coke output of the company is now limited only by the capacity of its ovens and the number of cars it can secure.

OHIO

Diamond—What is known as the old Kimberly mine is being reopened after being idle for a number of years. The mine is being cleaned up and it is expected to be in operation by June 1.

Bristol—The Huffman Mining Co., which has headquarters in Columbus, is busy on the work of opening a new mine on the Baltimore & Ohio R.R., near here. The company, of which T. J. Huffman is the head, has acquired 200 acres of land, on which a tipple has been built. It is expected to load coal in about 90 days.

INDIANA

Clinton—Miners of the Clinton coal field have agreed to work by the old time when the clock hands are moved forward Mar. 30. The miners say that a coal mine just before daylight is a very desolate as well as a dangerous place, especially on foggy mornings.

ILLINOIS

Carlinville—Trains on the Chicago & Alton R.R. are now run into Shoper, the new mining town opened by the Standard Oil Co. The crossing of the Chicago & Alton and the Northwestern has been completed and the first train ran Mar. 13 over the dam up to the mines.

Rutland—The tower of the Rutland coal mine has been destroyed by fire. The fire was not discovered until too late to save the structure, but the engine and boiler rooms nearby were saved. The loss is covered by insurance. The miners had not been working for several days as the boilers had been condemned. The company, the United States Coal and Coke Corporation, will rebuild.

De Soto—The Racine Co. has taken options on about 600 acres of land near De Soto and is boring holes in search of a big seam of coal. The company is really looking for the No. 5 seam of the famous coal mine at Murphysboro, and if it is found it will mean a large coal mining industry for De Soto, which now has a mine working 168 men, and another ready to start mining on a somewhat smaller scale. The Racine Co. has finished two holes and the drill is now at work on the third, which is to go deeper than the others. It is about 70 ft. to the bed of coal already being mined around De Soto.

Carlinville—The Standard Oil Co. mine on a recent day established a new record, hoisting 1212 loads, or 968 tons, which shows that the efficiency of the mine has increased greatly. While many mines in the state are idle, the Standard Oil mine here is running at full capacity. The Standard mine at Berry is producing coal and the machinery will soon all be in place for record-breaking runs. The Hunt Engineering Co., which has the contract for sinking the shaft, expects to turn over the mine to the Standard within a few days. Work is also progressing at the great mine at Shafer, and coal is being taken from both the main shaft and the air shaft in carload lots. When all the producing machinery is installed it is believed the mine will be the largest producer of coal in the world.

KENTUCKY

Whitesburg—It is announced here that the Southeast Coal Co., of Seco and La Viers, will put in a third mining plant on Thornton Creek, an important new territory being opened by a branch line of the Louisville & Nashville, a few miles out from Sergeant. It is reported that the work will soon be launched.

Central City—Two hundred miners have been thrown out of work and the operations of the Madison Coal Corporation, formerly the Central Coal and Iron Co., are at a standstill due to the loss of a big tipple by fire on Mar. 10. The blaze started from a defective flue in the weighroom, and spread rapidly. It is planned to rebuild the tipple at once. The Madison Coal Co. supplies considerable coal for the Illinois Central Railroad Co., with which it is allied, and is one of the most important company connections.

ARKANSAS

Midland—The first mine in Arkansas to be equipped with electrical undercutting machinery will soon be put in operation at this place by the Majestic Coal Co., of Fort Smith, which has recently been organized. The company own 290 acres of coal land and has leases on 300 adjoining acres in the Hackett-Excelsior vein, from which is mined some of the finest steam and domestic coal in the Southwest. The company will begin sinking its shaft not later than Apr. 1. It will be located one mile north of Midland No. 6 mine.

Personals

A. L. Learned has been appointed assistant to the president of the Lehigh Coal and Navigation Co., Lansford, Penn.

T. E. Barry, of Akron, Ohio, former union passenger agent, has been elected vice president of the Kendall Coal Mining Co. of Cleveland, Ohio, and has given up his connection with the Pittsburgh Coal Company.

James Conner, formerly mine foreman at the Freeport No. 1 mine at Dunbar, Penn., has been transferred to the Ferguson mine superseding **George Stockdale**, who has been granted a leave of absence for a much needed rest.

E. A. Holbrook, superintendent of the Urbana station of the Bureau of Mines, has been called to Washington to act as chief mining engineer of the bureau during the absence of George S. Rice, who is in Europe studying mine rehabilitation.

F. M. Sackett, of the Byrne & Speed Coal Co., Louisville, Ky., who served as Kentucky Food Administrator during the war, was the recipient of an unusual honor at an "after-the-war conference" in Lexington recently, being awarded a medal for distinguished service during the period. A medal was also awarded to E. W. Hines, chairman of the State Council of National Defense. The medals were awarded through the American Social Science Association.

W. D. Hamer, representative of the Electric Service Supplies Co., Philadelphia, Penn., has been transferred from his former territory in the Middle West to a southern territory with headquarters in Atlanta, Ga. He has been connected with the company for 14 years. Prior to 1905 he was employed in the stores and engineering department of the Lehigh Valley Coal Co. In 1917, with the courtesy and coöperation of the Nashville Railway and Light Co., he proposed and developed the first prepayment car operated in the South. Mr. Hamer also is inventor of the well known Keystone triangle arm.

Obituary

James M. Poyner, a prominent electrical engineer, for ten years connected with the Baltimore office of the General Electric Co., died, at the age of 37, of influenza, after an illness of ten days at Charleston, W. Va., on Mar. 3.

Charles E. Hurd, aged 33, formerly of Boswell, Penn., died in France in February of pneumonia. He had enlisted in the Engineers a year ago, and after a short training went to France. At the time of his enlistment he was employed by the Merchants' Coal Co. as a mining engineer.

William H. Yawkey, of New York City (formerly of Detroit), died Mar. 5 in Augusta, Ga. He was extensively interested in West Virginia coal properties, particularly in Boone and Logan Counties, where, it is said, in association with Colonel Freeman, of Huntington, 40,000 acres in all were owned. Mr. Yawkey was one of those prominently interested in the organization of the Big Creek Development Co., a large concern which recently passed into the control of others. He was at the time of his death one of the officers of the Pond Fork Coal Company.

W. R. Wilburn, general manager of the various mines in the Pennsylvania bituminous fields and the West Virginia field, of the Madeira-Hill Coal Mining Co., died at his late residence in Philipsburg, Penn. on Friday, Mar. 7, 1919. Mr. Wilburn was well known as an expert in mining, and was respected and liked by his fellow operators.

Mr. Fairbanks, of Chicago, Ill., for many years employed as the legal advisor of the W. P. Rend coal interests, died on Mar. 7. The Rends in particular, and the coal trade in the Middle West in general, feel that they have lost a valuable friend. Mr. Fairbanks was connected with the Rends for the last twenty-five years, and during that time has made a great number of acquaintances in the coal industry, both in the East and in the Middle West. Mr. Fairbanks' death is deeply regretted by a host of his friends, as his absolute reliability and his lovable character had endeared him to all who knew him.

Industrial News

Chicago, Ill.—The Roberts & Schaefer Co., engineers and contractors, are sending free of charge to anyone desiring it an exceedingly practical, vest pocket rule handy for scaling blueprints.

Mahanoy City, Penn.—The Lehigh Valley R.R., operating the Park Place Colliery, located near Mahanoy City, has placed into effect a new seven-hour per day working schedule for an indefinite period. A total of over 800 persons are employed at the mine.

Whitesburg, Ky.—A strike at the mines of the Stoner-Elkhorn Coal Co., in the Beaver Creek section, has been settled satisfactorily to the company. One of the reports stated that an increase in the wage scale was made, but it is understood that the strike was over operating conditions, and not over the wage question.

Birmingham, Ala.—The tipple of the Empire Coal Co. at Empire, Ala., will be completely remodeled and equipped with car hauls, revolving dumps, Marcus picking table screen and loading boom, the installation of this equipment having been contracted for with the Roberts & Schaefer Co., of Chicago.

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces that it has moved its Detroit office from 236 Hancock Ave. to 502 Farwell Building. The Boston office of the company has been removed to 182 High St., while an office and warehouse has been opened at Tulsa, Okla., and at El Dorado, Kansas.

Buffalo, N. Y.—J. H. Hillman & Sons Co., of Pittsburgh, are opening an office at 428 Prudential Building, with Thomas B. Dunbar, formerly with B. Nicoll & Co., in charge. J. Frank Pinner, an old Buffalo coal man, has taken an office in his own name at 300 Prudential Building. J. J. Eagan has moved his coal office to 1224 Prudential Building.

Louisville, Ky.—The mine operators of the Tennessee Central District have made a plea for a reduction in the present coal freight rates to Sheffield, Tuscumbia and Florence, Ala., from $2.20 to $2, to accord with rates from the Coal Creek and Glen Mary sections of Tennessee. This plea will be heard in Louisville on Mar. 26, when the Louisville District Freight Traffic Committee, of which J. M. Dewberry, is chairman, will hold a session. At this same session grain, lumber and other rates will be examined.

Columbus, Ohio—According to a recent statement of John Moore, president of the Ohio organization of miners, 15,000 miners in Ohio have been idle since Jan. 1. This is almost one-third of the total miners, as it is estimated that there are 50,000 miners in the state. Moore attributes the lack of work to the suspension of many business activities, the attitude of the U. S. Railroad Administration in not buying Ohio coal and in the fact that the markets of Indiana and Michigan have been lost temporarily. No relief is looked for until the opening of the lake trade.

Charleston, W. Va.—Valuable coal deposits in Fayette and Nicholas Counties will become accessible to the market through the building of the Gauley & Eastern Ry., which is now nearing completion, the road having cost about $450,000. The new road will be operated between Gauley Bridge and Belva—a distance of six miles—and will connect with the Kanawha & Michigan Ry. at Belva. It will be ready for operation by the middle of April. The Kanawha Collieries Co. and the Beech Glen Coal Co. expect to begin operations about that time.

Kansas City, Mo.—An increase of 10c. a ton on coal shipments from Springfield, Mo., to Kansas City, which is scheduled to go into effect soon, will be protested by commissioners of Kansas City, Kan. The increased freight rate was brought about by the Kansas City district freight traffic commission. A resolution of protest has been drawn up, stating if the rate is put into effect Kansas City and vicinity will pay from 10 to 50c. a ton more for coal than at present and more than any other neighboring districts.

Chicago, Ill.—The Sullivan Machinery Co. has established a branch sales office and warehouse in Mexico, at Edificio Oliver No. 3, Mexico City. Joseph F. Bennett, for a number of years sales engineer in Mexico, associated with the El Paso branch of the company, has been placed in charge of the Mexico City office. Sullivan air compressors, rock drills, hammer drills and drill sharpeners will be maintained in stock, together with parts and supplies. The office will serve central and southern Mexico, and that part of the states of Sinaloa, Durango, Coa Huila and Tamaulipas, lying south of the 26th parallel of latitude.

Jefferson City, Mo.—A bill has been introduced in the House here amending the Missouri anti-trust laws so as to permit coal dealers to arrange, under the supervision of the Attorney General of the state, the cost of conducting the retail coal business. The Attorney General will then decide what a fair margin of profit is. This is practically a continuation of the Government supervision of the distribution of coal, only it will be under the state instead of the Federal Government. An amendment of the anti-trust law has been introduced at the request of E. J. Wallace, who was advisor to the St. Louis Fuel Committee, and the feeling here is that it will go through.

Charleston, W. Va.—Five mine rescue stations will be established in West Virginia by the Department of Mines at a cost of $20,000. The location of such rescue stations has not yet been definitely decided upon, the department wishing to consult the operators of the state with a view to having such stations placed where they will be the most useful and serviceable. Preliminary plans indicate that not only will the coal men of the state fully coperate with the department in this matter, but that they will actively aid in the maintenance of the stations. Some have even gone so far as to promise that they will furnish a part of the equipment, such as ambulances, etc.

Louisville, Ky.—Western Kentucky coal operators who are alarmed over the efforts of some of their associates to reduce coal prices, have received word that the mine workers, through their unions will oppose any attempt toward reduction. The miners naturally do not favor reduced prices because they known that price reduction will mean wage reduction. The unions have agreed that their men will not work for any operator who lowers wages. On the other hand, western Kentucky operators are planning to abide by the prices indicated as a standard by the Director-General of Railroads. Under this plan screen coal is selling at $2.60 and mine-run at $2.35. According to information gathered in Louisville, it is generally believed that miners throughout the state are well united and that they will strike if there is any attempt at wage reduction.

Du Quoin, Ill. The annual meeting of the Southern Illinois Mine Superintendents Association was held in this city Saturday, Mar. 8. An elaborate banquet was given the delegates at the St. Nicholas Hotel, after which many splendid addresses were made by various state officials and others. James Dunn, of West Frankfort, president of the association, was chairman of the meeting, assisted by Bruno Schulter, of Sesser, who is secretary-treasurer. Dr. F. C. Honnold, of Chicago, secretary-treasurer of the Coal Operators' Association of Franklin, Williamson, Saline and Perry Counties, in the principal address of the meeting expressed the need of better screening and cleaning of southern Illinois coal and stated that if this was done the market for the coal would be much better. Joseph C. Thompson, formerly state mine inspector, and now director of the Department of Mines and Minerals, spoke on "Safety in Coal Mining." Other addresses were made by Walter S. Burris, former state mine inspector, James Forester and Theodore S. Cousins.

MARKET DEPARTMENT

Weekly Review

Coal Market in General Lacks Snap—Half Time at the Mines May Lead to Labor Troubles—Consumers Who Hold Off in Their Buying May Have Cause for Regret Later—Anthracite Situation Still Poor

THOUGH signs of activity are by no means wanting, the coal market in general lacks snap. The brakes are still being applied to industry; and until the wheels are unlocked the coal mines perforce must continue to work only half time, and mine employees must continue to complain that the shorter week does not enable them to meet the high cost of living (if they do not take it into their heads to evince their dissatisfaction through the well known medium of the strike).

Shortsighted consumers are still of the belief that coal prices will go lower if they hold off their purchases for a while longer, in spite of the fact that every grain of common sense they possess should influence them to the contrary. If labor troubles materialize at the mines, and the possibility is by no means remote, there are going to be many consumers who will wish they had bought coal while the buying was good. Prices cannot come down. The closing of a great number of mines should be proof conclusive that no indiscriminate price-cutting will be practiced by the operators. Either they do business at a reasonable profit or they do no business at all.

The weekly production of soft coal is still hovering around the eight-million-ton mark, only 8,058,000 net tons being the output for the week ended Mar. 8. For the coal year to date the total tonnage mined amounts to 533,579,000 net tons, which is but 16,613,000 net tons greater than the output for the same period of the previous coal year.

As yet the anthracite trade has not reacted to the announcement that prices would not go lower on Apr. 1. Dealers and consumers will doubtless commence to lay in stocks before May 1, when an increase of 10 cents a ton goes into effect. The only demand for anthracite seems to center around stove and nut coal, while a fair amount of pea is also being sold. Domestic demand there is none, and it is natural to expect a season of the keenest competition in the steam trade.

Anthracite production during the week ended Mar. 8 is estimated at 989,000 net tons, which brings the output for the coal year to date to 88,111,000 net tons.

WEEKLY COAL PRODUCTION

The production of bituminous coal during the week ended Mar. 8, is estimated at 8,058,000 net tons, and is approximately the same as the output of Mar. 1, which was estimated at 8,085,000 net tons. The current week's output, however, falls 3,559,000 net tons below the output during the week of Mar. 9, 1918. The daily average per working day during the week of Mar. 8 is estimated at 1,343,000 net tons, as against 1,815,000 net tons for the coal year to date and 1,758,000 net tons for the same period of last year. Total production for the period Apr. 1, 1918, to Mar. 8, 1919, is estimated at 533,579,000 net tons, and is but 16,613,000 net tons in excess of the output for the same period of last year.

Anthracite production during the week ended Mar. 8 is estimated at 989,000 net tons, as compared with 1,102,000 net tons during the week ended Mar. 1, and 2,099,000 net tons during the same week of 1918. The daily average per working day is estimated at 165,000 net tons, and is considerably lower than the average production per working day for the coal year to date, estimated at 300,000 net tons, and for the 1918 coal year, ended Mar. 8, estimated at 317,000 net tons. Production of anthracite from Apr. 1 to Mar. 8 is now estimated at 88,111,000 net tons and is 5,160,000 net tons below the production for the same period of last year.

Carriers' reports for the week ended Mar. 8 show increased loading in central Pennsylvania, Tennessee and Kentucky, and in the central and far west states. All other districts report a slight falling off compared with the week of Mar. 1. For the calendar year to date, loading in all districts is considerably behind that of last year.

Shipments of bituminous coal to New England from the tidewater harbors during the week ended Mar. 8 are estimated at 169,384 net tons, as compared with 128,885 net tons during the week of Mar. 1. The improvement occurred at New York, Philadelphia and Hampton Roads, no tonnage being loaded at Baltimore either this week or last. Shipments by rail were not reported for the week of Mar. 8.

Shipments of bituminous coal from tidewater harbors to all points during the week ended Mar. 8, estimated at 454,543 net tons, declined considerably compared with the tonnage loaded during the week ended Mar. 1, estimated at 567,782 net tons. While decreases occurred at all harbors, the decrease at Hampton Roads was slight, amounting to approximately 6200 net tons.

The production of beehive coke in the United States, during the week ended Mar. 8, is estimated at 440,118 net tons, and was but slightly in excess of the production during the week ended Mar. 1, estimated at 438,832 net tons. The current week's production, however, was far below that of the week of Mar. 8, 1918, when the output reached 595,992 net tons. Pennsylvania and West Virginia were the only states in which production during the week of Mar. 8 exceeded the output of Mar. 1, while all states report a lower output than was recorded during the corresponding week of 1918. The average production per working day during the week ended Mar. 8, is estimated at 73,353 net tons, as compared with the average production per working day of 82,419 net tons for this calendar year to date, and 90,769 net tons for the same period of last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running considerably less than for the same week of 1918. Road sales for at once delivery are not up to the large volume of the corresponding period a year ago. Salesmen are now getting on the road with Fall lines and an excellent advance business is anticipated. More merchants were in the market, buying for their immediate needs. Retail business continues most satisfactory. Collections are normal.

The Iron Age—New business has come in in the past few weeks at only a fraction of the February rate of operations. With most independent companies March orders have not been over 20 per cent of capacity. It is also to be considered that in some districts, notably Pittsburgh, large rollings for stock were made in January and February. It is thus to be expected that output will fall off in March and April, with progressive reductions in working forces at steel works and rolling mills.

American Wool and Cotton Reporter—The wool market seems to be particularly strong in pulled and scoured wools, as shown by the demand at the Government auctions on Mar. 10 and 11. It is evident that mills have received orders and are endeavoring to purchase wools with which to fill these orders. Activities in the Middle West on the new clip have already begun, as it is reported that a large Boston operator in fleeces has purchased wool on the sheep's back at 50c. per pound.

Dry Goods Economist—Two reasons are given for the continued prosperity of the dry goods trade: First, the great majority of the people are still in need of new goods, new clothes or new furnishings for the home, and are able to satisfy that need; second, the approach of Easter, now only five weeks away, has given emphasis to this need and thereby stimulated the movement of goods. Labor unrest continues in many centers and has hampered the production of various commodities and their transportation.

Bradstreet's—While inclement weather and bad roads are a bar to seasonal trade expansion and price uncertainties still hold back buying and industrial operations, the week's report summarized is one of moderate but still definite progress toward better things. Favorable features of the week are the continued strength of the securities markets, the settlement of shipyard strikes and the resumption of considerable textile machinery in New England, although at below maximum rate, the net result being a reduction in the total number of unemployed.

Atlantic Seaboard

BOSTON

Improvement very gradual. More confidence in prices. High range on quality grades a feature. Contracts being closed, but for small tonnages. Coastwise freights slowly reduced to working basis. Hampton Roads shippers watchfully waiting. Pennsylvania coals now accessible by water. Scattered inquiry for April shipment. Anthracite continues dull. Only hand-to-mouth buying except on special grades. D. & H. plans. Rumored that Reading fleet will be restored to Philadelphia.

Bituminous—A slow but steady improvement is noticeable throughout the trade. There is today an interest in quotations that has not been manifest since the summer of 1917. From all parts of the territory there are inquiries for coal in small lots, a condition that usually forecasts a broadening market later. Naturally, under present circumstances, this renewal of inquiry is almost wholly confined to coal by the all-rail route and operators are keeping in close touch with developments from day to day. Several operations where the output is favorably known in New Eng-

land have increased their tonnage over the January and February marks, and from all standpoints steam coal is in better request.

It follows as a direct result of such a market that buyers are listening more respectfully and that there is distinctly more confidence in prices than at any time since Nov. 11. It is being impressed upon steam-users that there is not really a very large tonnage of high grade coals available for New England, and with all the uncertainty over tidewater prices it is easy to see that some may over-stay, if buying is postponed to too late a day. The amount of coal in storage here is still very large, but inroads are being made, and there is in the aggregate quite a considerable market from plants where there is a desire to get superior coal to help burn some of the mongrel lots shipped last season. At $2.95@3.05 there is not much murmuring even on second-rate coals, provided they are of known quality, and something of a tonnage on "B" and "D" coals has been placed at about these figures.

One outstanding feature of the all-rail market is the price level that No. 1 Pennsylvania coals now command. Several sales have been reported on the choice grades from Wilmore Basin at $3.40@3.50 per net ton at the mines, and one quotation of $3.58 was heard the past week. Some grades from Clearfield County are being sold down to $2.35 per net ton, but as a rule the inquiry for these is less active. The gas coals, even of those of highest grade, are making only light shipments, so well stocked are all the plants in this territory. An energetic effort is made to place gas slack at $2.30@2.40, but the present market affords little response.

What contracts have actually been closed are on the $2.95@3.10 basis for coals from Somerset and Cambria Counties. So far, however, the tonnages have been small, for the larger buyers will not be ready to enter the market until May or June, at the earliest. A few consumers who have usually bought Pocahontas and New River through Boston and other rehandling plants have made purchases all-rail, but the greater number are still awaiting developments on the tidewater situation.

In respect of coastwise freights the situation is settling down quite rapidly. A week ago $2.50 was considered the rate from Hampton Roads to Boston, but at this writing it is virtually admitted that $2 is all the market will pay, even on bottoms owned or operated by the Shipping Board.

The Hampton Roads agencies are following a policy of watchful waiting for the present. There is no buying of any consequence today, even on the prospect of $2 freights, for it is felt that by the time New England industries are ready to enter the market on any comprehensive scale that marine freights will have settled down to something like a workable basis. The tonnage for New England is still very light, and on the part of rehandlers here there have been some extraordinary efforts to move coal inland to make room for the few cargoes that are coming forward each week.

One of the recent developments of the Boston market is the reappearance of Pennsylvania coals by water. This is induced by the relatively low rates that now prevail on barges from New York, $1.25@1.35 being the rate. The New York harbor strike has somewhat affected the movement of this transportation, but the demand here has not been urgent enough to cause any stiffening in rates. Several cargoes have lately been sold at $6.50 per gross ton alongside Boston, the coal being furnished from Pool 10, and one sale is reported at $6.10. There is at least a scattering inquiry for April shipment, especially from some of the utilities who have not yet seen fit to open the subject of contract. The steam railroads are making practically no purchases, their supply in storage being still very large. The Boston & Maine is understood to have upward of 350,000 tons in storage, or more than 90 days' reserve, at the present rate of consumption.

Bituminous prices at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net ton as designated:

	Clearfields	Cambrias & Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.80@3.50
Philadelphia, gross tons	4.20@4.90	5.00@5.55
New York, gross tons	4.50@5.25	5.35@5.95
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.80

Georges Creek is quoted at $3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at $4.70@5.25 f.o.b. Norfolk and Newport News, Va., for spot coal, the former Governmental differential of 35c. in favor of New River being fairly well maintained. Alongside Boston the present gross ton range would be $7.15@8.10.

Anthracite—The recent firm announcement that no reduction in prices at the mines would be effective and that on the other hand prices would be advanced by the companies 10c. per ton per month up to and including Sept. 1 has been used as an argument to get coal forward as fast as it could be had, but the retail dealers are not responding. At tidewater there is a strong feeling that freights will have to be reduced from the present arbitrary level on boats under the jurisdiction of the Railroad Administration, and all-rail there is a tendency to make haste very slowly. There is a very natural desire to get cleaned up of all the poor coal still remaining from last year's shipments, and then again local price situations, as left by the different fuel committees, are in such ragged shape that in many communities there will not be the inducement to take in coal during the spring months. In consequence here is very little buying.

Considerable interest has been aroused here over the rumor that the Reading fleet will be restored to Philadelphia.

NEW YORK

Anthracite market stronger since price announcement. Dealers in the market for coal, but harbor strike delays deliveries. Dealers expect improved conditions. Dissatisfaction reported among miners. Steam coals shorter. Embargoes prevent local docks being flooded with bituminous. Buyers ready to buy when necessary to refill bins. Line trade active and prices steady.

Anthracite—There is stability in the situation now that the coal trade knows what to expect in the way of prices. While everyone seemed to know that there would not be any reduction on Apr. 1, and that there would follow five monthly advances of 10c. each, buyers did not feel sure of themselves and hesitated to make any more purchases than was absolutely necessary, although many wholesalers had agreed to bill coal at the April prices.

The full effect of the price announcement has not yet been felt in this market because of the marine strike, but the ten-day tie-up of the coal boats and tugs has resulted in retail dealers supplies being reduced to less than a week's supply, and much less if the weather becomes suddenly cold. Wholesalers look for a decidedly brisk market when conditions in the harbor become normal, but which may not continue longer than it is necessary to refill the dealers' bins.

Inquiries here indicate a much better situation, not withstanding slow deliveries. Orders are being received in better shape and shippers said similar conditions existed in other sections of the country. From the West come reports of the lack of anthracite and the desire of consumers for a resumption of conditions as they existed before the war and prior to the supervision of the Fuel Administration. It is expected there will be a heavy demand for hard coal from those sections and shippers look for a busy season.

The slow production due to the unusual winter and the closing down of many washeries has caused a shortage of coal at the docks, but not to an extent to cause any alarm if there should come a sudden heavy demand.

More anxiety is felt over the anthracite steam coal situation than over the domestic sizes. Every householder has at least some of the latter sizes on hand, but users of the steam sizes, particularly buckwheat, must receive a certain tonnage daily, especially the big office buildings. With many of the mines and the washeries closed at least three days a week these coals have become scarce and some shippers are showing anxiety as to the tonnage they may receive in the future. There are some wholesalers who believe there should be a reduction in the prices for these coals if efforts are to be made to regain some of the trade taken over by bituminous coal sellers because of the lower price at which the latter can be obtained.

There has been some inquiry regarding contracts for the anthracite steam coals, particularly barley, quotations on the latter ranging from $1.80 to $2 for the better grades.

Current quotations, White Ash, per gross tons, f.o.b. Tidewater, at the lower ports are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	5.85	7.70
Stove	6.10	7.95
Chestnut	6.20	8.05
Pea	4.80	6.55
Buckwheat	3.40	5.15
Rice	2.90	4.65
Barley	2.40	4.15

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—Movement of coal has been slow here because of the harbor strike, but trade along the line has been active and a much better market exists. Prices have had but little effect upon conditions. Salesmen report that the reason for a not more active condition is either no work in the factories or full bins.

Buyers are realizing the futility of expecting cheaper coal with the present cost of production and seem willing to make purchases if they can secure the coal wanted. Along the line consumers are holding fast to the grades wanted and in most cases refuse any substitute.

The ending of the trouble in the New York harbor is expected to stimulate trade. Many bins are nearly empty as a result of the strike and manufacturers are becoming uneasy.

The placing of embargoes on shipments to this port has saved the docks from being over-stocked; nevertheless salesmen say the line trade has been able to absorb nearly all the coal produced and that the mines are working a trifle steadier than they did a few weeks back.

While there have been numerous inquiries concerning contracts the closing-up process has been slow. Buyers are hesitating about signing up for the twelve months ahead because they feel prices are sure to come down. To offset this it is reported some operators are including in their contracts a clause providing for a readjustment of prices at certain periods.

Quotations on various grades of bituminous coal for spot and contract delivery, are:

	Spot	Contract
South Forks	$2.90 to $3.50	$3.10 to $3.50
Cambria County (good grades)	2.80 to 3.00	2.95 to 3.00
Clearfield County	2.65 to 2.95	.....
Reynoldsville	2.65 to 2.95	2.85 to 3.00
Quemahoning	2.85 to 3.10	2.95 to 3.10
Somerset County (best grades)	2.80 to 2.95	2.95 to 3.10
Somerset County (poorer grades)	2.50 to 2.75	2.75 to 2.95
Western Maryland	2.50 to 2.75	2.65 to 2.85
Fairmont	2.10 to 2.35	2.35 to 2.50
Latrobe	2.25 to 2.40	.....
Greensburg	2.35 to 2.40	.....
Westmoreland ¾-in.	2.60 to 2.75	2.65 to 2.75
Westmoreland run-of-mine	2.40 to 2.65	2.40 to 2.65

PHILADELPHIA

Anthracite continues dull. New printed price circular sent out. Announcement fails to improve conditions. Much discussion as to permanence of price plan. Consumers hold back, still expecting reduction later. Credits becoming a problem. Retail price-cutting grows. Pea difficult to handle. Some activity in steam-coal contracting. Bituminous quiet. Strong demand for high-grade coals. Increased contracting. Railroads cut down fuel supplies.

Anthracite—It is not likely that the operators expected the early announcement of April prices would bring a rush of March business. They are probably too familiar with conditions to believe the coal-buying public would take kindly to a new schedule that does not permit the usual spring reduction. While the selling forces had endeavored for weeks to prepare the dealers in advance, by intimating what the new prices would be, the circular issued by the largest operating company, which was dated Mar. 10, but for some reason was held back and not received by the trade until the morning of the 13th, came as somewhat of a shock. This was probably because the price question was thereby squarely put up to them to explain to their trade. To put the responsibility entirely on the operators does not seem to satisfy their customers, and they are having a difficult time explaining "why."

That the circular referred to quotes prices for April and May only leaves room for doubt in many minds as to the summer schedule. It quotes the present March circular for April "subject to an advance of 10c. per ton effective May 1." In other words, the circular fixes the wholesale prices until June 1. Before that time many things might happen to prices. To begin with, there is much discussion as to miners' wages, it being firmly fixed in the minds of

all coal interests that no price reduction can be expected with wages fixed as at present. Certainly so long as conditions only warrant working the mines three days a week there can be no reduction.

Another cause of anxiety to the retailer is the question of credits. While the dealers can hardly expect to continue on the cash basis they enjoyed the past year, they now fear that when they try to force sales they will be expected to place accounts on their books. Some call attention to the fact, for instance, that three cars of coal often cost $1000, and with daily settlements for the freight the business calls for such a large investment that they cannot extend credits as in the old days. It is possible that the larger buyers will this season call upon the shippers to be lenient and not insist upon 30-day settlements. Right at this time it is known that all shippers have more money standing on their books than at any time during the past two years.

We hear that some of the more prominent dealers are considering asking the shippers for coöperation in their efforts to eliminate the price cutters. It seems they would like the producers to treat with indifference the orders of a few who have become notorious in this respect. It is a difficult matter to handle in that way, and we do not really expect to see anything of consequence come from the movement. This week one dealer announced his pea coal price as $7.75, or $1.30 per ton below the regular rate.

The only demand for sizes seems to center around stove and nut, with a fair amount of egg asked for. Pea continues to be a most serious problem. The dealers continue to have large stocks of it on hand with hardly any movement at all to their customers. They are still hoping for some cold days throughout March and April, with the idea that they may thus be able to move some of their stock. It is becoming an even greater problem with the operators, for while they can move the other sizes fairly well on the restricted working time, they are hard put to it to get rid of pea.

No action has been taken in regard to prices on steam sizes, nor on broken, as they are not mentioned in the only circular that has been issued and we take it for granted that prices are to remain unchanged for the present. With a poor domestic market we expect to see a season of the keenest competition ever experienced here for the steam trade. We have heard already that one of the largest companies is making up contracts on the steam sizes, although they have not stated publicly the prices which they expect to get. Apr. 1 is the usual contracting season for them, and we think they will pursue the practice of making up the contracts for their old customers in advance and then presenting them for their decision.

Due to the short working time there has been some difficulty in filling buckwheat orders by the larger companies, although some of the independent operators continue to offer this size around $2.75. The big companies are also going into their storage yards at times for rice coal in order to fill some of their orders.

The price per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.30	Buckwheat	$3.40	$4.45
Egg	5.85	7.20	Rice	2.90	3.80
Stove	6.10	7.45	Boiler	2.70	3.70
Nut	6.20	7.55	Barley	2.40	3.30
Pea	4.80	6.05	Culm	1.25	2.15

Bituminous—The bituminous trade is simply drifting along with the hope that industrial improvement may come to the rescue of the trade. As it now stands it is not believed that the mines on an average are making 30 per cent. of full working time.

An interesting feature of the trade lately has been the inquiry for high-grade coals from New England consumers. This is due to the fact that boat freights are so high from southern ports that it makes the use of coal from that territory almost prohibitive. Due to this condition there has not been the least trouble in maintaining the full price on the good coals here and tonnage is actually scarce.

If anything there has been an increase in contract business, which is being closed at figures running from $2.90 to $3.35 per net ton. Practically all this business has been closed to date as of Apr. 1 and some also May 1.

There is very little activity whatever in the spot coal market, although on low grade coals there are plenty of offerings with very few sales made. Sometimes there are fairly heavy price cuts to move occasional cars.

There is very little new tonnage going to the railroads for fuel, as the concerns who had contracts with them have shipped so heavily that the roads have been compelled to stop shipments in numerous instances.

BALTIMORE

New elements of strength noted in the bituminous market. Inquiry line grows steadily and prices are a little firmer. Hard coal business one largely of speculation as to the next spring schedule.

Bituminous—While general business in this section still wavers as to its scope for the future, awaiting apparently for some settlement of the governmental railroad control and other big reconstruction problems, there is a growing evidence of confidence for the days to come shortly and with it a resumption of plans that mean coal consumption. Then a number of plants are running low on supplies put in heavily in the months past, and the total result is that there is a steadily growing line of inquiry in practically all the coal offices here.

In the majority of cases the call is for high grade coal, this requisite being considered above that of price where the latter is near the old Government maximum. Of course there are some consumers gunning around for good coals at very cheap prices. Most of these have been encouraged by being able to pick up some coal at sacrifice. This was coal caught on demurrage and does not by any means represent the market.

The general run of trading here on fair to good coals was on a mine basis at tide around $2.65 to $2.85. Specialized coals in some cases sold higher. During the week the trade largely discussed the conference at the Hotel Shoreham, in Washington, between coal shippers and Government officials, concerning the future of the Tidewater Exchanges. Some interests have been for their complete abolition and some for their maintenance in full. Others favor some mid-way arrangement that would protect shippers against excessive losses on a high demurrage short-free-time basis where there was no interchange of coal at tide. The Maryland Jobbers' Association sent delegates to the conference to contest a complete wiping away of the pool on Apr. 1.

Anthracite—The hard coal men are merely marking time. Sales are light and the public on the one side awaits lower prices in the spring and the coal men await a new schedule which it is confidently expected will be at least as high as the present. Local newspapers have warned that little cut is expected and point out the considerable difference in the present retail prices and those of last April. Coal men point out that the public and the daily press fail to consider that the Government forced the present price by jumping freight rates and miners' wages, and that the coal men are getting no more, and in some cases less, than they did under the old schedules.

Lake Markets

PITTSBURGH

Contract season brings little activity. Tentative contracts considered. Production remains light. Prices well maintained.

The near approach of the conventional contract season for coal has brought very little increase in market activity. With few exceptions buyers are disposed to hold off and if they evince any willingness at all to enter into negotiations it is usually on the basis of seeking some other arrangement than the usual one of buying coal at a flat price for the twelvemonth. The course that operators had mapped out for themselves, that of simply adhering to recognized prices, is a very simple one, and there seems to be no disposition to depart from it. There is nothing out of line, however, in making an arrangement whereby coal will be shipped regularly and billed at the recognized market price from time to time.

Current demand for coal has not noticeably improved, as a whole. While stock piles have been running out there is on the other hand lighter consumption in several direction. The domestic demand, of course, is about over. There has not been much winter in this district and the time for wintry weather is now past. As to the steel industry's coal consumption, it is decreasing materially from week to week although it is still quite heavy, probably about 75 per cent. of normal. The independent steel makers are not doing as well as that, but the Steel Corporation subsidiaries are doing better. They are not a coal market factor, however. Pittsburgh district production continues at 25 to 30 per cent.

The market remains fairly steady at $2.25@2.35 for steam mine-run, with 1¼-in. domestic at but little more, while good grades of ¾-in. gas coal run $2.50@2.70, depending on grade, all per net ton at mine, Pittsburgh district.

TORONTO

Demand continues very quiet. Dealers and consumers well stocked up. Few shipments coming forward. Industrial readjustment slow.

The demand for coal of all grades remains very light, as owing to the remarkably mild winter most consumers who had laid in stocks still have supplies on hand. The yards are well stocked up, and but few shipments are now being received from the mines. The readjustment of plants lately engaged in the production of munitions to commercial work is proceeding but slowly, so that there is no noticeable increase in the call for bituminous. Smokeless coal is practically off the market, but dealers anticipate a good demand for it later in the season.

Quotations for short tons are as follows:

Retail:

Anthracite, egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	8.25
Slack	7.25
Domestic lump	10.00
Cannel	13.00

Wholesale f.o.b. cars at destination:

Three-quarter lump	6.25
Slack	5.25

BUFFALO

Coal still waiting for other business to move. Production exceeds sales. Bituminous mines idle most of the time. Loading anthracite into lake vessels.

Bituminous—The trade still languishes. Consumers appear to be agreed that they can reduce prices if they hold off. Some of them refuse to buy because they have a supply, often exposed to the weather, and they want to use it up as soon as possible. The shippers find little satisfaction in urging them to buy and report that it is useless to offer coal at a reduced price. The consumption is not heavy enough to force much buying and so there is not much to do but wait.

The bituminous prices are nominally unchanged. There is some cutting, but it is not as extensive as might be expected and does not affect the general firmness much. Quotations: $4.65 for thin-vein Allegheny Valley all sizes, $4.45 for Pittsburgh and No. 8 lump, $4.20 for same mine run and slack, $5.65 for smithing and smokeless, $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—The demand is light, especially since all fear of severe weather is now past. The consumer will no doubt buy some against the coming winter before May 1, but that is too far away to worry him now. The shippers are still finding coal coming out of the mines faster than they can sell it and are storing it wherever they can. Quite an amount of demurrage is said to have been paid at various points.

The prospective dullness of the lake trade is not favorable to a good movement. Vessels are taking cargoes here, as they often do in March, but as a rule they insist on sailing at their own option, instead of the option of the shipper, which means that the sailing may be delayed some time after the general opening of navigation. There does not appear to be any market for the coal at upper-lake ports at present.

The city prices for anthracite remain as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8.55	$10.25
Egg	8.45	10.20
Stove	8.70	10.10
Chestnut	8.80	10.50
Pea	7.00	9.05
Buckwheat	5.70	7.75

With an addition of 25c. per ton to the car price for loading on lake vessels.

CLEVELAND

Several lake shippers in the No. 8 district are preparing to operate their properties full time beginning Apr. 1. The steam coal market, generally speaking, continues extremely dull, with slack perceptibly weaker.

Bituminous—Stockpiles at the lower industrial plants in northern Ohio are beginning to look ragged, but plant executives appear deaf to all advice that they be careful lest when they seek to restock coal be less plentiful than it is today.

The attitude of users is that when the time to replenish comes prices surely will be no higher than today, and that the wise policy is to work off as soon as possible all the low-grade coal they were compelled to accept last summer. As a consequence, 40 per cent. operations at eastern and southern Ohio mines continue to be the answer.

Slack is growing weaker, and may be had for $4.55 to $4.90, delivered, short ton, in Cleveland. Mine run for both the No. 6 and No. 8 grades is holding firm at $4.55 and $4.90, respectively. The retail trade continues to do obeisance to the continued warm weather.

Anthracite—Like domestic grades of bituminous, anthracite is sluggish. The cold spell of last week, which by now has succumbed to a mild wave, forced consumers to dig into their piles but has brought no buying.

Lake Trade—Lake coal shippers have been definitely informed by the Federal Railroad Administration that the present three-day demurrage rule has been abrogated and five days' free time will be allowed on cars at Lake Erie ports, with demurrage beginning the sixth day at only $1 a day instead of $3. This clears the boards for the 1919 lake trade, which is fast getting into full swing. Operators and railroad representatives have agreed that while general pooling of cargo coal will be discontinued, shippers will pool coal voluntarily where possible in order to release cars. The Ore and Coal Exchange, with headquarters at Cleveland, which conducted the 1918 lake pool, will be continued, with Herman M. Griggs again manager.

Coal is coming forward to Lake Erie ports in good shape, and due to the congestion of lake steamers at Buffalo, to hold winter storage grain for the Government, cargoes are in excess of carriers. Four steamers are being loaded at Cleveland and several at Buffalo and Ashtabula for the first trip to the head of the lakes.

Quotations on coal in Cleveland in net tons, delivered, are as follows:

Anthracite:	
Egg	$10.80 to 10.95
Chestnut	11.00 to 11.10
Pocahontas:	
Lump	7.50
Mine-run	7.20
Domestic Bituminous:	
West Virginia splint	7.15
No. 8 Pittsburgh	6.35
Massillon lump	7.10
Steam coal:	
No. 6 slack	4.55 to 4.60
No. 8 slack	4.90 to 4.95
Youghiogheny	4.95 to 5.05
No. 8, ¾-in.	5.45 to 5.55
No. 6 mine-run	4.55
No. 8 mine-run	4.90

DETROIT

Despite a slight stimulus in retail domestic lines due to colder weather the Detroit coal trade is generally inactive.

Bituminous—Only a small degree of activity is discernible in the bituminous division of the coal trade in Detroit. Neither the users of steam coal nor the retail dealers seem willing to give receptive attention to offers of additional stock at this time. Jobbers say few of the buyers show any disposition to consider contracts at present, though customarily the matter of contracts is of large interest at this period of the year.

Indifference of the Detroit buyers is ascribed to the large stocks of bituminous that are still filling storage yards of the retailers and appear in enormous reserves of the steam plants. Some of the latter are said to have sufficient coal in reserve to provide for normal needs until nearly July. Low grade stock forming a substantial part in many of these reserves is chiefly held responsible for fires that have occasioned considerable inconvenience and annoyance to the owners.

The wintery temperature of the early part of the month was productive of larger demands on retail dealers from household consumers, most of whom, however, were asking for anthracite coal or coke, while the dealers would more gladly see sales of the abnormal accretions of bituminous coal that were put in when the Fuel Administration regulations seemed to make that form of coal the only kind that would be available for most of the household consumers. Many of the retailers will be obliged to carry over large stocks into the summer, which with a more plentiful supply of anthracite next winter may prove difficult to move even then.

Jobbers say the last prices made effective by the Fuel Administration are still being maintained on practically all the business they are receiving through occasional sales, with demurrage impending, show a slight shading of price.

COLUMBUS

A slight improvement is reported in the demand, especially for steam grades. Domestic trade is rather quiet, due to the continued warm weather. Prices are somewhat unsteady although cutting is not as common as formerly.

The principal feature of the coal trade in Ohio is the approaching contract period for steam tonnage. Operators and jobbers alike are wondering what will happen when Apr. 1 rolls around. That is the date for a large number of steam contracts to expire and consequently there is much question as to the future. It is believed by a large number of producers that prices will be pretty generally maintained at government levels, as it is quite close to the cost of production, plus a reasonable profit.

Railroads are now buying a larger tonnage and that is stimulating production to a certain extent. Some of the larger consumers in industrial circles are running short of fuel and are buying in the open market. But generally speaking, reserve stocks are still large and little increase is looked for within the coming few weeks. The weakest feature is fine coal, which is a drug on the market. Prices on screenings and other small sizes are being cut to a greater extent than any other grade. Mine-run and prepared sizes are holding up fairly well.

The domestic trade is rather slow. Outside of the demand for the so-called fancy grades, such as Pocahontas, there is little domestic tonnage moving. Retail stocks are apparently sufficient for the present and there is no disposition to increase them. The unusually warm winter has caused heavy stocks to be accumulated by some retailers, some of which will have to be carried over. Reports show that consumers will also carry over a considerable amount, but not as much as was previously supposed.

CINCINNATI

Market remains quiet, but improvement in tone is noted. Some contracts are being signed, on a basis of present prices. There is little activity.

Coal men in the Cincinnati district report a slight improvement in the tone of the market lately, evidenced more by almost intangible indications of a change in feeling than by any specific change in demand or in prices. The work of reëstablishing the coals which move through this gateway on the markets where they were formerly distributed is getting slowly under way, hampered, naturally, by the extreme quiet of the market and the negligible demand noted in all quarters. It is taken for granted, however, that as time goes on this process will be hastened, to a point where the normal channels of distribution will again be established, and a volume depending on conditions will be distributed regularly.

Locally demand remains as it has been for some weeks past, quiet in all departments of the market, and it bids fair to remain so indefinitely, in the absence of some factor to improve it which is not now in sight. The weather seems definitely to have settled into spring, as generally expected, and prospects of further cold weather, necessitating fuel consumption for heating purposes, are getting more and more remote.

Interest in contracts for the year is confined largely to dealers and their agents, as consumers naturally feel that the situation is in their hands. However, large industrial concerns, whose consumption of coal is a fixed quantity, realize that it might prove dangerous, as well as bad business, to neglect arranging for their supply of coal, and are accordingly entering into contracts with their coal connections for their regular supply.

LOUISVILLE

Operators and Jobbers reporting slightly better demand for steam coal, with domestic demand about the same. Production said to be slightly larger. Producers disturbed over labor situation, and refusing long-term contracts.

The coal trade reports a slight improvement in steam demand, and is generally of the belief that things will open up somewhat about Apr. 1. It is claimed that the mines are doing slightly better than they were, production being around 50 per cent. for the fields. There is a fair demand for domestic coal, with dealers buying close for immediate use, and no large stocks in this market. A good deal of coal is on board cars at mines awaiting orders for shipment.

Prices are ruling rather firmly on domestic, but run-of-mine and nut and slack are slightly weaker in the eastern Kentucky fields. Western Kentucky operators are holding firmly to their old prices, claiming that it is impossible to produce coal profitably under existing conditions for less money than the Fuel Administration figures. Some western Kentucky operators claim that they will close down rather than cut prices, as they have operated many years on a very meager profit, and sometimes have met with direct losses. The war is said to have saved many of them from bankruptcy, in their efforts to compete with higher grade coals on a lower price basis, due to the cost of production being about the same for both grades.

Mine quotations, on short ton basis, not including brokerage of 15c. a ton are:

	Eastern Kentucky	Western Kentucky
Block and egg	$2.85 to $3.00	$2.60
Run-of-mine	2.20 to 2.40	2.35
Nut and slack	1.85 to 2.00	2.05

These are basic prices, there being some mines getting more and some less. It is reported that some eastern Kentucky nut and slack has sold as low as $1.75 per ton, and some western Kentucky at $1.85. Some eastern Kentucky mines are getting $2.40 @2.50 for run-of-mine; and $2@2.10 for nut and slack.

The strength of the market was shown when the Louisville Railway Co. asked for prices on a year's contract, calling for eight to ten cars a day, and an annual tonnage of between 85,000 and 90,000 tons. The company was somewhat surprised at being quoted $2.05 on western Kentucky nut and slack, this being the lowest bid, as operators were afraid of long contracts, and the western Kentucky operator making the bid was doing so on a full price basis.

BIRMINGHAM

Market conditions fail to show improvement during the past week. Steam business weak, while domestic demand is holding up well. The dull steam trade curtails the supply of domestic sizes.

The inquiry and bookings for steam coal in this field is confined mostly to small tonnages to meet current requirements of consumers. The Southern Ry., which for some time has been only taking minimum deliveries on contracts in this district placed orders for an additional tonnage aggregating probably 50,000 tons, the business being prorated among the contract mines, and to some operations where no contracts were held. Other lines are only taking the minimum allowed in contracts. Steam quotations are as follows per net ton mines:

	Mine-Run	Prepared	Slack and Screenings
Big seam	$2.45	$2.75	$2.40
Black Creek and Cahaba	3.45	3.75	3.05
Corona Jagger-Pratt	2.85	3.05	2.45

There is need for more domestic coal than is now being obtained in this district, the output being seriously affected by the slump in the steam market; and while there is a feeling that a good demand will obtain for domestic grades right along, the supply will not be in line with the requirements until there is a very perceptible improvement in the steam trade. The usual Apr. 1 prices have not been announced, and little if any contract business has been offered, though inquiries are beginning to come in. Current quotations are about as follows per net ton mines:

	Lump and Nut
Black Creek and Cahaba	$3.85@4.50
Big Seam	2.90
Corona	3.40
Carbon Hill	3.15
Climax and Montvallo	5.00

Mining operations are on a much restricted basis, commercial mines running from two to five days per week.

Coke

CONNELLSVILLE

Softening in market continues. Operators do not have to run. Range in foundry coke.

Cost of production has now become a real factor in the coke market, the almost continually declining prices of the past two months having brought the market down to about the cost level for the higher priced operations. Counting everything, including overhead, and charging the coal at something like market value, there are many operations that will show more than $4 as cost, and that is a price at which coke is readily obtainable. Some operators have lower costs other than others and some are

willing to forego their overhead, as most of it would count if the mine were idle.

Some operators, having made large profits in the past two or three years, are disposed simply to stay out of the market except as they have contract coke to deliver and are not attempting to make the slight profit they might possibly secure by making additional sales. In this respect the industry is in better shape than ever before, as in past years some operators have had to operate, profits or no profits, merely to keep their money turning and to encourage the banks to which they owed money. All this is changed now, the operators being able to do as they please.

Furnace coke is freely offered, though not in very large lots, at $4, for prompt or delivery over a fortnight or month. There are some offerings at less, but most if not all of them could not be classified as standard grade. So much 72-hour coke is being made, with the short running time now so common, that there is plenty of foundry coke and 72-hour coke, of a grade that can be had at but little above the price for furnace. Fair grades, however, would command fully $4.50 and better grades $4.75 or $5, while two or three of the old line producers of well known brands, having contracts in force at $6, will not shade that figure at all, and of course they make few if any sales. The market is thus quotable at $4 for furnace and at $4.50@6 for foundry, per net ton at ovens.

Middle Western

GENERAL REVIEW

Market conditions healthier and optimism reigns. Prices holding up above former Government maximums. Small demand for steam coals.

During the past few days the market has developed a much healthier tone. This has been brought about, not so much by an actual increase in sales, but by recent developments in the stock market in New York and Chicago. All good industrial shares are in an upward movement, and it is generally thought that those in a position to know believe better times are in store for the country in the immediate future. At all events, it is a fact that the bigger operators and jobbers are looking forward with more optimism than heretofore.

Until very recently the operators in Franklin and Williamson Counties, of Illinois, and the Fourth Vein district of Indiana, have not made any contract prices. These gentlemen felt that conditions were too unsettled to justify the making of a price on their coal to cover a year's shipments. Now that the coal industry has had a chance to adjust itself, the operators feel safe in quoting contract prices.

Given below are the figures for Franklin and Williamson Counties. Opposite them are the prices set on these coals by the Government, which prices were canceled by the Fuel Administration effective Feb. 1:

	Contract Price F.o.b. Mines, per Ton	Former Government Price per Ton
6x6-in. furnace	$2.75	$2.55
6 in. lump	2.75	2.55
3x2-in. small egg	2.75	2.55
2x1¼-in. stove	2.75	2.55
1¼x⅞-in. chestnut	2.65	2.55
⅝x⅜-in. pea	2.55	2.55
Mine-run	2.45	2.35
2-in. screenings	2.20	2.05
1¼-in. screenings	2.10	2.05
⅝-in. screenings	2.00	2.05
No. 5 or ½-in. screenings	1.85	2.05

The contract prices for the Fourth Vein district of Indiana are as follows:

4-in. lump	$2.75	$2.55
2½-in. lump	2.70	2.55
4x2½-in. egg	2.70	2.55
4x1¼-in. railroad egg	2.65	2.55
2x1¼-in. nut	2.65	2.55
1¼-in. lump	2.65	2.55
Mine-run	2.45	2.35
2-in. screenings	2.25	2.05
1¼-in. screenings	2.15	2.05

A glance at the foregoing figures will show conclusively that the operators do not propose to run their mines and deplete their properties at a loss. It also shows the operator—that is, the larger and more substantial ones—have confidence in the future.

Actual market conditions for the past week have been about as usual—that is, there has been but little demand for steam coals. What steam coal is moving is, nine times out of ten, sold at the full price. The domestic situation today is unusual, inasmuch as most of the large mines producing good coal are from one to two weeks behind on practically all sizes of their domestic products. As a result, and in order to get full running time, as well as keep cheap coal off the market, steam sizes are being stored until the time will come for a strong steam coal demand.

CHICAGO

Domestic coal in good demand, though steam coal market is inactive.

The domestic trade in Chicago is fairly active, with good coals in demand. This is due entirely to the cold snaps this city has been enjoying for the past week. The weather man also promises a few more weeks of winter before spring arrives. The steam coal market, as usual, continues inactive, and not much change is to be looked for during the next few weeks. Operators and jobbers report shipments cut down rather than increased.

There is a sharp demand in Chicago for good coal salesmen. A great many companies let their sales organizations go to pieces during the last few years, when coal was scarce, and as a result, now that a good sales force is of the utmost importance, these operators and jobbers are doing their best to rebuild their organizations.

MILWAUKEE

Market continues dull and lethargic. Holders of coal doing everything possible to reduce stocks.

The coal market continues in a lethargic state, with mild, spring-like weather operating to check consumption. Dealers are bending every energy to reduce stocks, which are heavy for the season, as there is bound to be a loss in holdover bituminous at least. All agree that there will be no material changes in prices until May; as to what will come then nobody will venture to prophecy. Some hard coal continues to come by rail; also small consignments of screened Pocahontas. Shipments to the interior continue light.

Following are the coal prices at Milwaukee, per short ton, effective Mar. 1. The prices given include delivery. At the yards the prices are 50c. per ton less:

	Domestic Short Ton
Anthracite—	
Egg	$12.20
Stove	12.40
Nut	12.50
Pea	11.00
Buckwheat	10.60
Bituminous—	
Pocahontas mine-run	$8.15
Hocking, screened	7.90
Youghiogheny, screened	7.90
Pittsburgh, No. 8, screened	7.90
West Virginia, screened	8.40
Splint, screened	8.40
Kentucky, screened	8.40
Illinois, screened	7.25
Coke—	
Solvay, large sizes	$11.50
Solvay, small sizes	10.25
Smithing	8.40
Steam—	
Youghiogheny, Hocking and Pittsburgh No. 8, screened	$7.18
No. 8, pile run	6.93
No. 8 screenings	6.68
West Virginia, Kentucky and splint Screened	7.68
Pile run	7.43
Screenings	7.18
Illinois and Indiana, screened	6.50
Pile run	6.25
Screenings	6.00
Smithing	7.68

ST. LOUIS

A continued quiet and easy market, with no demand of any kind. Steam and domestic business falling off. Surplus of all kinds of coal, with nothing promising to look forward to.

The local condition still continue to be a problem. The steam demand seems to be falling off instead of picking up, with the result that the market is glutted with steam sizes. There is nothing to indicate at this time that these conditions will improve. If anything, it is likely to grow worse. This not only applies to St. Louis proper, but it is general throughout this section.

The mild weather continues and there is little demand for domestic coal of any kind. Such orders as are being taken are usually for small lots. Then, too, it is usually for the cheaper grades of coal. A careful survey of the country districts reveals the fact that former users of coal have found it much more economical to use wood, which has been exceedingly plentiful the last couple of months on account of the oversupply of labor. The mild weather gives the farmer a chance to get the wood cut and hauled in without much trouble.

The local demand for anthracite is extremely easy and there is practically no demand for smokeless, with no Arkansas coming in. The local supply of coke continues to pile up, with very litle movement and no prospects of much for the future.

There is no change in the retail market, and the prevailing circular per net ton f.o.b. mines is:

	Mt. Olive and Staunton	Standard
Franklin County		
Prepared sizes, lump, egg, Nos. 1 and 2 nut	$2.75	....
Williamson County		
Prepared sizes, lump, egg, nut	$2.55	$2.55 $1.90@2.25
Mine-run	2.20	2.20 1.60@1.70
Screenings	2.05	2.05 .95@1.10
3-in. lump	....	2.30 .....
2-in. lump	....	.... 1.75@1.90

Williamson-Franklin rate to St. Louis is $1.10; other rates 92½c.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Mar. 17, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com	(BB)	143	145
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	43½	43¾
Colorado Fuel & Iron, Pfd	(CF)	99	125
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	27	28
Elk Horn Coal, Pfd	(EH)	..	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	48¾	49
Pittsburgh Coal, Pfd	(PC)	85½	86
Pond Creek Coal	(PD)	12½	13½
Virginia Iron, Coal & Coke	(VK)	58	60

* Ex. Div.

BONDS	Bid	Asl.
Cahaba Coal, 1st Gtd., 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A., 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	89½	90
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74½	76
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	88	91
Grand River Coal & Coke, 1st 6s, 1919	...	....
Jefferson & Clearfield Coal & Iron, 2d Mtg. 5s, 1926	96½	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	98⅝	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79¼	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	83⅛	85
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	88	90
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	99⅛	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	88½	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	92¼	94½
Utah Fuel, 1st Sinking Fund, 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	87

COAL AGE

Volume 15 New York, March 27, 1919 Number 13

Removing the Causes of Trouble

By Floyd W. Parsons

LABOR unrest is not a new disease; it is as old as humanity. But the present epidemic is more virulent and more widespread than ever before, and the pity of it is that back of all the trouble are real causes. If certain capitalists and industrial leaders had not exploited labor in the past, there would be no such upheavals as occur today,

It is human nature to condemn a whole class because several members are unjust. A dozen dishonest employers can throw an industry into bad repute. The same truth applies to labor organizations. The wonder is that in the light of this common fact real citizens should fail to expel from their councils and associations those who perpetrate wrongs and foster discontent. Whether the man be employer or employee, there should be no place in the business community for him if his life holds no thought of the full responsibility he owes his fellow citizens.

Health is the precursor of happiness. It is often the index of a man's worth to his company. Individual efficiency is determined by endurance of body and clearness of mind. An emergency often arises and prompt action is necessary. Sickness and indecision are twin brothers.

There are several great corporations in America that through all the turmoil of recent years have never had a strike. The managements recognize that labor unrest is due, not only to wages and hours of work, but to unwholesome habits of life that are encouraged by dull, shabby, unsanitary homes. Investigation has proved that the labor turnover at a plant can be more than cut in half by providing the employees with decent houses, good drinking water, proper facilities for washing, gardens, hospitals, healthy and sufficient milk supplies, schools, rest and recreation centers, relief, compensation and insurance funds and properly supervised commissaries.

Nothing that has to do with the operation of a mine is more important or more worthy of careful study than human fatigue. The development of energy in the body is almost identical with the development of steam in a boiler. In order that a workman may have a normal amount of muscular energy, he must be fed plenty of fuel, have sufficient oxygen with which to burn it and possess a system with ability to carry off the ashes or waste. When one of these functions fails to operate efficiently, the result is body fatigue.

Hardly a company but has on its pay-roll dozens of worthy workmen who are deficient in energy because of conditions that might be removed. Employees, and especially housewives, should be taught the value of a mixed diet of food. They should be educated to know how to fill a lunch box and what to put in it. Much benefit comes from providing clean places for the men to congregate, rest and eat.

In every effort to remove fatigue the manager's plans have to include a carefully prepared discussion of personal hygiene that must be got across to the employee. Not much can be accomplished unless there is care of the individual by himself. The workman should be made to feel the importance of regular meals, thorough mastication, hours of rest and sleep, ventilation of rooms, regularity of movements from the bowels, the cultivation of cheerfulness, and above all the necessity of keeping a clean nose and mouth. The time is coming when no man, capitalist or laborer, will eat a meal without first washing his teeth and hands.

More than 50 different varieties of disease-producing microorganisms have been found to inhabit the mouth. When these bacteria are swallowed with food, they cause fermentation in the stomach, and then passing into the intestines produce poisons that are absorbed and create body fatigue. At the same time they lower the individual's resistance to disease. As to hands, it has been found that although there is no known method of perfect disinfection of the hand, culture tests prove that the number of germs remaining on the hands after washing is very much less when the man uses a brush and afterward rubs with a rough, sterile towel, than when only soap and water are used. Paper towels are a menace in that they do not remove the bacteria.

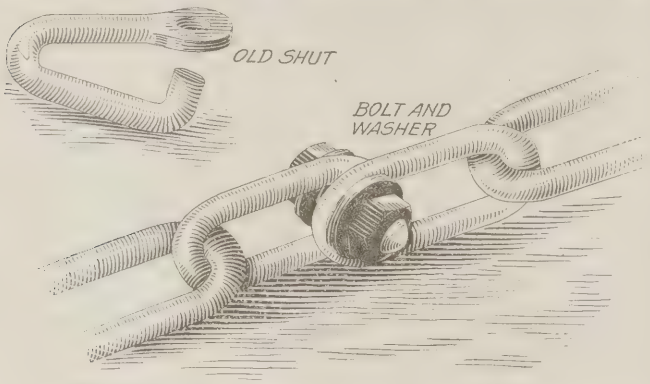
The foregoing thoughts are not written with any idea of even covering a part of the problem of health in its relation to industry, but are presented for the sole purpose of arousing the employer's interest in a subject that is vital to the solution of present-day troubles. This is no time to strike the flag without firing a shot, and the best kind of shots to fire are those that are aimed to root up and destroy the things that breed discontent and create class hatred.

IDEAS AND SUGGESTIONS

Temporary Chain Repairs

BY CHARLES H. WILLEY
Concord, N. H.

Often there is need to quickly make temporary repairs to a parted chain or to join two bights of chain together. It has several times come to my notice that



DETAILS OF TWO MAKESHIFT CHAIN REPAIRS

many men try tying the chain, if it is a small one, or binding the two ends with wire. Having used the two makeshift repairs here shown with much satisfaction, I am passing them along to others.

Surveying Without an Instrument

BY T. EDWIN SMITH
Coalhurst, Alberta, Canada

It is often necessary to make a survey when a transit is not available or convenient, and in case any reader of *Coal Age* should find himself in that predicament the following hints may prove useful.

I once had occasion to survey a coal mine and connect the underground survey with the surface survey when my only apparatus was a new steel tape. A section line ran near the mine and two stakes on this, one a quarter of a mile and the other a mile and a quarter away, enabled me to extend the line and mark it as was necessary.

I selected a point on this line, extended, that would be convenient to the top of the slope and drove a stake marking the station. On this line and back toward the flags at the section corner I measured a distance of 20 ft. and marked it with a pin. I sighted then toward the mine and on the line, and 20 ft. away located another point and marked it with a pin. The last part of the work at this point was to measure the distance between the two pins. In this case it was 25 ft. 6 in.

I now had a triangle located on the ground with one vertex at the station of the survey and two sides coinciding with two courses of the survey. Now knowing the bearing of one line, I had only to solve for one angle of the triangle whose sides were given in order to compute the bearing of the other course.

There are two ways of computing this angle. First, call the angle included between the two lines A and the side opposite that angle a, then

$$Cos\ A = \frac{b^2 + c^2 - a^2}{2bc}$$

It does not matter which side we call b. This formula will give two results for one of the other angles, but as we are concerned only with one this does not matter. From the data given

$$a = 25.5 \text{ ft.}$$
$$b = 20 \text{ ft.}$$
$$c = 20 \text{ ft.}$$

$$Cos\ A = \frac{400 + 400 - 650.25}{800} = \frac{149.75}{800}$$
$$= 0.18719 \text{ and } A = 79^\circ\ 13'.$$

This gives the angle, and the course run will have the bearing S 10° 47′ W.

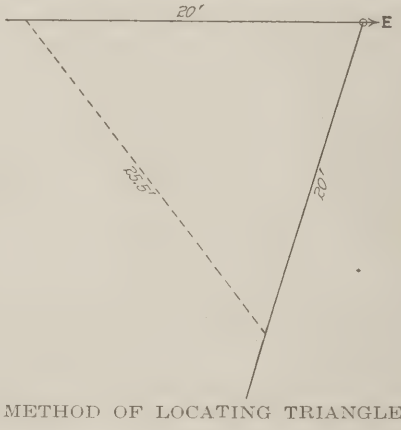
When two legs of the triangle are the same length the angle may be computed as follows:

$$Sin\ \tfrac{1}{2} A = \frac{\frac{1}{2} a}{c}$$

In this case it works out:

$$Sin\ \tfrac{1}{2} A = \frac{12.75}{20} = 0.6375$$
$$\tfrac{1}{2}A = 39^\circ\ 36'\ 30''$$
$$A = 79^\circ\ 13'$$

At this mine the coal was hauled up a slope and it was necessary to calculate the rise in order that the thickness of cover over the coal might be placed on the map. The pitch distance was carefully measured, then



METHOD OF LOCATING TRIANGLE

the horizontal distance was measured by breaking chain, a carpenter's level being used to keep the tape level and a sharp pointed plumb bob allowed to drop two or three inches, marking the horizontal steps. The slope was 190 ft. 3 in. long while the horizontal distance was 170 ft. 5 in.

The table on pages 4 and 5 of the "Coal Miners' Pocket Book" enables the odd inches and fractions to be reduced to decimals of a foot without trouble.

From trigonometry, the cosine of the angle of inclination is equal to the horizontal distance divided by the pitch distance.

$$Cos\ angle\ of\ inclination = \frac{170.4167}{190.25}$$

The angle of inclination is therefore 26° 31′ 30″.

The rise of the slope is equal to the pitch distance

times the sine of the angle of inclination. In this case it was 84.85 ft. or, say, 85 feet.

Inside the mine I found a situation somewhat more involved. A narrow slant turned off the entry at such an angle that long measurements were impossible. The timbers and the coal rib made it impossible to lay off definite distances in each direction and then measure the third side. Having marked the intersection of the center lines of the two places, I sighted down the entry toward a light placed at the face and located to points on two ties several feet away. I drove small nails in these ties and connected them with a cord. Next I sighted toward a lamp at the face of the slant and in a tie drove a small nail at a distance of 9 ft. 9¼ in. from the corner. From this mark the tape was stretched to the entry between timbers and as near as possible to the corner of the coal and its intersection with the cord stretched previously in the entry noted. The distance up the entry was measured and the cross measurement taken. This provided all the data necessary for computing the angle. The three sides were respectively:

$a = 9'\ 9\frac{1}{4}''$ or 9.77 ft.
$b = 8'\ 6''$ or 8.5 ft.
$c = 8'\ 1\frac{1}{2}''$ or 8.125 ft.

The angle made by the crosscut with the entry was thus found by computation to be 52° 20′.

This method can be used not only when a transit is not available, but is useful during a high wind; for a steel tape stretched close to the ground is but slightly affected by a wind that would render observations taken with a transit unreliable.

The accuracy of the results will depend upon the care taken in sighting the lines and measuring distances. In general the results are as close as those obtained from ordinary mine surveys made with a transit.

THE many suggestions, mining kinks and wrinkles published in the Ideas and Suggestions Department of COAL AGE are of great practical value to all readers actually engaged in operating mines. From the 10,000 and more men the paper reaches each week there should come a much larger number of such ideas. There are clever arrangements of a simple and practical nature in use at all mines. What may be an old story to one is likely to be just the idea some other fellow is looking for. We particularly invite all COAL AGE readers to send us ideas and suggestions suitable for this department. Everything published is paid for at a liberal rate.

Mica Insulated Armature Coils for Use on Alternating-Current Generators

Failure of armature coil insulation is the most common single cause for generator shutdowns. These are invariably expensive, either through loss of revenue or repair charges, or both. A perfect insulation—one that never fails—is unknown, at least at present. Mica is probably the best available material for insulating purposes.

The Westinghouse company and other manufacturers are now finding mica a solution for some of the problems of the large-capacity, high-voltage and high-speed designs of electrical machines demanded by the up-to-date power plant.

Mica is a first-class dielectric. Its insulation resistance increases with temperature—a valuable characteristic for higher temperature work, and in direct contrast with the properties of treated tapes, in which the insulation resistance and loss increases rapidly at temperatures above 100 deg. It is unaffected by temperatures far in excess of those encountered in the modern, well-ventilated alternator. It is impervious to the static discharges present in all high-voltage machines. It is resilient and retains its resiliency indefinitely—thus helping to hold the coil tight in its slot. Mica is a mineral obtained in the form of large crystals. These split readily into thin, parallel-sided laminæ, or flakes. The flakes are pasted uniformly on cloth or paper to facilitate handling and to provide a mechanical support during application.

In the form of a "wrapper"—that is, pasted on large sheets of specially treated paper—mica is used on all modern alternating-current generators on the straight sides of each armature coil, to provide insulation between conductor and iron, the operating voltage of the machine determining the number of turns, or the thickness of this insulation wall. All known insulating materials are relatively poor heat conductors. This is equally true of mica and treated tapes. Therefore the tighter and the thinner the wall, the better are the heat radiating characteristics of the coil. For the lower-voltage machines the mica wrapper is applied as tightly as possible by hand. For the higher-voltage windings (in general 6600 and above), where the insulation wall must be relatively thick, special machines apply the wrapper under heat and pressure, and finish it to a solid, compact wall.

Frozen Rope Causes Accidents

Manila or other fiber rope is made brittle by freezing, and should be thawed before being used. Accidents happen when this precaution is neglected.

Few contractors take proper care of fiber rope; a neglect of handy rope and of rope used for tackle is an extremely flagrant waste of material. Fall rope and those used in standing rigging do not absorb much moisture, soon dry out in the wind, and are comparatively free from dirt. No special care need be taken to prevent them from freezing. With general utility rope the case is different. A manila rope contains only a small amount of natural moisture, but it will absorb as much as 30 to 40 per cent. in a damp atmosphere.

The moisture does no harm, but the freezing of the contained water makes the fibers brittle and the rope weak; therefore the frost should be thawed out before the rope is used for heavy lifts or pulls.

Dirt is chiefly objectionable because it reduces the working life of rope. When working, the rope fibers move on each other and the grit in the dirt cuts and frays them rapidly. On a construction job a visitor recently had to pick his way over the tangle of handy rope and tackle left lying where last used, and frost was in every inch of this rope.

When finished with a rope it should be put where it will not freeze or be ground into the mud; if this is impracticable, coil the rope and set this coil on a pile of boards or on any other handy platform so that it will have some chance to dry.—*Engineering News-Record.*



Handling River Coal at Harrisburg

By Henry J. Edsall
Philadelphia, Penn.

THE dredging of small anthracite coal from the rivers that flow through the anthracite coal region of Pennsylvania, or that have branches in this region, has come to be quite an industry. Along the Susquehanna, in the Harrisburg region alone, the amount of coal taken out of the river each year probably exceeds 200,000 tons.

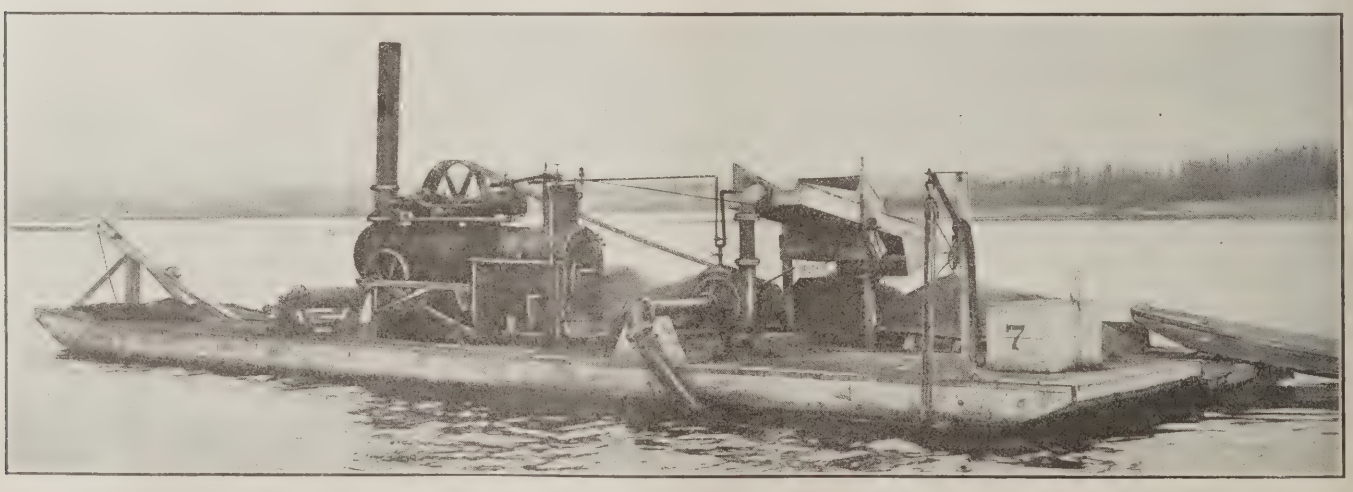
This coal is washed down the river in times of high water, especially in the spring. It settles to the bottom in the quieter stretches where there is comparatively little current. There is a tendency for the coal to collect in certain spots, due to depressions in the river bottom, eddies and other causes. This coal forms into beds, some of which are quite large. The usual method of dredging the coal in the Harrisburg region is to suck it up with a rotary dredge pump. This has a 6-in. suction pipe with a bonnet on the lower end about 18 in. wide and an intake opening through which the coal is sucked as the bonnet moves along the river bottom. The dredge pump is set up on a flatboat, which is operated by means of a horizontal boiler and engine. In the bow of this boat is a small-diameter drum, 3 or 4 ft. long, on which an anchor rope can be wound.

When a bed of coal is located the dredge boat is taken to the upper end of the bed, the anchor thrown overboard, and then the dredge drops downstream until the anchor rope is paid out. The pump is then started and the suction end lowered into position so that the dredging operation may begin. At the same time the drum at the bow begins to slowly wind up the anchor rope, power being obtained for this purpose by an auxiliary drive from the engine. The dredge thus moves forward slowly until the anchor rope is wound up or until the bed of coal is passed over.



SUCTION NOZZLE OF THE DREDGE

The dredge pump discharges the coal and water to a screen about 6 ft. long through which the water washes the mud and fine coal. The good coal goes



CLOSE UP VIEW OF THE SUCTION DREDGE WITH A FLATBOAT ALONGSIDE





VIEWS OF THE MACHINERY INSTALLATIONS AT OPPOSITE ENDS OF THE DREDGE

over the screen to a flatboat tied alongside the dredge and is helped over the end of the screen by an attendant with a hoe. This attendant allows more or less coal to remain at the lower end of the screen to act as a dam to keep any water from washing over the end instead of going through the screen.

The flatboats for transporting the coal are about 50 ft. long by 10 ft. wide, and are decked over. The coal is piled on the flat deck, which is provided with 12-in. planks set on edge along each side to keep the coal from spilling over. These boats will carry from 15 to 20 tons each. For moving the flatboats there are steamers of about the same size as the coal boats but equipped with paddle wheels at the stern. The paddle wheels are driven from a horizontal combination engine and boiler by means of a belt drive to a countershaft, thence through a chain drive from the countershaft to the paddle-wheel shaft. One of these steamers will handle several loaded coal boats at a time, and they look quite picturesque with their paddle wheels churning up the water at the stern and the flatboats in front and possibly alongside.

The unloading of the coal from the boats with a minimum amount of labor is somewhat of a problem, since each boatload is a comparatively small amount; also on account of the coal being spread over a considerable area compared to the depth of the pile. To eliminate labor, a mechanical loader must go over the whole area of the deck and clean up all the coal; otherwise handwork is necessary. The unloading arrangement shown in the accompanying illustrations has accomplished this result almost perfectly, as it covers practically the whole area of the deck and leaves only a thin layer of coal that can be easily cleaned up by one man. This equipment will handle the coal at a rate of over 60 tons per hour, so that a boat can be unloaded in about 15 min. The power required to operate it is a small item of expense, the motors being of 7½ and 3 hp. respectively.



FOOT OF THE UNLOADING CONVEYOR

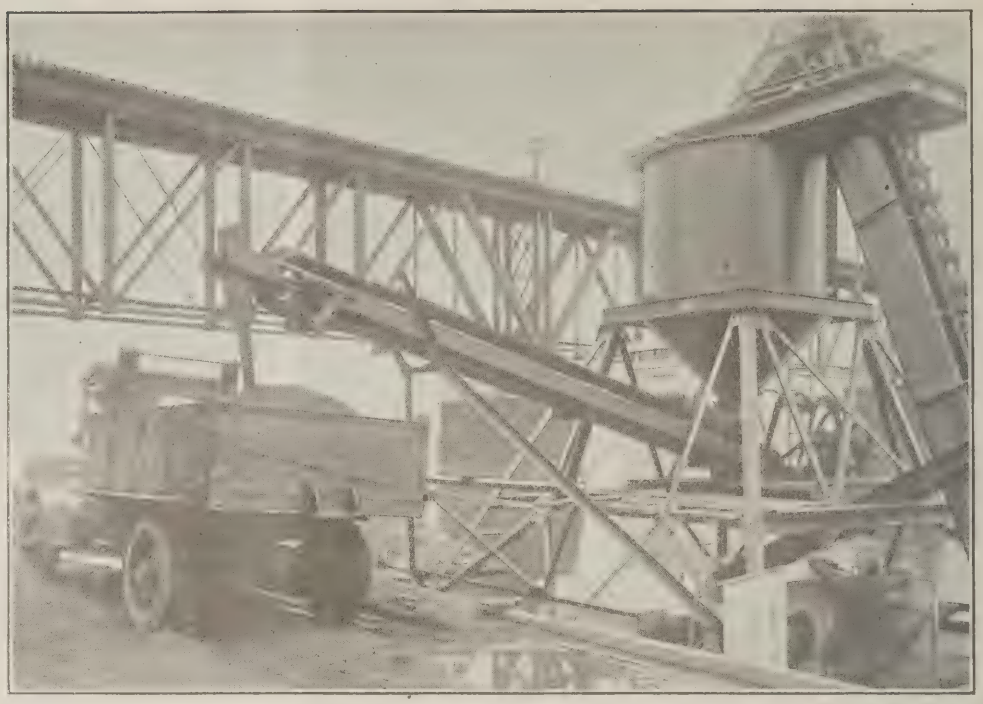
This arrangement includes three separate parts—the elevating element, consisting of a chain and bucket elevator with a spiral feeder at the lower end, a belt conveyor to deliver to the trucks and a 10-ton steel tank to act as an equalizing reservoir between the elevator and the belt conveyor. The machinery and the tank are supported on steel framework resting on two flatboats far enough apart to allow the coal boats to pass between them. This method of support was adopted largely because the most convenient point for unloading the coal at Harrisburg is in the park along the river front, where it is out of the question to consider building anything of a permanent nature either in the river or on the shore. This scheme, however, has other advantages since it keeps the structure symmetrical, with the elevator and bin in the center and as low as possible. Furthermore, the complete equipment can be removed and laid up for the winter to avoid damage by floods and ice.

It will be noticed that the elevator is pivoted at the upper end. This allows the foot to be swung forward, which also raises it, thereby providing for different levels of the boats with varying loads and also making it possible to get the loader into position and out of the way without interference.

The elevator is about 26 ft. long center to center of head and foot wheels and is of the single-strand centrifugal-discharge type. The standard malleable iron buckets are 12 in. long and 6 in. wide, and are attached to every link of the No. 710 malleable iron chain. Since the elevator operates on an incline, it was considered advisable to attach flatirons across the backs of the buckets and let these slide up and down in angle-iron guides in order to support the buckets on both the up and down runs and keep them from sagging or sway-

ing. There is also a steel casing around the return run to avoid danger and to catch any coal that spills from the ascending buckets or from the discharge at the head. The elevator foot shaft is extended at both sides for the spiral feeding device, which consists of a spiral ribbon 32 in. in outside diameter and with 12 in. pitch, the blades being made of $\frac{3}{4}$ x 3-in. steel flats.

A steel trough is provided at the back of the ribbon and this extends part way underneath. The coal thus cannot get out at the back; neither is there danger of injuring the man at the rear of the elevator through coming into contact with the ribbon. The ribbon is made right and left hand so that the coal from both sides of the elevator is pushed in toward the buckets, which are well filled if the foot of the elevator is kept against the coal properly. The coal is almost entirely cleaned up from the decks of the boats, the small amount left being easily shoveled up by one man and fed to the elevator.



TOWER, HOPPER AND CONVEYOR OF THE UNLOADING MACHINE

The elevator discharges at the head in the usual manner, over a chute into the 10-ton circular steel tank. This tank is 8 ft. in diameter and is made of $\frac{3}{16}$-in. steel plate properly braced and stiffened by angles and channels. The bottom is hoppered and fitted with a gate for delivery to the belt conveyor. Across the top of the tank beams are placed to support the head of the elevator. The frames that support the tank and machinery have two legs resting on each flatboat, the load being distributed on the deck of the boat by means of channels running part way across. The possible rocking of the boat is taken care of by a pin connection, which insures flexibility. The belt conveyor which runs from the tank to the trucks is 24 ft. long center to center of head and foot wheels and has an 18-in. five-ply rubber belt. This belt runs over standard troughing idlers on the carrying run and returns over standard return idlers. It is supported by means of a steel boom with a strut underneath which allows of adjustment in height of the boom. The belt conveyor has a somewhat larger capacity than the elevator, so that a truck can be loaded quickly, this extra capacity being also needed by the belt conveyor on account of its intermittent operation, which means that it has to handle the same amount of coal as the elevator, but in less time. The elevator operates continuously until the boat is unloaded, whether a truck is being filled or not. The bin, however, sometimes becomes filled when the trucks are not taking coal away fast enough, and in this case the elevator has to be stopped until some of the coal is taken out of the bin. The 7½-hp. motor is located on the platform at the head of the elevator and is geared direct to a countershaft which also acts as a pivot shaft for the elevator. From this countershaft a



AFFORDS AN EXCELLENT GENERAL VIEW OF THE UNLOADING STATION

chain drive extends to the head shaft of the elevator. The 3-hp. motor is located on the platform at the foot of the belt conveyor and geared direct to the conveyor foot shaft. The starting boxes for the motors are in a small closet on the flatboat nearest the shore, the feed wires leading from an underground conduit to this closet. There is also a push button near the delivery end of the belt conveyor so that the truck driver can stop this belt when his truck is full.

New English Coal Field to Be Extensively Developed

North Nottinghamshire, known to lovers of beautiful scenery as "The Dukeries," will soon see the development of its large coal resources on a hitherto unattempted scale. Some of the deposits are being worked already, but the greater part of this immense coal field is as yet untouched.

Enough coal exists in the area mentioned to insure the prosperity of this portion of the county for the next 100 years. Most of it is comparatively easy of access. Indeed, there is no coal yet to be developed in any part of England that lies nearer the surface than that in this district, and the demand for it is practically unlimited. Being of a hard texture, it is particularly suitable for transportation, and hence it is not surprising to find that before the war 40 per cent. of the output of the Nottinghamshire pits was exported, notwithstanding the fact that, lying in the center of England, it is farther from the ports than any other coal-producing area.

The Germans were particularly willing buyers. They found this coal far better for their blast furnaces and locomotives than their own Silesian and Westphalian product, and, thanks to British shipping, which, while bearing away from us the sources of our wealth brought back German manufactures as return cargoes, they also found it cheaper. Its chief excellence consists in its comparative freedom from sulphur—an important consideration in the making of steel. As compared with 2½ per cent. of sulphur found in Welsh coal, the coal of North Nottinghamshire contains only ½ per cent.

The principal agency concerned in the sinking of new pits is the Bolsover Colliery Co., whose pit near Mansfield, known as Crown Farm, holds the world's record for output in a given time, 4850 tons having been brought to the surface in 7 hours 40 minutes[1]. The company also runs two other important pits at Bolsover and Cresswell, in Derbyshire. The Dukeries comprise, in the main, the estakes of the Duke of Portland, the Duke of Newcastle, Earl Manvers and Lord Savile.

The first of the new pits, at Blidworth, known as the Rufford Colliery, was completed just before the war by the Bolsover Colliery Co., and is now turning out some 2300 tons a day. This could easily be increased to 4000 if the necessary labor were available. Another pit on the Duke of Portland's estate at Clipstone, four miles from Mansfield, will be sunk by the same company as soon as the Government gives permission. All the surface work has been done, and sinking was about to commence when the Government commandeered the labor and material. Coal is expected to be reached here at a depth of 1860 feet.

The next collieries to be started will be at Blidworth, by the Newstead Colliery Co., which has acquired the mineral rights over an area of five or six thousand acres. Not far off is Ollerton, where the Butterley Coal and Iron Co. and the Stanton Iron Co. have jointly arranged to work the coal under Lord Savile's estate. Belonging to the same owner is Bilsthorpe, with an area of 6000 acres, where a borehole has been put down by the Stanton Iron Co. and the coal shown to be satisfactory. Rufford, to which allusion has already been made, possesses the thickest coal bed of any so far proved in this neighborhood.

Marked for later development are the coal deposits under Sir Charles Seely's Sherwood estate, including Oxton, which lies between Blidworth and Farnsfield. A company is to be formed to work the coal, and negotiations are also about to be opened with Earl Manvers to deal with that on the Thoseby estate, where there is satisfactory reason to suppose the deposit is good.

It is extremely probable that the Wigan Coal and Iron Co., which now has one colliery at Manton, will sink another on the Duke of Newcastle's estate near Worksop. About 20,000 acres are here available.

In nearly all the projects mentioned the leases have been actually let, but to sink and equip one of these collieries for an output of 4000 tons a day will cost from £650,000 to £750,000, without reckoning anything for railways and workmen's dwellings, before a single ton of coal is raised. At a moderate computation between four and five millions sterling will be invested in the exploitation of this new coal field. Each of these collieries will employ, on an average, 2700 men and boys, which will mean some 20,000 miners, or a new mining population of 100,000 souls.

Railway extensions are projected to deal with the resulting growth of trade and population. The Mansfield Ry., which owed its inception a few years ago to the advent of fresh collieries in the neighborhood, will be connected by a branch line with the Great Central Line from Chesterfield to Lincoln at Blidworth, where the new population is already being housed in a village laid out on town-planning lines. A hundred and seventy houses had been erected when the outbreak of war stopped building operations, but the complete design provides for 500 dwellings. Similar model villas will be laid out for the other collieries, since the coal seams are so numerous and of such a thickness that 40 years would be required to exhaust one of them. Below the upper hard coal lie other beds, some of which can certainly be worked at a profit. At the present rate of production this new coal field will not be exhausted for 150 or 200 years. Thousands of houses are already in contemplation and would have been erected ere this but for the war.

[1]The author of this article is evidently unfamiliar with such American operations as the Orient mine of southern Illinois, and Vesta No. 4, near California, Penn.—EDITOR.

IT HAS BEEN STATED by an authority conversant with pulverized-coal furnace practice that the life of a furnace burning powdered fuel is not as long as that of other forms of furnaces. It can also be stated that the life will be the same as that of other forms of furnaces operating under the same capacity rating. It is considered, however, that the expense of furnace renewal is more than offset by the advantages of using pulverized coal.

Agencies in the Transformation of the Connellsville Region

By John L. Gans
Connellsville, Penn.

THE change in the character of the Connellsville coke region, from a beehive coke manufacturing to a coal-producing center, is being effected through what may be termed four different agencies. In order of sequence by which they have become operative they are: The adaptation, whole or in part, of existing coking plants, both merchant and furnace-owned, to the shipment of byproduct coal; the acquisition and development by furnace and steel interests of Connellsville coking coal as a source of raw product for the manufacture of byproduct coke at the point of consumption; the association of coke producers who are owners of coking coal with steel interests in the joint ownership and operation of byproduct coking plants outside of the Connellsville region, and the establishment of relations between a steel producer, who is also a byproduct coke producer, and an independent Connellsville coal-land owner, whereby the latter becomes a producer of byproduct coal for the exclusive use of the former.

Tracts Being Developed for Byproduct Coal

The order of importance is perhaps different from that just given and is very likely to undergo changes as developments grow apace. At present, however, the shipment of raw coal from plants originally designed, and for a long time operated, as coking plants only, but now partially and in some instances wholly diverted to the new purpose, takes the lead in volume of tonnage. The development of tracts by new mines to be devoted solely to the production of coal for byproduct coking is yet in the primary stages, but it is fast assuming such proportions as will eventually make these operations very important, if not the most important, factors in the new order.

Several merchant producers of coke have been shippers of byproduct coal in varying quantities for a number of years past and within the last year have engaged somewhat more extensively in that line. Many of the more recently constructed plants were equipped for loading coal direct from the tipples into railroad cars, and others have made such provision, hence the number of coal-loading plants has gradually increased as the byproduct industry has expanded. The Republic Iron and Steel Co., operator of the Republic plant of 400 beehive ovens, has been shipping its excess coal to its byproduct plant for several years, together with the partial, and sometimes the whole, output of the Martin plant, which has an equipment of 244 beehive ovens. The Bowood mine of the same company is an exclusively coal-loading plant, as is also the Atchison mine since the permanent abandonment of its 120 beehive ovens.

All of these operations are in the Lower Connellsville district, from which virtually all of the byproduct coal is being shipped. Early last spring the 470 beehive ovens of the Brier Hill Coke Co. in the Lower Connellsville district were blown out, since which date the entire mine production has been going to the Brier Hill Steel Co.'s byproduct coking plant at Youngstown.

The LaBelle Coke Co., operating 200 ovens, has within the past two years completed a barge-loading plant and ships coal to the LaBelle Steel Co., Steubenville, Ohio, for byproduct uses, while continuing part of its beehive ovens in blast.

Since last midsummer the H. C. Frick Coke Co., a subsidiary of the United States Steel Corporation, and the largest coke producer of the Connellsville region, has been making increasingly larger shipments of coal from a number of its mines in the Lower Connellsville district to the Clairton byproduct plant of the Carnegie Steel Co. As additional units were made ready for firing at this plant, coal shipments have been increased through cutting down the number of beehive ovens in blast at the several mines and diverting the coal by an elaborate underground electric haulage system to barge-loading tipples on the Monongahela River. This shifting of the destination of mine output has progressed until four large beehive oven plants—Colonial No. 4, Edenborn, Lambert and Ronco, with a total of 1612 ovens—have been relegated to the inactive list, while the coking capacity of the Leckrone plant has been cut down from 516 to 110 ovens.

Many Mines Overhauled and Improved

Meantime the Ralph, Palmer and Gates mines in Fayette County and the Dilworth mine in Greene County, at which no coke has ever been produced although some were so designed, have been overhauled and extensively improved and their output is being sent to Clairton. The 100 ovens at the Bridgeport mine continue to be operated, but the mine capacity has been increased and the excess coal output is shipped by river. At the Maxwell mine some miles up the river barge-loading preparations are under way, this being another step in the comprehensive plan for the Frick company to change its mines which are tributary to the Monongahela River into producers of coal for the Clairton byproduct plant.

To date there has been but a single instance of an owner of Connellsville coking coal, and operator of beehive ovens in the region, joining with a steel producer as owner and operator of a byproduct coking plant. That is the union of the W. J. Rainey interests with the Alan Wood Iron and Steel Co. in the formation of the Rainey-Wood Coke Co., which has a plant of the Koppers type of ovens in course of construction at Swedeland, Penn. This plant is to be supplied with coal from the mines of the Rainey interests right in the heart of the Connellsville region, and long the source of supply for the beehive ovens on the property. (This enterprise was more particularly mentioned in *Coal Age* in the issue of Aug. 8, 1918.)

Several developments are in progress in the Greene County extension of the Lower Connellsville district which are to be producers of byproduct coal for the

exclusive use of the parent steel and furnace interests. At present the most notable and farthest advanced of these enterprises is that of the Buckeye Coal Co., a subsidiary of the Youngstown Sheet and Tube Co. The plant of this company, briefly described in *Coal Age*, issue of Feb. 6, is located at the new town of Nemacolin, and will have an ultimate capacity of 6000 tons of coal per day, all of which will go to the byproduct oven plants at Youngstown.

What is herein termed as the fourth of the series of agencies through which the Connellsville region's evolution is being brought about has thus far but a single example. This is found in the comparatively recent purchase by the Jamison Coal and Coke Co., one of the leading merchant coal and coke producers of the Greensburg-Connellsville district, of 575 acres of coking coal in the Perryopolis section of the Connellsville district, which will be devoted to the production of coal exclusively. The property, which is already under development through two slope openings, will have a capacity of 2000 tons per day. The entire output will go to the byproduct plant of the Bethlehem Steel Corporation at Sparrows Point, Md. The new operation adjoins the holdings of the Washington Run Coal and Coke Co., one of the leading merchant producers of the Connellsville region and a long-time shipper of byproduct coal.

Even with the multiplication in number and variety of means whereby the coal of the Connellsville region, once held sacred to the production of beehive coke, is being utilized in the manufacture of coke, no alarm is felt among coke producers over the transformation that is in progress. Firm in the faith that Connellsville coal is as essential to the production of high-grade byproduct coke as it has been in the manufacture of coke by the more primitive process, the operators are accepting, even welcoming, the situation as an assurance that the prosperity of the Connellsville region is by no means at an end. Instead, it is the belief that, having a market for its principal product in two forms, rather than one as formerly, they are infinitely better positioned than when they were subjected to the "flings of fortune" in the "prince and pauper" days.

Germans Use Driving Belts of Paper

Some particulars of the paper driving belts which are now being introduced into German workshops are given in the *Bulletin des Usines de Guerre*, a translation of which appears in the *Compressed Air Magazine*. The paper is cut into narrow bands, which are then spun. The belts are made by a weaving or braiding process.

Woven paper belts are of two kinds—paper fabric and paper thread belts, the former being the more frequently used. The fabric is first cut into bands 40 m. (131.12 ft.) long, which are subsequently made up according to the desired width and thickness. A core of strengthening material is interposed, either cotton or sheet metal, though more recently these cores have consisted of paper thread and metal wires interwoven. The core is surrounded with the paper strips and the whole sewn with strong thread. Belts so prepared are said to be very flexible and to wear satisfactorily. Woven paper belts have a tensile strength of from 100 to 125 kg. per centimeter of width (560 to 700 lb. per inch of width).

Even Ireland Has Coal News

The Province of Connaught in Ireland lies in the northwest of that island. One of the counties in Connaught—Roscommon—has in the northern corner, which is wedged in between the counties of Leitrim and Sligo, the village of Arigna, where are located producing coal mines. It is stated that this coal has been successfully used at the Sligo gas works, though the coal is said to be of anthracitic variety. The field is commonly known as the Leinster coal field, for the coal is mostly found in that county, though Arigna is the principal point of development and after it the coal field is occasionally named.

The Government of Great Britain and Ireland is endeavoring to ascertain the quality of the coal in the Tyrone field in Ulster, which field passes under Lough Neagh, a comparatively large lake forming a sort of common corner monument for Tyrone, Londonderry, Antrim, Down and Armagh Counties. About $75,000 is to be expended toward experimental borings. They will be made near Lough Neagh, for it is believed that sheet of water masks the most desirable portion of the field. Coalisland is the most important town in the field, and after it the Tyrone field is often named.

PLAIN ENOUGH

Written Expressly for Coal Age

By Berton Braley

THINK of this a moment, prophet sad and glum:
Here's a world that must be built anew,
Built with tools and products of the shops that hum—
Has that little fact occurred to you?
Some one has to do it; who can do it best,
Europe, lacking labor and supplies,
Or this mighty nation with its wealth unguessed?
There's an answer plain before your eyes!

WE don't gloat at Europe in her misery,
Neither do we hold our losses light;
Yet the truth's before us, who can help but see
Logic of the facts that are in sight.
Men must live and labor; we have goods they need,
Products of our industry and brains,
Trade is therefore certain, as who runs may read,
Certain as the sunshine or the rains.

THINK of this a moment, blue and fearful soul,
Prophet of disaster far and near:
Trade means busy workshops, shops mean streams of coal,
Keep your courage up and never fear.
Chuck your dour statistics, take a broader view,
Men must have the fruitage of our skill.
There's a world that's waiting to be made anew,
We can help to do it—and we will!

Increasing Cage Safety

By Thomas Price
Nanaimo, B. C.

SYNOPSIS—*A disastrous accident resulted from a breakage of the hoisting cable and a failure of the safety catches on the cage to function properly. Extensive tests showed that these catches were at best unsatisfactory. A scheme for attaching two ropes to each cage, either one of which shall be capable of sustaining the load, was then devised. This is to be tried soon.*

IN SEPTEMBER of last year a serious accident occurred at the Protection Mine of the Canadian Western Fuel Co., Ltd., due to the breaking of the descending hoisting rope. This resulted in the death of 16 men. The accident occurred in spite of the fact that the cages were equipped with a type of safety catch that was considered a good one. At the time of the catastrophe the reason of the failure of these catches to work properly could at all not be accounted for. This led to a series of thorough and practical tests of the catches. For this purpose a trestle 45 ft. high was used, and guides similar to those employed in the shaft were bolted in position and the experimental cage fitted with the safety catches. Prominent mining men were present to see the tests carried out.

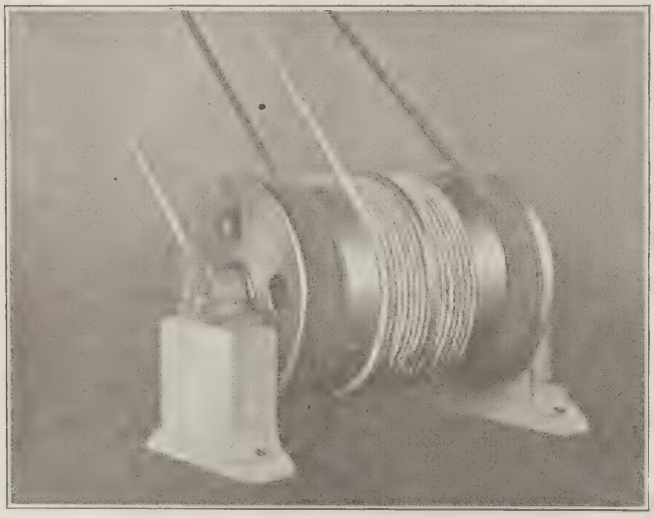
Several trials with the ascending cage were made, and in some cases the safety catches did their work but failed with the descending cage, which crashed to the ground every time. A new grip was tried. This certainly acted, but those present were of the unanimous opinion that while the catches stopped the cage they were totally unsuitable, the action being altogether too sudden and dangerous. This was conclusive evidence that something entirely different would have to be devised and proved the fact that any type of safety catch was more or less unreliable.

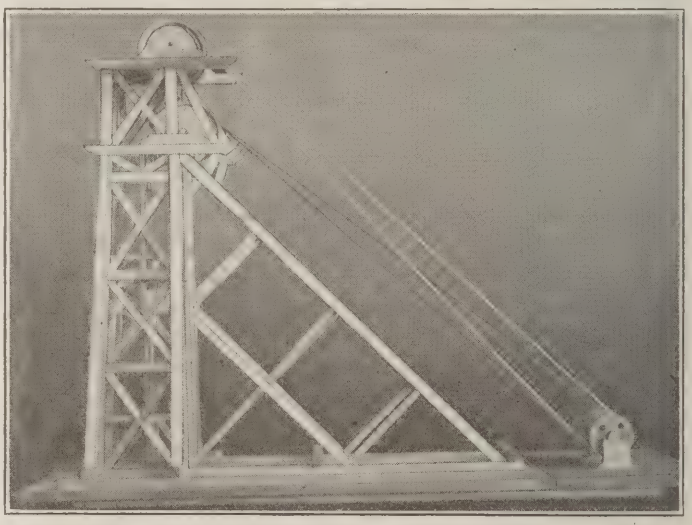
After much scheming the idea of using two ropes on each cage presented itself. This at first sight made it appear that great alterations would have to be made to the present machinery, or at least that extra winding drums would have to be added to those already in place. This would prove a costly change.

Thomas Price, master mechanic of the Canadian Western Fuel Co., Ltd., finally solved the difficulty by crossing the ropes from the drum to the two extra sheave wheels, which are placed above the present ones. Thus as one rope winds on to the drum, the other is wound off. The angle of the sheaves is adjusted to suit the center of travel of the opposite half of the drum. The ropes from the drum to the sheaves cannot possibly come together, being kept apart by reason of one rope being wound under the drum and the other over.

The size of winding rope used is 1½ in. in diameter. This could either be doubled on each cage or a smaller sized rope used, which would still increase the factor of safety. Of course, whatever size of rope is employed it should be capable of carrying the load itself with a considerable margin of ultimate strength. Each rope will have its full share of the load. Thus at no time in its working life will any one rope under this double-rope system be subjected to the same relative stress as it would be in the single-rope system. Furthermore, there will always be a far greater margin of safety. The only extra cost outside the two additional ropes is that required to erect the extra section of framework and the sheaves.

This arrangement is to be tried out at the Wakesiah mine as soon as sinking operations are completed.





METHOD OF WINDING CABLES ON THE DRUM AND A MODEL OF THE ENTIRE APPARATUS

THE OUTPUT OF COAL from the Malayan collieries rose from 101,846 tons in 1916 to 155,279 tons in 1917, and would have shown a greater increase but for the difficulty in obtaining the necessary additions to the plant. There was also some difficulty in obtaining sufficient labor for the mines, due to the greater attraction offered to laborers on rubber estates, where higher wages can be earned with much lighter work.

British Columbia Operators Object to Features of New Act

Representatives of the coal mine operators of British Columbia waited upon the Executive Council of the Provincial Government on Feb. 27 to register some objections to the amendments proposed by Hon. William Sloan, Minister of Mines, at the present session of the legislature, to the Coal Mines Regulation Act.

As is indicated by the summary of these amendments, which already has been published in *Coal Age* (p. 524, issue of Mar. 20), the first change contemplated is the inauguration of a minimum wage board that shall have power to fix districts in which such minimum wage as may be decided upon shall be made to apply. It is not stated, however, that the same wage shall be enforced for each district or that a minimum shall be applied to all the coal-mining sections of the province.

Such legislation, the operators assert, discriminates against the coal-mining industry. They say it also discriminates against collieries, as a minimum may be applied to one and not to the other. It is "vicious," it is declared, for these reasons and because it places too much power in the hands of the Minister of Mines. Further, they maintain that the establishment of a minimum wage will have a tendency to do away with contract work, under which system the coal mines of British Columbia are operated. They would have the effect of reducing production. It will, in their opinion, increase the cost of production and, the greater the cost of local coal, the larger proportion will be imported, and consequently the greater the loss of revenue to the province. The dealers, it is affirmed, were driven out of the coal market of California because of the production costs and, if it was to continue, would meet with a similar fate with regard to all the foreign markets.

Competition, it was declared, was becoming closer in the State of Washington and, when it was remembered that of the 2,000,000 tons produced in 1917 no less than 800,000 tons was exported, the seriousness of such a loss would be better appreciated. Moreover, any greater increase in production costs, which would mean beyond question a further advance in retail prices, would result in the encouragement of the replacement of coal by fuel oil. This transition was a factor which those interested in the coal trade had to face. If it persisted it simply meant that more and more capital which now was invested locally in locally produced fuel would be expended on an imported fuel and would fatten foreign profits.

Exception was taken to the proposal that the Lieutenant-Governor-in-Council should be given power by the Legislature to make such orders as may be deemed necessary from time to time for the further safeguarding of the lives of underground workers. The criticism offered was that it would result in uncertain conditions. Operators might be confronted from time to time with new regulations having the effect of disturbing their smoothly working systems of management.

The delegation took advantage of the opportunity to protest, as well, against the enforcement of the provisions of the Eight-Hour Act, which was passed by the Legislature in 1918, and which gives all those working above the surface around coal mines the same working day as those employed underground—namely, the eight-hour day. This law becomes effective on Mar. 31 next, and it was stated that, as it would tend to increase production costs, the wisdom of permitting it to remain without change should be made the subject of inquiry.

There have been reports that the Provincial Government proposes increasing the tax on coal produced in British Columbia from 10c. to 25c. a ton. While the statement has been publicly made that such action is under consideration, no pronouncement has been made from official circles. It is thought that this accounts for the fact that the operators took occasion, when meeting the Government, to submit a petition for the reduction of the present 10c. a ton tax to 5c. a ton. One of the arguments advanced in this connection was that in Alberta the tax is only 5c. a ton and that British Columbia coal already comes into competition, to some extent, with that of the sister province. It also was asserted that the points already enumerated against any action being taken that would have the effect of increasing costs, which under present conditions were extremely high, applied to the question of taxation. It was essential that the burdens of the operators should not be made greater if the coal-mining industry was to be maintained in a prosperous state.

Fuel Oil and Its Applications

By M. Meredith
Liverpool, England

Apart from its superiority to coal for marine propulsion the use of oil on railways is advantageous in countries that are not favorably situated in respect to coal supply. A typical instance is that of the Mexican Ry., where conversion from coal to oil has resulted in reductions of 32 per cent. in the weight of fuel consumed per train kilometer and of 40 per cent. in the cost of fuel. The oil can be handled from tank cars to storage tanks and thence to locomotives very cheaply as compared to coal. The wastage in handling between shipment and point of consumption (estimated at 8 per cent. to 10 per cent. with coal) is eliminated. No men are required to load up the engine or clean out ashpans. There are no ashpits to empty or ashes to be loaded up and hauled away.

Where used as an auxiliary equipment to coal-fired boilers to meet recurring peak loads the use of oil not only enables the plant to meet sudden and heavy demands, as in the case of electrical power stations, but may obviate the necessity of installing additional boilers with the growth of the average output of current.

The perfect smokeless combustion of oil fuel would prevent or abate the smoke nuisance in closely populated districts. In many instances the local authorities insist on the provisions of smoke legislation being carried out. That much remains to be done in this direction, however, is shown by the statement that in the Administrative County of London 76,000 tons of soot descend every year.

Efficiencies as high as 84.5 per cent. have been obtained on Scotch marine-type boilers using Mexican fuel oil with the pressure system of oil burning.

In the United States a large series of actual working temperature tests have shown that with coal the thermal efficiency of boilers usually varies from 66.6 to 68.1 per cent., with oil from 80.6 to 81.5 per cent.

In Great Britain fuel oil is used in industrial fur-

naces for such processes as billet heating, metal melting, riveting, bolt and nut making, and the manufacture of glass bottles. Of the three systems of burners for oil fuel the pressure jet system, in which the atomizing agent is pump pressure and steam temperature, has been developed during the last 10 years to such an extent that it is now recognized as the most economical system for use under stationary and marine boilers, and is being rapidly developed for locomotive purposes. The oil is drawn from the storage tanks by a steam pump through suction strainers, and delivered through heaters and discharge strainers to the oil fuel burners.

An interesting development is that many metal melting manufacturers have either scrapped their coke-fired furnaces or converted them to gas or oil. The principal metals being thus melted at the present moment are aluminum and what is known as 70/30 brass.

In the early years of this century a French engineer introduced the subject of oil as an auxiliary. The main advantage of auxiliary firing lies in being able to obtain at will a large increase in the power of boilers. The combustion of the petroleum does not in any way prejudicially affect that of coal; in fact, by the introduction of jets of petroleum the condition and efficiency of combustion are improved through a more complete mixture of the gases. It is therefore not correct to consider the evaporative power of coal as identical when passing from ordinary auxiliary firing.

Admitting this as a principle, but supposing the quantity of water evaporated by the coal to be constant, the extra evaporation due to the better mixing of the gases is credited to the petroleum.

In several evaporative trials made on the same boiler of a French naval vessel, when coal alone was burned at the rate of 18.8 lb. per square foot of grate area per hour, the water evaporated per pound was 9.05 lb. With a mixture of coal and 45 per cent. oil, the corresponding figure was 11.34 lb.; with a mixture of the coal and 64 per cent. oil, 14.12 lb. In this last test the efficiency of the mixture was higher than when burning petroleum only.

These tests served as a basis for further experiment, about four years ago, by power station engineers. Their theory was that a poor quality of coal could be conjunction with oil fuel. When used alone the inferior coal tended to cake on the links of the chain grate stokers, thereby retarding the necessary quantity of air from being drawn through the bars to complete

Plant of the West Virginia

THE panorama below affords an excellent view of the Coalton plant of the West Virginia Coal and Coke Co., at Coalton (near Elkins), Roaring Creek District, Randolph County, West Virginia, including a part of the company's batteries of coke ovens. This plant was built in 1901 at a cost of approximately $600,000 and is modern and businesslike in appearance throughout. The coal mined is taken from the Lower Kittaning seam, through two openings, one of which may be seen at the right in the view, the other being hidden by the tipple located immediately behind the coke ovens at the left. The tipple is of steel construction and is equipped with a cross-over dump and shaking screens; four different sizes of coal are prepared at this plant.

Immediately to the right of the tipple is the conveyor, also of steel construction, by which slack is conveyed to the slack bin, which has a capacity of 2000 tons. To the right of the slack bin is the power house, and in the background the blacksmith and repair shop. About at the point where the cloud of steam is seen is



PANORAMIC VIEW OF THE COALTON PLANT OF THE WEST VIRGINIA COAL AND COKE

combustion. The result was a smoldering mass, which traveled slowly along the bars and was dumped into the ashpit as a partly consumed coal. On analysis this ash would probably be found to contain a high percentge of combustible matter. Therefore a much larger quantity of coal was burned per hour to maintain, say, rated evaporation, than would have been necessary had complete combustion been possible.

The theory was that when fuel oil was applied the combustible gases rising from the coal fuel bed were quickly ignited, causing the top of this mass to become incandescent, and thereby tending to aërate the bottom mass, which would allow sufficient air to be drawn through to complete the combustion of the inferior coal.

Sufficient interest was taken in this theory for a large London power station to give sanction for tests to be carried out under a coal-fired Stirling water-tube boiler. One burner was introduced into each side of the boiler approximately 25 per cent. of the distance from the back to the front of the grate, the burners being opposite each other. The oil was stored in an overhead tank capable of holding three or four days' supply. It gravitated to the burners, which were of the steam-jet type, operating with steam as an atomizing agent at a pressure of about 25 lb. per square inch.

The first test was carried out on a coarse slack having a calorific value of 10,400 B.t.u., and a boiler efficiency of 69.25 per cent. was obtained. The temperature of the combustion chamber was 2648 deg. and that of the uptake 660 deg. Fahrenheit.

The final of a series of experimental mixed-burning tests was carried out on a mixture of coarse slack having a calorific value of 10,300 B.t.u. with Mexican fuel oil having a calorific value of 18,750 B.t.u. A boiler efficiency of 74 per cent. was obtained. The temperature of the combustion chamber was 2850 deg. F. and the uptake temperature 628 deg. F. The proportion of oil to coal on a B.t.u. basis was 8 per cent., and on a weight basis 4.96 per cent. The comparative costs were—with coal alone, 2.8; with the mixture mentioned, 2.62, showing a monetary saving of 6 per cent.

The tests showed that with oil at a cost per unit of weight of 2½ times the cost of coal, and burning in the aforementioned percentages, a saving is effected which should induce power station engineers to consider adopting this method of firing in the extremely large power stations of the future.

Coal and Coke Company

located the large electric ventilating fan. In fact the whole plant is operated by electricity and is as nearly fireproof as it can be made. The coal produced at the Coalton plant is used chiefly for steam, coking and domestic purposes.

The company operates 250 coke ovens, arranged in two double blocks, or batteries, and one single block of bank ovens. The latter ovens are almost hidden by the track in the foreground. The remainder of the ovens extend some distance to the left of the tipple. The average capacity of the ovens is 450 tons of coke a day, though as high as 500 tons have been produced in a single day under favorable conditions. To operate the plant to full capacity the services of about 300 men are required.

The town of Coalton is built on the hillside back of the ovens. The company owns 95 houses in this mining village and some sixty of the homes in the community are owned by individual miners. The company is planing the erection of a modern Y. M. C. A. building.



EAR ELKINS, WEST VIRGINIA; THE PLANT WAS BUILT IN 1901 AT A COST OF $600,000

Barking Up the Wrong Tree

By Frank H. Kneeland
Associate Editor, *Coal Age*

SYNOPSIS—*Many men engaged in coal production are inventors—unfortunately, some are patentees. A device may work perfectly, yet a patent covering it may be utterly worthless. In order to be valuable a patent should cover a device that will save a fair percentage of the money previously expended per unit of output. Furthermore, the output affected must be large and the demand therefor must be extensive.*

THE coal industry, probably like all others, is not devoid of a generous sprinkling of inventors and would-be inventors. Ever since *Coal Age* came into existence scarcely a month has passed without someone, somewhere, sending in a patent specification accompanied by a request that it be given publicity. Frequently these missives are little short of the pathetic.

"I will give any responsible party a 49 per cent. interest in this invention, if he will agree to manufacture it and get it on the market." "I don't expect much from this invention, although I am satisfied of its value. All I want is a reasonable compensation for my time and trouble." "Now that I have got this device perfected, I want to get a little something out of it. I will be satisfied with a small percentage on the profit that I am sure will accrue if the thing is properly advertised and pushed." "Please advise me where I can find someone who will be willing to back this invention financially and get it before the public." These are a few of the expressions used by the inventors who write to us.

During the past 20 or 30 years I have, on several occasions, come in contact with inventors, inventions and patents. Naturally, I have gained what has been, to me, more than once, valuable experience.

The Inventive "Bug" Will Invent Anything

The real dyed-in-the-wool inventor, the man who is thoroughly inoculated with the inventing disease, so to speak, of course knows no bound or limit. One of his schemes may deal with an automobile tire, the next with a sewing machine, the next with a steam locomotive, and the next with a telephone; and the pity of it is that all may be equally impractical.

Coming down to the coal industry, what do the patents issued cover? They cover all manner of devices—except the right ones. Mule harness, track devices, car door latches, methods of burning coal, etc., are a few of the schemes that coal men have patented, sending their specifications to *Coal Age* in the hope of obtaining publicity, fame and especially fortune.

And who are the inventors of these devices? They are stable bosses, draftsmen, surveyors, pit bosses, foremen, sub-foremen and under-officials generally. Once in a while an experienced mine superintendent patents some device or other to be used about the mine, while occasionally we receive a communication from an entirely disinterested party; that is, one not directly engaged in coal production. Thus the patent of one of the most practical inventions that we ever received was sent us by a salesman in a retail haberdashery, or some similar emporium.

Now, the objects that men have in making inventions and improvements in existing practice may be both varied and multitudinous. Necessity or expediency beyond a doubt furnishes the inspiration for most inventions. It is easy to conceive that any man confronted with the necessity of performing a certain operation without what he considers the proper means to perform it will develop some scheme for getting the thing done even without proper tools. Then, apparently, the thought comes to him, either from within or without, that this particular operation was never performed in exactly that way before, that it possesses certain advantages and should be patented, Here, as a rule, is where the mistake lies.

Men Take Out Patents for Different Reasons

As a general rule, men take out patents covering their inventions for the purpose of gain—either financial gain or an increase in experience. The ambitious engineer who desires to get into the business of developing either his own or other men's ideas may well seek a patent for no other reason than the acquisition of experience in securing that patent. To him an increase in knowledge is an increase in capital, and a well-developed scheme, even though it be worthless in itself, may be a convincing argument concerning his ability when he seeks to develop the ideas of others. The average individual, on the other hand, usually protects his idea with a patent in the hope of financial gain. Probably 99 per cent. of all patents taken out are of this nature, and it is unfortunate that the person who makes the invention fails to take inventory of what gains are possible before he proceeds to apply for letters patent.

Let us here pause for a moment to consider what is and what is not patentable. Broadly speaking, any new or improved useful idea, process, apparatus or product may be legally patented. Unfortunately, patent office rules and regulations are not absolutely iron-bound, and patents are often issued upon devices that are as old as civilization itself. As an example of this, a patent was issued some years ago covering the use of a corncob for the removal of dirt from various surfaces. Thus, legally, any farmer who picked up a stray corncob in his barn or stable and used it to remove dirt from his horse's legs violated and infringed this patent. Another patent issued from the national capital covered, among other things, "a partially cooked prune as an article of commerce or consumption." Any housewife, chef or other cook who served to his or her family or guests a prune or prunes which were not thoroughly stewed, baked, boiled, fried or otherwise cooked violated this patent. These are, of course, freaks in the patent world, but they illustrate the point.

In not a few instances, also, a man will invent one thing and his attorneys patent something entirely different. Some years ago I had occasion to look up a patent (issued in a country outside of the United States)

which was supposed to cover certain improvements in apparatus for the stocking of coal, ore and similar material. I found that the inventor of the device in question had indeed invented and intended to patent a structure upon which the stocking dump car was to discharge its contents. What his attorneys had actually patented for him was the *stocking* of "coal, ore and similar granular materials."

Because an invention is patentable is by no means a reason that it should be patented. This is of course assuming that the reason for patenting is the hope of financial gain. The patent covering a device which may be perfect mechanically, which may function exactly and fulfill every claim that was made for it, might be an utter failure from the financial standpoint. It is because inventors, after they have perfected their apparatus, do not stop to take stock of what their invention will accomplish, not physically or mechanically, but financially, that so many seek and acquire patents that are not worth the paper upon which they are written.

To again draw an example from my own experience: A few years ago I hit upon a scheme to lessen degradation of coal discharged from rotary mine-car dumps. The idea was simple, comparatively inexpensive, and there appeared to be no reason whatever why it could not be made to work properly and efficiently. A short calculation, however, led me to the conclusion that, although the device was entirely patentable, it would only save a small amount upon each ton of coal handled —not sufficient to pay fixed charges on the device and a bonus, percentage or royalty to the inventor also. I therefore abandoned my first idea of patenting the scheme.

Patent Did Not Make Its Owners Rich

A few years later the scheme which I had devised was patented practically in its entirety by one of the firms manufacturing apparatus for the coal-mining industry, or was patented by an individual and the patent rights acquired by this manufacturer, probably "for and in consideration of the sum of $1 and other valuable considerations." So far as I have ever been able to learn, the holder of this patent has never reaped any large financial returns from it. If he has done so, he is welcome to them, so far as I am concerned, for it was then, and still is, my judgment that large financial gain would not be forthcoming from this invention.

In order that a patent may be of commercial value, the device which it covers must effect a saving in some major operation. A saving in labor or material on a single minor operation that goes to make up any finished product, even though that saving is comparatively large, will not yield the man who employs it any material advantage over his competitor.

Thus, let us suppose that a man has invented a means whereby the dumper on the tipple may operate the car-door lifting device from a point near the dump levers. This device may work perfectly, lift the door of every car without fail, save a large portion of the dumper's time, and eliminate the necessity of his walking from his dump lever to the front end of the car and back again twice every time a carload of coal is discharged. Such a device might be entirely patentable, yet the patent would be of small value financially because it would save only a part of one man's time while that man was engaged on a decidedly minor operation in coal production.

Let us assume, for illustration, that the mine produces 1000 tons of coal per day, and, for the sake of argument, that the device in question saves two-fifths of the entire time of one man whose wages, we will assume, are $5 per day. Now, it will be conceivable that this invention or device saves the operating company $2 per day; but how much does it decrease the cost of coal per ton delivered on the railroad car? Just exactly one-fifth of one cent, which is not enough to give the mining company employing this device any decided advantage over competing coal producers.

Working Out a Typical Case

Let us assume again that a device has been perfected whereby one man loading coal cars in the mine is able to put out twice as much coal in a day as he did before. Let us further assume that the total expense of operating this device amounts to 5c. per ton; also, that the wage rate for mining in the district where this machine is employed amounts to 50c. per ton. It will now be immediately apparent that assuming that the machine operator's wage per day remains the same as the average daily mining wage, this invention effects a radical and decided saving in the cost of coal. The cost has been reduced from 50c. per ton to $\frac{50}{2} + 5$, or 30c. per ton delivered on the mine car. In other words, a saving of 20c. per ton has been effected in the cost of coal, which is enough to give the mine or company employing this device a decided advantage over other mines that do not employ it. A real and measurable saving has been made.

Generally speaking, the conditions under which an invention will be a pronounced financial success are three: The device, process or apparatus invented must make an appreciable saving in the labor, material or other cost per piece or per unit of product, and the present cost, or that entailed without the device in question, per piece of product must be considerable; the demand for the article made must be wide; the number of people engaged in the production of this particular product must be large. If an invention measures up to these three conditions, it should, by all means, be protected by letters patent.

A really valuable idea should not be confided to the protection of one patent alone—it should be protected from all avenues of approach. Most articles may be produced in any one of several ways, and, in order to secure thorough and adequate protection for the inventor's idea, all methods of manufacture, so far as possible, should be protected. It is useless to lock the front door of a stable to keep out a horse thief if the windows and back door are left wide open.

If a person is to follow invention purely and solely from the standpoint of possible profit, it is well to take his inventory of possible results as early in the development of any scheme as possible. If he does not apply the financial test to his invention and trusts only to the mechanical or physical results obtained, and relying on them forges ahead through all obstacles and discouragements until he finally secures his patent from the national capital, he is not only liable but likely to dis-

cover, after he has incurred considerable expense, that he has been after all, figuratively speaking, barking up the wrong tree.

The foregoing has not been written with either the intention or desire of discouraging invention in any way whatsoever. On the contrary, the field for the exercise of inventive and creative ability was never more promising in the history of the world. What I wish to discourage is the idea that any and every new scheme is deserving of patent protection. Patents for automobile tires (so I have been told by a patent office employee whose statement I have no reason to doubt) have been issued in the United States at the rate of about two per day for several years. How many types of such tires are in general use? Are the fingers of more than one hand needed to count them? While this is possibly an extreme case, it shows that probably some thousands of patents have been issued in one particular line of invention, with only a meager few containing real merit.

Probably one of the most frequent errors made by inventors is to think of the industry served by the invention in the aggregate instead of considering a specific case. Take the example of the car-door lifter cited above. The device saves one-fifth cent per ton of coal dumped. The output of the United States is roughly 600 million tons annually. Thus the device, if applied to the entire output, would save yearly 600,000,000 $\times$ \$0.002 = \$1,200,000. Suppose that the inventor is a poor subforeman in a small mine. If he could realize only 1 per cent. of the total saving made possible by his scheme he would consider himself fairly rolling and wallowing in affluence. And having caught a glimpse of the pot of gold at the foot of the rainbow, he promptly proceeds to chase it, regardless of the stern fact that his pet scheme makes an infinitesimal saving in a minor operation in coal production. The golden base of the rainbow is therefore unattainable.

New French Coke-Pulling Device

The accompanying illustrations show an ingenious coke-pulling device, described in a paper presented before a recent meeting of the Societe Technique de L'Industrie du Gaz en France. It is called the Nerriere coke discharger and is recommended especially for use in small plants.

The apparatus consists essentially of two jointed irons carried upon a horizontal piece. At the end of the two irons are two steel hooks which lie against the roof of the horizontal retort and which pivot upon two axes actuated from outside. These two hooks are connected by a steel traversing piece which is withdrawn behind the hooks when the appliance is entering the retort, and then descends behind the coke in order to pull it out.

The form and size of the different parts vary according to the lines or size of the retort. Fig. 1 shows the contrivance as adapted to retorts 10 ft. by 2 ft. 1½ in. by 14 in. The levers for manipulation lock automatically in the positions adapted for entering and withdrawal. During its action the appliance can be fixed so as to make it suit any of the cases shown in Fig. 2, of which the first is the normal condition, the second a case where the roof of the retort has been thickened by carbon deposits and the third shows the condition when the retort has become distorted. In the latter case the iron bars settle down into a suitable position by their own weight.

There is a good deal of flexibility in the apparatus, so that it will adapt itself to retorts varying widely in form and height; it is very strong and substantially built. The supporting rod is suspended in such a way as to allow some play both horizontal and vertical; in this way the appliance can feel its way into the back of the retort, between the coke and the roof. It is

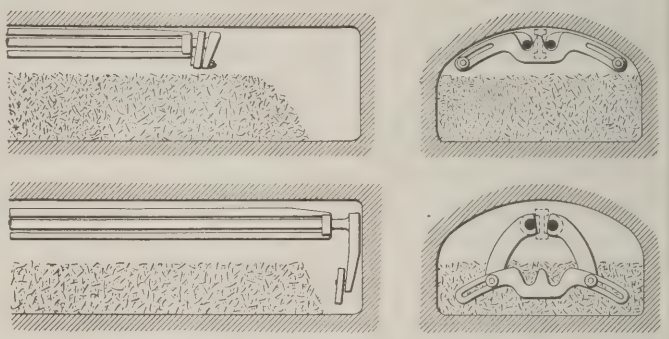


FIG. 1

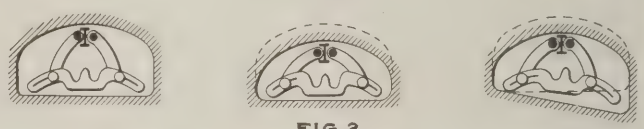


FIG. 2

FIGS. 1 AND 2. DETAILS OF A NEW COKE-PULLING DEVICE

easy, by operating the external levers, to constrict the apparatus and enable it to be withdrawn a little in case any difficulty is encountered in its introduction.

The work required in drawing the coke is greatly reduced with this machine and small men can work it perfectly well; the time taken is also considerably reduced and the coke is brought out with very little breakage. The time taken to put in the extractor and withdraw a charge amounts only to from 30 to 45 sec. From opening the retort to closing it again, the time is reduced from, say, 3½ min. with a good detail of men, or 4 to 5 min. with a less-skilled squad, to 90 to 100 sec. in the former case, and 100 to 115 sec. in the latter case. The whole time for five retorts, including renewal of fuel in the producers, takes 15 minutes.

This appliance has been in use at St. Brieuc, and it has handled very different qualities of coal quite satisfactorily. With large charges the only difference is that the coke has to be pulled with more than one haul.

A SUGGESTION was made recently by one of the large anthracite operators that the percentage of impurities in anthracite be permitted to increase 2 per cent. above the existing standards. If this were carried out, it would mean that 1,500,000 additional tons of slate would be sent to market. To transport this increased amount of impurities to market would require about 40,000 railroad cars, necessitating from two to ten weeks for its delivery. The Bureau of Mines has estimated that the coal mined in the United States, in 1917, had an increase of 5 per cent., as an average, in the amount of ash, taken for the whole country. Also, that this increase in ash content meant an additional loss of 17½ per cent. in the efficiency of the power plant. Furthermore, in some of the mining districts there was a much higher increase in ash than is indicated by this average. As we mined and shipped 544,000,000 tons of coal in 1917, some 27,000,000 tons of this amount was inert material.



THE BOX-CAR LOADER AT THE MODERN MINE AS SEEN BY THE CARTOONIST

Report of Pittsburgh Coal Company for the Year 1918

The year 1918 was a memorable one in the coal business, with its practical immunity from serious strikes and disturbance to the price of coal. Throughout the entire year practically full control of all operations was exercised by the Fuel Administration. The warning of the previous year led to efficient coöperation by producers and consumers under Government regulation everywhere, with the result that there was no time of acute fuel shortage after the severe winter weather of the first quarter of the year. The shortage of coal during the late winter months of 1917-18 was mainly due to transportation difficulties.

The annual report of the Pittsburgh Coal Co. for the year ended Dec. 31, 1918, goes on to say that production had gradually reached full demand by the time the armistice was signed and at prices fixed by the Fuel Administration. These prices were arrived at after a thorough examination had been made as to costs of production; the final price adjustment aimed to stimulate production so as to secure the tonnage required by permitting a reasonable profit to be made in coal mining. After the signing of the armistice business gradually declined. The demand became much reduced, partly by reason of the assurance of customers that their decreased requirements would be readily met. Heavy stocks were taken in and open weather following, a general state of oversupply of bituminous coal developed at the end of the year 1918.

Total Tonnage Below that of Preceding Year

The total tonnage produced by the Pittsburgh company in the year in question was 17,073,283 for all districts. This was a decrease of 915,932 tons under the amount mined by the company in 1917, or 5.36 per cent., and the decrease was practically all in the Pittsburgh district. The number of the Pittsburgh company's mining plants in all regions working all or part of the year were 68; three were leased, two available but idle, and one was consolidated with other workings. General conditions of transportation and labor supply made possible in any event only a 70 per cent. use of the full production capacity of the plants.

Labor supply was reduced throughout the year by reason of a number of employees going into war service, and the efficiency of those remaining was somewhat impaired by the changing of workmen from one position to another. It is to these two causes, chiefly the latter, that a greater tonnage was not realized from the mines. In the first quarter of the year car supply and movement was bad, and in the last quarter the influenza epidemic was severely felt. The report further states that the general condition of the mining plants has been fully maintained notwithstanding labor shortage, the difficulty of obtaining supplies and in the face of a steady demand for a maximum tonnage. However, this was accomplished at a greatly increased cost. One new mining plant was placed in operation during the year and another one is now under construction. No unusual purchases of property or expenditures for construction are in contemplation at present.

During the year 1918 additional coal lands were purchased by the Pittsburgh company. Some 10,085 acres were acquired, principally in the Pittsburgh district. The mining operations of the past year exhausted 2271 acres of the company's coal lands, leaving 186,019 acres of unmined coal on Jan. 1, 1919. Of this territory 154,217 acres are in the Pittsburgh district. Referring to the production figures and the acreage exhausted in the Pittsburgh, Illinois and Hocking districts, we learn that the tonnage mined per acre by the Pittsburgh company was 7747, 5978 and 6283, respectively. It would be interesting to know the average thickness of the seams mined in each of these districts so as to get at the percentage of recovery of coal in each section. In connection with these coal lands, in compliance with the U. S. Revenue Act of 1916, the company appointed three disinterested appraisers to determine the value of such lands. This valuation is exclusive of all improvements and for the purpose of determining a basis for future depletion and taxation. Based on this appraisement $43,886,308 in excess of the amount heretofore carried upon the books of the company is charged to "coal lands and real estate," making a total of $114,225,249 to this account on Dec. 31, 1918. Neglecting real estate and considering the acreage of unmined coal land at the end of 1918, this valuation would give about $614 as the appraisement per acre for the company's coal land.

Activities of Employees' Relief Department

The activities of the Mine Employee's Relief Department have been efficiently kept up during the year under supervision of the advisory board, of which the general manager of mines of the company is chairman. To the support of this department the company has contributed only the expense of general administration since the enactment of the Pennsylvania compensation law. The workmen's compensation fund of the Pittsburgh company now amounts to $878,996 in round figures. There were approximately 3900 personal injury accidents during the past year—an increase of 5 per cent.—all covered by compensation laws; of these 40 were fatalities, or three less than for 1917. The amount paid and adjusted to be paid on account of these accidents amounts to $354,761. Both the company and the employees have been fortunate on the whole in that there was no catastrophic loss of life. Furthermore, the injuries to the workmen were of a lighter average grade than customary. However, the work has demanded a heavy toll even under the safety provisions required by law.

The pension fund of this company now amounts to $212,994.36, of which $189,409.98 is invested in the preferred stock of the Pittsburgh Coal Co. and in United States Government bonds. During the year 1918, 27 names were added to this roll; 17 have died and there are now 110 pensioners. It is natural that this fund should develop a strong bond of mutual interest between the company and its employees. The report states that enlargement of the present pension basis is under consideration. Another activity administered at this company's expense is the Employee's Association. Through this agency the employees have subscribed, paid for and have had delivered to them 5272 shares of preferred and 3476 shares of common stock of the Pittsburgh Coal Co. Moreover, there are now under subscription 9658 shares of preferred and 7303 shares of common stock, or a total of 25,709 shares of both classes. Thus this association has been the means of promoting thrift and of delivering a good investment to the employees on easy terms and at reasonable average cost.



Railroad Fuel Policies Too General Say Coal Operators

In putting into effect the coal policies recently outlined by Director General Hines of the Railroad Administration, instructions have been issued to regional directors which are regarded by coal operators as being entirely too general. These instructions were issued by Henry B. Spencer, who is in charge of the division of purchases of the Railroad Administration. They contain no specific order of procedure. This is regarded by coal producers as necessary to the working out of reforms which are essential to the best interests of all concerned. The Railroad Administration is quick to admit that wages should be maintained at existing levels, but it apparently is reluctant to put into effect conditions which will permit of the operation of the maximum number of mines which furnish employment.

Coal men call attention to the fact that there has been a very gratifying display of good intentions on the part of the Railroad Administration, but the thing most needed just at this time is practical procedure. They are clamoring to know what is meant by "bids." What form are they to take? For what period are they to extend?

Very recent procedure indicates that the price of the lowest bidder is being accepted and then other operators are being called in and offered contracts if they will meet the low man's price. This is held to be entirely contrary to the spirit of the Director General's recent statement. The instructions issued by Mr. Spencer, referred to above, follow in their entirety:

1. The railroads must not violate existing contracts or cancel contracts where the quality of coal is in accordance with specifications, without special consideration by the Central Advisory Purchasing Committee of the reasons for cancelling.

2. The purchasing agent of each individual railroad shall buy the coal for that road under the supervision of the Regional Purchasing Committee of his region. In all requests for bids, the following paragraph should be inserted:

"It is distinctly understood that all bids are to be based on existing rates of pay for all mine labor, and the price will be subject to readjustment in event existing rates of pay are changed."

On contracts awarded or orders placed, the following paragraph should be inserted:

"It is distinctly understood that the prices named herein are based on existing rates of pay for all mine labor and the prices will be subject to readjustment in event existing rates of pay are changed."

3. For coal purchased hereafter, the purchasing agent of each road shall request bids in accordance with paragraph 2. In considering these bids or making recommendations to the Regional Purchasing Committee for contracts, roads must take into consideration the desire of the Director General to make as wide a distribution of the tonnage bought as conditions will permit considering quality, transportation and price, at the same time confining so far as practicable purchases to producers on the individual roads. The purchasing agent should not offer any price to producers and must stipulate that any price named must be based on existing pay for mine labor. He reserves the right to reject any or all bids.

4. The Director General has directed that prices and names of contractors will be available to accredited representatives of the miners or producers who may request the information after contracts are closed. Prices or bids which are not accepted need not be disclosed.

5. Contracts may be made for a period not exceeding one year, subject to cancellation upon 30 days' notice in writing by either party. If in the judgment of the Regional Director it is desirable, the clause requiring 30 days' notice of cancellation may be waived.

6. All contracts for fuel shall contain the following:

"The contractor expressly warrants that he has employed no third person to solicit or obtain this contract in his behalf, or to cause or procure the same to be obtained upon compensation in any way contingent, in whole or in part, upon such procurement; and that he has not paid, or promised to pay to any third person, in consideration of such procurement, or in compensation for such services in connection therewith, any brokerage, commission or percentage upon the amount receivable by him hereunder; and that he has not, in estimating the contract price demanded by him, included any sum by reason of any such brokerage, commission or percentage, and that all monies payable to him hereunder are free from obligation to any other person for services rendered, or supposed to have been rendered, in the procurement of this contract. He further agrees that any breach of this warranty shall constitute adequate cause for the annulment of this contract by the United States, and that the United States may retain to its own use from any sums due or to become due thereunder an amount equal to any brokerage, commission or percentage so paid, or agreed to be paid.

"This agreement of the Director General of Railroads shall not extend beyond the period of Federal Control of Railroads, and unless sooner terminated, shall as to him, terminate at the end of such Federal control."

Fuel Administration Again Urges Consumers to Buy Coal Early

That the public must buy coal early for next winter's needs is urged in an announcement by the Fuel Administration made on Mar. 20. The administration is alarmed at the tremendous decline in production and the accompanying lack of buying. It points out that stocks of coal are rapidly being consumed and that ample provision must be made during the spring and summer, if congestion in coal transportation next fall and distressing shortages are to be avoided.

Urges Continued Governmental Co-operation with Coal Industry

Acting on the assumption that the coal industry is convinced that coöperation with the Government during the war resulted in certain benefits to all concerned, Fuel Administrator Harry A. Garfield suggests that it may be desirable to continue a modified form of co-operation. In order that the views of coal producers may be set forth systematically, Dr. Garfield has requested the National Coal Association to submit the question in referendum form to its membership. The mailing of the proposals to the members of the National Coal Association began Mar. 20. It is believed that practically complete returns will be had by the end of the first week in April. Thus it will be possible to have the consensus of the opinion of the producers of 400,000,000 tons of coal, or three-fourths of the country's annual production. Deductions from the returns will be available for consideration by the directors of the National Coal Association when they meet at Cleveland Apr. 4.

Plan Proposed by Dr. Garfield

In addition to price, the plan goes into various ramifications with the idea of promoting the welfare of all interested. In brief, the plan proposes:

First, that all facts relating to the industry or any question touching it, such as the cost of living, the cost of production, labor conditions, transportation facilities and other factors entering into the cost of coal be officially and accurately ascertained by some of the regular Government agencies, since the Government is the most appropriate representative of the public.

Second, that the public is one of the parties at interest, the other two being capital and labor, and that no action affecting any of the findings of fact be taken until all three parties, through their duly qualified representatives, shall have had an opportunity to consider and discuss the proposals.

Third, that the determination of facts, as outlined, and the formulation of administrative policy are two separate and distinct functions and therefore should not be performed by the same agency of the Government.

Fourth, that the findings of facts, thus proposed, should be submitted to a permanent department or commission of the Government. In this connection it is pointed out that the plan does not contemplate the creation of new agencies, but proposes to utilize existing permanent Governmental organizations.

Fifth, that the President designate some cabinet officer, or other appropriate official, to represent the public in considering any policy proposed, and that as advisers to the commissioner there should be an equal number, say three, of representatives of operators and miners. The function of the commission would be the consideration of all problems affecting the industry, and the formulation of policies to deal with such problems, the commission being a purely advisory body.

Sixth, that the commission shall make recommendations to the President, who would thus be placed in close relation with the industry and all factors entering into it, making for its prosperity or retarding its development.

"Such a plan," says the Fuel Administration, "modified to suit diverse conditions, it is conceivable, might be adopted not only by the coal industry, but by other basic industries of the country as well, in which event the Government would be placed in possession of intimate facts, figures and findings, and recommendations in meeting industrial problems relating to any industry as such problems might arise. It does not conflict with the work now being carried forward by the Industrial Board of the Department of Commerce."

Conference Will Discuss Business Side of Engineering Education

Convinced that insufficient attention is being given to business training in the engineering courses of the higher institutions of learning, the Commissioner of Education of the United States is conferring with representatives of these institutions. In these conferences, the Commissioner of Education is being represented by Dr. G. L. Swiggett, the specialist in charge of commercial education for the Bureau of Education. Dr. Swiggett was the secretary in charge of the second Pan American Scientific Conference, which was held in Washington in 1915.

The matter first was called to the attention of a small group of administrative professors of engineering and commerce from several of the institutions in the Middle West. There was such unanimity of opinion that the average engineer is leaving college with insufficient business training that it was decided to hold a larger conference in Washington Mar. 31. At this conference it is hoped to formulate certain plans as to curricula which it is hoped the various colleges and universities will see fit to adopt.

Since it is expected that the United States will take a far more active interest in projects in other countries calling for engineering skill, it is the opinion of Dr. Swiggett that the requirements for that purpose alone would justify greater attention to the business side of engineering education.

The conference on Mar. 31 also will be attended by representatives of the leading four national engineering societies and of the Society for the Promotion of Engineering Education. The conference is to be of an executive nature.

Coal 44 Per Cent. Higher Than in 1913

Since January, 1913, Pennsylvania white ash coal has advanced 44 per cent., chestnut 42 per cent., and bituminous 44 per cent., according to an article in the March number of the *Monthly Labor Review*, issued by the U. S. Bureau of Labor Statistics of the Department of Labor. The first big jump in the price of all kinds of coal came in the year from Jan. 15, 1917, to Jan. 15, 1918. From Jan. 15, 1918, to Jan. 15, 1919, stove coal increased in price 17 per cent.; chestnut, 16 per cent.; and bituminous, 3 per cent.

A surplus of coal cars throughout the central western region is reported by Hale Holden, regional director for the Railroad Administration.

William B. Symmes, Jr., solicitor of the Fuel Administration, has tendered his resignation to Dr. Garfield. It is effective Mar. 31 and has been accepted. Mr. Symmes will return to the practice of law in New York City.

A study of the prices of coal and coke during the war has been prepared by C. E. Lesher, the geologist in charge of coal statistics for the Fuel Administration. It will be a part of a work on the history of prices of various commodities being prepared by Prof. Leslie C. Mitchell, of the War Industries Board. Mr. Lesher's contribution records the fluctuation in prices of coal and coke from 1913 to 1918. It is accompanied by a large number of diagrams.

EDITORIALS

The Question of Wages

THROUGHOUT the world the economic pot is boiling. It is inconceivable that out of the turmoil no good will come. Already lessons are being learned and great truths are becoming more apparent. In Russia we see the results attending a government controlled by radical socialists. Here in America we are furnished with an example of government ownership in the Federal control of our railroads. We find that the experience of Great Britain is duplicated here, and the railways are run at a big loss. It is also true that the railway deficit has occurred in spite of record receipts.

All of this furnishes food for thought and leads to the conclusion that something is radically wrong. People are commencing to discover that rewards of industry are not fair on the part of either capital or labor when obtained by force. When wages are increased through compulsion, they are nearly always disproportionate to other awards of the same class. There is also a growing feeling that there is a limit to the ability of taxpayers to pay wages that are raised without reason or restraint.

In many industries workmen are maintaining that profits are unnecessary. Only disaster can follow in the wake of such a belief. Profits are the pay of management that produces wages. When profits disappear, work must stop, or wages must be paid by taxpayers.

The time has arrived when employees must acknowledge that when costs are increased above the worth of the product produced, ruin is sure to follow. Nothing is more unsound than the belief that wages and profits are antagonistic, for not only is this untrue, but it is an economic fact that profits and wages always rise and fall together if basic industrial conditions are healthy.

Perhaps the most outstanding truth we have learned is that even excessive wages fail to satisfy those who receive them. There can be neither peace nor industrial progress until both capital and labor learn once for all that justice cannot prevail in a system where either the employer or the employee is permitted to fix his own price in a market controlled by force.

If any one takes you for a sucker and tries to exchange your honest-to-goodness Liberty Bonds for worthless stocks (oil, mine, railroad or other) kindly send the literature he hands you to the Federal Trade Commission at Washington, D. C. The Capital Issues Committee is trying to expose all individuals who are seeking to sell blue sky to the public in exchange for Government securities, and it will appreciate as a patriotic act your assistance in showing the rascals up.

Jacob Is in No Need of a Father

AS WAS said at the recent session of the American Institute of Mining and Metallurgical Engineers, the Governmental control of the anthracite industry proved to the hilt the dangers of Federal regulation. The price of hard coal was made so low that large numbers of substantial operating concerns would have been compelled to close down if the control had continued, unless of course the price set by the Administrator was increased.

The Administrator himself, while not admitting that he had fixed an unjust price to satisfy a grumbling public and to help the persons in power, did admit that the price was too low and that he would have had to raise it himself if the regulation had been continued. Seeing that Dr. H. A. Garfield, like most war controllers, was disposed to be reasonable, his failure to do justice to a large number of anthracite operators exhibits clearly the dangers of Federal control.

Control in general is based on two principles. The first is that the profits made by the least favored of the controlled shall not exceed a certain per cent. This is not a bad feature, and it is one that is openly avowed. The second is a scandalously vicious one, yet every controller seems to believe in it heartily. It is this: Having discovered what price will possibly render a certain profit, let that price be granted; if there are any mistakes, let the industry stand for them.

It appears that the increase in price, when one is granted, is so fixed that it almost always fails to meet increases in cost of operation. The controller is so sternly bound that the controlled shall not make an excessive profit, that he casts out, when he makes the price, all possible contingencies of raise of costs and anticipates all kinds of contingencies that will lessen cost. It is as if an engineer, having made a reasonable estimate, has it reduced, by authority, 10 per cent. instead of having it, as is usual, increased 10 per cent. to cover unforeseen expenditures.

Seeing that large parts of the anthracite industry did not get justice from Dr. Garfield, to whom then could it look? Certainly not to such a body as the Interstate Commerce Commission, which as an organization was rather for closing down the railroads than for providing for their reasonable control. The trouble is that, like Mr. Micawber, it was always looking for "something to turn up." This "something" was expected to relieve the situation without any rise in rates.

The United States Railroad Administration was just as remiss in its sizing up of the situation. It did not reckon on business falling off with the end of the war; it did not consider that the railroads it had taken over had managed to exist solely by letting the roadbeds and equipment deteriorate from day to day; it did not think that the soldier boys would be back looking for jobs. What is the real situation? Business has collapsed and the railroads have no traffic. There are a quarter million more employees than before to be paid, and more are coming from the ranks of the army and navy.

In consequence, the freight rates are found to have been raised an inadequate amount. Nevertheless, when the country's governors and mayors met at a conference recently, they demanded among other things that freight rates be lowered. That was their contribution toward solving the problem—lower freight rates for building and road-making materials.

Control is, and always will be, made on the basis of letting the industry stand for all the mistakes of the estimator. It will be fortunate if that estimator will be wise enough to face half the contingent expenses of production, in spite of public clamor, to say nothing of those which are remote and indeterminable. If he does show such wisdom, however, he will be summarily removed. The public can no more be trusted to set a fair price on the goods it consumes in quantity than a father can be suffered to serve on a jury before which his son is arraigned. The public is an interested party and acts accordingly. No industry in the present state of enlightenment can safely submit its direction to such a court.

Nevertheless, there are rumors that the work of the Fuel Administration is to be perpetuated in the future. The Geological Survey is to take over the statistical work of the defunct Fuel Administration, the Bureau of Mines is to take over the problems of conservation, and it is said it would now like to take over cost accounting, mine inspection and the procurement of clean coal. The Department of Commerce, it is said, is scheduled to allocate and distribute coal and fix the price for it as far as the Administration decides that the price ought to be fixed. The Department of Labor also wants a hand in the regulation, not to speak of the Federal Trade Commission. The coal industry will not lack for stepfathers. It is a husky lad, and one to whom anyone would rejoice to be father, for there is a profit in acting as its common-law guardian.

No profession has a smaller equipment of cost data than the coal-mining profession. The metal-mining fraternity is vastly less reticent than the members of the coal-mining industry, where little has been recorded as to production costs or even as to depreciation and the expenses of construction. The latter, surely, are not forbidden subjects. When will coal-mining engineers be as liberal with their data as are the metal-mining engineers, the civil engineers, contractors and railroad engineers, who have lately done remarkable work in cost accounting?

Financial Backing for the Export Trade

THERE is a growing feeling that the Government must take an active part in supporting the banking interests that are promoting our export trade. Not only is this necessary from a material standpoint, but also for the moral effect it will have. There is further the humanitarian phase in that American capital is a tremendous factor in rehabilitating and restoring the devastated countries of Europe. To be effective this assistance must be of a permanent character; the exporter must feel that his business arrangements are not going to be subject to the periodical changes in the political situation.

One of the first problems confronting the Government will be to provide some means for absorbing the enormous trade balance which this country is piling up in favor of itself. For instance, our January exports amounted to 623 million dollars as compared with only 215 million dollars' worth of imports. Banking authorities are agreed that this is a fundamentally unsound condition, and impossible in normal trade. The coal producer obviously will not be interested in the foreign markets unless he sees definite prospects of something other than credits to be obtained.

It is interesting in this connection to note how the British Government reacted to a feeling of this kind as expressed by the business interests in England a few years ago. The Government immediately established a bank under the name of the Trade Corporation, which was employed to promote and finance business undertakings of any kind in addition to entering into foreign trade itself. This was a radical departure for the old-line banker, who had always been ultra-conservative in the matter of actually entering into trade.

The Corporation so far seems to have confined its activities to financing larger propositions, such as the Portuguese Trade Corporation, whose chief object is to supersede German interests in Portugal. Of more interest, however, to American exporters is the formation of the Anglo-Brazilian Commercial and Agency Co., which the Trade Corporation effected in conjunction with the London and Brazilian bank. The primary purpose of this organization is the promotion and protection of British trade in South America. In Brazilian trade, the Corporation officials complain of a serious trouble, which American exporters have also encountered; namely, the difficulty of obtaining the right kind of men to promote activities in that country.

One of the recognized functions of the Corporation will be its authority to act as a fiscal agent; thus it has already made an industrial issue involving a half a million of debentures to the Morgan Crucible Co., all of which were readily subscribed to. Its activities are of course seriously handicapped by blockade restrictions of various kinds, and the general demoralization in the world's trade, but the Corporation is in no way slowing down in its efforts.

The attitude of the British Government was well summarized in a statement by a prominent Government official made before the British Parliament a number of years ago as follows:

"The Foreign Office and the Colonial Office are chiefly engaged in finding new markets and in defending old ones. The War Office and the Admiralty mostly are occupied in preparing for the defense of these markets and for the protection of our commerce. Therefore, it is not too much to say that commerce is the greatest of all political interests and that that Government deserves most popular approval which does the most to increase our trade and to settle it on a firm foundation."

It is to be sincerely hoped that our own Government will take cognizance of the sentiment expressed in the last sentence of that statement and promulgate a no less helpful attitude toward the prospective exporters in this country. Our exporters must have powerful financial resources behind them to assure their being able to compete on a favorable basis with our British rivals.

Too readily we assume that the eyes of brain workers are vastly inferior to those of manual laborers, and that this explains why so many of the former workers are bespectacled. It may be granted that the brain worker's eyes have, in many cases, been injured by the strain of reading; but much eye trouble is congenital and, as such, will be found equally prevalent among manual laborers and brain workers. Many accidents would be spared doubtless if the mine worker would be morally brave enough not to resent cries of "Four eyes," "Goggle eyes," and "Quatr' Occhi," but wear the spectacles that his imperfect eyes demand. An inquiry is needed into the ocular efficiency of the mine worker.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Those who wait to buy coal are creating an anarchy for which they will undoubtedly have to pay and pay dearly, at least in money, if not in commodities more valuable. The mine workers now laid idle are meditating all kinds of industrial reconstruction, none of their schemes being likely to decrease the cost of coal but rather to increase it. When the public resumes buying, it may find that many fateful things have happened which will make coal a dearer article than they thought. American coal is cheap today because American labor has not demanded European restrictions. But every day makes it more apparent that the American mine worker (or rather the mine worker in America), Canada by no means excepted, looks upon Great Britain's uneconomic labor-union rules as helpful to the workers in the industry. The workman is wrong. European restrictions are suicidal, but who can convince the mine worker of that fact?

Shortness of work has made him advocate the 6-hr. day and 5-day week with wages adjusted so that the day worker in the mines will receive more for 30 hours of work than he did for 48 hours during the war. That is 60 per cent. more per hour or unit of accomplishment. If the day worker in the mines gets it the public will pay 60 per cent. more per ton for his labor, quite a noticeable increase. Secondly, the mine worker is anxious to arrange for the operation of all mines, profitable as well as unprofitable. That will prevent offsetting by economies in production any of the wage increase and working-time decrease now demanded.

PUBLIC WILL PAY DEARLY FOR WAITING

Worse yet, we find the mine worker wanting Government ownership, which is another way of raising costs of production. If the purchaser of coal does not get busy the cost of coal will be raised immensely. The increase just announced by the anthracite operators will be seen to be futilely small, mere playing with conditions, should the mine workers decide to violate their contracts and make the anthracite operator also pay what they are proposing already for the bituminous operators.

The recent adventures in Government ownership have been utter failures. In Great Britain 50 per cent. was added to freight rates and every restriction of accommodation imaginable was put in force. The public was systematically milked by the British Government, but despite this and in spite of coöperation in railroad work such as was highly illegal here before the war, the Government could not make the railroads pay.

In the United States the Government operation of railroads is highly unprofitable. The wage increases do not represent all the increases in operation. There are other increases in operating cost of at least equal size which have arisen largely, though not solely, from Government mismanagement. This is despite the savings resulting from a coöperation which for privately-owned railroads would be a violation of the Sherman law.

In a similar way the nationalization now being discussed by the miners would put a new burden on the public. The delay in reconstruction, the greed of the buyer and his gullibility are about to levy on him a tribute under which he will groan increasingly year by year. We pay dearly for uncertainty. The Peace Conference gets nowhere in Paris, and Bolshevism grows. The buyers of America also get nowhere, fed up by promises of lower prices by the price reductionists, and meanwhile Socialism grows—short hours, nationalization of mines and bigger wages for shorter time. The Republic should wake up for Rome is most certainly burning.

Closing of Mines Causes Trouble

Despite the fact that during the war the miners of Centralia were among the most loyal in the anthracite coal fields, responding to every appeal to support the Government in all war activities, Centralia Colliery has been idle for the past five weeks. The miners and citizens of Centralia, believing that they deserve better treatment, have adopted resolutions as follows:

"Whereas, the Lehigh Valley Coal Co. shut down the Centralia Colliery on Feb. 7, 1919, leaving all the men in the town of Centralia without employment, there being only one colliery in the town for a population of about three thousand of people, and, whereas, during the recent crisis the people of Centralia were as loyal as any in the country; and the town of Centralia sent more men to the army and navy than any other town of its size in the state and the town went over the top with all Liberty Loans and Welfare drives, and, whereas, the miners of Centralia made many sacrifices, working holy days and holidays during the war and during the year 1917, the breaker working 16 hours a day for a period of time, in fact as long as the breaker was in a condition to do so.

UNION CONDEMNS CLOSING UNPROFITABLE MINES

"Therefore, be it resolved that we condemn the action of the Lehigh Valley Coal Co. in closing down the mines of Centralia, leaving the people without employment, as there is no other industry in the town, and also condemn the business men of Centralia for their indifference at this time, an indifference that is inconsistent because in the past they interfered in the troubles of the miner's local, using their influence to get the miners to work whether they got justice or not, and be it further resolved that we request an investigation by the Federal Department of Labor as to the cause of the idleness of these mines of the Lehigh Valley Coal Co."

The grievance committee of the Delaware, Lackawanna & Western R.R., Coal Department, employees, has requested that a speedy effort be made to give all the employees of the Continental and Brisbin Colleries work in other mines. The officials of the company promised to adjust this trouble as soon as possible.

SALARIED MEN MUST LAY OFF AS OFTEN AS REST

The mine workers of the same company complain that salaried men have been permitted to work on days which have been officially declared idle, and thus some men have been receiving more pay than others. The men also request that consideration miners be continued on that basis until an equitable contract can be mutually agreed upon. They urge that an earnest effort be made to secure such an agreement. The officials declare themselves desirous of reaching, without delay, an agreement satisfactory to both employer and employee.

Representatives of the employees also asked that where contract miners have been working on a consideration basis under abnormal conditions they be continued at work on said basis until conditions again become normal. The officials agreed to go along for a period of ninety more days on a consideration basis. Another meeting between the officials and mine workers will be held, at which time it is hoped an amicable adjustment will be made.

Announcement was made on March 18 that the check-off which anthracite miners have sought for years as a concession from the operators will again come up when the two bodies send their representatives to confer on the wage scale for a term of years starting Apr. 1, 1920, which is the date at which the present contract expires.

The check-off, which permits the union to collect its dues at the pay office through deduction from miners' wages, is in effect in many parts of the soft-coal fields, but its introduction into the anthracite region has thus far been resisted by the operators.

Anthracite coal miners are content to let the question of coal prices rest with the federal fuel administration, but they are vitally concerned over maintenance of their present wages, according to a statement given out on Mar. 17 by Thomas Kennedy, president of the Lehigh District, who said that every effort would be put forth to retain the current scale and, if possible, to get concessions improving living and working conditions.

West Virginia Elects Not To Enforce Laws

What amounts to a death blow was dealt the State Police patrol bill in the House of Delegates on Tuesday afternoon, Mar. 18, when, by a vote of 42 to 41, the measure was tabled. Chief opposition to the measure came from the United Mine Workers and other labor organizations and from two state officials—W. S. Hallanan, Tax Commissioner, and S. B. Montgomery, State Labor Commissioner, Republicans, who in alliance with the labor element have fought the bill on political grounds. The police bill as proposed had been endorsed specifically by a number of coal operators' associations, including the Smokeless Coal Operators' Association, whose membership represents a West Virginia production of 35,000,000 tons annually. Governor Cornwell had urged favorable action on the bill as a means of protecting the lives and property of the people of the state from the Bolshevists, anarchists and I. W. W. and within a day or so after his message was sent to the legislature, miners at Wendall in Taylor County after threatening the Governor and legislature with violence attempted to hold a "red-flag" parade as a protest against the enactment of any legislation which would provide police protection to replace that hitherto given by the national guard.

After the Ramage resolution threatening revolution in case the police bill was enacted into law had been adopted by about 20 other miners' unions in the state, F. C. Keeny, President of District 17, U. M. W. of A., issued a statement saying that the Ramage local had no authority to adopt such a resolution because it was an open declaration of violence and as such in conflict with the laws and policies of the United Mine Workers' organization. Federal agents have had the authors of the Ramage resolution under investigation and this prompted Keeney to say that the authors of such a resolution need look for no protection from the national body.

Trouble is expected in several of the districts of the state before the summer is out, not from the native element, but from the foreigners who have become inoculated with Bolshevism.

Illinois Agitates for Shorter Hours

Illinois miners have taken up with acclaim the suggestion of State President Frank Farrington that a demand be made for a 6-hour day and a 5-day week. It is the principal subject of discussion at all the meetings of locals and at all district conventions now being held. The line of reasoning is this: There is not enough work now to give the miners employment more than two or three days a week, therefore the hours of labor should be reduced without reducing the day wage. This would increase the regularity of employment and consequently make the earnings of day men equal to those earned during the war.

The way that the operators will probably solve it will be by the simple and direct method of refusing the demand. They are determined to fight the 6-hour day. They declare that they cannot grant the demand and survive and charge that the 6-hour day is a scheme to bring about Government control if not Government ownership. One item which would add enormously to the expense of production would be the necessity of employing four shifts in the 24 hours of the full day for such laborers as are needed to keep the plant in operation. Of course, this does not apply to the diggers.

The 6-hour day was the principal subject of discussion at the recent convention of Subdistrict No. 7, which was in session three days of the past week at Collinsville, Ill. The principal speaker was John Walker, president of the Illinois Federation of Labor. He and others urged upon the 100 delegates that the only solution of the problem of providing employment for the miners of the district under present conditions is the 6-hour day. Impetus was also given to the coöperative store movement.

The proposition has received some attention at recent joint conferences of operators and union representatives. The latter have been given to understand that the proposed reduction of working hours will not be entertained for a moment, unless the same conditions are enforced in competing states. They have pointed out that the enforcing of such a measure in Illinois would not produce a better condition than at present but on the other hand would make matters worse for the Illinois operators, because it would give the mine workers of other states an advantage over the Illinois mine workers. The union officials have admitted the correctness of this contention.

Short Day Cannot Be Made Locally Effective

President Farrington has even gone so far as to send out a circular letter to the officers and members of District No. 12, who were planning to call a district convention in the interest of the 6-hour day, pointing out to them that such action would be useless, as it would mean that the cost of production in Illinois would be much higher than that of competing districts and would result in little or no work for the Illinois miners. Farrington's letter is as follows:

"Recently a number of resolutions have reached the district office asking that a special district convention be convened to take up the matter of securing a shorter workday.

"As stated in my circular of Feb. 21, I am convinced that we will get no substantial relief until our hours of labor are decreased. Conditions demand a 6-hour work day, 5 days per week, for all the mine workers of the country, with no double shift work on the coal allowed except as necessity may require, and development for increased tonnage should not be regarded as being a necessity. We must wage an aggressive, uncompromising, organized fight to attain that end. Nothing short of that will bring the needed relief. To achieve this reform is vital and paramount and the full strength of our union should be used to attain that end. Other things are secondary, nothing less will do.

"The over-development that obtains in the mining industry of the United States is a waste of capital, of labor and of natural resources, and is an economic crime that would not be tolerated by any other country in the world. The evil of it reaches into the lives and the homes of all of the hundreds of thousands of mine workers in America; it is ever present to make impossible their security, to blight their happiness and to prevent their prosperity. It is so fundamentally wrong that justice demands its correction. No make-shift expedient devised to carry us through the period of reconstruction will do. The remedy must be lasting and true.

Two Hours Cannot Be Taken Out of Profits

"However, the matter of securing a shorter workday is too big and too far-reaching in effect to be disposed of by action of a district convention. It must be obvious to all that a district convention could not secure a shorter workday for all the mine workers of the country and that it would be useless to attempt to shorten the hours of labor in Illinois without regard to the hours worked by mine workers elsewhere, as to do so with the present over-development in the mining industry would mean, should we succeed, that the cost of production in Illinois would be so much higher than that of competing districts that Illinois coal could not be marketed and we would get little, if any, work at all. Thus it is that the matter is not one to be handled by a district convention. But you may be certain

that the matter will have attention and that a definite line of action will be devised when your policy committee, which is to assemble at President Hayes' request, meets in Indianapolis on Mar. 18."

The Fifth District, in convention at Taylorville, Ill., adopted a resolution in favor of organizing a labor party. The 6-hour day and 5-day week were approved. The anti-injunction and the state constabulary bills were denounced and officers and members were urged to work for their defeat.

The policy committee of the United Mine Workers assembled at Indianapolis, Ind., has accepted the 6-hour day and added thereto the 5-day-week, an increase in tonnage rates, day wages, deadwork and yardage and nationalization of mines. The increases to be demanded were at last advices still being discussed.

British Miners Threaten Strike

While there is perhaps not the same organic unity in Great Britain among the miners that there is in America, there is a unity of aims, and, what is more, there is a triple alliance of mine workers, railroad and transport workers, an organization formed to make the taxpayers who do not belong to this widely extended union pay them an unreasonable wage and grant them unusual privileges. If that concession is not granted, England and Scotland will sit still and starve.

It is not therefore a comfortable situation in which the taxpayers of Great Britain find themselves. The people must conciliate the Mighty Three or many persons will starve to death. Some years ago there was a big strike of this kind and some people not interested at all in it starved rather than ask for alms. This threatened strike may not come off. It is said that the Government "for the first time shows an inclination to meet the miners and railway men fairly instead of haggling over each point." That is to say, the Government is weakening under pressure. It is going to desert the unmarshaled majority for the marshaled minority.

The trouble started long ago. It is hard to set a date, for the mine workers and railroad men have been chronically discontent. They had a grievance which would stand some inspection. During the stress of war wages had gone up a little less than cost of living—the difference was pitifully small as a basis for a national strike, only 115 per cent. increase in cost of living against an advance of 106 per cent. in wages. The Government was perfectly willing, as were also the operators, to grant that, or even a larger increase than any that the increased cost of living made reasonable.

The miners first voted that they would stop work on Mar. 15, a ballot being sent out to the different districts of the Miners' Federation. In order to expedite matters, the Executive decided that each district print the necessary ballot papers. Speedy taking and counting of the vote was necessary. The union figured that haste would express determination and paralyze those who would otherwise oppose the attempt to shut down British industry or impose on the taxpayers an unequal burden in favor of the Mighty Three. The ballot-paper was quite simple in form and was as follows:

MINERS' FEDERATION OF GREAT BRITAIN.

Ballot of Members.

1. Application for 30 per cent. increase in wages.
2. Six hours day.
3. Full maintenance at trade union rates of wages for miners unemployed through demobilization.
4. Nationalization of mines.

The Government having failed to grant any of the above proposals, Are you in favor of a National Strike to secure them?

Yes.....

No.....

Please place an X opposite Yes or No in the space provided for the purpose.

Frank Hodges, Secretary

In their deliberations at the Southport Conference the Executives were not satisfied merely to recommend the ballot. In their resolution they said, "We further strongly urge all members to vote in favor of a national stoppage until our demands are conceded."

The vote favored a strike and great was the consternation which followed. Never in living memory had local stocks been so small. When the strike was approved by vote Londoners were forming queues to purchase 50-lb. bags of coal with which to mitigate as best they could the bleak coldness of their homes. True, spring was near at hand and the householder could rely on the sun not to join the Triple Alliance, but even this was no consideration at all to those workers who were dependent on the coal for their livelihood.

The decision of the miners was followed by the railroad men and transport workers. Even since 1914 they have planned a concerted attack on those who were not employed with them in their industry, but the war delayed matters. There were even bigger things on hand. Now that the war is over the program is again taken up.

A Coal Commission was formed some time ago to find out a solution. The majority of the commission has found one and has returned an interim report of date Mar. 20. The operators were making too much money according to the findings. Possibly the commission was right in this contention, as the Government is still proposing to let the operator make a profit of 28c. a long ton or 25c. a short ton. The Government, according to Bonar Law's statement in the House of Commons, will reduce the operators' profits 13,000,000 pounds or $65,000,000 per year.

But that will not pay the increase in wages proposed during the current year, which is 43,000,000 pounds or $215,000,000 a year. The balance of 30,000,000 pounds or $150,000,000 will apparently come out of the pockets of the taxpayers. But they need not worry about that, for in 1921 it will be much more. Just as the Government of Great Britain has bought dear wheat in the United States and sold it cheap at home at the loss of the taxpayer, so it will by subsidy or purchase put up wages and yet keep down the price of coal.

It must not be considered that the Sankey Commission, so called because Justice Sir John Sankey is chairman, was unanimous. There were three reports. The principal one recommended that underground the hours of work should be limited to seven, instead of eight. This provision would come into effect July 16 of this year. On July 13, 1921, the duration of underground work would be reduced to six hours, if the economic position of the industry warranted it. Bonar Law in the House of Commons explained this, saying that in 1913 the output was 287,000,000 long tons. It was expected that it would be possible by July, 1921, to get the same tonnage, working only two-thirds of the time.

The wage increase proposed is not large, being two shillings, or 48.7c., per shift for those colliery workers now under sliding scales and an advance of one shilling, or 24.35c., per shift for workers under 16 years. The committee favored giving the mine workers an effective voice in the direction of the mines. The present system of ownership and the existing manner of operation is condemned, and the commission advocates some substitute, either nationalization or unification by national purchase and joint control. The report declares that one penny, or 2c., per long ton should be collected at once on all coal brought to the surface. This penny is to form a housing fund for improving the dwellings in the colliery districts. It seems a small amount, but it will bring in about a million pounds, or five million dollars, annually.

Sankey's report is signed by Arthur J. Balfour, Sir Arthur Duckham, Director of Aircraft Production, and Sir Thomas Royden, member of the Shipping Control Committee. It seems to concede everything within the scope of the imagination, but it does not please the miners' representatives led by Robert Smillie, who is the miners' leader; Frank Hedges, Sir Leo Chiozza Money, Sidney Webb and others who in their report recommend acceptance of the miners' demands in full, including nationalization of mines. The miners, it may be recalled, ask for a 30 per cent. increase. The operators' representatives favored a 36c. advance per shift and a 7-hour day.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Utilizing Mine Gas to Save Fuel

Letter No. 2—I was very much interested in the letter of W. D. Owens, *Coal Age*, Feb. 20, p. 372, which was reproduced, a little later, in the Wilkes-Barre Record, one of the leading newspapers in the upper anthracite valley. Mr. Owens' article related to the utilization of methane gas for steam-raising purposes, and was based on the recent experiments that have been taking place at the Loomis colliery of the Delaware, Lackawanna & Western Coal Co., near Wilkes-Barre.

Every new venture will surely bring its difficulties, which require careful study and watchfulness to overcome. But let us hope that none of the dangers to which Mr. Owens has drawn attention will ever be realized in the undertaking now at hand. As in many other large enterprises—the Panama Canal or the New York Subway, for instance—so here man's ingenuity will eventually prove successful and master the problem of utilizing the great power now lying dormant in the waste gases of mines.

Speaking of the experiments and tests that are being made in the Loomis colliery, it can be stated with certainty that the mine management are running no risks of blowing up the plant or causing an explosion within the mine. Whether these tests will prove successful or not, the results obtained will surely add to our knowledge regarding the handling and the possibility of utilizing this most important of the mine gases.

CALCULATING THE HORSEPOWER OF THE WASTE GAS

In order to comprehend the immense possibilities of the problem before the management, let us consider the amount of gas that passes through a large fan, say one that is handling 200,000 cu.ft. of air per min. Assuming that this air coming from the Loomis colliery contains, as stated in Mr. Owen's letter, 1 per cent. of methane and the specific gravity of the gas being 0.559, the weight of gas passing through the fan in 24 hours would be $24 \times 60(0.01 \times 200{,}000)(0.559 \times 0.076) \div 2000 = 61.177$ tons.

Now, as estimated by Mr. Owens, the complete combustion of 1 lb. of methane generates 23,513 B.t.u. But the calculation shows the escape of $(61.177 \times 2000) \div 24 =$ say 5100 lb. of methane per hour. Then, if this weight of methane is burned to carbon dioxide and water, each pound of the gas yielding 23,513 B.t.u., (since 2545 B.t.u. per hour is equivalent to 1 hp.), this weight of gas escaping from the mine per hour is equivalent to $(5100 \times 23{,}513) \div 2545 = 47{,}000$ hp. The figures showing this tremendous potentiality in the return air of a gassy mine are staggering, to say the least.

Referring again to the tests made at the Loomis colliery and the attendant dangers mentioned by Mr. Owens, it can be said that arrangements are being made to increase or decrease the amount of pure air, which is added to the mixture drawn from the mine, so as to maintain a more uniform degree of inflammability and keep the mixture well below the explosive limit of the gas. It may even be found possible to make this control automatic, so that should there suddenly occur an increased percentage of gas in the mine air, this would be at once compensated by a corresponding increase in the addition of pure air, before the mixture enters the furnace.

The suggestion has also been made that the pipe line may be further protected by a gauze that will isolate the firebox of the furnace from the mine, after the principle of the safety lamp. It is further stated that a careful watch will be kept on barometric changes, knowing that a falling barometer is commonly followed by an increased outflow of gas in the mine. When these precautions are taken, it does not appear to me that any trouble need be anticipated, and the ultimate success of the plan will certainly reflect much credit on the men responsible for its development.

West Pittston, Penn. RICHARD BOWEN.

Drawing Pillars in Machine Mining

Letter No. 10—Referring to the letter of D. F. M., *Coal Age*, Feb. 6, p. 288, permit me to say that I agree with him in respect to the method that he has explained of drawing back the pillars with machines. There is one point, however, that I think is misstated in his letter. I have reference to the fact that the pillars should be attacked from the side opposite to the fall and not as explained in that letter, "by cutting through the rib in No. 1 room with the machines."[1]

If the pillar is cut through from No. 1 room, there will be left what I call a "pick stump." When this stump is removed, there remains too little support for No. 2 pillar, which is apt to be crushed by the weight thrown on the end of that pillar, which is about 50 ft. back of the first pillar, the road in No. 2 room being all open.

Instead, however, the first pillar should be started and cut through from No. 2 room or on the side opposite to the fall, which will give better protection while the cut is being made and avoid the road's being closed before the remaining stump is all removed. In the same manner, No. 2 pillar should be cut through from No. 3 room, and the same order followed in all the rooms.

It is best to keep the line of pillar work on an angle of about 45 deg., which tends to cause the roof to break more against the rib of the pillar, and less weight is thrown on the pick stump, which is then removed with less difficulty than where the pressure is thrown with greater force on the supporting stump, as must be the case in the figure on page 288.

Crafton, Penn. RICHARD MCDOUGALL.

Letter No. 11—We are drawing pillars, with Sullivan machines, under almost identical conditions with those mentioned by "Operator," *Coal Age*, Jan. 2, p. 32. The

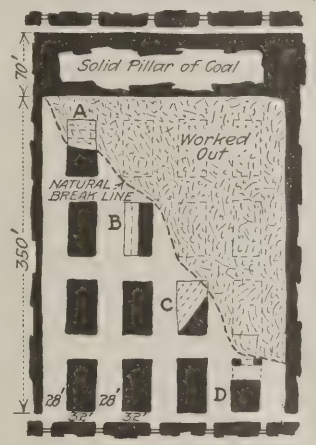
[1]This correction was made by D. F. M. in a second letter that more fully explained his sketch and which was published in *Coal Age*, Feb. 27, p. 415.

coal seam varies from 4½ to 5 ft., in thickness, and is overlaid with from 30 to 40 ft. of solid sandstone, at a depth reaching from 50 to 800 ft. below the surface. The lower half of the seam is a hard splint coal, while the upper half is softer and contains a 6-in. band of laminated or bone coal.

In our mine, the rooms are driven on 60-ft. centers and are 28 ft. wide and 350 ft. long. Rooms are opened on one side, only, of each pair of headings, and a solid pillar of coal, 70 ft. thick, is left at the head of the rooms, for the protection of the air-course of the next pair of butt headings. Twenty of these rooms form a panel.

When drawing back the pillars, several different methods have been tried, with the object of obtaining the largest possible recovery of coal with the machines. We have found that almost any method will work well, for the first 150 or 200 ft., when starting away from the solid barrier pillar. But, when the first fall occurs and a little weight is thus thrown on the pillars, the proposition grows more difficult, and it becomes necessary to adopt a method that will then give the best results.

The accompanying figure shows the work of drawing back the pillars in progress in a single panel. Four methods of attack are shown at *A*, *B*, *C* and *D*. At *A*, the pillar is shown as being cut across on the end, using the machines for that purpose. In this method, however, it was found that when a fall started it would usually come suddenly, and the roof would break tight to the face, the fall frequently catching the track. It can be said, however, that this method works well in a slate top that is carefully timbered.



METHODS OF CUTTING PILLARS

In the second method shown at *B*, the pillar is attacked by slabbing the rib, which is undercut the entire length of the pillar with the machine. This method worked well, until the thickness of the pillar was reduced to about 10 ft., after which the work became very dangerous, as the portion remaining was the only solid support for a considerable area of roof. While the weight resting on this stump was not sufficient to make it easily mined with the pick, any attempt to use the machine resulted in the coal settling down in a manner that made very hard cutting. Moreover, there was the added danger that the whole exposed area of roof would fall with the coal. It has been our luck to have two machines caught, in the attempt to use this method. They were both badly smashed.

The plan of starting the attack on the inby corner of the pillar and cutting out the coal on the bias, as shown at *C*, gave a little better success, but presented the disadvantage that when a big fall occurred, it was very apt to follow a featheredge and extend up into the rooms, thus cutting off the working face and making it very difficult to recover the balance of the pillar. Usually, a portion of this coal would have to be left, which was sure to give trouble later.

In all of these methods, timbers must be set regularly for protection against loose roof, but excessive timbering is of no avail. While large posts or many posts are useful at times, for special purposes, they generally serve to delay a fall, for a short time only; and when this finally occurs, the fall is greater and extends farther up into the rooms.

Our experience is that the best method to employ, and the one that recovers the most coal with the greatest regularity and safety, is the method shown at *D*. As this method has been fully described in previous letters, in *Coal Age*, it is only necessary to say, here, that a crosscut is first driven through the pillar with the machine, leaving about 6 ft. of solid coal on the gob side, for the protection of the work. The center of this stump is then cut out by the machine, leaving the two small stumps, as shown, one at each corner, to be removed by the pick.

This method has the advantage that the cut is always in the solid, with no large open areas behind the machine. It is economical of timber, the roof being supported by the coal stump, until the machine has finished its work and is withdrawn. In the use of the first method explained, roof falls occurred in increments of from 60 to 100 ft., while in the last method mentioned, these increments were reduced to from 18 to 30 ft., with a less thickness and a better control of the fall when the roof started to break.

Stone, Ky. MINING ENGINEER.

Waste of Coal

Letter No. 4—When Joseph R. Thomas remarked, in his excellent letter, *Coal Age*, Jan. 16, p. 160, that "we will never miss the coal till the fire goes out and the bin is empty," he could not have stated the truth more emphatically. He has done well to suggest a discussion of this subject from a practical standpoint.

Most men will agree that war-time requirements have made two things clearly discernible by the public eye. Either mining methods have very greatly improved, or the higher price paid for coal has caused operators throughout the country to mine and send to market coal that could not be mined at a profit, under the low prices prevailing previous to the war. Surely, there never was a time in the history of this country when the coal mines have been worked to their capacity, as during the past year or two.

LARGE RECOVERY OF COAL UNDER WAR STRESS

While there is no question but that much coal has been and is still being wasted by improper methods of mining and the careless disregard of necessary precautions on the part of both miners and mine officials alike, yet it cannot be denied that the war crisis made it possible to recover much coal that was previously considered as unmineable at a profit. I will cite a single instance that came to my notice some time since.

In a certain bituminous mine, the coal pitched so heavily in one section of the workings that cars could not be taken to the face. Still, the pitch was not great enough to cause the coal to slide down the chutes. For this reason, work was abandoned in that section and the miners transferred to a portion of the mine where the conditions were more favorable. It was not long, however, before all the available coal in that section was worked out and the foreman was obliged to again consider the working of the coal that he had previously abandoned.

Such was now the demand for coal that the foreman ordered sheet iron to lay in the floor of the chutes, which enabled the coal to slide freely to the heading below. Previous to this he had argued that the price paid for coal would not admit of this extra expense. Even then it was a common remark among the miners that the company would never get enough coal from that section to pay for the sheet iron; but the results soon proved to the contrary.

While one cannot say that the use of this sheet iron was an improved method of mining the coal, it resulted in saving what would otherwise have been an enormous waste of good coal. Lining the chutes with sheet iron, in such cases, has been in use for years, in the anthracite region, and this foreman simply used the same means when the situation required or the opportunity presented itself in the bituminous field.

Rapid Growth of Small Operations

Another feature, which has been brought to the notice of *Coal Age* readers, and has led to the development of large quantities of coal that was previously considered unmineable, is the number of small mines that were opened everywhere because of the extraordinary demand for coal during the war period. Many of these mines were isolated from railroads or other shipping facilities and had to be worked as "wagon mines."

In other cases, much coal was recovered from the outcroppings of larger mines, that had previously been abandoned. There is little doubt but that these small operations supplied much local trade and made it possible to devote the entire output of railroad mines to supply the needs of the war. Since much of this coal would never have been mined, it is clear that the war crisis has had a good effect in making plain the fact that much coal formerly regarded as unmineable and abandoned can and should be utilized.

There is no question but that, as indicated in Mr. Thomas' letter, much coal is wasted by careless miners not cleaning their places and allowing good coal to become lost in the gob, as well as in other ways, such as falling off the cars when being hauled to the slope bottom, because the car was improperly loaded or, perhaps, badly in need of repairs. A good foreman will see that the causes for such waste are removed as far as possible and careless miners trained to better habits.

Roads over which coal is daily hauled should be cleaned at regular intervals and kept in good condition to reduce this waste to a minimum. It must be remembered that every ton of coal lost or wasted shortens the life of the mine and reduces its value. Conservation of coal has been preached for the past ten years and yet many fail to consider its importance. It is hoped that these will be impressed with such a discussion.

Jacob, Penn. H. G. Cockill.

Reducing Ventilation at Firing Time

Letter No. 5—I recall distinctly that this subject was discussed in *Coal Age* several years ago. As I did not voice my sentiments at that time, the reopening of the discussion affords me an opportunity to express a few thoughts that are, perhaps, worthy of some consideration.

It is my belief that any attempt to reduce the ventilation in a mine, at the time of shooting, should be considered as an acknowledgement that a dangerous condition exists that requires some modification of the ventilating system, in order to avert trouble. If this is the case, it is a virtual admission of inefficiency, in respect to the ventilating system in use. All obtainable statistics relating to accidents in mines have shown conclusively that the majority of these accidents are either the direct or indirect result of carelessness or inefficiency, for which there is no excuse.

It is useless to argue this question, having in mind the presence of explosive gas only, since gas does not constitute the real danger in respect to explosions. The examination of mines where explosions have occurred invariably reveals the presence of coke that has been deposited on the ribs and timbers, which is evidence that dust and not gas is the real danger that must be avoided.

For over a century dust has been the main factor that has played havoc in the mines and proved itself the dangerous enemy of the coal-mining industry. In the year 1803, a Mr. Buddle, one of the pioneers in British coal mining, stated in his report of an explosion that had occurred in a dry and dusty but nongaseous mine that the men were burned by incandescent coal dust carried by the air current.

Now, the old saying is that "the value of a tooth is reduced where there is nothing for it to do." Working on this principle, the most effective method of dealing with the dust in coal mining is to treat it in a manner that will render it inactive and thus destroy its value in respect to producing an explosion.

The methods of treatment of coal dust have been fully explained in past issues of *Coal Age*, and I think it has been fully proved that the best method of keeping a dusty mine safe, at shooting time, is to employ a systematic system of sprinkling and washing down the ribs and timbers where the dust has accumulated. In addition to this, all accumulations of dust on roadways and travelingways should be removed regularly from the mine. Experience.

Birmingham, Ala.

Efficiency in Mine Management

Letter No. 4—In a recent letter that appeared in *Coal Age*, Jan. 30, p. 246, the writer referred to the position of mine superintendent as not being "an office job." The reference brought to my mind a conception that I formerly had of that official. I regarded him as a man who was able to produce the desired tonnage at a satisfactorily low cost. I thought of him as spending the greater part of his time in the office and only making an occasional inspection of the mine, which he generally left to the charge of the mine foreman.

A few years of close observance have shown me that there are many attributes needful to make a successful mine superintendent. He must, of course, be able to produce coal at a low cost and keep the mine in good condition and safe for work; besides, he must possess a sense of fairness that will enable him to see the other fellow's side of a question; he must also manifest an ever-ready sympathy, tact and diplomacy, together with not too keen a sense of humor in all his dealings.

To define what is a superintendent is about as difficult as to answer the question, "How old is Ann?" A

picture arises in my mind of the superintendent of a certain large operation. This man had been in charge for several years and had made himself familiar with the employees and their families. So successful had he been that there was little change among the mine employees; few were hired or discharged. Many of the men had been in the employ of the company for years and had built their homes, which was true alike of both the foreign and American miners working for that company. It may be amusing but, to my mind, it should prove instructive to cite, in order, the events of a single day in that superintendent's life. The narration would read as follows:

One Day's Record in the Affairs of a Successful Superintendent

Going to the office at 7:30, he started to open and read the mail, only to be interrupted by the electrician who came in from the power house with a list of needed supplies and repair parts and departed, after a few minutes' talk on some phase of his work. The superintendent resumes his task of reading over the mail and dictates a letter, in the midst of which he answers the telephone and again takes up the dictation only to be interrupted by Dick H., who comes in with the request, "Will the superintendent please send a carpenter to fix the back porch of my house, today, as the baby fell down the steps and skinned her nose." The superintendent promises and spends a few minutes to comment on the merits of the aforesaid baby, it being the man's only child.

On the departure of the much-pleased father, the interrupted dictation is once more hardly under way when the foreman calls up on the 'phone and gives an order for supplies that must be sent into the mine at once. That matter being attended to, the next visitor is the stableboss, who brings the information that "the gray mare Lizzie is off her feed." The superintendent goes carefully over the symptoms of the mare and then reads from Gleason's Horse Book, after which he concludes that the illness is not serious enough to call a veterinarian. He gives the stableboss some remedies and instructions and turns again to his dictation.

A few moments later, Mike Russ slips in to know if he can have enough bricks to build him an oven. The oven question being settled, Mrs. T appears and asks if it would be all right for her to move into the house that Mrs K has just vacated. Inquiry by the superintendent brings out the fact that Mrs T's reason for making the change is that Nick Slovak's chickens scratch up her flower beds, which the superintendent promises to remedy by building a more substantial fence between the properties.

The superintendent, here, puts in a long-distance call and has hardly done so when Mrs. T bursts into the office with a tale of woe of how Mrs. K had called her names; and "won't the superintendent please move Mrs. K into some other part of the town." Immediately after, Mrs. K appears on the scene with a similar tale of woe and some few minutes and the utmost diplomacy on the part of the superintendent are required to subdue that irate woman and restore her surface calm. This episode is happily cut short by the ring of the telephone. A few minutes' talk over the 'phone is followed by the carpenter, who comes in with an order for four panes of glass for house No. 77, stating that Jones' kids broke two windows playing "Andy Over."

The noon hour has now nearly arrived and, after a little routine work, the superintendent goes to lunch. Lunch over, he makes a brief visit to the power house, tipple or store, often taking a run into the mine, which may occupy the rest of the day. Not going into the mine, he starts for the office within an hour, but is intercepted on his way by Mrs. I, who wants a donation for the minister's new furnace. This woman is a born talker and relates at some length her experiences in the hospital, when she broke her arm last fall. The superintendent fidgets from one foot to the other and at last is glad to escape with a much-flattened pocketbook.

Finding a salesman in waiting at the office, the superintendent gives him an order for supplies, chats a few minutes and then turns to some work, going over the reports from the mine. In this, he is interrupted by Bob L, who wants to know why he is charged $6 for rent instead of the $4 that he is accustomed to pay. Another caller claims that he is short two cars and the superintendent turns him over to the bookkeeper, asking the latter to explain. Then, John Czek asks the superintendent if he can help him get out his naturalization papers, which the superintendent willingly does. Next, Charlie Y comes out of the mine with a cut on his head and, in the absence of the company doctor, the superintendent dresses the wound, putting in one or two stitches. This done, he barely has time to sign a few letters when his wife calls to know if he is ever coming home to dinner.

Responding to the dinner call, this affable superintendent had just left his desk when Mrs. R comes in to ask if he will please address a letter for her to her boy in France, as she does not write very well. Unlocking his desk, he addresses the letter and goes home to dinner. The meal is but half-eaten, however, when a loud knock at the door announces Dick T who wants the superintendent to come at once to his house, stating that two of his boarders got into a fight, with the result that one knocked the other down and he thought the man was dead. Leaving his dinner, the superintendent responds to this call, also, and finds much to his relief that the man was only stunned. He quickly settles the trouble between the fighters and goes home.

Reaching his house and the meal being scarcely finished, Tom W appears at the door with his wife, bearing a peculiar-looking package under his arm, which proves to be a hen, a half-dozen fresh eggs, and a pumpkin pie, all of which the good woman presents to the superintendent's wife with an appropriate speech and receives her thanks. Tom W then broaches the subject to the superintendent of his proposed new house and asks his help in arranging the plans and contracts. This the superintendent gladly agrees to do, and the three depart for the office, the superintendent returning home about 9:30 or 10 o'clock.

Such is the full day of one active and successful mine superintendent.

Spectator.

———, W. Va.

Efficiency in Firebossing

Letter No. 8—From the reading of Letter No. 3 on this subject, *Coal Age*, Jan. 23, p. 199, I am inclined to think that its writer, Edward H. Coxe, must be a superintendent. Speaking from my own present position as mine foreman and with a full knowledge of the duties of a competent fireboss, permit me to say that when a fireboss does his duty, the mine foreman will not need to set him to work digging a ditch or timbering a roadway.

Allow me to suggest to Mr. Coxe that he acquaint himself a little more with the requirements of the state mining law (Penn.) and then read up a little on accidents and how to prevent them in coal mining. If this is done with the sincere purpose of making a coal mine safe for work, the result cannot be otherwise than to change his opinion in respect to the daily employment of firebosses.

In many cases, the fireboss, having made his first examination of the mine, can assist in giving out the lamps to the men and, if he is on his job, he will explain, in detail, to each man who works in his section, what conditions he found in his place. He will willingly give the mine foreman an idea of what coal is loaded and ready to haul, and make other suggestions regarding work that must be done on the roads and in the working places.

A little later, the competent fireboss will be found making the second round in his section. This time, he gives more attention to the examination of the roof and observes carefully the manner in which the miners perform their work. The balance of his shift is spent talking with each man and advising him in regard to keeping his place safe.

Where pillars are being drawn, the fireboss must climb well up on the falls to ascertain the condition. Naturally, he performs many minor tasks such as giving information to drivers, assisting in lifting a car onto the track where it has been derailed, or helping a miner to set a post under a loose piece of top.

Such is a brief outline of a good fireboss' daily work. But, too often it happens that a fireboss is only interested in the theory of his work, as far as it will assist him in getting his certificate. When that is secured the books are sold or thrown aside and given no further attention or study. Such men seldom prove efficient or competent.

Incompetency, however, is not confined to firebossing, and I cannot refrain from saying a word here in regard to its effect in the mine when a superintendent is incompetent. Either there is a lack of proper supervision of the work, on his part, or the orders given by him prove impracticable and cause much trouble and friction in the mine.

At times, it has happened that good mine foremen have been obliged to resign their position, on account of the incompetency of their superiors in office. When that is the case, time is required to break in a new man and much loss results to the company. In my opinion, every mine superintendent should have at least eight or ten years' practical mining experience before assuming the duties of that office. He should hold a first-class, mine foreman's certificate.

Oliphant Furnace, Penn. JOHN H. WILEY.

Letter No. 9—Holding certificates, as I do, for both mineboss and fireboss, in this state, has made me much interested in the discussion, in *Coal Age*, regarding the latter position, which certainly has its good and bad points. Some time ago, I contemplated taking a position of fireboss that was offered me, in a certain mine, but asked that the place be held open for a few days, in order to give me time to consider it.

The advantages of firebossing may be briefly stated as follows: The position offers regular work and is not as laborious as most of the work performed in coal mining. The work is much more interesting than that of loading coal and offers greater opportunity for promotion.

THE DIFFICULTIES OF FIREBOSSING

On the other hand, there are disadvantages connected with firebossing, and these should always be considered, before a man takes upon himself the duties of that position. In the first place, the work of firebossing requires a man to leave his home in the early morning hours and start his examination of the mine alone. He must face many dangers, which no one understands better than the one who has encountered them. The fireboss is responsible for the safety of every portion of the section in his charge. His work must be completed and he must be back at the entrance of the mine in time to make his report before the men proceed to work.

Aside from these difficulties and dangers that surround the fireboss, in the performance of his work, there is too often a disposition on the part of a foreman to treat the fireboss in a way that is not pleasant. Frequently, his work is underrated as being of less importance than that of the foreman who has full charge of the mine. In the State of Indiana, I may say that more technical knowledge is required of a candidate for the position of fireboss than is necessary to secure a certificate to act as mineboss or foreman, and this fact may cause some foremen to berate the work of the fireboss.

To such an extent did this condition exist here, some years ago, that there was much talk of the firebosses organizing for their own protection. They hoped, by pooling their strength, to overcome the growing injustice that they felt was being done them, and secure better recognition and increase their chances for promotion.

ESSENTIALS TO SECURING HIGHEST EFFICIENCY

The question of attaining the highest efficiency in firebossing is well worthy of discussion and I want to make the following suggestions:

1. The ventilation of the mine should be entirely in the charge of the fireboss as it affects, primarily, his work of examining the mine, and is the chief element in securing safe and healthful conditions.

2. The fireboss should be given no more territory to examine and supervise than will permit him to do that work in a thorough manner. He should be given men to build all necessary doors, stoppings and overcasts and to assist in erecting brattices where these are required.

3. While I see nothing wrong in a fireboss turning his hand to do any work that may be required of him, it must be admitted that where a fireboss is put to loading coal, laying track and performing other work, to the detriment of his own, the effect will be to lower his prestige and impair his authority. There must be strict discipline to insure safety in coal mining.

4. The examination of a mine should never be started five or six hours before the time for work to begin in the mine. Particularly in a gassy mine, the mining law should restrict the time for beginning the morning examination to two or, at the most, three hours before the men go to work.

5. The fireboss should live as near as practicable to the mine, in order to avoid loss of time in going to and from his work, and that he will be able to reach the mine quickly in case his presence is needed in any emergency that may arise. In many cases, living close to the mine would mean to occupy one of the company houses, which are too often set close together with little opportunity for gardens and outhouses, such as barns, cow-sheds, and yardroom for hens and chickens, which many firebosses desire in their home surroundings. It is these comforts of life that add to the efficiency of all mine employees, particularly of firebosses, whose early morning work shortens the hours of his shift, in the day, and gives him opportunity for some outdoor work and exercise.

In closing, I want to mention that there is a custom prevailing in some of the mines in this state, where the duties of the fireboss are light, to make the roomboss perform the duties of a fireboss in connection with his own work. The roomboss, in Indiana, is really an assistant mineboss (foreman). He must hold a mineboss certificate, and is also required to have a fireboss certificate if his work combines the two positions.

Linton, Ind. W. H. LUXTON.

INQUIRIES OF GENERAL INTEREST

EDITED BY JAMES T. BEARD

Roof Conditions in Longwall Work

I have a longwall proposition that I would like to submit to the readers of *Coal Age* and get their ideas in regard to the best method to adopt in order to secure the best results. The proposition is as follows:

Ours is a bituminous coal of average hardness and 3 ft. 4 in. thick. Immediately above the coal is a 9-in. layer of very hard sandrock, which is overlaid with about 3 ft. of a soapstone formation. Above the soapstone, again, is sandrock. The coal is underlaid with 3 ft. of fireclay, which heaves slightly under the roof pressure.

The question I want to ask, particularly, is, Should this top be broken at regular intervals, using cogs for that purpose; or should the packs be so arranged that the roof will settle gradually on the waste, without breaking? SANDROCK.

Landstreet, Penn.

Coal Age will be glad to receive the suggestions of its practical readers who have worked longwall under conditions similar to those mentioned in this inquiry. It is to be regretted that the correspondent has not given the depth of cover. However, this can be assumed as varying from 200 to 300 ft.

The experience of the editor, in dealing with longwall work, is that, as a general proposition, it is far better to build solid packwalls and arrange these in a manner that will induce a regular and uniform settlement of the roof. The underlying principle of longwall work is to maintain a traveling weight or overburden bearing on the face of the coal and only sufficient to break down the coal when the latter has been properly mined.

In the best longwall practice, the roof should not be broken if it can be avoided as that would at once relieve the pressure, which must be utilized to break the coal. Moreover, the roof is liable to break off at the coal face, unless it is properly supported and controlled by uniform packs. The breaking of the roof at the face is the one thing that must always be avoided, in longwall work, as it destroys the principle on which this system of mining depends.

Tonnage per Foot-Acre

Please explain the rule for estimating the number of bushels of bituminous coal underlying an acre of land when the seam has a uniform thickness of 5 ft. This coal will average 80 lb. to the bushel, or 2000 ÷ 80 = 25 bu. per ton. There is, I understand, a rule for estimating the tonnage, which is generally used in practice. BITUMINOUS.

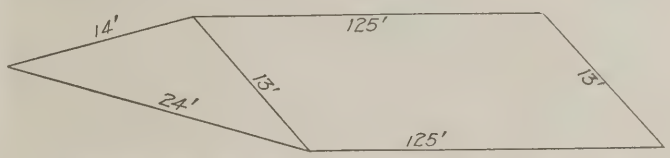
Martins Ferry, Ohio.

The rule to which this correspondent refers is one that is based on an assumed extraction of two-thirds of the coal underlying an acre, which was quite common practice, in bituminous mining more than a decade ago. The average specific gravity of bituminous coal can be taken as 1.27, which makes its weight 1.27 × 62.5 = say 80 lb. per cu.ft. There are 43,560 sq.ft. in an acre; and the weight of coal per acre, for a thickness of 1 ft., is, therefore (80 × 43,560) ÷ 2000 = 1742 short tons. Then, assuming a two-thirds extraction, the weight of coal available per foot-acre is $\frac{2}{3}(1742) = 1161$ short tons.

On this basis, the common practice was to estimate 1200 short tons, per foot-acre, of bituminous coal. Since the extraction of coal, at the present day, far exceeds two-thirds of the entire amount, a closer estimate for bituminous coal would be to allow 1500 short tons, per foot-acre, as the available coal in a seam.

Measuring a Coal Pile

Kindly permit me to ask how a coal pile having the shape and dimensions given in my sketch can be measured to ascertain its contents. The ground is flat. The coal was unloaded, by hand, along a railroad track.



SHOWING SHAPE AND DIMENSIONS OF COAL PILE

From the ridge line, the coal sloped each way uniformly, the length of slope being 13 ft. on one side and 14 ft. on the other side, while the spread at the base measures 24 ft. across. Kindly explain the manner in which the contents of this pile is calculated. The coal is mine-run bituminous coal. COAL DEALER.

Chicago, Ill.

In this inquiry, no data are given to determine the slope at the two ends of the pile; but, judging from the sketch, the coal may be regarded as stacked between two walls, making the two ends vertical and parallel. On this assumption, it is only necessary to calculate the area of a triangle whose three sides are 13, 14 and 24 ft. in length; and multiply this area by the length of the pile, which is 125 ft., as indicated in the figure.

The area of a triangle the three sides of which are known is calculated by the formula,

$$a = \sqrt{s(s-a)(s-b)(s-c)}$$

To apply this formula, let a = the sectional area of one end of the pile and s = the half-sum of the three sides, a, b, c. The half sum of these three sides is $\frac{1}{2}(13 + 14 + 24) = 25.5$ ft. and, substituting this and the given values in the formula, we have,

$$a = \sqrt{25.5(25.5-13)(25.5-14)(25.5-24)} = 74.15 \text{ sq.ft.}$$

The cubical contents of this pile is, therefore, 74.15 × 125 = say 9269 cu.ft. Mine-run bituminous coal measures 40 cu.ft. to the short ton. The weight of coal in this pile is, therefore, 9269 ÷ 40 = $231\frac{3}{4}$ short tons. Estimated in bushels, the pile contains, approximately, $231\frac{3}{4}$ × 25 = 5793 bushels.

EXAMINATION QUESTIONS

EDITED BY JAMES T. BEARD

Alabama Second-Class Examination Birmingham, Jan. 20-23, 1919

(Selected Questions)

Ques.—What dangers arise from blasting coal out of the solid?

Ans.—Coal that is blasted out of the solid is not mined or side cut, and there is little opportunity given for the charge of powder to do its work properly in breaking down the coal. Under certain favorable conditions in the coal seam, it is possible to employ what is sometimes called a "grip shot," in which the drill-hole is inclined at a sharp angle with the face of the coal. While this shot may not be mined or side cut, the butt cleats often existing in the coal cause it to break easily and there is no particular danger.

On the other hand, when these conditions do not exist and the shot is not mined or side cut, or when the charge is located on the solid beyond the cutting, there is danger of a blownout or windy shot being produced. In either case, much of the force of the explosion is spent on the air, instead of being absorbed in the breaking down of the coal. A large amount of heat and flame is produced, and there is danger of gas or dust being ignited and causing a local explosion, which may or may not be transmitted throughout the mine, depending on the condition of the mine air and the workings.

Ques.—How would you timber an airway when the bottom is soft or wet?

Ans.—Where the bottom is soft or wet, there is danger of the posts supporting the roof being forced down through the clay, leaving the roof free to settle heavily on the pillars, which are crushed by the undue pressure thus thrown on them. To avoid this contingency, the posts should be set on footboards whenever the bottom is soft or wet, so as to distribute the pressure and give a firmer footing to the posts. Under these conditions, extra precaution is required, in order to reduce to a minimum the danger of squeeze or creep, particularly if a good width of pillar has not been provided to avoid this trouble. In airways where the roof conditions are such as to require the timber frames to be set but a few feet apart, side sills are generally used instead of footboards. The bottom should then be well drained by ditches on both sides of the track.

Ques.—What dangers and difficulties are encountered from a mine squeeze?

Ans.—The occurrence of a squeeze in mine workings throws an undue pressure on the pillars left to support the roof and protect the roads and airways. The mining of the pillar coal is then more difficult and dangerous, because of the great weight on the pillars, which crushes the coal, and because of the danger of heavy roof falls when the pillars are withdrawn. Owing to the crushing of the pillars, it frequently happens that much good coal is lost beyond recovery. When roads are cut off or completely closed by the advance of the squeeze much tracking and timber also are lost.

Ques.—When extracting pillars, how should the general line of face be kept?

Ans.—The ends of the pillars should be kept in line with each other so as to provide a continuous break line, and produce a more uniform and gradual settlement of the roof in the gob. Where the line of fracture is straight a more uniform pressure is thrown on all the pillars alike, but when one or more pillars fall behind the others, the coal in them is crushed by the undue weight they carry. The line of fracture will generally need to be kept at an angle approaching 45 deg. with the entry to obtain the best results; but this is not always the case, as much will depend on the conditions in the seam and the overlying strata. These conditions must be carefully studied to determine the best line of fracture in drawing back the pillars.

Ques.—What should be considered in determining the size of pillars, in mines?

Ans.—The chief factors in determining the size of pillars, in coal mining, are the depth of cover, width of opening, thickness and character of the coal, nature of the overlying and underlying strata, and the time that the pillars must remain before being withdrawn. The presence of slips or fault lines in the formations must also be considered with regard to the effect produced on the working of the seam. The presence of water in the strata will soften the floor and roof of the seam, and require greater pillar support than is necessary in dry workings. The presence of gas in the floor or the roof of a coal seam may give unexpected trouble by causing the bottom to heave or the roof to fall.

Ques.—Why is the single-entry system of operating almost certain to prove a failure?

Ans.—In a single-entry system of working, the air current must be returned along the faces of the rooms, since there is no separate return airway provided. In this system, a fall of roof at the face of one or more rooms may block the entire circulation in the mine, until another opening can be made to conduct the air current to the return opening. When this happens the system of ventilation is a failure.

Ques.—What is the best mode of ventilation to adopt?

Ans.—The plan of ventilation of a mine should be such as to meet the particular requirements. There should always be a separate intake and return airway provided, except in longwall work, where the air travels the working face throughout the most of its course. In a small mine, the double-entry system will generally prove sufficient to meet every requirement; but, in a gassy mine, three or more main entries may be needed, in order to provide ample area in the return airway. In many mines producing large tonnages it is necessary to provide a multiple system of main entries, in order to secure the best results with regard to economy and safety. As the workings are extended, the mines should be divided into separate sections and each section ventilated by a separate air current. This is accomplished by splitting the main air current and building an air bridge at that point to carry the air across.

Book Reviews

To Avoid Blind Guesses at Probable Cost

MECHANICAL AND ELECTRICAL COST DATA. By Halbert P. Gillette and Richard T. Dana. Pp. xvii + 1716 + 16 index; 4½ x 7 in.; adequately, but not profusely, illustrated. McGraw-Hill Book Co., Inc., 239 West 39th St., New York City, publisher. Leather cover. Price, $6 net.

The weakest element in the engineer's whole equipment is in costs. The bulk of the training of the engineer tends to lead him away from the subject. Most of the craft have been drawn to the engineering profession by a delight in pure science, and scientists at heart they always remain. But they absorb a few "base mechanical" facts, to quote Shakespeare, in the course of their college or university training, though such facts are grudgingly given by instructors and unwillingly accepted by the student. The cost element of training comes last. It is the hardest information for the instructor to secure; it is contrary to his psychology and, as it is also alien to the psychology of the students, it is quite generally neglected.

Manager Knows, Yet Asks Engineer to Estimate

Besides, both preceptor and pupil argue, the study will serve only for a while, for prices are fleeting things, lasting only till the union forces a new wage scale, conditions of business introduce a new labor psychology, or the manufacturer prints a new discount table. But after all, despite the haughtiness and aloofness of such a superior being as the mining engineer believes himself to be, he must pay attention to the present and the ephemeral if he is to be successful. He is in an unfortunate position and one it is hard for him to correct. Under the present absurd division of labor, the manager does the buying, the bookkeeper keeps the accounts and the poor devil of an engineer estimates probable cost of construction. No wonder his estimates are too frequently a joke.

But how will a cost book based on pre-war figures help a man to learn as much or more than the manager who knows the real costs and propositions of manufacturers and who keeps all that knowledge in his managerial bosom Gillette and Dana in an introduction declare that such a book on "Mechanical and Electrical Cost Data" can and will help considerably, for any labor costs can be multiplied by the factor representing increase in wages and so corrected. They also declare that any machine costs can be determined when the increased cost factor has been determined for any one class of machine, for as one machine increases in cost another is almost sure to increase. So long as the design is not changed materially a fairly safe estimate can be made. The engineer must be patient. He cannot secure the impossible, and his judgment is shown in securing the best help that is offered.

Interest Charges During Construction

The writers of the book certainly open up ideas on valuation in their department entitled "General Economic Principles." The reviewer has looked long and unsuccessfully for a statement like the following:

"Very few operating companies charge any interest during construction, when new construction proceeds *pari passu* with renewals. In other words, after the original nucleus of the plant is built, the 'interest during construction' account, if ever there was one, is closed."

"If ever there was one," is a good reservation. The reviewer recalls one well-posted accountant who refused to allow for interest during construction unless that interest was actually paid to someone. If money was borrowed to build a plant, that plant was, by his way of reasoning, worth more than if the money was subscribed. When urged that work by a construction company was loaded with interest, profit and rick charges during construction he replied that he knew it, but to add interest during construction where a company constructed a plant with its own money was to credit a profit on the investment when no profit was actually made.

The section, just quoted on "General Economic Principles" contains many other wise considerations. Then follows "Depreciation, Repairs and Renewals," with a long table showing the estimated life of plant units in years, with the authorities for such estimates. This table is insufficiently detailed; for instance, ties for track construction are credited with a life of 8 years, of 13.3 years and 20 years. No attempt is made to differentiate the kind of ties of which the longevity is given. Steel, locust and hemlock ties are not given their appropriate longevities, nor is there any reference to the place and conditions of use.

Running rapidly over the book, Cost of Buildings, Chimneys, Moving and Installing, Fuel and Coal Handling, Steam Power, Internal Combustion Engines, Hydro-Electric Plants, Electric Light and Power Plants, Overhead and Underground Electric Transmission, Lighting and Wiring, Belts, Shafts and Motor Drives, Compressed Air, Gas Plants, Pumps and Pumping, Conveyors, Hoists, Cranes and Elevators, Heating, Cooking and Ventilating, Electric Railways and miscellaneous matters, such as arc welding, are taken up in turn. This is a handy book, a good companion to "Handbook of Cost Data" by Gillette and "Handbook of Construction Plant and Its Cost" by Dana. Every mining engineer's office of any pretension should contain all three. They do not cover the same ground, but supplement each other.

How To Store Goods With Profit

STORING: ITS ECONOMIC ASPECTS AND PROPER METHODS. By H. P. Twyford, Otis Elevator Co. Pages xvi + 196 + 5 index; 5 x 9¼ in.; 96 ill. D. Van Nostrand Co., 25 Park Place, New York, publisher. Cloth Boards. Price $3 net.

Provident storage was ever looked upon as one of the greatest of housewifely virtues—to put things by for future use, to keep them so that they would not spoil, to have them where they could be located even in the dark, to record their number, quality and purpose—these were primal duties and they remain so even today. But nowadays we buy in large quantities, and the problem becomes far larger.

As the purchaser has not expended on the product the labor that a housewife has expanded on hers, he is prone to forget just what he has on hand and to order it over again while he still has some of the material in reserve. He has not exerted himself to get it, so he doesn't feel the loss of his labor if the material spoils. Conversely, knowing these failings the manager is opposed to storing because he is afraid the stored material will not be used and because he anticipates that new material will be purchased whenever an emergency arises demanding the use of material of the kind stored.

Therefore methodical storage is the need of the hour, especially for large firms. It prevents excessive buying while permitting of speedy replacements when breakdowns occur. It assists in securing properly balanced buying, and it enables the manager to know just how well he is protected against unforeseen troubles.

Here is a book pointing out the economic questions related to storing, giving details regarding specifications, definitions and standardization, providing suggestions as to the location and equipment of the storeroom, showing what appliances facilitate its operation, detailing the manual, clerical and managerial work involved and then following the material from delivery to exit. Though more adapted to the larger storerooms of manufacturing concerns, it will afford the mine operator and manager many excellent suggestions.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Coal Production in Japan

An excerpt from *The Japan Chronicle* of Dec. 24 and 25, 1918, transmitted to the Bureau of Foreign and Domestic Commerce by Consul General George H. Scudmore, Yokohama, states that the output of Japanese coal mines during the last seven years was, in tons, as follows: In 1912, 15,709,663; 1913, 17,050,267; 1914, 17,289,861; 1915, 15,488,828; 1916, 17,476,803; 1917, 19,887,147; and 1918 (estimated), 20,835,254 tons. It will be seen that, compared with the output for 1915, which is the smallest during the last seven years, the 1918 estimate shows an increase of about 35 per cent.

At present about 26 yens ($12.95) per ton is quoted for Japan best and steam lump coal at Moji, and when freight, landing and other charges are taken into account the price at Kobe will be about 35 yen ($17.45). Opinions differ as to the outlook of the market. It is true, however, that though there has been a general decrease in the prices of other commodities since the armistice, there has been a continued advance in the price of coal.

At the end of November stocks at Moji and Wakamatsu, taken together (though Moji stocks alone showed an increase), showed a decrease of 55,000 tons compared with the preceding month, amounting to 149,000 tons. Stocks at the pit's mouth at the end of November were put at 296,000 tons, about 26,000 tons less than in October. Present stocks at Osaka amount to about 180,000 tons, a decrease of about 40,000 tons. Though stocks have diminished, there has been no particular change in the demand since the armistice, and it is thought that coal prices will continue at their present level, if not increase. On the other hand, the theory is advanced that the demand is bound to decrease as the result of the industrial slump caused by the termination of hostilities; and, as the number of coal miners will increase, owing to many workers being dismissed by industrial companies, there will be increased supplies in the future, naturally causing a decline in price.

Serious rioting is reported at Gelsenkirchen and other places in the Ruhr coalfield and conflicts between the military and Spartacists. The strikes are now said to have ended, but not before serious damage had been done to coke ovens and other industrial plant.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Mar. 10	Amer. S.S. Ulysses	Cristobal, C. Z	12,022	1,134
Mar. 11	Amer. Sc. Anna Laura McKenny	Rio de Janeiro, Brazil	1,558	....
Mar. 12	Amer. S.S. Honduras	Bridgetown, Barbados	2,984	501
Mar. 13	Amer. S.S. Lake Gradan	Bridgetown, Barbados	3,595	193
Mar. 13	Amer. Sc. Republic	Rio Grande do Sul, Brazil	1,119	....
Mar. 13	Amer. S.S. Tampico	Vera Cruz, Mexico	2,318	431
Mar. 14	Amer. Sc. Florence Thurlow	Rio de Janeiro, Brazil	1,317	....
Mar. 14	Amer. Sc. Samuel W. Hathaway	Rio de Janeiro, Brazil	1,404	....
Mar. 14	Amer. S.S. Lakewood	Rio de Janeiro, Brazil	2,020	655
Mar. 15	Fr. Bark Cape Horn	Antofagasta, Chile	4,223	48
Mar. 15	Amer. Sc. Mary L. Baxter	Rio de Janeiro, Brazil	1,445	....
Mar. 15	Ital. S.S. San Rossore	Gibraltar for orders (Italy)	6,343	876
Mar. 15	Ital. S.S. Luigino Accame	Gibraltar for orders (Italy)	3,949	669
Sewalls Point				
Mar. 5	Amer. S.S. North Bend	Huasco, Chile	2,751	579
Mar. 12	Amer. Sc. Van Lear Black	Pernambuco, Brazil	814	....
Mar. 12	Amer. S.S. Glen White	Rio de Janeiro, Brazil	7,038	1,395
Mar. 13	Amer. Sc. Eleanor F. Bartram	Pernambuco, Brazil	1,606	....
Newport News				
Mar. 8	Nor. S.S. Commodore Rollins	Santiago, Cuba	1,516	402
Mar. 8	Amer. S.S. Lake Lesa	Havana, Cuba	3,114	45
Mar. 8	Amer. S.S. Serpentine	Santiago, Cuba	808	240
Mar. 8	Amer. S.S. Serpentine	Santiago, Cuba (Coke)	163	....
Mar. 10	Dutch S.S. Hector	Amsterdam, Holland	3,576	1,050
Mar. 12	Amer. S.S. Cranenest	Pernambuco, Brazil	2,042	807
Mar. 12	Amer. S.S. Lake Marion	Antilla, Cuba	2,717	328

American Exports Set New Record

January exports from the United States, valued at $623,000,000, were announced by the Department of Commerce as exceeding any previous month in the history of American commerce. They compare with $505,000,000 for January, 1918, and $566,000,000 for December, 1918.

During the seven months ended with January, exports from the United States totaled $3,798,000,000, as compared with $3,450,000,000 for the corresponding period one year ago.

Imports during January were valued at $213,000,000, the report said, leaving a net trade balance in favor of the United States for the month of $410,000,000. Imports during January, 1918, were valued at $234,000,000, and during December, 1918, at $211,000,000.

Exports continued to show great strength in February, the total reaching $588,000,000 in value. This is a falling off from the record January total of $623,000,000, but as there were only 28 days in February, the daily average would appear to be even higher than in January. The total for the month represents an increase of approximately 42 per cent. over the $411,000,000 for February of last year. Exports for the eight months ended with February were valued at $4,386,000,000, as compared with $3,862,000,000 for the corresponding period of the previous year.

February imports are announced as $235,000,000, a gain over the $213,000,000 for January, and over the $208,000,000 for February, 1918. Imports for the eight months ended with February totaled $1,933,000,000, as against $1,841,000,000 for a similar period the previous year.

United States Exports of Coal and Coke by Districts and Bunker Coal by Districts, During January, 1919

Districts	Anthracite Tons	Anthracite Dollars	Bituminous Tons	Bituminous Dollars	Coke Tons	Coke Dollars
Maine and New Hampshire	279	3,576	1,072	7,167	70	616
Vermont	1,793	14,210	5,642	32,650	67	675
Massachusetts	141	1,767	.....	.....	.....	.....
St. Lawrence	136,005	1,068,744	257,678	999,695	1,515	9,968
Rochester	2,876	22,950	53,654	128,484	1,405	9,741
Buffalo	212,905	1,521,376	230,746	878,079	16,449	174,368
New York	10,367	84,275	3,168	25,108	570	16,091
Philadelphia	4,101	31,093	15,390	100,643	.....	.....
Maryland	.....	.....	32,315	200,456	1,878	21,994
Virginia	.....	.....	373,222	2,364,698	3,802	49,494
Georgia	.....	.....	2,116	17,986	.....	.....
Florida	.....	.....	1,950	13,661	.....	.....
Mobile	.....	.....	1,906	20,889	.....	.....
New Orleans	.....	.....	1,464	10,344	53	1,591
San Antonio	114	1,343	2,680	15,697	3,007	28,489
El Paso	159	2,419	3,666	25,255	3,122	23,633
Arizona	.....	.....	3,452	11,537	16,632	144,214
Southern California	.....	.....	15	192	.....	.....
San Francisco	.....	.....	.....	.....	12	180
Oregon	.....	.....	800	9,200	.....	.....
Washington	.....	.....	1,404	9,091	90	1,118
Dakota	.....	.....	714	4,243	90	692
Duluth and Superior	.....	.....	1,360	8,810	26	312
Michigan	9	117	123,492	435,030	12,995	121,611
Ohio	.....	.....	89,728	337,850	5,740	37,467
Porto Rico	.....	.....	.....	.....	3	80
Total	368,749	2,751,870	1,207,634	5,656,765	67,526	642,334

BUNKER COAL

	Tons	Dollars
Maryland	22,217	129,721
New York	211,099	1,266,094
Philadelphia	24,697	165,059
Virginia	112,932	662,692

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Mar. 17 states that the demand for steamers to take coal to the West Indies was a little better and that a number of charters were effected at the Chartering Committee's rates. The active demand at advancing rates for tonnage for general cargo to transatlantic ports is making it difficult to secure vessels to carry coal to South America, but there are occasional boats inquiring for such business that are willing to accept the Chartering Committee's rates. W. W. Battie & Co. expect to have a number of steamers in the near future that will be available for coals to South America.

The Chartering Committee's rates are as quoted below:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge. Rio, $19.50 net, 1000 tons dis.; Santos, $19.50 net, 1000 tons dis., or $21 net, 600 tons dis.; Buenos Aires, $18.50 net, 1000 tons dis.; Montevideo, $19.50 net, 750 tons dis.; Pernambuco, $18.50 net, 500 tons dis. To Nitrate Range, $16.50 gross prepaid.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. To Nitrate Range, $16.50 gross prepaid.

The coal crisis in Paris may now be considered at an end.

Exports of Anthracite and Bituminous Coal and Coke for the Calendar Years 1916, 1917 and 1918

(Compiled by Bureau of Foreign and Domestic Commerce)

Exported to	Twelve Months Ending December 1916 Tons	1916 Value	1917 Tons	1917 Value	1918 Tons	1918 Value
Italy	1,735,072	$5,143,280	560,628	$2,082,664	9,994	$47,710
Canada	11,839,447	23,208,952	16,177,571	56,340,315	16,191,364	57,122,873
Panama	427,732	1,244,299	618,962	2,240,372	504,126	2,146,085
Mexico	196,547	736,171	184,345	921,001	162,631	750,731
Cuba	1,284,172	3,762,319	1,410,594	6,293,207	1,440,457	8,476,213
Other West Indies	443,200	1,429,265	402,812	1,857,441	254,501	1,503,486
Argentina	921,969	3,012,654	317,563	1,637,890	178,899	1,050,717
Brazil	782,094	2,938,133	685,142	3,568,001	559,099	3,489,163
Chile	.....	.....	.....	.....	300,062	1,905,885
Uruguay	152,732	502,706	60,188	342,602	228,959	1,392,994
Other countries	1,194,381	3,850,313	867,515	4,219,161	125,917	778,999
Anthracite	4,165,652	$22,470,147	5,363,666	$30,909,798	4,435,543	$29,215,689
Bituminous*	18,977,346	45,828,092	21,285,320	79,502,654	19,956,009	78,664,856
Coke	1,048,790	$4,202,236	1,258,321	$8,543,746	1,506,986	$11,861,408

* Does not include fuel or bunker coal laden on vessels engaged in the foreign trade, which aggregated during the twelve months ending December, as follows: 1916, 7,825,731 tons, valued at $27,491,822; 1917, 6,883,176 tons, valued at $31,844,799; 1918, 5,626,175 tons, valued at $29,868,023.

Large Tonnage Allocated for Coal Export Trade

The increase in the coal exports is reflected clearly in the allocation of shipping made by the Shipping Board Mar. 17. The steamer "Salto" is to carry coal from New York to Montevideo, the "Glen White" from Hampton Roads to Brazil, the "West Indian" from New York to Uruguay, the "North Pines" from Hampton Roads to River Platte points, the "Snug Harbor" from Norfolk to the West Indies, the "Lake Ontario" from Hampton Roads to the west coast of South America, the "Point Lobos" from Hampton Roads to Hawaii.

In addition, the following vessels are assigned to take coal to Brazil: The "Randolph S. Warner," the "E. C. Pope," the "Bulano," the "Mojave," the "Andra," the "Chibiabos," the "Lakeside," the "Lake Shore," the "Biran," the "Lake Huron," the "Lakewood," the "Cranenest," the "Mineola," the "Randwijk," the "Larenberg," the "Sacarappa" and the "Bellatrix."

Other allocations for coal destined to West Indies points are as follows: The "Lake Akkra," the "Lake Forest," the "Lake Champlain," the "Frednes," the "Lake Buckeye," the "Lake Sebago," the "Lake Ledan," the "Lake Deval," the "Lake Butler," the "Lake Duncan," the "Lake Janet."

The following ships have been assigned for the carrying of coal to points on the Rio de la Plata: The "Prococyon," the "Sac City," the "Winterswijk." Other ships assigned to the west coast of South America are as follows: The "Saguache," the "Castle Point," the "Dalana," the "H. Ponteppidan." There was also a number of vessels assigned to the carrying of coal to the Pacific Coast, to New England and to various naval coaling stations. The total tonnage assigned for coal is 228,200.

Hampton Roads Coal Exports, February, 1919

	Gross Tons
Norfolk & Western R.R.	401,951
Virginian R.R.	210,284
Chesapeake & Ohio R.R.	184,973
Total	797,208

The War Trade Board announces that the export conservation list as of Mar. 1, 1919, includes coal and coke. Individual licenses, however, are not required to Canada and Newfoundland. Shipments of coal and coke to these destinations may be made under Special Export License R A C—63.

Commitments for Export

Instances have recently come to the attention of the War Trade Board wherein certain American exporters have been embarrassed by reason of the fact that they have entered into definite commitments for export shipments prior to the receipt of the necessary export licenses.

The War Trade Board takes this opportunity to renew its warnings to exporters that, although the importer in the country of destination may have contracted to purchase goods and may have cabled that he possesses the necessary import certificate, the prohibitions of the Trading with the Enemy Act and the necessity of maintaining the blockade conditions may prevent the issuance of an export license. In view of the present policy of the associated governments with respect to shipments to the countries contiguous to Germany, the War Trade Board is unable definitely to assure exporters in advance that licenses will be granted. For their own protection, therefore, exporters should obtain export licenses before making definite and unconditional commitments.

Import Duties on Coal and Coke

With American coal exporters seeking new fields for their product, a knowledge of the rates of duties levied on coal and coke shipped to the various countries, are of necessity of much interest to the coal industry. In making use of these rates it should be kept in mind by shippers that authoritative information in regard to the duties can be obtained only from the custom authorities of the country concerned. This precaution is advised by the Bureau of Foreign and Domestic Commerce, at Washington. The bureau also advises that to test the rates small trial shipments are advisable.

It is also explained that when two or more rates of duty are shown for the same article, products of the United States as a rule are admitted at the lowest rate ("conventional" or "minimum"), except: (1) Into France and French colonies, where (in the case of most articles) the "general" rate is applied; (2) into Canada, when the "general" rate is applied; and (3) into other British colonies, where the "preferential" rates (if any) are withheld from all non-British imports.

In some countries there is an addition of surtaxes which are to be added to the rates.

The following tabulation shows the rates of import duties levied by various countries to which American coal is sent:

	Rate of Duty
Austria-Hungary—Coal and coke	Free
Belgium—Coal and coke	Free
France—Coal or coke (general and minimum), francs per 100 kilos	0.12
Germany—Coal, anthracite, unmanufactured cannel coal, coke and gas coal, from all countries	Free
Italy—Coal and coke (general and conventional)	Free
Norway—Coal	Free
Portugal—Coal, per ton	0.345 milreis
Spain—Mineral coal. (Exemption of coal from import and transportation duties in Spain was granted by royal decree of Apr. 7, 1915. No announcement of the reimposition of the duty has been received.)	
Sweden—Coal and coke	Free
United Kingdom—Articles not specified in the tariff	Free
Russia—Coal. Imported by the Black Sea or the Sea of Azof, rubles per pound	0.066
Imported by the Baltic Sea, rubles per pound	0.0165
Coal imported by the White Sea is admitted free of duty.	

	General	Preferential
Canada—Coal, anthracite, anthracite coal dust	Free	Free
Bituminous slack coal, such as will pass through a ¾-in. screen, subject to regulations prescribed by the Minister of Customs, per ton	14c.	10c.
Plus ad valorem	7½ per cent.	5 per cent.
Coal, bituminous, round and run-of-mine, and coal not specified, per ton	53c.	35c.
Plus ad valorem	7½ per cent.	5 per cent.
Gibraltar—Coal	.....	Free

	Valuation per 1000 Kilos	Rate of Duty
Argentina—Coal	7.00	Free
	Per Kilo	
Bolivia—Coal	0.07	Free
Brazil—Coal	....	Free
Chile—Coal, not specified, and coke	....	Free
Colombia—Coal	....	Free
Ecuador—Coal	....	Free

	Valuation Pesos per 1000 Kilos	Rate of Duty
Paraguay—Coal	11.00	Free
Peru—Coal	.....	Free

	Valuation Pesos per 1000 Kilos	Rate of Duty Per Cent. of Valuation
Uruguay—Coal	10.00	6
Venezuela—Coal	....	Free
Costa Rica—Coal	.....	Free

	Rate of Duty Peso per Kilo
Guatemala—Coal except pulverized coal, gross weight	0.01¼
Honduras—Coal	Free
Nicaragua—Coal	Free
Panama—Articles not specified	Free
Salvador—Coal	Free
Finland—Coal	Free
Denmark—(Crown, 26.8c.) coal, per 100 kilos	0.03 crowns
Holland—Coal	Free
Switzerland—Coal	Free
Greece—Coal	Free
Turkey—Coal	Two (2) Piastres per 100 kilos
Bahamas—Coal	Free
Barbadoes—Coal and coke, per ton	2s. 6d.
Bermuda—Coal, per ton	2s.
	Ad Valorem
British Honduras—Coal	15 per cent.
Trinidad and Tobago—Coal, coke and patent fuel	Free
Jamaica—Coal, coke and patent fuel	Free

	Per Ton General	Per Ton British Preferential
British Guiana—Coal, bituminous	$0.50	$0.40
Other	.50	.50
Coke and patent fuel	.50	.50
Newfoundland and Laborador—Coal, anthracite imported through St. John's port	.70	.....
Coal imported through any other port	.50	.....
Dutch Guiana—Coal	Free	.....
Dutch West Indies—Coal	Free	.....
Dutch East Indies—Coal and coke	Free	.....

	Per 100 Kilos. Francs
St. Pierre and Miquelon—Coal	Free
Anthracite	0.10
Guadeloupe—Coal	Free
Martinique—Coal	Free
Mexico—Coal	Free
Haiti—Coal	$1.30 per 500 kilos or 1000 lb.
Cuba—Coal	Free
Virgin Islands—Coal	Free
Dominican Republic—Coal and screenings of coal (gross weight) 1000 kilos	$0.25
Coke (gross weight) 1000 kilos	.75
Fuel charcoal	5.00
Briquets of coal dust, screenings of coal waste, prepared for fuel, with or without the addition of other substances and other fuels (gross weight) 1000 kilos	3.00

COAL AND COKE NEWS

EDITED BY ALEX MOSS

Harrisburg, Penn.

Governor Sproul, who last week asked Attorney General Schaeffer to inquire into the power of the state to make an investigation of the proposed increases in the price of anthracite coal, on Mar. 19 indicated in correspondence made public between himself and a representative of independent operators, that an investigation by a legislative commission might be the most effective way to reach a decision as to whether the raise in price is justified.

The Governor also threw out the suggestion to the operators that if a way could be found to prevent, or even to defer, the proposed increase in coal prices until such an investigation has been made as will show that such an increase is justified, if it can be justified, a great deal will have been accomplished.

It is possible, it is said about the capitol, that an investigation might be averted.

Francis S. Brown, former Attorney General of the state, sees no way out for the coal operators except that they be allowed to charge the higher prices announced in their summer schedules. He pointed out that the high wages paid the mine workers, the increased transportation charges, and the fact that so little coal had been purchased this winter, had placed the coal men in a bad situation.

Coal operators who lease properties from the Girard estate have asked the Board of City Trusts of Philadelphia, which handles this estate, to relieve them of a certain portion of the royalties now paid under the increased price resulting from the higher wages. The matter is being placed before the court with a recommendation that the operators' appeal is a righteous one.

When the government raised the miners' wages a dollar, this was automatically added to the price per ton charged by the operator. In accordance with the terms of the Girard lease, the royalty increases proportionately with the gain in price, so that the operator was being taxed for the wage advance, on which he says he did not get any return. The operators ask that the royalty tax on this one dollar be taken off, as they cannot otherwise produce their coal without a loss.

Uniontown, Penn.

The Fayette County coal region continued to mark time during the past week, with but little change in the local situation over that of the preceding week. Approximately 500 additional coke ovens, widely scattered, were blown out in the region, and operation at plants still running averaged four days a week with additional employment given many workers at improvements and repairs being made at plants in order to put the operations into good shape for the prosperous run believed to be due in the immediate future.

The coal market continues to show signs of resuscitation. During the past two weeks there have been a number of inquiries concerning contracts, and the increased number in which these inquiries are being received is believed to be convincing proof that storage supplies have been depleted and that users will have to place orders immediately to keep their plants in operation. There is no storage supply in the region, and this means that when the contracts are signed work will be resumed immediately. Another encouraging development of the week was the receipt of some highly important inquiries from South American industrial concerns. A few cargoes of Fayette County coal have been shipped south during the past few months and there are indications now that some of the operators are to find a ready market in the South American field for their product.

Early stimulation of the coke industry is expected now following the announcement in Washington this week of agreement upon basic prices for steel commodities with basic pig iron at $25.75 a ton This indicates that the price of coke will be around $4.70 a ton if the ratio of 5.5 to 1, effective during the war between the price of pig iron and coke, is maintained. Operators generally throughout the region seem inclined to go along under the 5.5 to 1 ratio, but they point out that under present conditions they would be unable to supply coke at a profit at a price lower than $4.70. A number of contracts for the first quarter are about to expire and renewals were held up pending decision of the conference with the Industrial Board of the Department of Commerce and the iron and steel representatives, although in some instances arrangements were made to continue shipments on a month to month basis.

Announcement by Judge E. H. Gary, head of the iron and steel institute, that there was no intention at the present to interfere with the wage scales is reassuring to the region and the feeling of optimism which has been so manifest in the Fayette County field during the period of readjustment continues at high tide.

Charleston, W. Va.

The most encouraging development in West Virginia coal fields was the resumption of work at one or two large operations in the state on Mar. 17, after a suspension lasting over a considerable period. Otherwise conditions as a whole were unchanged in the mining industry of the state. There did not appear to be, during the second week of March, either any decrease in production or any appreciable increase, except in one district. That production is no longer on the toboggan was looked upon as being a favorable sign, but producers up until the last week or so had looked forward to a better market in the West, only to find after careful inquiry that little might be looked for in that respect for the time being.

The general resumption of coal traffic on the lakes is not expected as early this year as in years past. Naturally this will have an effect on other consuming areas, since the resumption of activity in the lake trade was considered reasonably certain of stimulating activity throughout the West. Since Western business has not been increased those districts whose products are usually consumed in that part of the country are working only about one-quarter of the time.

Generally speaking there is more activity in the East than in the West, if the direction of the bulk of the coal produced is to be taken as an index to conditions. However, the Pocahontas district has derived some business from Western sources, and it has helped to stimulate the production and sale of coal in that field to a considerable extent. Car shortages existing in several producing districts are attributed to the fact that the railroads have been under instructions to use only the larger capacity coal cars. This order, however, was rescinded on Mar. 16, at least as to some districts.

The export situation has proved to be discouraging to some West Virginia producers so far as vessels and rates are concerned.

Spokane, Wash.

"This year the coal mines of the Northwest will not operate 40 per cent. of the time, which means a heavy expense for the operators and a shortage of coal," states James S. Ramage, head of the Continental Fuel Co. and the Hawkeye Fuel Co.

For some time there has been serious over-production of coal in the Canadian and other districts from which Spokane and nearby cities receive their supply. About 80 per cent. of the steam coal used in this district comes from the mines of Canada, and a serious situation has developed in that country as evidenced by the recent report issued by the workingmen's compensation commission in the definite statement that cost of labor in producing coal is $2.60 a ton, which is above previous calculations and more than in other field with which Canadian mines compete.

It has been estimated from time to time in a general and unscientific manner that the labor cost of producing domestic coal was from $1.60 to $1.80 per ton. The coal industry in the province of Alberta is not on a very sound footing, and the outlook is far from reassuring. The reason for the high labor cost is that the industry is seasonal. The work is carried on not more than six months during the year and in some parts less. It seems that there are too many mines operating in the province. There are sufficient mines open and sufficient machinery to produce five times as much coal as will be mined this year. Last year 70 mines closed and 71 new ones were opened. The opening of new mines made the problem more difficult. With one-half of the mines in operation working a greater part of the season the situation would be much improved. It is difficult for the Government to prevent the opening of new mines, but unless something is done of that nature the coal industry of Canada will be in serious danger.

The state legislature effectively defeated the "coal bill" by forgetting it on second reading. The "coal bill" No. 204 provided that no municipal, county or state or other public office or institution should use other than Washington fuel. It was defeated when it first made its appearance but was resurrected the last week of the session for reconsideration.

Victoria, B. C.

"By bringing the coal-mining companies under the alternative of income tax or mineral tax, in common with other mining companies, we can hope for a revenue of $200,000 instead of the $160,000 estiated for the last year."

This statement was made by the Hon. John Hart, Minister of Finance in the British Columbia Government, when making his budget speech before the Provincial Legislature recently. It is of special interest to the coal operators of the Province as it intimates the policy on which the Government has determined relative to the taxation of the coal-mining industry. From the sense of the statement it is concluded that the report that a straight increase was to be made in the tax per ton of coal produced is without foundation.

In explanation it may be said that the tax the companies now pay is 10c. a ton. Returns of coal produced are made to the Government at regular intervals accompanied by taxation payments on the basis shown. Under the amendment which the budget speech of the Minister of Finance suggests, it is understood that this rate will stand, the companies paying as heretofore, but if at the end of the year it is found that tax on a company's income would realize more to the Treasury than has the 10c. a ton, the company will be required to pay the difference. In other words, the company will be taxed on whatever basis is found to bring in the greater amount to the public exchequer.

It must be understood that there is no definite assurance as yet that this is the Government's policy, because the bill amending the taxation act is not before the House up to the time of writing; but it is the only interpretation that can be placed on Mr. Hart's budget speech, and operators are satisfied that nothing further will be done this year. As far as can be gathered there is no particular objection to the proposal, though there would have been to any suggestion that the tax on the per-ton production be raised. The argument brought against such a move is that British Columbia coal to a large extent comes into competition with that of the Province of Alberta, and the coal of the latter Province is taxed only 5c. a ton.

PENNSYLVANIA

Anthracite

Minooka—The Carlton Coal Co. breaker was totally destroyed by fire on Mar. 19. The loss will exceed $50,000. The origin of the blaze still remains unknown. The structure was burned to the ground.

Pottsville—State Mine Inspector M. J. Brennan, of the nineteenth anthracite district, in his annual report to the state department of mines shows that last year influenza was far more deadly to mine workers than all the dangers of the mines. There were only 17 men killed in his district during 1918, but the Philadelphia &

Reading Coal and Iron Co., operating in the district, lost 118 men from the influenza. Pine Hill colliery lost 48, and Oak Hill 42. The Buck Run collieries lost 12 per cent. of its men from influenza and Darkwater colliery lost 14 per cent.

Scranton—Fire the night of Mar. 16 caused the destruction of the Minooka breaker of the Carlton Coal Co. It was one of the few electrically equipped breakers in this part of the anthracite field, and the loss is estimated at $50,000. Several hundred employees were thrown out of work. It is believed that crossed electric wires started the blaze.

Browndale—J. G. Westcott, of Endicott, N. Y., C. H. Truesdale and E. A. Wendell have purchased the Clinton Falls colliery. The purchase of the colliery includes a plot of ground containing 130 acres of coal land. The new owners are to take immediate possession. The machinery and the breaker on the tract have been leased to the company.

Jeddo—Returning to his home in New York, after an inspection of the G. B. Markle Co. properties, John Markle, president of the firm, announced that he will abandon his palatial summer residence and take out the rich beds of anthracite which underlie the premises, covering approximately 18 acres. The estate is one of the beauty spots of the Markle interests, and during the war was turned over to the miners and their families for the planting of gardens. The coal at this point forms one of the richest beds in the entire hard coal fields.

Reading—Engineers who completed an inspection of the Schuylkill Navigation Co. canal on Mar. 18 announced that there will be little or no coal boating on the stream between Port Clinton and Philadelphia next summer on account of the channel being filled with an unusual amount of coal dirt. The recent 7-ft. rise in the Schuylkill River, the largest of the winter, caused thousands of tons of coal dirt to be washed into the canal below Reading. It is explained that it would take an immense amount of dredging to clear the channel, and the navigation company does not seem inclined to go to the expense at this time.

Tamaqua—On Mar. 25 the Lehigh Coal and Navigation Co. put in operation its new No. 11 breaker in the Panther Creek. The breaker is of all-steel construction and is the finest and most modern in the southern anthracite fields. Heretofore it was necessary to send the product from the No. 11 workings to Hauto to be prepared for market, but the new structure will turn out the finished product ready for shipment, proving a great economy. The new breaker will have a capacity larger than the present supply calls for, as it is designed for future contingencies, when the output will be increased by the opening of additional workings.

BITUMINOUS

Canonsburg—A new tipple is to be erected at the Bridgeville mine, and a movement is on foot to organize a Boy Scout patrol.

Shenandoah—The Newly formed Raven Run Coal Co. has awarded a contract for a stripping at its colliery near here. A burning culm bank at this colliery has been successfully cut and the fire is under control.

Clymer—The Widdowson Coal Co. is constructing a new incline plane and storage bin just above its present tipple and will eliminate the long tram haul which it has had heretofore. The coal is loaded from the storage bin into the incline plane cars, which are of the large drop bottom monitor type car.

WEST VIRGINIA

MacCorkle—Under the direction of Samuel Butler, of Charleston, general manager, the Malleable Coal Co. is preparing to operate an additional mine which it is now opening at this place. The company is also erecting an up-to-date, well equipped tipple and intends to build two miles of standard-gage railroad.

Boomer—The No. 2 North mine of the Boomer Coal and Coke Co. broke all its previous records on Mar. 12 with an output of 1115 tons of coal. J. R. Huddy is the superintendent and C. E. Lilly the foreman. The company has been operating its mines on half time for a few weeks, but expects full-time operation in the near future.

Algonquin—The Algonquin Coal Co. has recently completed 20 new dwellings for the use of its employees.

Matoaka—The American Coal Co. has completed the tipple at the Piedmont mines, which will be used for dumping coal in cars provided by the Virginian R.R. The tipple tracks have not been laid as yet, having been held up on account of the war. It is expected the work will be commenced at once. When completed this mine will be able to load coal for shipment via both the New York & Western and Virginian railroads.

Matoaka—Representatives of the Consolidated Coal Co. were in this field looking over the properties of the American Coal Co. and subsidiary companies, with a view to purchasing. It is reported no agreement could be reached on price.

ILLINOIS

Niantic—Officers of the Niantic Coal Co. have under consideration the sinking of a shaft to a 7-ft. seam of coal which is believed to lie about 500 ft. beneath the surface. Coal is at present being mined from a 5-ft. seam at a depth of 365 feet.

Carlinville—Sixty-six men were employed the day the Berry mine operated. This is the first of the three new coal mines which the Standard Oil Co. is opening. More men will be taken on from time to time, and eventually 500 or more will be given work.

West Frankfort—It is said that many of the English and Italian miners in this vicinity are preparing to go back to Europe. The reasons assigned are the lack of work around the mines. Many of the Italian miners made such large wages during the war period that they can live at their ease in the villages of Italy for the rest of their lives.

Collinsville—At the Seventh subdistrict miners' convention here it was reported that there are now 65 coöperative stores in Illinois, organized by the miners. They are under the direction of the Central States Coöperative Society.

KENTUCKY

Whitesburg—The Wells-Elkhorn Coal Co., Beaver Creek, Ky., has purchased the plants and business of the Elkhorn-Black Diamond Coal Co. and the Salt Lick Coal Co., and has acquired additional holdings also—making this one of the largest in the new field. The capital of the company has been largely increased and some large extensions are planned for the immediate future.

Sergent—The Whitley Elkhorn Coal Co. has completed the installation of its power equipment, and plans some extensions and increases at once. Adam Q. Ramey is the electrical engineer.

Personals

H. A. Anderson has been promoted to the position of mine foreman for the Algonquin Coal Co., Algonquin, W. Va.

J. J. Maloney has been employed as a sales representative for the Goodman Manufacturing Co., of Pittsburgh, Penn., in the central Pennsylvania field.

Tom Cunningham has been engaged as mine foreman for the Pawama Coal and Coke Co., Matoaka, W. Va., vice **J. W. Shewsbury**, who has resigned to engage in other work at Roanoke, Va.

Joseph A. Graft, civil and mining engineer, has opened an office at 507 First National Bank Building, Connellsville, Penn. Mr. Graft until recently was superintendent of the Elkhorn Piney Mining Co., at Riley, W. Va.

F. W. Nay, well known among Kentucky coal operators of Clarksburg, W. Va., where for years he was connected with the Elkhorn Coal Corporation, has been transferred to Wayland, Ky., in the right Beaver Creek field of Kentucky.

G. M. Mathews, formerly manager of the Amburgy Coal Co., Smoot Creek, Ky., has accepted a position as superintendent of the Elkhorn Coal Corporation, Garrett, Ky., in the Beaver Creek field of Kentucky. He has entered upon his duties.

Roy Shirley, formerly coal inspector for the United States Fuel Administration in central Pennsylvania, has accepted a position with the Hulburt Oil and Grease Co., Inc., of Philadelphia. Mr. Shirley will make his headquarters in Punxsutawney, Penn.

Capt. A. C. Nell, construction division, United States Army, who for the period of the war has been in charge of the purchase of power and mechanical equipment in the construction division, has been released from active duty in the army and has been appointed Chicago district manager for the Lea-Courtenay Co. and the Schutte & Koerting Co. Mr. Nell was formerly connected with the Allis-Chalmers Manufacturing Co. The Chicago offices are at 1466 Conway Bldg.

Obituary

E. W. Bates, who has held the controlling interest in the Latham Mining Co., Lincoln, Ill., died Mar. 15 at Miami, Fla.

O. D. Maxwell, assistant superintendent of mines at Glace Bay, N. S., died Mar. 17 from heart failure. He was 50 years of age and had been an official of the coal company for 18 years.

Charles J. Wittenberg, president of the Wittenberg Coal Co., of New York City, died Wednesday, Mar. 19, in his fifty-fourth year. He was also president of the Newport News Docks and Coal Corporation, the Pocahontas and New River Coal Co., the Victoria Coal Mining Co., and the Virginia and Tidewater Coal Co.

John Patterson, mine foreman of the Klondike mine at Lilly, Penn., was killed recently when an unloaded mine car broke loose from a trip and ran down a grade, catching Mr. Patterson between the runaway car and a standing loaded car. He was fatally crushed and died on his way to the hospital. He was aged 50, and leaves a family.

John R. Williams, member of the once prominent bituminous company of Frank Williams & Co., now for some years out of business, died at his home in Buffalo on Mar. 18, at the age of 64 years. Since the dissolution of the company he had continued business in his own name, though quite out of health for some time. He was single. Three brothers, not in the coal business, and two sisters survive.

Coming Meetings

Illinois Mining Institute will hold its annual meeting May 22, 23 and 24. Secretary, Martin Bolt, Springfield, Ill.

National Coal Association will meet May 21, 22 and 23, at Congress Hotel, Chicago, Ill. Secretary, J. D. A. Morrow, Washington, D. C.

International Railway Fuel Association will hold its annual meeting May 19-22 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

Indiana Retail Coal Merchants' Association will hold its annual spring meeting Apr. 23 and 24 at Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Canadian Retail Coal Association will hold its fifteenth annual convention Apr. 2 and 3 at the King Edward Hotel, Toronto, Canada. Secretary, B. A. Caspell, Brantford, Canada.

Recent Coal and Coke Patents

Ash Sifter. W. J. Kennedy, Binghamton, N. Y., 1,289,187. Dec. 31, 1918. Filed Oct. 28, 1916. Serial No. 128,352.

Furnace Arch. W. D. Ranney, Columbus, Ohio, 1,289,262. Dec. 31, 1918. Filed Jan. 29, 1918. Serial No. 214,323.

Coal Bag. H. Josephson, Bridgeport, Conn., 1,291,539. Jan. 14, 1919. Filed Mar. 6, 1918. Serial No. 220,727.

Coal Car Cover. D. M. Grear, Chicago, Ill., 1,291,481. Jan. 14, 1919. Filed Aug. 8, 1918. Serial No. 248,929.

Ash Sifter. F. W. Seeman, Detroit, Mich., 1,291,190. Jan. 14, 1919. Filed Nov. 18, 1915. Serial No. 62,094.

Mine Car Wheel and Axle. T. A. Parker, Brazil, Ind., 1,289,249. Dec. 31, 1918. Filed Apr. 30, 1918. Serial No. 231,638.

Smoke Washer. G. W. Glassford, Cleveland, Ohio, 1,289,439. Dec. 31, 1918. Filed June 2, 1917. Serial No. 172,514.

Smoke Washer. R. J. Johnson, Lake Benton, Minn., 1,289,797. Dec. 31, 1918. Filed Mar. 1, 1918. Serial No. 219,929.

Ash-Sifting Apparatus. C. M. Drinkwater, Kokomo, Ind., 1,290,725. Jan. 7, 1919. Filed Dec. 20, 1917. Serial No. 208,047.

Coke Oven. R. S. Moss, Chicago, Ill., and A. Roberts, Evanston, Ill., 1,289,870. Dec. 31, 1918. Filed Jan. 7, 1914. Serial No. 810,809.

Apparatus for Cleaning Coal. H. R. Conklin, Joplin, Mo., 1,290,515. Jan. 7, 1919. Filed Dec. 27, 1917. Serial No. 209,101.

Attaching Device for Miner's Cap Lamp. J. M. Brock, Brooklyn, N. Y., 1,289,631. Dec. 31, 1918. Filed June 19,1918. Serial No. 240,870.

Mining Machine. N. D. Levin, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,290,022. Dec. 31, 1918. Filed Aug. 7, 1913. Serial No. 783,564.

Coal Mining Machine. N. D. Levin, assignor to Jeffrey Manufacturing Company, Columbus, Ohio, 1,290,593. Jan. 7, 1919. Filed Jan. 5, 1917. Serial No. 140,750.

Coal-Loading Shovel. W. Ferris, S. Bager and M. L. Fykse, assignors to Bucyrus Co., S. Milwaukee, Wis., 1,289,426. Dec. 31, 1918. Filed Apr. 28, 1917. Serial No. 165,215.

Publications Received

Methods of Shutting off Water in Oil and Gas Wells. By F. B. Tough. Bulletin 163, Petroleum Technology 46. Illustrated, 122 pp., 5¾ x 9 inches.

Biennial Report of the State of Nevada State Inspector of Mines, 1917-1918. A. J. Stinson, State Mine Inspector. Unillustrated, 97 pp., 6 x 9 inches.

Twentieth Annual Report of the Mining Industry of Idaho for the year 1918. Robert N. Bell, State Mine Inspector. Illustrated; pp. 133; 6 x 9 inches.

Abstracts of Current Decisions on Mines and Mining Reported from May to September, 1918. By J. W. Thompson, Department of the Interior, Bureau of Mines. Unillustrated, 138 pp., 6 x 9 inches.

Mines Producing Low-Sulphur Coal in the Central District. By Gilbert H. Cady. State of Illinois Department of Registration and Education, Division of the State Geological Survey. Cooperative Mining Series, Bulletin 23. Unillustrated, pp. 14, 6 x 9 inches.

The Quigley Powdered Fuel System. Quigley Furnace Specialties Co., Inc., New York, N. Y. Bulletin No. 11. Pp. 16, 8 x 11 in., illustrated. A system for preparing, transporting and burning powdered coal, lignite and peat that is the result of twenty years specializing in selection and application of fuels, and in furnace design, construction and operation.

Water-Gas Operating Methods with Central District Bituminous Coals as Generator Fuel. A Summary of Experiments on a Commercial Scale: a Preliminary Report. By W. A. Dunkley, State Geological Survey Division and W. W. Odell, U. S. Bureau of Mines. State of Illinois Department of Registration and Education, Division of the State Geological Survey. Cooperative Mining Series. Bulletin 24. Unillustrated, pp. 28, 6 x 9 inches.

Trade Catalogs

Leyner Oil Furnace No. 3. Ingersoll-Rand Co., New York, N. Y. Form No. 9120. Pp. 4, 6 x 9 in., illustrated. Catalog describing furnace used for heating drill steel.

United Hoists. United Iron Works Co., Kansas City, Mo. Catalog H-19. Pp. 76, 10¼ x 6¾ in., illustrated. Specifications of belt-driven, steam-driven electric-driven and horse and hand operated hoists.

Specifications of the Mancha Storage Battery Locomotive. Mancha Storage Battery Locomotive Co., St. Louis, Mo. Catalog. Pp. 4, 9 x 11 in., illustrated. Describes in detail the company's well-known types of haulage locomotives.

Fairmont Steel Tie. Fairmont Mining Machinery Co., Fairmont, W. Va. Pamphlet. Pp. 4, 6 x 9 in., illustrated. Gives the construction details of a steel mine tie that is being used in every coal-producing state in the Union.

Sullivan Small, Belt Driven Air Compressors.—Sullivan Machinery Co., Chicago, Ill. Bulletin 75-G. Pp. 12, 6x9 in., illustrated. Compressors described range from 50 to 470 cu. ft. in capacity. Simplicity, compactness, power, economy, a minimum of care and attention are claimed.

High-Tension Outdoor Universal "Unit Type" Bus Bar and Wiring Supports. Delta Star Electric Co., Chicago, Ill. Bulletin No. 34. Pp. 48, 8 x 10½ in., illustrated. Gives the design, adjustable features, prices and other details of bus bar and wiring supports for outdoor substations.

"Howells" Non-Corrosive Center Spads. Howells Mining Drill Co., Plymouth, Penn. Booklet. Pp. 6, 3⅝ x 5⅝ in., illustrated. Descriptive of mining engineer and surveyor's center spads made of copper, brass and galvanized sheet steel. Two pages are devoted to one of the Howells heavy geared post drill.

Perforated Metals. Hendrick Manufacturing Co., Carbondale, Penn. Catalog. Pp. 128, 6¼ x 9¼ in., illustrated. A beautifully printed book descriptive of this manufacturer's product, which includes perforated metals, elevator buckets (plain and perforated), conveyor trough and flights, stacks, tanks, hoppers, elevator casings and light structural steel work.

Automatic Reclosing Circuit Breakers. Automatic Reclosing Circuit Breaker Co., Columbus, Ohio. Bulletin No. 301. Pp. 4, 8½ x 11 in., illustrated. Describes the company's new type ARL, DRL and CRL breakers. These are automatic in operation and are governed by an index which responds only when load conditions are proper. The index is adjustable to suit any load condition.

No. 7 Deister-Overstrom Diagonal Deck Coal Washing Table. Deister Concentrator Co., Fort Wayne, Ind. Bulletin No. 2. Pp. 4, 9½ x 11½ in., illustrated. Among the advantages claimed for this process of washing bituminous coal are: Removes sulphur, reduces loss of combustible in ash, increases heating value, increases boiler efficiency, decreases transportation difficulties, makes marketable product from low-grade coal or screenings.

Catalog No. 17. Ohio Brass Co., Mansfield, Ohio. Pp. 671, 6¼ x 9¼ in., illustrated. A comprehensive publication, carefully indexed and divided into department classifications for ready reference. Should be on the desk of any purchasing agent interested in appliances used in mine haulage systems and transmission lines. Among the specialties listed are high tension porcelain insulators, overhead materials, rail bonds and car equipment.

Industrial News

Ashland, Ky.—The Lackey Mining Co. has increased its capital stock from $12,000 to $25,000.

Mossy Bottom, Ky.—The Kentucky Block Fuel Co. has increased its capital stock from $100,000 to $200,000.

Akron, Ohio—The authorized capital of the Akron-Virginia Coal Co. has been increased from $10,000 to $250,000.

Ashland, Ky.—The Sandy & Guyan Coal Co., capital $20,000, has been incorporated by H. C. Rogers, V. I. Jones, O. D. Jones, and others.

Indianapolis, Ind.—The J. R. Morris Coal Co. has filed notice of an increase in its capitalization from $30,000 to $60,000, to provide for expansion.

Richmond, Ky.—The Savage-Smith Lumber and Coal Co., Richmond, capital $20,000, has been incorporated by Earl Savage, William Smith and D. C. Field.

Cincinnati, Ohio—The Kellicka Coal Co. has been chartered with a capital of $100,000 by Edward F. Peters, Frank E. Burnett, S. Geismar, S. R. Ducker and J. G. De Fossett.

Scranton, Penn.—The Echo Coal Co. has been incorporated with a capital of $50,000 to engage in general coal-mining operations. E. A. Gallagher is the principal incorporator.

Ebensburg, Penn.—The Cambria Fuel Co. has been incorporated with a capital of $100,000 to operate in the Ebensburg district. A. W. Evans and associates are the incorporators.

Cleveland, Ohio—The Lake and Rail Coal Co. has been chartered with a capital of $10,000 by Edwin Robbins Smead, Marie O. Smead, Alice I. Lane, Rudolph Krause and Henry Grund.

Sullivan, Ind.—The Black Comet Coal Mining Co. has filed notice with the Secretary of State of an increase in its capitalization from $100,000 to $135,000, to provide for expansion.

Lock Haven, Penn.—The Lock Haven Mining Co. has filed articles of incorporation with a capital of $100,000, to operate in the Lock Haven section. C. F. Kreamer is the principal incorporator.

Knoxville, Tenn.—The Calvin Holmes Coal Co., has recently filed notice with the Secretary of State of an increase in its capitalization from $100,000 to $150,000, to provide for general business expansion.

Morgantown, W. Va.—The Adams Coal Co. has filed articles of incorporation with a capital of $25,000 to engage in coal-mining operations in the Morgantown district. John A. Adams is the principal incorporator.

Ashland, Ky.—The Sandy & Guyan Coal Co. has been incorporated with a capital of $20,000 to engage in general coal-mining operations in the Ashland section. V. I. and O. D. Jones and H. C. Rogers are the incorporators.

Cincinnati, Ohio—The Kellicka Coal Co. has been organized by local financial interests, with a capital stock of $100,000, being a reorganization of the old Kellicka Coal Mining and Sales Co., operating in Harlan County, Kentucky. L. E. Armen-

Lexington, Ky.—The Vesper Coal Mining Co. has opened offices in Dallas, Texas, with J. K. Bowering as agent in charge of their Texas business. This company owns leases on a large area of west Texas coal lands which it is planned to develop at an early date.

Petros, Tenn.—The State Board of Control, Nashville, John S. Denton, chairman, is arranging plans for the immediate reconstruction of the tipple at its Brushy Mountain coal-mining properties recently destroyed by fire with loss estimated at $10,000.

Pittsburgh, Penn.—The Consumers' Fuel Co. has contracted with the Roberts & Schaefer Co., of Chicago, for the installation of a picking table in connection with its tipple at the Eureka mine. The new equipment will be installed within the next sixty days.

San Angelo, Tex.—The West Texas Coal Mining and Developing Co. is arranging plans for the early development of approximately 585 acres of coal properties. Mining machinery for all details of production will be installed. J. W. Powell, Ballinger, Tex., is president.

Jellico, Tenn.—The Italian Coal Co., recently incorporated with a capital of $50,000 to operate in the Jellico district, has arranged plans for the development of a tract of about 5000 acres of coal properties. It is understood that work will be inaugurated at an early date.

Evansville, Ind.—The Evansville Atomized Fuel Co. has been incorporated with a capital of $250,000 to manufacture atomized fuel in Vanderburg County. Fred Amann, John J. Tuite, William E. Tuite, Thomas Lavelle and Norman Patrick, Indianapolis, are the incorporators.

Jellico, Tenn.—The Italian Coal Co., recently incorporated with a capital of $50,000, has plans for development of 5000 acres of coal land, but has not completed plans relative to production and time for starting development. C. O. Baird, E. S. Miller and Z. D. Baird are the principals.

Whitesburg, Ky.—The Wells-Elkhorn Coal Co. has increased its capital stock from $75,000 to $300,000, after leasing about 1500 acres of coal land in the Jack's Creek section. The company has its office at Left Beaver Creek. A new town will probably be built at the site of the proposed mine.

Whiteside, Tenn.—The New Etna Coal and Lumber Co. has been organized by J. C. Higdon, president; Van Eastland, secretary, and others, to develop a 200-ton daily production. The company will also handle lumber, ties and forest products. Company is capitalized at $30,000 and has equipped mines.

Phoenix, Ariz.—The Olmos Coal Mining Co. of Phoenix, Ariz., has been granted a permit to do business in Texas, employing a capital stock of $400,000. Texas headquarters will be maintained at Eagle Pass, and the company will develop extensive holdings of coal lands in the border country of Texas.

Whiteside, Tenn.—The New Etna Coal and Lumber Co., recently incorporated with a capital of $30,000, has perfected its organization and is arranging plans for the development of local properties, to have a daily capacity of about 200 tons for initial operations. J. C. Higdon is president, V. Eastland is secretary.

Whitesburg, Ky.—The Wells-Elkhorn Coal Co., a new corporation at Left Beaver Creek, north of Whitesburg, has increased its capital from $75,000 to $30,000, after leasing 1500 acres of coal lands in the Jack's Creek section. The company plans big developments and a new mining town when conditions are right.

Washington, D. C.—In a tentative decision rendered by the attorney examiner of the Interstate Commerce Commission, joint rates on coal from Illinois and Indiana mines, allowing a charge to St. Louis of 20c. higher than that to East St. Louis, due to river transportation across the Mississippi River, have been upheld.

Gadsden, Ala.—The Blount Mountain Coal and Iron Co. has filed articles of incorporation, capital stock being named as $2000. J. J. Burns, of Chicago, is president of the company and D. E. Mitchell, of Gadsden, is the local agent of the corporation. It is understood that the company has about 30,000 acres of coal land under option.

Dayton, Ohio—The Robert H. Ball Coal Co., recently chartered with a capital of $150,000, will soon start development of a large area in the Hazard field of Kentucky. It is also announced by Robert Ball, president, that the concern will build a large coal elevator in its retail yard in the east side of Dayton at a cost of approximately $20,000.

Scranton, Penn.—H. McKean Conner, consulting mining engineer, has received the drawings for a complete coal mining plant to be built in South Brazil, the expected output to be 1000 tons in eight hours. The shaft is 131 meters deep. The equipment, which has all been bought in the United States, is up to date in every particular.

Radford, Va.—The Belle Hampton Coal Co., recently incorporated, has completed negotiations for the purchase of the Belle Hampton coal properties, and it is understood that plans are now in process of formation for the commencement of development at an early date. It is said that the plans include the construction of necessary railroad facilities.

Chicago, Ill.—The first concrete coal car ever constructed was recently delivered to the Illinois Central R. R. for operation in the company's coal service. The patentee and designer is Joseph B. Strauss, civil engineer and president of the Strauss Bascule Bridge Co. The car has a capacity of 100,000 lb. and was built by the Conway Co., a Chicago concern.

Columbus, Ohio—The Flint Coal Co. has been chartered with a capital of $40,000 to operate a coal mine near McArthur. The mine has been opened and is loading some coal. It is planned to increase the output. William Dauch, of Delphos, Ohio, is president; W. C. Fridley, Lima, vice president, and L. F. Bertram, Columbus, secretary, treasurer and general manager.

Chicago, Ill.—The W. A. Jones Foundry and Machine Co., manufacturer of a complete line of power transmission apparatus, special foundry and machine work and also the Jones spur gear speed Reducer, has opened an eastern office at 30 Church St., New York, under the direction of Lemuel C. Biglow, who formerly for a number of years held a similar position with the Morse Chain Co., of Ithaca, N. Y.

New York, N. Y.—The St. George Coal Co. is the name of a new corporation with offices in the Singer Building, 149 Broadway, this city. G. B. St. George is the president and L. V. Bermingham is vice-president. Mr. Bermingham was formerly a salesman for Whitney & Kemmerer. This company will handle Philadelphia & Reading; Delaware, Lackawanna & Western and Lehigh Valley Coal Co.'s coals.

Clarksburg, W. Va.—One of the new and larger corporations of the state organized within the last few days insofar as securing a charter was concerned, is the Orr Coal Co., with a capital of $100,000, the company being interested in the operation of several large plants in northern West Virginia. Leading figures in the new company are Harry W. Sheets, J. W. Agnew, C. S. Elliott, C. E. Prunty and J. W. Booth, all of Clarksburg.

Chicago, Ill.—The Sullivan Machinery Co. announces the appointment of Chester Mott as manager of its branch office at Denver, Colo., 837 Equitable Building, succeeding Wallace T. Roberts, recently resigned. Mr. Mott has been associated with the company for several years past in the capacity of sales engineer at its Spokane, Wash., office and more recently at its Chicago office in charge of the company's interests in Iowa, Northern Illinois and Minnesota.

Dallas, Tex.—The Garrison Coal and Oil Co. is being organized here for the purpose of developing a tract of 500 acres of land underlaid with lignite. This tract of land is near Garrison, Texas, and is also considered as promising for oil development. The company is capitalized at $500,000 and the officers are: Sterling P. Strong, of Dallas, president; T. R. McLean, of Mount Pleasant; L. E. Birdsong, of Greenville; J. R. Slay, of Frost; R. W. Caraway, of Logansport, La.; and W. Y. Garrison, of Garrison, directors.

Benton, Ill.—The Dodds Coal Co., with a paid-up capital of $25,000, has been incorporated by the Illinois secretary of state. It has its principal office at Carrier Mills, Saline County, Illinois. The company has secured a large tract of land just southeast of Carrier Mills for prospecting. The Big Four R.R. has a switch leading to the mine. The vein of coal is said to be large and the quality unsurpassed. Coal has been lifted during the past few months from the air shaft, but the main shaft is to be completed within a few weeks.

Charleston, W. Va.—Under the terms of a bill introduced in the Senate of the West Virginia legislature, now in extraordinary session, by Senator E. H. Morton, of Webster Springs, no company, firm or person shall operate a mine after June 1, 1919, unless a license shall have first been secured; and to secure such a license application would have to be made to the auditor of the state, together with a written statement swearing to the production of each mine of the applicant.

Charleston, W. Va.—In all 33 lives were lost during the month of February in West Virginia mines, 21 fatalities alone being due to falls of coal, slate, roof, etc. The next largest number of casualties—seven—was due to mine-car accidents. Only two deaths were caused by motor accidents. The only other fatality within the mines was caused by an electrical shock. There were, however, two deaths on the outside of the mines, one due to electricity and the other resulting from a motor-car accident. Of th total number of 33 fatalities, 11 were in McDowell County.

Columbus, Ohio—President Henry A. Williams and Secretary James T. Daniels, of the Columbus Chamber of Commerce, have suggested a central route for the proposed barge canal to connect the Ohio River with Lake Erie. In the authority secured from Congress for a survey the route from Cincinnati to Toledo by way of the Miami canal is expressly mentioned, but authority is given for the survey of "other practicable routes." Now it is proposed to have the route from Columbus to Sandusky via the Scioto River to Marion and the Sandusky River from Upper Sandusky to Sandusky surveyed also.

Danville, Ill.—The Illinois Traction System has been ordered by the Council of Danville, Ill., to cease hauling coal through the streets between the hours of 6 a.m. and midnight. During the period of the war the demand for coal became so urgent and the difficulties of transportation so great that the Councils of Danville, Champaign, Urbana and other cities modified their pre-war ruling that no interurban trains of coal could be moved through the streets between the hours of 6 a.m. and midnight. The Danville Council now demands that coal cars be transported through the streets of the city only during the latter part of the night, that is from midnight to 6 a.m.

Gary, Ind.—About 5000 tons of coal, originally purchased by the Aetna Explosive Works for the purpose of making munitions, have been purchased by the Gary board of education. James F. Cullerton, purchasing agent of the school system, bought the coal through the Empire Trust Co., receivers for the Aetna company. The coal was the property of the French Government, which made its purchases through the Aetna company. Mr. Cullerton purchased 2000 tons at $1 a ton and learning that 3000 tons were still in the bunkers, telegraphed an offer and it was immediately accepted. Mr. Cullerton made a large saving for the board of education, the supply of coal being enough to last the Gary schools one year.

Louisville, Ky.—Further warnings on the part of western Kentucky mine workers to some of the operators who are cutting coal prices, or who are threatening to make reductions, have been sent out by unions representing the men. Serious conditions are said to be impending unless the workers are heeded. The latest ultimatum is from District Union No. 23, United Mine Workers of America, with headquarters in Kentucky and is addressed to western Kentucky operators in general. The miners claim that the only meaning of reduced prices is reduced wages. The ultimatum recites that the coal miners need more than a mere living, in fact a profit on their work, and emphasizes the fact that the coal miner has done a large part in the industrial background of the recent world war.

Baltimore, Md.—The annual meeting of stockholders of the Consolidation Coal Co. held here recently brought with it the retirement from its presidency of Jere M. Wheelwright, who will, however, take up the work incident to the post of chairman of the board of directors. Former Senator Clarence Watson, who has been chairman of the board, became president of the company. New vice-presidents named are Sprigg D. Camden, of Parkersburg, W. Va.; F. W. Wilshire, of New York; and E. M. Mancourt, of Detroit. Arthur Hale was reëlected vice president. George T. Watson and Fairfax S. Landstreet are named as assistants to the president. New directors on the board are Gen. Carl R. Gray, Brooks Fleming, Jr., and George T. Watson. The net tonnage of the Consolidation mines in 1918 was 8,053,010, as against 9,533,543 tons the year previous. The net earnings of $26,148,895 showed only a decrease of $35,691, but the net earnings of $7,155,169, because of labor and other operating increases in cost, showed a falling off of $4,181,791.

St. Louis, Mo.—Following the submission of a tentative report to the Interstate Commerce Commission by Commissioner Mackley upholding the Terminal Railway Association's bridge arbitrary of 20c. a ton on coal, bills have been introduced in the Legislature authorizing the city to create and operate its own terminals. It is planned to establish such terminals in competition with the Terminal Railway Association if the Interstate Commerce Commission upholds Mackley's report. It is the intention to use the municipal free bridge, city terminal property and the Manufacturers' Ry. It is also contemplated to appeal the case to the Federal Court, if the decision of the Commission is adverse to the city. The appeal will be in the form of contempt proceedings against the railroads in the Terminal combine to compel them to show cause why they treat the Terminal as a separate road and allow it a separate rate for carrying coal and other freight across the river to St. Louis and performing a delivery function which the roads themselves should perform.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Labor's Attitude When Peace Is Signed Now Chief Topic of Discussion—Now Is Best Time to Purchase Fuel—Consumer Shares Blame in Present Coal Situation—Anthracite Industry Dull—Contract Inquiry Brisk

UPPERMOST in the minds of the thinking element in the bituminous coal industry is the question of what turn events will take when the present wage agreement expires, which will be when the treaty of peace is signed. To say that the mine workers are restive is to put it mildly. The men are dissatisfied with their present earnings and with their hours of work, and have already gone on record as demanding a six-hour workday for only five days a week and an increase in the daily rate. This would net them more return for the reduced working time than they receive for a full 48-hour week under the present agreement.

These demands, in the main, are the result of the reduced working time at the mines, though one cannot overlook the fact that they are also a reflex of the attitude now being taken by British mine labor. The tremendous cut in coal consumption in this country immediately following the signing of the armistice led to the shutting down of a large number of operations and the curtailment of working time at many others. The story has been told so often that it has become almost a platitude.

What the large consumer of coal does not realize, however—and what he will be the first to deny—is that he himself cannot escape blame for the present situation. He kept out of the market for so long a period that his disinterestedness has shaped itself into a boomerang that has turned the corner and will shortly strike him in his most vulnerable spot—his pocketbook. For, if the miners' demands are satisfied, it will mean an increase of more than 60 per cent. in the earnings of mine workers who are paid by the day. Other classes of labor will doubtless want increases, and all in all the cost of producing bituminous coal will be much higher. This certainly is pathetic, as the chief reason that prompted most consumers to hold off in their buying was that prices must certainly come down.

Once the situation is viewed in its true light, apathetic purchasing agents will awaken to the fact that the time to buy coal and make contracts for their future requirements is right now. The Federal Fuel Administration has already seen the handwriting on the wall, and is urging consumers to buy soft coal early. This is not another unfounded cry of "Wolf! Wolf!" but is based on the production figures of weekly coal output. During the week ended Mar. 31 the output of bituminous coal was 8,065,000 net tons. At this rate the production at the end of the present coal year will not exceed that of the previous coal year by more than 8,000,000 net tons.

The anthracite situation is exceedingly dull. What the labor attitude will be when peace is signed it is hard to foretell, as the workers in the hard-coal region have a contract that does not expire until 1920. However, we have heard references made somewhere to "scraps of paper." Agreements and treaties in these momentous days seem to carry with them no particular significance.

A reduction recently made in the price of rice and barley may help to stimulate interest in these two steam sizes of anthracite. Dealers are not stocking up to any extent, believing that it would be wiser instead to dispose of the stocks on hand. Production is picking up somewhat, the output of hard coal during the week ended Mar. 15 being estimated at 1,206,000 net tons. The total production for the coal year to Mar. 15 is 89,317,000 net tons, as compared with 95,370,000 net tons during the same period of the previous year.

Contract activity in the bituminous industry is brisk, though operators are loath to bind themselves at this time as they do not know what the labor situation will be two months from now. Prices are being maintained, the better grade coals finding ready takers at former Government figures. Low-grade coals are hard to move. Conditions in the bituminous trade are improving, though many operations are still working short time due to "no market."

WEEKLY COAL PRODUCTION

The production of bituminous coal during the past few weeks has varied but very little, and the current week's output, estimated at 8,065,000 net tons, is no doubt a fair barometer of bituminous coal demand. As during recent weeks, the current week's output fell approximately 3,000,000 net tons below the production for the same week of 1918, bringing the excess in the output for the coal year to date over the same period of last year down to 13,670,000 net tons, and it is estimated that the close of the coal year on Mar. 31 will find the excess at not more than 8,000,000 net tons, and the actual output at approximately 558,000,000 net tons for the year. The daily average per working day during the week ended Mar. 15 is estimated at 1,344,000 net tons, as against 1,806,000 net tons for this coal year to date, and 1,760,000 net tons for that period of the 1918 coal year ending with Mar. 16.

Production of anthracite in the United States during the week ended Mar. 15, estimated at 1,206,000 net tons, was approximately 20 per cent. in excess of production during the week ended Mar. 8, estimated at 989,000 net tons. Compared with the production during the week ended Mar. 16, 1918, when the output was 2,099,000 net tons, the current week's production was exceedingly low. The daily average per working day during the week ended Mar. 15, is estimated at 201,000 net tons, as against 298,000 net tons for the coal year to date, and 318,000 net tons for the same period ended Mar. 16, 1918. Total production for the period Apr. 1, 1918, to Mar. 15, 1919, is estimated at 89,317,000 net tons, as compared with 95,370,000 net tons during the same period of last year.

Carriers' reports for the week ended Mar. 15 show but few changes in loading in the various fields, compared with the week to Mar. 8. Slight decreases occurred in Pennsylvania, Tennessee and Kentucky, and in the central states, while slight improvement was reported in all other fields. For the calendar year to date, loading in all the fields is considerably behind that of last year.

The mines of the country have been operated during the past four weeks at approximately 50 per cent. of their full time, with time losses due to labor and car shortage, mine disability and lack of market, fluctuating but very little from week to week. The real limiting factor is, of course, lack of demand, and unless the "buy early" campaign, inaugurated by the United States Fuel Administration during the past week, is taken seriously by the consumers of the country, very little improvement may be expected in the full-time operation of the mines until the stocks accumulated last summer and fall are more generally used up.

Tidewater shipments to New England during the week ended Mar. 15, are estimated at 57,710 net tons, and are 48.2 per cent. behind shipments during the week of Mar. 8. No tonnage was loaded at Baltimore for New England, while the tonnage loaded at New York and Philadelphia, amounting to 34,156 tons, fell 47 per cent. behind the loading of the week preceding, and Hampton Roads tonnage of 53,554 net tons fell 49 per cent. behind. Rail shipments during the week to New England were not reported.

Shipments of bituminous coal from North Atlantic ports and Hampton Roads to all points, during the week ended Mar. 15, are estimated at 321,064 net tons, and are 29.4 per cent. behind shipments during the week preceding. Baltimore, with a loading of 35,069 net tons, was the lone harbor to report improvements, the current week's shipments exceeding that of the preceding week by 57.7 per cent. Shipments from New York and Philadelphia during the week of Mar. 15, fell 48.1 per cent., and from Hampton Roads 19.4 per cent.

Beehive-coke production in the United States during the week ended Mar. 15 is estimated at 429,446 net tons, as against 441,031 net tons during the week of Mar. 8, and 604,516 net tons during the corresponding week of last year. The daily average per working day during the current week is estimated at 71,574 net tons.

and while slightly in excess of the daily average for the calendar year to date, estimated at 70,402 net tons, is considerably below the daily average for the same period of 1918, estimated at 79,312 net tons. Production during the current week in Pennsylvania, Virginia, Kentucky and the far west states fell below that of the week of Mar. 8, while considerable improvement occurred in West Virginia, Alabama, Tennessee and Georgia. Compared with the week of Mar. 15, 1918, the current week's production in all states is exceedingly low.

BUSINESS OPINIONS

Bradstreet's—Trade and industrial developments of the week have been many and varied, these including a further expansion in spring trade at most markets, especially in dry goods and wearing apparel, hitherto inclined to lag a trifle behind other lines; a speeding up of industrial operations where readjustments have been completed and new demand has appeared; a glowing series of reports as to early crop and soil conditions in surplus crop regions; a rather sharp advance in many food products, with a consequent advance in the general level of necessaries; excellent returns as to general export trade for February, and enlarged shipments of wheat to Europe.

Marshall Field & Co.—Current wholesale distribution of drygoods is running considerably less than for the same week of 1918. Road sales for both immediate and future delivery also were much less than the high figures of a year ago, although first fall orders for lines which have just been opened are larger in comparison with those of last year. More customers were in the market. Collections continue satisfactory.

Dry Goods Economist—In the great agricultural region west of Chicago retailers are doing a large business. Naturally, in the industrial centers where there has been cessation of Government work, or labor unrest, retailing has been on a somewhat less free scale. Such conditions, however, are the exception. For Southern retailers there has been encouragement in the renewed upward movement of cotton.

American Wool and Cotton Reporter—The feeling in the wool market is improving generally. Demand is, however, a little spotty. Some days the demand is marked and some days it is not so pronounced. China wools are of interest for woolen purposes, and fine wools are also in demand. There is some talk of the United States Government following the ideas of the British government in reducing the price levels. Dealers are naturally laying their plans for purchases of the next clip, and they do not want to make them at the present level, if the Government is going to reduce prices. Tendencies in the cotton market are bullish. Predictions are made in many quarters that raw cotton will sell at materially higher prices before a new crop is marketed.

The Iron Age—Among the leading producers of steel there has been no change in the feeling that price reductions at this time will not produce the desired revival in buying. Reductions in copper, more drastic than have been proposed in steel, have not stimulated demand, it is argued; and the spelter market, with the price below the cost of well-equipped producers, has no semblance of life. The amount of steel bridge and building work put under contract in February was practically no greater than that in January. The total of the two months is 44,000 tons out of a year's capacity of 2,160,000 tons. In the winter of 1914-1915, before the war demand from Europe set in and when the fabricated steel business saw the lowest demand for years, the January-February total was about 95,000 tons, more than twice this year's.

Atlantic Seaboard

BOSTON

Another pause in buying. Many contracts made for small tonnages. No comprehensive buying as yet. Quotations firm. Few consumers can take April or May coal. Diffident about contracting. Wide range in price continues. Hampton Roads freights approach stable figure. June is the earliest date set for buying Southern coals. Distress offerings at New York piers. Anthracite quiet. Railroad-owned barges tied up generally. Effort made to induce retail buying, but demand extremely light. Steam sizes in short supply.

Bituminous—For the first time since the market began to improve a month or so ago there is now an interval of very few purchases. It is not due to any slackening in interest, nor can it be regarded in any sense as a sign of weakness; it simply means that those who were ready to buy have done so, and that others have postponed entering the market. There is bound to be a dull period between now and a month or two hence when it is expected there will be renewed inquiry and on a larger scale. Those who can take in during the summer what is practically a season's supply are still waiting to test the market, and this attitude will be justified so long as operators make spot prices less than their contract offerings. The crux of the matter is, however, that there are few large consumers in position today to receive shipments in such volume as would be of help to producers who are struggling to hold their men at the mines.

While the number of contracts already placed is large, and the aggregate tonnage considerable, it should be stated that most of them are for less than 10,000 tons and that with few exceptions they are on grades that have come to be regarded as specialties. Nothing else would account for the prices consumers have agreed to pay. And it is also true that by far the greater number of these contract arrangements have been made in the same channels as in other years. Service during 1917 and 1918 has frequently been a consideration in favoring customary sources of supply, but now most of this smaller business has been taken care of and there remains the broad competitive market the trade is hoping for later in the season.

Several charters have been made from Hampton Roads to Boston at $2, but there is only light demand even at that figure. The trade regards this as about the right level for barge transportation, although on steamers it is felt that when several of the 5000 to 8000-ton ships are returned by the Shipping Board to their owners, there will be a rate nearer $1.50@1.75. It is expected that by June 1 Hampton Roads rates will have become stabilized and that the smokeless agencies will be in that much better position to make delivered prices.

No one here looks for any active market on Pocahontas and New River until well into June and July. Of course a considerable volume of business has already been underwritten by factors who are themselves producers, but this is all on a mine basis plus charges. Inland from Providence and Boston buyers are more likely to wait for a definite figure on cars; otherwise they will turn to all-rail shippers. It seems to be clearly established that a large number of buyers who have been accustomed to Southern coals will pay a dollar or more over the cost of all but the very choicest grades from Pennsylvania.

One of the demoralizing features of the present situation is the volume of distress coal available at the New York piers. This is being sold at from 50c. to 75c. less than any $2.95 price at the mines would warrant and the few orders that were in the market for April shipment have been filled from that source. With small barges plentiful at $1.35 from New York to Boston it is easy to see that this coal would be readily absorbed by consumers who had the room to take it. Buyers find it hard to understand why prices should be held so firmly at the mines while sacrifices are being made at the loading ports.

Bituminous prices at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net ton as designated:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.80@3.50
Philadelphia, gross tons	4.20@4.90	5.00@5.55
New York, gross tons	4.50@5.25	5.35@5.95
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.80

Georges Creek is quoted at $3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at $4.70@5.25 f.o.b. Norfolk and Newport News, Va., for spot coal, the former Governmental differential of 35c. in favor of New River being fairly well maintained. Alongside Boston the present gross ton range would be $7.15@8.10.

Anthracite—Demand remains extremely quiet, the kind of market that usually precedes a 50c. reduction in price. While retail dealers along the coast have no expectations of lower prices on coal they are certainly withholding orders until something definite is announced with regard to barge rates. Only in scattered instances, however, are all-rail dealers filing their orders for April shipment. A 15c. advance is certain for May 1, and yet there is no buying in any direction worth talking about. In any other year this lack of interest would be something remarkable.

A large fleet of railroad-owned barges and tugs is tied up at New York because the authorities have not yet seen fit to fix lower rates. Outside barges are in ample supply at $1 to ports on Long Island Sound and at $1.25@1.35 to Boston. The few cargoes of domestic sizes now coming forward are being freighted in these boats and the trade is eagerly waiting for some sign from Washington that railroad barges will resume their usual functions in the anthracite business. Meanwhile the piers at Philadelphia and New York are embargoed from further receipts because of accumulation, and collieries are forced to shut down three and four days a week.

NEW YORK

Reduction in prices for rice and barley announced by one of the large companies. Harbor strike ties up shipments and supplies are running short. Public service corporations are feeling effects of labor trouble. Line dealers taking coal and active market expected. Policy of education may help summer buying. Bituminous situation shows slow but steady improvement. Dumpings of anthracite and bituminous increase.

Anthracite—The announcement of one of the large producers of a 15c. reduction in the prices for rice and barley was by far the best information received by the trade the past week. A cut in the mine prices for the anthracite steam sizes has been hinted at for some time as the only way of holding the present trade and also as a means of regaining some of the trade lost to soft coal operators because of the lower prices at which bituminous could be obtained. With the cut in rice and barley prices the present rates at the mines are $2.75 for rice and $2.25 for barley. There was no cut made in buckwheat.

There is a good demand for the steam coals which enables the companies to maintain prices and put a premium on some grades of the so-called independent product, especially the better grades. Stocks are not plentiful because of the curtailed production, but there is enough to keep everybody supplied with current requirements.

Movement of the domestic coals, as well as of the smaller sizes, has been slow because of the harbor strike now in its fourth week. Very little coal has left the docks, but this has not as yet inconvenienced the local retail dealers to any great extent, most of whom had full bins when the difficulty first started. Their bins are now beginning to look rather bare, but no serious consequences are looked for so long as weather conditions remain seasonable.

Most Brooklyn and Long Island dealers have been kept supplied with coal because of all-rail deliveries. The office buildings in lower Manhattan are not having any difficulty in keeping their fires going, most of this fuel being ferried across the river from the New Jersey pockets.

Some houses report fairly active buying inland with good prospects for the late spring and summer. It is expected that considerable coal will be sent into the west, many inquiries having been received from that section of the country.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	5.85	7.70
Stove	6.10	7.95
Chestnut	6.20	8.05
Pea	4.80	6.55
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The slow but steady improvement continues. Operators say that inquiries are more numerous and that the prospects of a good contract closing are encouraging. In some instances it is said the operators are inclined to hold back, they not being disposed to tie up the major part of their output.

The marine strike is playing havoc with consumers, not many of whom can boast of large stocks at present. With the trouble entering upon its fourth week and the settlement apparently as far off as at any time, the outlook is dubious for many industrial plants that secure their coal by water. Already many large consumers are canvassing the situation and making arrangements, if it is possible, to secure sufficient coal to meet their current needs.

Shipping has also been interfered with and many bottoms have been sent to other ports because of the difficulty to obtain

fuel here. In many instances transatlantic liners have been detained for a couple of days while waiting for sufficient coal to take them to Europe. This has caused a considerable loss of tonnage to local dealers.

There is an increasing call for coal along the line, but in small lots, the tendency apparently being to prevent having large stocks on hand as the heated season opens. There is also a feeling that buying can be done at lower prices as the season advances, but operators ridicule that idea in the face of the present cost of mining.

The poorer grades of coal are not being inquired about, buyers wanting nothing but the high-grade coals. While the appended price list gives the average range of quotations, some lower quotations have been heard of for various grades of coal:

Quotations in various grades of bituminous coal for spot delivery and contract follow:

	Spot	Contract
South Forks	$2.90 to $3.50	$2.95 to $3.50
Cambria County (good grades)	2.80 to 3.10	2.95 to 3.10
Clearfield County (good grades)	2.65 to 2.95	2.80 to 2.95
Reynoldsville	2.65 to 2.95	2.85 to 3.00
Quemahoning	2.85 to 3.10	2.95 to 3.10
Somerset County (best grades)	2.80 to 2.95	2.95 to 3.10
Somerset County (poorer grades)	2.50 to 2.75	2.75 to 2.95
Western Maryland	2.50 to 2.75	2.65 to 2.85
Fairmont	2.10 to 2.35	2.35 to 2.50
Latrobe	2.25 to 2.40	.....
Greensburg	2.35 to 2.40	2.35 to 2.60
Westmoreland ¼-in.	2.60 to 2.75	2.65 to 2.75
Westmoreland run-of-mine	2.40 to 2.65	2.40 to 2.65

PHILADELPHIA

Improvement in anthracite situation checked by state price inquiry. Consumers withhold orders expecting lower prices. Retail price cutting minimized. Pea size hangs heavily on shippers. Stove and nut in most demand. Contracting on steam sizes. Bituminous quiet. Prices well maintained, with light production. Contracting increases. Railroads buying little fuel until April 1.

Anthracite—As the dealers were preparing to go after spring business following the announcement of the summer price schedule, Governor Sproul announced his intention of investigating the reason for the continuation of the winter schedule. The newspapers have given wide publicity to the subject, and this has had quite a distressing effect on business.

Any investigation honestly undertaken will only divulge what every other similar query has shown during the past several years—that the retail price of coal per ton has advanced far less in proportion than most commodities. As a matter of fact it would not be surprising if the investigation should demonstrate that an even higher price is justified.

In the meantime the coal trade has sagged almost completely. Retailers report that many customers who had placed orders for spring delivery have telephoned in suggesting that these be held until later in the season, frankly stating that they feel coal might be lower in price. This seems to be the general impression.

Shippers report that little business is being received without solicitation. Even where dealers have room for a considerable tonnage they are in no hurry to buy, and all seem satisfied they can secure their requirements during April.

There is little price-cutting, what there is of it being confined to the firms who usually indulge in this game. So far as we can learn the principal efforts of the price cutters have been centered on pea coal, which nearly every one has in stock in large volume. The lowest price on this size remains at $8, and one dealer has cut as low as $10 on egg.

Pea coal continues to be a burden on the shippers. It was really a surprise when the new prices were announced that some action was not taken to make it more attractive. It is a fact that some shippers have changed their screens and a better size is coming to market, but the price is too near that of chestnut to attract the consumer; as a consequence sales are away below normal for this time of year. Chestnut is beyond all doubt the best seller now, and with stove is causing much less trouble than the other sizes. Owing to the mild winter, egg coal, which usually had quite a spurt late in the season because the early supplies of the householders had become exhausted, has recently been draggy. We hear of some price cutting on it by the smaller houses. This condition will probably not be general after Apr. 1, as we expect to see egg as well as broken well covered by contract. At this time one of the large operating companies is entering into agreements on broken at $5.95 at the mines, which is also the present circular on that size, and while egg coal is $5.85 and will so continue until May 1, will eventually be 40c. higher than broken.

Among the steam coals buckwheat is being sold off by some of the independents, but not in very large lots. All the larger shippers are adhering strictly to the price of $3.40, as recently announced, and are making contracts on that basis. On the smaller sizes there have been slight price reductions by the companies, amounting to 15c. per ton.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.80	Buckwheat	$3.40	$4.45
Egg	5.85	7.70	Rice	2.75	3.65
Stove	6.10	7.95	Boiler	2.50	3.50
Nut	6.20	8.05	Barley	2.25	3.15
Pea	4.80	6.40			

Bituminous—The trade continues as it has for the past ten weeks. There is little buying for current use, yet the operators are able to maintain the price range on good coals from $2.90 to $3.15. Rather than sell below these figures many operators close down their operations. On special coals, such as blacksmith, prices run from $3.25 even up to $3.75, with of course little tonnage moving. There continues to be an increasing contract activity, with prices fixed similar to those quoted above. While some contracts are dated to begin Apr. 1, many do not call for shipments until several months later, even up to June 1. At this time the railroads are not actively in the market for fuel, but there are indications that they will be ready to close agreements by Apr. 1.

BALTIMORE

Prices quoted at mines more even than at tide, where there is an unusually wide range for bituminous coals. New York strike and embargo cuts loose some cheap fuels in this section, and the market is strictly one for buyers and not sellers. Hard coal dealers here to take up retail price question during week.

Bituminous—A tremendous effort is being made by producing concerns and distributors to hold up the market, but the success has been rather indifferent at times. Some high-grade coals, it is true, are being held firm at the old Government maximums or better, but other high-grade coals are selling much off that figure. Some operators have agreed to stand by others in their regions to protect fuels, and then openly admit that some sales have been made below the quotations they give when approached. At tide the sales of coal caught here have gone over one of the widest ranges in years, practically the same grade of coal selling to the trade on a single day at prices ranging from a little over $2 on up to $2.75.

The strike in New York harbor has had a distinct effect here. Much coal has been caught away from New York by the embargoes, and has either been shunted into this and other eastern territory or is standing on sidings at the mines or along the railway lines to the coast. This coal in some cases is now offering cheap and hurting what would otherwise be a firmer market.

Another disturbance to the local situation was the release here during the week to the bunker trade for foreign vessels of some 180 cars of coal which the Navy had standing at the Canton pier of the Pennsylvania R.R. since December. Vessels were ordered to take this coal to the exclusion of private shippers. This coal is being fast cleared up, but the Navy has another lot at Curtis Bay and a big storage pile at a water-front ordnance depot; and there is a fear in the coal trade that this, too, will be released.

Anthracite—The hard-coal dealers have taken no steps as yet to fix an April selling price to the public here. The various wholesale schedules are awaited first. The members of the board of the Baltimore Coal Exchange will take up the subject some time this week and will then call a meeting of coal dealers to arrange a schedule of sales. It is probable that the margin of profit as allowed during the war by the Fuel Administration will be followed. This may give a slight cut in the spring and early summer from the existing retail schedule, and possibly a slight advance when the full over-summer 50c. raise in wholesale prices becomes reflected in the retail selling here.

Lake Markets

PITTSBURGH

Production remains very light. Market slightly more ragged. Steel industry's coal consumption may not decrease further.

The coal market is as dull as ever, and is somewhat more ragged. Production remains at 25 to 30 per cent. of capacity, not having improved appreciably, while it still seems to be a shade in excess of actual requirements, so that odd lots of coal are frequently forced on the market at cut prices, below the accepted levels of $2.35 for mine-run and $2.60 for ¾-in. gas. In the case of demurrage coal sales are sometimes made at under $2.

Coal consumers are showing the utmost conservatism and evidently will consume practically the last ton of coal in stock piles before making extensive purchases, their theory being that while demand for coal may become much more active it is quite improbable that any demand can develop that would send prices above the present asking levels.

Very little contracting has been done for the twelvemonth and operators are no longer making any effort to close contracts. They realize that the situation will have to work itself out and that the maintenance of prices depends upon regulation of production to requirements.

Coal consumption by the steel industry has decreased further, but the decline in steel mill operations will probably be arrested by the slight price reductions that were made last week under the auspices of the Industrial Board of the Department of Commerce. While these reductions were less than had been expected, they will probably inject a confident feeling in the steel market for a month or two at least.

Apart from occasional sales of odd lots forced on the market, the market is quotable at $2.25@2.35 for steam mine-run, with 1½-in. domestic at but little more, ¾-in. gas coal running $2.50@2.70 according to grade, all per net ton at mine, Pittsburgh district.

BUFFALO

Trade still slow. Light contracting. All mines going on short time. No promise of a stir. Loading anthracite into lake vessels.

Bituminous—The demand continues light. If there is any increase most of the trade have not observed it. The warm weather has had much to do with the small consumption of coal. Nobody recalls such an open winter. Last year it was May before the lakes were open, this year they have not frozen at all. Jobbers are not receiving many contract inquiries, for consumers still expect a decline in prices.

The price of high-grade bituminous is still at former Government figures, though some low grades are selling at a reduction, with certain members of the trade trying to maintain that these cut prices are the prevailing ones. Quotations: $4.65 for thin-vein Allegheny Valley; $4.45 for Pittsburgh and No. 8 lump; $4.20 for mine-run and slack; $5.65 for smithing and smokeless; $5.60 to $6.10 for cannel; all per net ton, f.o.b. Buffalo.

Anthracite—The situation remains as before. This winter is gone and only the smallest amount of buying will take place till the consumer begins to stock up for next winter. Some demand will arise before the May advance, but nobody knows whether it will be of much account. Shipping agents are overrun with coal that they have had to put into lake vessels in order to escape paying demurrage on it. The outlook is not for a very active season. The Canadian anthracite trade is as quiet as the Buffalo trade, with dealers often carrying wood, coke or bituminous coal which they bought against a possible giving out of anthracite, and which they cannot sell now at any price.

CLEVELAND

Decided improvement is noted in bituminous shipments to northern Ohio, the bulk of the increase going to Lake Erie ports for loading in lake carriers. Steam-coal users are buying more freely. Prospects are that the lake season will open slowly, but wind up just the opposite.

Bituminous—Considerably more snap is being evidenced in the bituminous markets. This is believed to be due principally to the formal presentation of wage and other demands by No. 8 district mine workers, and the consequent fear of a tie-up when peace is actually declared and negotiations be-

tween operators and mine workers get under way. Stock piles in many cases are showing bottom now, while quite a volume of business, for some time repressed by high prices, is believed to be on the verge of coming out. The outlook altogether is the best in some weeks. The sight of bituminous destined for lower lake car dumpers is most cheering, too.

The subject of price has come in for considerable consideration lately and many informal discussions are said to have been had by No. 8 district operators. The sentiment is said to be almost unanimous that present prices are too high. Whether a reduction would stimulate business is the question. Some operators have favored reductions ranging from 45 to 25c. off the $2.60, f.o.b. mine price fixed by the United States Fuel Administration for prepared sizes. There seems to be no question but that when the price of lake coal for the 1919 season is fixed it will be under the 1918 figure. No. 8 district operators are anxious to have the matter of price adjusted as soon as possible in order to get the lake season away swiftly.

Lake Trade—Though quite a number of early cargoes are being floated, the 1919 season on the Great Lakes probably will not be in full swing until the end of the first week of April. The season is expected to open a great deal slower than normal, due to stocks carried over by upper lake docks and the uncertainty of prices. No. 8 operators fear that while the season will open slowly it will wind up with a rush. The No. 8 district, which sent forward 5,249,728 tons to the upper lakes last season, undoubtedly will far exceed that figure this season. Estimates of total bituminous lake shipments in the 1919 season all range around 22,000,000 to 23,000,000 tons, compared with 28,000,000 tons in the 1918 season.

Coal prices, per net ton delivered, are as follows:

Anthracite	
Egg	$10.80@10.95
Chestnut	11.00@11.10
Pocahontas	
Lump	7.50
Mine-run	7.20
Domestic Bituminous	
West Virginia splint	7.05@7.15
No. 8 Pittsburgh	6.15@6.35
Massillon lump	6.95@7.10
Steam Coal	
No. 6 slack	4.45@4.55
No. 8 slack	4.90@4.95
Youghiogheny	4.95@5.05
No. 6 mine-run	4.35@4.55
No. 8 mine-run	4.90
No. 8 ¾ in.	5.45@5.55

DETROIT

Small orders from retailers for domestic lump are said to form a large part of the present business of jobbers, with the steam trade inactive.

Bituminous — Unsatisfactory conditions are encountered by jobbers who attempt to sell bituminous coal in the Detroit market. The volume of business is described as small. A considerable proportion of it is said to be made up of small orders for lump from retail dealers, who desire to supply a household demand without greatly increasing stocks on hand, which in most instances consist of mixed sizes and much coal of inferior quality.

Efforts to interest consumers of steam coal in offerings of high-grade stock formerly popular in the Detroit market are disappointingly unsuccessful, due to the unusually large reserves in storage yards of most of the buyers. Because of the quantity of coal at hand, few of the large steam-coal users manifest any inclination to consider contracts at this time. Their backwardness in this respect, jobbers say, is also the result in part of an idea that coal can be had cheaper by holding off.

Slack is proving especially hard to move. While in comparison with previous years the quantity of slack reaching Detroit is small, there is apparently no present demand. Prices are said to have been reduced on some offerings as much as $1 below the Fuel Administration level. Mine-run also is not easy to place, and low prices have been quoted by some dealers. On domestic lump and egg sizes, prices are being kept fairly steady around the mark set by the Fuel Administration, jobbers say.

That certain producers are doing more to impair stability of prices than any other factor in the market is asserted by some of the jobbers, who say they have learned of attempts to sell coal at very low prices to consumers, who owing to their heavy reserves indicated no interest in the propositions they received.

Anthracite—Inquiry for anthracite from household consumers was more active during the recent period of cold weather. Retail dealers in most instances were able to supply all requirements for any size of anthracite. There was a broader inquiry also for coke, the supply of which seems fully sufficient for the needs of the market. Dealers say a considerable quantity of domestic coke is now arriving in Detroit.

COLUMBUS

A slight increase in the demand for steam grades has developed in the Ohio coal trade recently. Domestic business is slow and little tonnage is moving. Prices are uncertain, but the larger companies are maintaining Government quotations generally.

In almost every locality there is a little current business to report, but the tonnage moving is not large. Purchasing agents are more disposed than ever before to discuss the question of fuel, but they are still holding off when it comes to signing contracts for any large steam tonnage. A large number of contracts expire around Apr. 1, and there is much uncertainty in the future. It is reported that a large contract has been closed at a reduction of 10c. under the Government figures. There is sufficient spot coal moving to take care of current demands. Reserve stocks are still large and in some instances are sufficient to last from four to six months.

The domestic trade is quiet in the extreme. Retailers are not buying, as their stocks are large. There is some demand for the so-called fancy grades such as Pocahontas and West Virginia splints, but this is not sufficient to cause much activity in the trade. Householders are not stocking up for the future and reports show that a considerable tonnage will be carried over until next season. Dealers in this territory do not expect much trade until later in the summer. Country dealers are preparing for a number of orders during the summer to take care of the threshing demand. On the whole, the retail trade is slow, because of the unusually warm weather that has prevailed and the large stocks. Prices are pretty generally maintained, although some cutting is reported.

CINCINNATI

Contract business is attracting attention, but is not progressing rapidly on account of situation in the market. Current demand remains moderate.

With an improved condition in the general situation, brought about by the advance of the season and the changed attitude of consumers with reference to the fuel supply, attention has naturally been centered more on the status of contracts for the coming year; and a peculiar situation has been noted. While large users of fuel are willing to contract, provided they can secure low prices commensurate with the comparative dullness of the market, producers are not willing or anxious to contract at such prices, as they are by no means sure they can make a satisfactory profit under the uncertain conditions existing in the industry.

Operators openly declare that they prefer to let contracts slide rather than bind themselves to furnish coal for an entire year at rates which might in all probability fail to yield a living margin. This attitude seems to be growing stronger as the season advances, and the impossibility of keeping the coal trade on a starvation basis becomes more apparent. It is not at all unlikely, therefore, that before long the logic of the situation will force a decidedly higher level of prices for contracts to be entered into, and that this in its turn will operate to strengthen the spot market, thus helping things all around. A more optimistic feeling regarding the amount of coal carried over is also in evidence, as it seems that this is not going to interfere materially with purchases for next winter on the part of domestic consumers.

LOUISVILLE

Conditions showing slight improvement and general trade taking on more optimistic air. Steam demand improving somewhat, and numerous inquiries being received on contract prices.

Operators are generally more optimistic concerning the market during the spring and summer months. During the past month inquiries on quotations for annual contracts have been coming in well, and a fair volume of business has been landed. However, operators as a rule are not sure of the labor situation, and are going slow when it comes to quoting prices below the former Fuel Administration maximum price, on contracts. A few operators are cutting prices for immediate business, but standing pat on futures.

The coal trade generally is strongly in favor of the news items appearing in daily papers relative to summer stocking for domestic consumers. It is believed that the remnants of the Fuel Administration can do some excellent work via the publicity route in showing the consumer that prices are firm, stocks being depleted, and that it will be a wise policy to stock during the spring and summer months, especially if the consumer desires the better grades.

Prices are fairly firm, but there is some price cutting being done. One large retailer reported that he had been offered the best eastern Kentucky run-of-mine at $2 per ton, which is between 20 and 50c. under the market. At this price he purchased some stock, as he figured he could handle it through his own screening plant, screen 65 per cent. lump and come out well at the price.

The market this week per short ton is quoted as follows:

	Eastern Kentucky	Western Kentucky
Block and egg	$2.85@$3.00	$2.60
Run-of-mine	2.20@2.40	2.35
Nut and slack	1.90@2.10	2.05

BIRMINGHAM

Consumers of steam coal reluctant to enter market. Domestic grades continue to enjoy a fair demand, though the supply is being curtailed by the dullness in steam trade. Production showing a gradual decline.

The Birmingham coal market is very quiet and steam users as a whole are not taking much coal in the spot market, though there is a good sprinkling of small orders, and inquiries are now being received from contract consumers. It is expected that some improvement will be seen in the trade within the next two weeks. The largest contracts closed so far were for 10,000 and 12,000 tons of railroad fuel at the last named Government figures. Some export business is being gradually developed, 1000 tons of coal from this field being shipped to Cuba through the port of New Orleans the past week, and orders are in hand for several thousand tons more. Bottoms are hard to obtain for export business, shipowners stipulating the tonnage they will handle, which in many cases is in excess of tonnage to be moved. Prices are being rigidly maintained on the basis of last Government schedule, and are as follows per net ton mines:

	Mine-Run	Prepared	Slack and Screenings
Big Seam	$2.45	$2.70	$2.40
Black Creek and Cahaba	3.45	3.75	3.05
Corona, Jagger and Pratt	2.85	3.05	2.45

While there is little demand for domestic coal from consumers on account of mild weather conditions, the wholesale trade is fairly good and the output of the mines is readily marketed. Domestic sizes are not any too plentiful, as the output of lump and nut from steam producers is far below normal. Contract buying is expected to begin between now and Apr. 1. Domestic quotations are as follows:

	Lump and Nut
Black Creek and Cahaba	$3.85
Corona	3.65
Carbon Hill	3.15
Climax and Montevallo	5.00

Commercial mines in this field are running from two to five days per week. Furnace companies have curtailed production considerably, the Woodward Iron Co. having closed down practically all its mines, its furnaces being banked, while other large ironmakers have closed down some of their large operations pending a revival in the pig iron trade.

Coke

CONNELLSVILLE

Market prices fairly well maintained. Production relatively low. Reduction in pig iron pleases coke operators.

The reduction of $4.25 in pig iron prices arranged last week between the Industrial Board of the Department of Commerce and representatives of the merchant pig iron producers, proved to be quite a satisfactory piece of intelligence to the coke producers. The coke producers wanted pig iron to be reduced so that demand for pig iron might be stimulated, whereby more coke would be consumed, while at the some time

they did not want to see pig iron reduced so much that claims would be made for further reductions in coke prices. The pig iron reduction went about as far as it could without furnishing grounds for bringing up the subject of coke prices, except in the case of contracts that had been written at "last Government price," such contracts having been adjusted down only as far as $5, except in one or two instances, in which no adjustment at all had been made. With coke at $4, or one-third less than the Government limit, it is in line with basic pig iron at $25.75, valley, the new price, against the last Government price of $33.

The furnace coke market is a shade easier than a week ago, but is not quotably lower. Recognized standard brands of furnace coke are still held at $4, for both prompt and nearby shipment, and this price has been paid freely by furnacemen who wanted fair-sized lots of standard grade. Sometimes the price has been shaded fractionally, while coke of only fair reputation has sold in a few instances at $3.75. In the case of foundry there is a wide variety of fairly good brands to select from at $4.50, while two or three old line operators still adhere to $6. The market is thus quotable at $4 for furnace and $4.50@6 for foundry, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Mar. 15 at 202,308 tons, a decrease of 20,618 tons. While the production was lower than in three weeks preceding, it was about the same as production in the week ended Feb. 15.

Buffalo—The demand for coke is light and the outlook for the season is still not well defined. While it is quite certain that about the same amount of iron ore will be moved as in recent seasons, the ore men are waiting for general developments. No lake charters have been reported yet. The lake fleet is not fitting out as it would if good business was expected early, and brisk operations are expected only late in the season. The coke market is dependent on the ore movement and must wait for it. Quotations are $7.60 for 72-hour Connellsville foundry and $6.60 for 48-hour furnace. Off-grade is unsteady and hardly quotable.

Middle Western

GENERAL REVIEW

Market continues dull, though inquiries are coming in. Expect that labor troubles will interfere with industry in near future.

The coal market in the Middle West continues to be uniformly dull, and with a general lack of interest expressed on the part of the consuming public. The weather may have something to do with this, as the Middle West territory has been enjoying some nice spring weather for the last week. Inquiries are coming in a little faster than heretofore, but this is only natural, as we are now in the midst of the contract season.

To date the buying public have not shown a very keen interest in placing its coal requirements under contract, and the coal men are a little worried over the attitude the public is taking, as each operator has a clientele of special friends that he does business with year after year that he wishes to protect. The difficulty of the situation is that the average coal men confidently expect some labor troubles a little later on in the season. Whether it will affect his field or fields further east, he is not prepared to say, but he does know that should any important coal-producing district be tied up with a strike, the result would be that prices of coal in the non-affected fields would promptly advance.

The industry as a whole is not as yet on a stable footing. However, we understand that the new prices on steel products will soon be published as a direct outcome of the steel men's conference recently held in Washington. If something like this could be done with the lumber and coal business—especially coal—it would be a great benefit to the trade.

There has been no more price cutting on this market than usual, and in this price-cutting game the small operators appear to be the chief offenders. We think men, who from the standpoint of production are perhaps in the minority, are doing the industry as a whole a considerable amount of harm, and it is to be hoped that some means will be worked out by the National Coal Association to curtail their activities in this respect.

Reports show that manufacturing conditions, taken as a unit, are improving. Factories are working now that were idle a few weeks ago. The country is getting a little more confidence, but in view of the fact that there is still so much coal in storage, the effect of this confidence has not as yet been felt in the coal industry.

CHICAGO

Steam trade dull, while domestic demand is picking up.

There is absolutely no change in the steam market in this city since last week. Everything continues along dull lines, with no big sales reported. The domestic situation is a little better, as the dealers are now doing some business. It seems that the householders have just about cleaned up their coal bins, and as their furnaces will have to be kept going for at least another six weeks, the dealers are planning on a fair business from now on. There has been some domestic buying, most of it Franklin County or Eastern coal.

Prices per ton are as follows:

ILLINOIS

Southern Illinois Franklin, Saline and Williamson Counties, etc.	F.o.b. Mines	Rate to Chicago
Prepared sizes	$2.55@$2.75	$1.55
Mine-run	2.35@ 2.50	1.55
Screenings	1.85@ 2.20	1.55
Central Illinois Springfield District		
Prepared sizes	$2.55@$2.75	1.32
Mine-run	2.35	1.32
Screenings	2.05	1.32
Northern Illinois		
Prepared sizes	$3.25	1.24
Mine-run	3.00	1.24
Screenings	2.75	1.24

INDIANA

Clinton 4th Vein District		
Prepared sizes	$2.65@$2.75	1.27
Mine-run	2.35@ 2.45	1.27
Screenings	2.05@ 2.25	1.27
Knox County Field		
Prepared sizes	$2.65@$2.75	1.37
Mine-run	2.35@ 2.45	1.37
Screenings	2.05@ 2.25	1.37

MILWAUKEE

The fact that there are no dealers buying keeps soft coal from sagging, despite cutting at the mines. Very little doing.

The coal market at Milwaukee has developed no new features since last week's report. Stocks continue to move off slowly. There is much more soft coal on the docks and in interior retail yards than will be called for by the end of the coal year. But for this fact prices of western grades would have been on the toboggan ere this, as Illinois operators are shading prices in an endeavor to stimulate business. The first dealer who buys at the new rates will let down the bars. Prices of all grades of coal and of coke are firmly held, with everybody in the trade guessing how long it can be maintained. The supply of anthracite is being reinforced by rail, but dealers are looking for an advance in the price of hard coal. The weather continues mild for the season and everything points to an early spring.

Following are the coal prices at Milwaukee, per short ton, effective Mar. 1. The prices given include delivery. At the yards the prices are 50c. per ton less:

Domestic	
Anthracite—	Short Ton
Egg	$12.20
Stove	12.40
Nut	12.50
Pea	11.00
Buckwheat	10.60
Bituminous—	
Pocahontas mine-run	$8.15
Hocking, screened	7.90
Youghiogheny, screened	7.90
Pittsburgh, No. 8, screened	7.90
West Virginia, screened	8.40
Splint, screened	8.40
Kentucky, screened	8.40
Illinois, screened	7.25
Coke—	
Solvay, large sizes	$11.50
Solvay, small sizes	10.25
Smithing	8.40
Steam—	
Youghiogheny, Hocking and Pittsburgh	
No. 8, screened	$7.18
No. 8, pile run	6.93
No. 8 screenings	6.68
West Virginia, Kentucky and splint	
Screened	7.68
Pile run	7.43
Screenings	7.18
Illinois and Indiana, screened	6.50
Pile run	6.25
Screenings	6.00
Smithing	7.68

ST. LOUIS

Market continues inactive, with promise of better screening conditions. Situation is extremely trying, with no demand at all for any kind or size of coal.

There has been a slight increase in the demand for steam coal from the Standard field in the past few days. At least, it has been noticeable that screenings moved from some mines that have been unable to work on account of a surplus of screenings. There is, however, a noticeable falling off in the demand for lump in the Standard district, for both steam and domestic. This would indicate that the lump coal will be easier and the screening and steam market will become stronger.

Locally there is no demand for either steam or domestic Standard coal. A few plants here and there are getting a few cars in, but it has not affected the market as yet. Some mines are working one and two days a week; others are not working at all. The railroad tonnage the last week increased somewhat. It has been reported that the railroads have been instructed from Washington to let their storage coal remain on the ground and give the miners as much work as possible on new coal.

In the Mt. Olive field similar conditions exist, although most of this coal is moving north, with a little railroad tonnage to help. This market is inclined to be fairly steady and holding to the Government price. Mines in this district are working about two days a week.

In the Carterville field of Williamson and Franklin County, as well as in the Perry County field, there continues to be an over-production. Steam sizes, such as screenings, have kept many mines shut down on account of their inability to move. At other mines the domestic sizes are piling up. The railroad tonnage from this field is not what was expected, but is moving out on contract principally. These contracts are not profitable. The Missouri Pacific contract at the present time calls for $2.07½ for mine-run coal.

The operators in the Franklin County field, however, are turning down all cheap prices, and the prices in the Franklin County field are holding up stiffly, while Williamson County is inclined to be a little bit weak; so is Perry County.

Business conditions in general are not good throughout the Mississippi Valley at this time. That is one reason why the steam sizes are heavy. There is no immediate chance of improvement.

The prevailing prices are per net ton f.o.b. mines:

	Mt. Olive and Staunton	Standard
Franklin County		
Prepared sizes, lump, egg, Nos. 1 and 2 nut	$2.75	
Williamson County		
Prepared sizes, lump, egg, nut	$2.55	$2.55	$1.90@2.25
Mine-run	2.20	2.20	1.60@1.70
Screenings	2.05	2.05	.95@1.10
3-in. lump	....	2.30	....
2-in. lump	....	....	1.75@1.90

Williamson-Franklin rate to St. Louis is $1.10; other rates 92½c.

HAMPTON ROADS

The following are the prices of anthracite and bituminous coal at retail per ton of 2000 lb. delivered on the different grades of coal enumerated. These prices hold good until Apr. 1, 1919:

Pennsylvania anthracite	$11.70
Pennsylvania anthracite, half ton	6.00
Pocahontas egg	8.90
Pocahontas, run-of-mine	7.90
Pocahontas lump	8.90
Pocahontas nut	8.90
Splint	8.50

Pocahontas and New River run of mine $4.85 per net ton on tracks in carloads; for foreign shipment, $5.40 per gross ton; for coastwise shipment, $5.10 per gross ton; for bunker purposes, $5.40 per gross ton, plus expenses of delivery. A war tax on railroad freight charges in addition to all the foregoing prices.

Suppliers are offering Pocahontas and New River run of mine for local industries at $4.85 per net ton, plus war tax on railroad freight, delivered on track or over piers for the year commencing Apr. 1, 1919.

COAL AGE

Volume 15 New York, April 3, 1919 Number 14

Getting Rid of Unrest

By Floyd W. Parsons

NOW we learn that the total cost of the war to the United States from April 6, 1917, to June 30, 1919, will be $30,205,000,000. This is three-fourths the size of England's war expenditure, one-fourth larger than the debt of France, twice that of Italy and fifteen times the war debt of Canada. Compared with Germany, the United States expended two-thirds as much as did the Teutons, while balanced against the cost of our Civil War the conflict just closed, although shorter, cost five times more.

From whatever angle we view the past four years there is no escaping the conviction that the world has been struck a harder blow than ever before in history. Exclusive of losses of lives and property, the cost of the war in money alone amounts to $200,000,000,000. Of all the countries that have suffered, the United States undoubtedly will be able to meet and pay off its obligations far in advance of other nations. However, while we have been running up our huge debt, which necessarily modifies the normal course of our daily lives, the mental enlightenment of the world has gone marching on, and it will require a great effort for the physical and material elements in life to catch up with the mental and spiritual side of humanity.

It makes little difference to a workman whether the head of his government is a democrat if the head of his company is an autocrat. National justice is not worth much if local injustice is permitted to flourish. The degree of contentment and happiness that surrounds an employee is determined by the character of his employer, not by some man with a new idea in the capitol at Washington. If labor unrest is attacked at the root, the plant will never grow and ripen above ground.

The way to kill anarchy and Bolshevism is to eliminate human unhappiness. We are experiencing the action of a leveling process. The so-called common people are demanding and must receive an increasing share of the good things of life. If these changes are to proceed along sound economic lines — if we are to have evolution instead of revolution — the people who have most must more speedily recognize the rights of the people who have least. There must be the recognition of the dignity of labor in terms other than money. Wages are not a universal cure-all.

Of all the important questions that bear on the lives of workmen and that influence their attitude toward existing conditions no problem is more vital than that of health. We have an enormous war debt to settle, and it can only be paid by exercising constant energy and high efficiency. Industry and health go hand in hand, while disease and incapacity travel together. We aim to eliminate poverty, and sickness is one of the chief causes of human want. In a community where ill-health prevails, the soil is fertile for the sowers of discord.

One of our great corporations long ago accepted the idea that health and safety are prime requisites in the promotion of industrial peace, and in twelve years this concern has saved 23,000 men from accident. It has also profited in compensation insurance alone to the extent of more than six million dollars. The company's employees are supplied with hospitals, wash and locker rooms, restaurants, playgrounds, good fellowship clubs, evening schools and attractive houses with splendid sanitary appointments. There are also visiting nurses, housekeeping centers for the training of the workmen's wives, gardens to supply fresh vegetables and community cellars where any oversupply of vegetables raised by the employees can be stored during the winter months.

In and near hundreds of mining camps there are foul swamps that cultivate swarms of disease-carrying mosquitoes, while only a small expenditure will rectify the trouble. Other mining towns harbor cesspools, earth closets and open manure pits, breeding millions of houseflies in close proximity to unscreened kitchens, and yet there are people who lay the epidemics of malaria and typhoid to things supernatural.

Any company official who is looking for a way to justify receiving the salary he gets need seek no further than the problem of health. Here is a work that can be made to pay dividends in the kind of self-satisfaction that comes from real service as well as in dollars earned.

IDEAS AND SUGGESTIONS

Keep Useful Articles for Reference

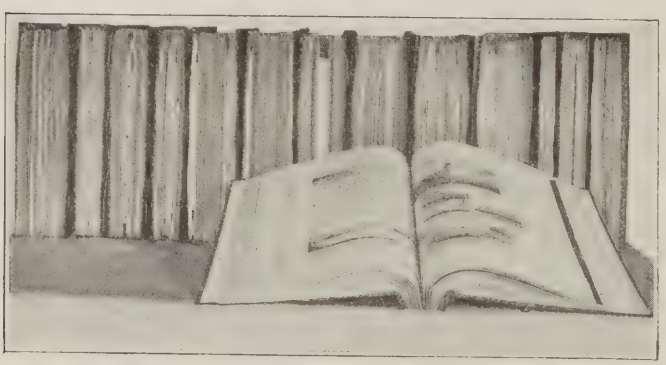
By A. H. Myers
Chief Inspector, Marine Department, Wellman-Seaver-Morgan Co., Akron, Ohio

It is well said that "He who reads and throws away may live to rue that very day." The adage forces itself on the attention when one is vainly searching for an article which impressed one at the time of reading it as likely to be of assistance. I purpose to describe a filing system that I have used successfully for many years.

It has been my practice to save articles appearing in many different periodicals and also bulletins of various engineering projects, if not too bulky, binding them between a pair of stiff cardboard covers, with brass binding posts, using separating or indexing sheets of paper between them. The sketches show the details of the method adopted.

The binding posts of the 4-in. size, the largest size on the market, can be purchased from an office outfitter for about 3c. each. Any bookbinding establishment should be willing to make the covers for about 80c. a pair. The paper to use as separation sheets can be purchased at the same establishment, being later cut as required. Covers of the size shown will serve for the filing of any articles which have been taken from any of the American publications now being issued.

The most convenient part of the filing system is the separating or indexing sheets which are bound in with the articles, being arranged according to the alphabetical order of the subjects thus indexed. There are subject-headings at both the right-hand side and the top of the separation sheets. The right-hand notations indicate the subject proper, while the top notations

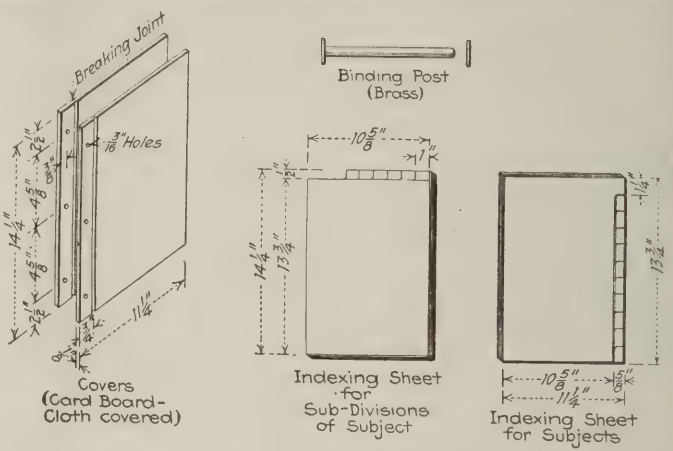


HANDY INDEX FILES OF EXCERPTED ARTICLES

indicate the subdivisions of the subject. For example, suppose the subject of boilers is to be referred to: the subdivisions that appear as top notations are construction, operation, land types, testing, marine types, etc., the subdivisions being added as the articles are procured.

When removing articles from periodicals do not cut out the article with a knife, but pull out the binding wires of the magazine with a pair of pliers. This is the better plan, for when an article is cut out of a magazine there is seldom a sufficient margin left for filing.

It can readily be seen that a system of this kind can be made comprehensive and yet simple, for all the articles saved on any given subject are in one place and not scattered all over the library, as would be the case if they were bound up with articles which the reader does not want but which appeared in the same issues with the desired articles. The photograph shows



DETAILS OF FILE FOR MAGAZINE ARTICLES

to what modest proportions my article file has attained in 10 years.

Because of the labor involved in opening up the volumes for filing, I do not usually file the articles as they are received, but lay them away until a sufficient number have accumulated to make their insertion advisable, memory being relied upon in the meanwhile or entries being made in a card index.

All persons who file data should maintain a card index in which should be listed all books, papers, etc., in the library. The card index, although not absolutely necessary for this type of article file, is nevertheless a good standby.

And now a word as to filing of catalogs, pamphlets, books, etc.; I use a system of letters to designate the heights of the books as they stand in the book case and numbers to designate any given book. Thus all books over 10-in. high are designated by the letter A, all between 9 in. and 10 in. in height by the letter B, all between 9 in. and 10 in. in height by the letter C, all under a height of 8 in. by the letter D. A standard sectional book case with a drawer for the card index is used for filing.—*Engineering News-Record.*

Extending a Long Straight Line

When a long tangent is being laid out on a railroad survey, or when any large number of stakes for any reason have to be set in a line, it pays the transitman to drive a special (or datum) stake in an easily visible location with an upstanding tack, so that he can test the alignment rapidly and without focusing or plunging the telescope and without the assistance of a flagman. A movement of the transit is always apt to occur and to

cause a swerve in the line. This is especially true if the instrument is set on the ground, which should rarely be done, for it is almost impossible to guarantee that it will remain just where it stood when first placed unless pedestal stakes are firmly driven and the instrument erected on these.

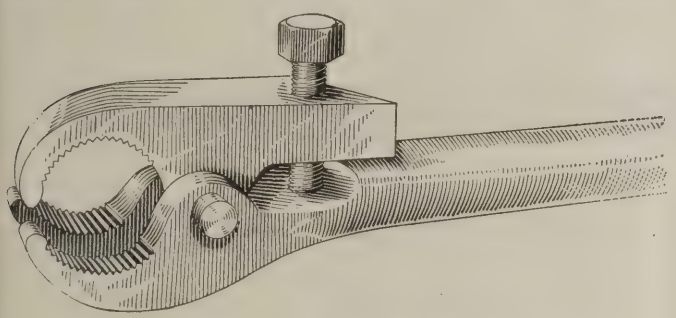
It quite frequently happens that the plummet, after the transit has stood awhile, fails to plumb to the instrument point. In this event the tack on the datum stake will not register the exact line, but it will prevent the error from being as great as it would have been if the tack had not been used; especially if the datum stake is set at a point quite remote from the transit. Most transitmen when running a tangent line for locating houses, lots, sewers or grades waste more time bringing the instrument back to line and position than they would waste if they, from the first, provided the instrument with a pedestal of undoubted permanence and located a suitable datum stake for readily testing the accuracy of their work.

Sure Grip Pipe or Stud Wrench

By Charles H. Willey

Concord, N. H.

A sure grip wrench may be made in a size to suit one's needs in a form similar to that shown. It can be used for gripping any round stock, pipe, studs and similar material. The device was invented to answer



WRENCH FOR ROUND STOCK

the need of a positive grip wrench for removing stubborn pipe and studs. The pin is slipped out when putting the wrench on or taking it off the work. By screwing down the screw the jaws of the wrench exert an enormous grip on the pipe or stud.

To Locate a Curve with a Tape

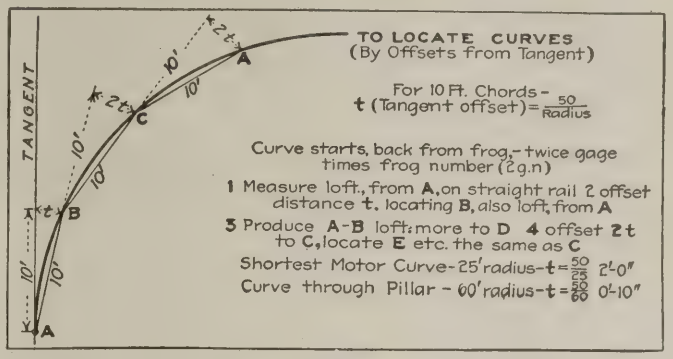
By Harry Goodnow

Du Quoin, Ill.

The other day I was drawn into a discussion between the "Big Boss" and the "Little Boss." A switch had been laid for a turn from a main entry into a panel entry. The Big Boss said there was not room for starting a turn over which an 8-ton motor could pass successfully, and that the switch would have to be torn up and relaid, starting further back in the entry. The Little Boss was sure the curve would go in all right.

We finally agreed, after measuring another short curve in the mine, that a 25-ft. radius curve was the shortest over which the motor could operate. As the engineer I was asked to stake out such a curve and see whether or not it would lie within the confines of the entry in question. It would—with few inches to spare—but anyone except a first-class tracklayer would have failed in his task without stakes, as the curve had to be absolutely uniform.

It occurred to me then that such questions often come up and that there is seldom an engineer on hand to settle them. Accordingly, the accompanying data



CURVE DATA SHEET

were drawn up on tracing cloth and blueprints made for several of the bosses.

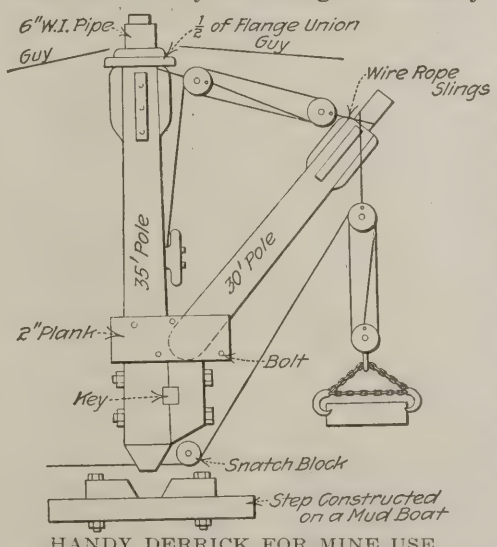
It is my belief that the blueprint is self-explanatory. However, I would advise a little teamwork between the boss and the local engineer so that no mistakes will be made through lack of understanding on the part of a boss not used to such work.

Improvised Derrick Without Usual Irons

By Samuel P. Baird

Columbus, Ohio

The accompanying figure illustrates an improvised boom derrick, built without the derrick irons which would ordinarily be thought necessary. The principal features are the step-bearing for the mast, the step for the boom and the means for allowing the mast to rotate at the top. The rope used was 1-in. manila, the boom hoist was a pair of double blocks, and the main hoist was a combination of a double and a triple block. The main power was a steadily moving team. The loads lifted were stone weighing about a ton, and they were raised high enough for a truck to back under. A friction drag was provided on the main fall line, so that the load could be lowered gently. With this provision the team could be permitted to return as soon as the load was raised to the desired height. Thus it was ready to be hitched onto the rope for the raising of the next stone as soon as the first was lowered into place.—*Engineering News-Record.*



HANDY DERRICK FOR MINE USE

The Yellowhead Coal District

By S. Mac Vicar
Coalspur, Alberta

SYNOPSIS — *Two coal beds on a steep pitch are worked simultaneously by means of a balanced plane. Each balanceway produces about 75,000 tons of coal and requires nothing but gravity for its operation. The coal produced finds a ready market and the area worked will eventually be one of the most important in western Canada.*

THE Yellowhead coal district is situated in the foothills of the Rocky Mountains, about 180 miles by rail west of Edmonton, Alberta. It is served by a branch of the Grand Trunk Pacific Ry., which leaves the main line at Bickerdike, Alberta, running southwesterly 37 miles to Coalspur Junction, then southeasterly for 20 miles along the same general direction as the strike of the coal beds to the mines of the North American Collieries, at Lovett. Present developments indicate three series of outcrops running through the district, each series containing six large and valuable beds of coal as well as many smaller ones of lesser value.

The beds worked by the operating companies are on the southwesterly slope of an anticlinal fold, the crest of the fold appearing about 1½ miles to the northeast. The measures belong to the Upper Cretaceous period. A section at Coalspur shows the formation to be about 3000 ft. in thickness, consisting of a succession of sandstones, shales and coal beds, with a conglomerate bed near the bottom. The Yellowhead coal beds are in the upper part of the section and the Lovett beds in the lower.

The strike of the coal seams is approximately northwest and southeast, and the dip of the Yellowhead beds at Coalspur is 52 deg. to the southwest. The ridges containing the coal measures are low, except at Coalspur, where they are high and well defined, and are cut at right angles by the Embarass River. The railroad is afforded a natural passageway through by following this stream.

The coal is a hard bituminous of good quality suitable for steam-raising or household use. If mined with care, under proper methods, it will not contain over 10 or 12 per cent. of ash. In Table I are representative figures taken from "Analyses of Canadian Fuels."

The mine-run shipments from this district, in July, 1918, to the Grand Trunk Pacific Ry., showed the analysis given in Table II.

The coal in all cases is non-coking, burning to a gray ash. The Government analyses are a fair representation of what the mined product would be, if the coal was kept clean and free from dirt; also they show that the quality of the fuel over the whole district is very regular. The coal is shipped in the following sizes: Slack, 0 to 1 in.; stove, 1 to 4 in.; lump, 4 in. and up; also mine-run. The slack is used by the cement plants, the Grand Trunk Pacific Ry. at its division points, by power plants adapted to burning slack, and by factories at Prince Rupert.

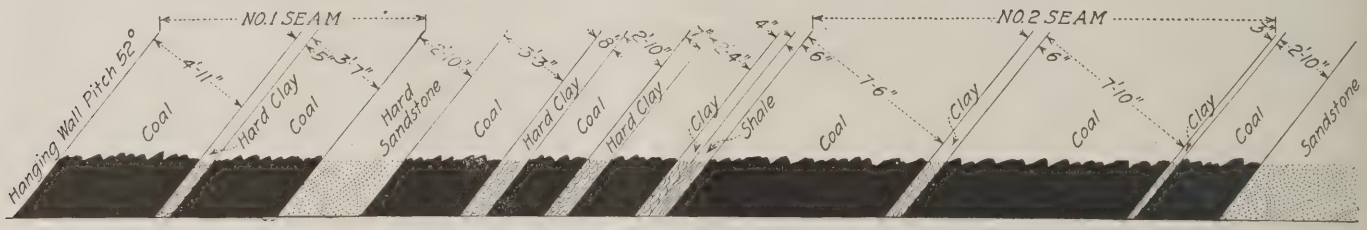


FIG. 1. SECTION OF BEDS BEING DEVELOPED AT COALSPUR MINE OF YELLOWHEAD COAL CO.

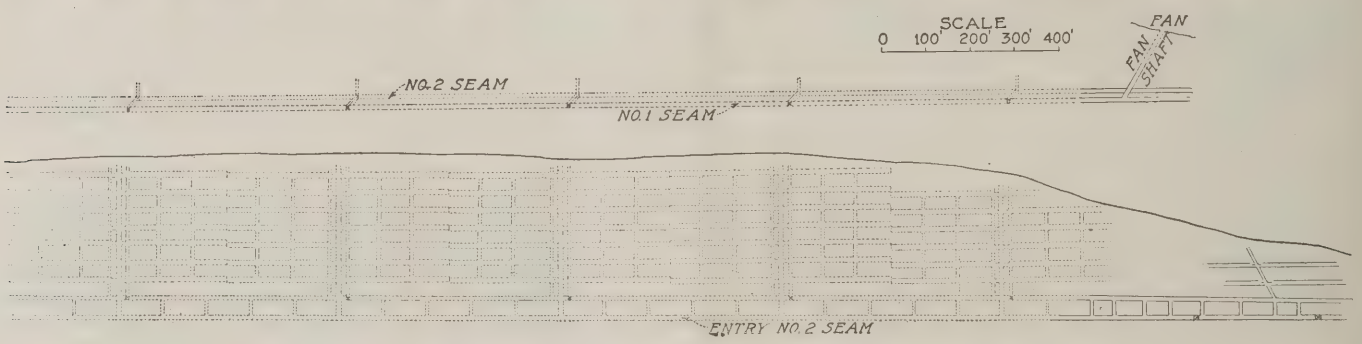


FIG. 2. PLAN OF METHOD ADOPTED TO WORK YELLOWHEAD COAL BEDS

The mine-run is used for stationary boilers, and in the winter season by locomotives. The stove and lump find a ready sale in Saskatchewan and Manitoba, where this fuel is able to hold the market against any coal shipped into these provinces. The coal sells best in lump, and the system of mining adopted must be one that will preserve the lump and deliver it clean and free from impurities.

A section of the beds being developed at the Yellowhead Coal Co.'s new mine at Coalspur is shown in Fig. 1. Fig. 2 is a plan of the method adopted to work these beds. A tunnel driven across the measures, after crossing several seams of varying thicknesses, cuts No. 2 bed 500 ft. from the portal. An entry is driven in this bed with a counter 35 ft. above, and an air-course in No. 1 seam parallel to the counters

in No. 2 seam. The coal from this air-course is dumped into chutes driven across the measures from the entry in No. 2 seam.

When 1100 ft. in, the entry is well under the hill, and one main headway is driven on the full pitch of the seam along the course of the center parting; 12

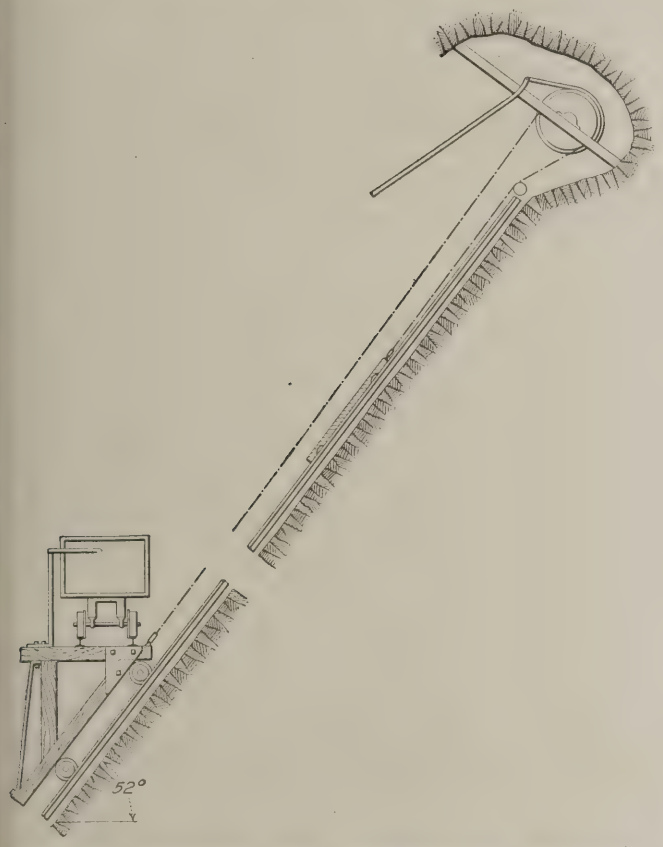


FIG. 3. BALANCED CONVEYING SYSTEM BETWEEN ROOMS AND GANGWAY

ft. on each side of this headway two smaller air-courses are driven in the under part of the seam. As the headway and raises advance roomnecks connecting the raises with the headway are driven at 40-ft. centers.

As soon as one roomneck on each side is completed, the clay minings from the headway, raises and roomnecks above are caught by properly arranged wing boards and stowed in the completed roomnecks. The wing boards are shifted as the raises and headway advance. After the completion of the headway all the refuse from the roomnecks is cleaned out, the headway prepared for balanced haulage, and the raises used for air-courses and traveling ways.

In preparing the headway for the balanced system of conveying the cars between the rooms and the gangway below, the headway is laid with two sets of rails; one of a wide gage to accommodate a triangular shaped cage (Fig. 3 in side view); the other of narrow gage set inside the cage track for a long narrow balance car. A pulley provided with a brake is placed just above the top room. A rope passes around the pulley, one end being attached to the cage, the other to the back balance.

The back balance consist of a weight midway between that of the cage when carrying an empty car and when carrying a loaded car. The top of the cage is a horizontal platform with track placed at right angles to the balance track, and provided with catches. At each roomneck the track is extended close up to the rails fixed on the cage. An indicator is provided for the attendant at the brake, and by an arranged code of signals the cage can be stopped at whatever room is required to be served. At the bottom of the balanced haulage the gangway is widened out to form a pit for the reception of the cage, and a parting is formed for empty and loaded cars. This system enables the coal to be loaded directly at the working face into the mine cars, and the miners may be paid by weight. It insures a minimum of breakage. The timber can be taken up to the working places on the cage, faulty mining can be detected immediately, and machines can be used for cutting the coal.

Four rooms at the top of the balance are developed on each side. These with crosscuts connecting them to No. 1 seam make in all eight rooms on each side of the balance. These will give an output, when machine mined, of 250 to 300 tons per day. After the rooms are driven 250 ft., the pillars are taken out, commencing at the upper one. While the first formed pillars are being drawn, others are being formed by driving rooms further down on the balanceway. A general idea of the method of working may be gained from Fig. 4. The details of the method of drawing the pillars can be gathered from Fig. 5.

The bottom corner of the pillar is taken out, and a face formed across the pillar from room to room, at an angle sufficient to allow the coal to roll to the track and be loaded out. If the pillar is already drawn above,

TABLE I. APPROXIMATE ANALYSIS OF YELLOWHEAD DISTRICT COAL

	Fixed Carbon	Volatile	Ash	Moisture	B.t.u.
Yellowhead	49.9	37.8	8.3	4.0	11,790
Oliphant Munson	51.0	37.1	8.7	3.2	....
Lovett	50.3	34.9	9.3	5.5	11,650

TABLE II. ANALYSIS OF MINE-RUN COAL FROM YELLOWHEAD DISTRICT

	Fixed Carbon	Volatile	Ash	Moisture	Sulphur	B.t.u.
Yellowhead	46.40	34.42	14.62	4.56	0.28	10,280
Oliphant Munson	45.20	36.06	14.14	4.60	0.29	10,700
Lovett	42.34	30.80	21.66	5.20	0.39	9,007

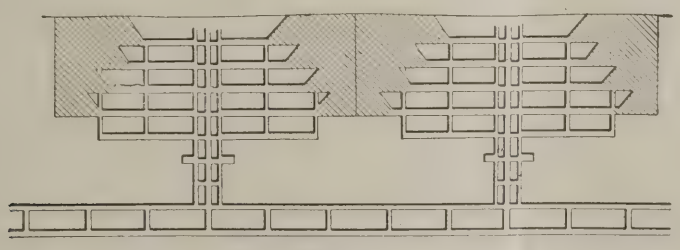


Fig. 4



Fig. 5

FIG. 4. METHOD OF WORKING AND (FIG. 5) METHOD OF DRAWING PILLARS

then, when near the gob a shot is put in, breaking the coal and causing the gob to run into the face of the pillar, which is being drawn. When this occurs the miners have a platform of loose gob to work on. Pillar extraction goes on simultaneously in both beds, and on both sides of the balanceway. With careful mining each balanceway will yield over 75,000 tons of coal.

The coal is hard, with no pronounced cleavages. It stands considerable handling without loss and weathers well in the open. It is a long-flamed, free-burning fuel giving off intense heat. The area worked is one of the largest and most valuable in Alberta, and must eventually supply a large portion of the western provinces with fuel for industrial and domestic use.

A One-Year Retrospect of the Coal Industry of Utah

By A. C. Watts
Salt Lake City, Utah

SYNOPSIS — *Many circumstances both within and without the state tended to influence the coal industry of Utah during the past year. On the other hand, some factors that it was anticipated would have pronounced effects have failed to make their influence felt. A steady growth in civic pride throughout the mining communities is noticeable.*

WHILE it is usually considered wise to look forward rather than backward, it is sometimes inspiring to review past events in order the more readily to appreciate what is yet to be accomplished. The following paragraphs deal with conditions that have to a more or less decided extent directly or indirectly influenced coal production in the State of Utah during the past year. No serious attempt has been made to join the subjects treated into anything like homogeneity. They are rather notes more or less at random, covering certain conditions that influenced production and secial conditions in the coal fields.

During the latter part of March, 1918, Mr. Garfield's zoning order was issued and caused considerable speculation regarding its application to Utah and Wyoming mines. Some of the Utah operators interpreted it to mean the elimination of Wyoming coal from markets to the west and northwest of that state. This would naturally result in increased demands for Utah coal. This idea was speedily dispelled by advices from Washington to the effect that the order contemplated no change in the movement of Utah coal and no change in the movement of Washington, Montana and Wyoming coal except to allow these fuels to move further east, thereby increasing their market territory.

Although there were many Austrians and some Germans and Bulgarians working in and around the coal mines of Utah, but little trouble was experienced from them. A few became too outspoken in their allegiance to the Central Powers and in their criticism of this country and were deported, while one or two were interned in the internment camp at Fort Douglas adjoining Salt Lake City. Despite an apparent lack of evil intent among the aliens, the operators took no chances and had their properties well lighted and guarded, and exercised as much care as possible in the employment of men.

One of the main concerns of the operators was the prevention of illegal accumulations of explosives by evilly disposed aliens, if there were such among us. The Government, through the Bureau of Mines, exercised supervision over the sale and distribution of explosives, but the powder regulations of most of the operators have always been strict. To be further on the safe side, the officials of the mines doubled their inspection and in some instances the use of powder in the mines was subject to the inspection of four or five different officials and under-officials.

On Jan. 29, 1918, the Secretary of the Interior ordered withdrawn from entry 40,000 to 50,000 acres of land adjacent to the Price River in Carbon County pending investigation of the feasibility of an irrigation project having as its source of supply one of the main tributaries of the Price River, and embracing a reservoir site in Pleasant Valley, in which is situated the town of Scofield. The significance of this order lies in the fact that if this project is held feasible and adopted, it will mean the building of a new branch line of the Denver & Rio Grande R.R. to the coal mines of the Pleasant Valley district. The building of the reservoir may mean the impossibility of working coal deposits adjoining it. The valley is traversed by great faults which might prove to be efficient water channels. The lands withdrawn from entry embraced many acres of oil-bearing shale.

The success of Liberty Loan, War Savings Stamp and various war work drives in the coal camps has been wonderful. Every one went over the top and the competition between various camps as to which would get over first was keen.

The first Liberty Loan in 1917 was much more difficult to handle. At that time there was not the keen realization of the importance of the loans that was exhibited last year—nor the sense of responsibility. Furthermore there seemed at first to be a belief that the money subscribed was given to the Government, and thereby lost. After a coupon or two had been cashed, the feeling changed and each succeeding loan was easier to handle. A man felt disgraced if he could not take at least one bond.

It was surprising to note some of the subscriptions. One boiler fireman took $1000 of the Fourth Loan. A car dropper who before last year had never earned over $3.15 per day, was found to owr $1700 in bonds and savings stamps. When asked how he did it, he gal-

lantly attributed it all to his wife and said if he had married ten years ago instead of six, he would not now have to work. An old lady who had three sons in the service, one of whom I am proud to say worked for me, came to the office and bought $500 of the Fourth Loan; and when a few hours later she received $90 as the Government allotment from her soldier boys' wages, she went directly back to the office, aded $10 to the $90 and bought a bond for her sons. There were many incidents of this kind, for patriotism runs high in the coal camps.

For war work funds many mines made a monthly deduction of from 25c. to $1 from each man's wages as the contribution of the miners.

The Fourth Loan proved a glorious success and Carbon County was the banner county of the state—its subscriptions averaging $40 for each man, woman and child in the county. For one company, a grand total of $567,419.93 has been subscribed to Liberty Loans, War Savings Stamps, and given for various war funds.

Utah contains many thousands of acres of oil-bearing shales, which Government experts believe capable of furnishing large quantities of oil. The great demand for this fuel for war work has brought attention to the fact that many petroleum fields are barely holding their own in production, and as the demand is increasing all the time some new sources of supply must be discovered. When attention was attracted to oil shales, many people had visions of great wealth and much excitement prevailed. But as yet no real progress has been made toward utilizing the oil shales, and we are still burning coal in our locomotives and furnaces.

Influenza Proved Serious in Utah

The epidemic of influenza which has and is sweeping the country has proved a serious drawback to the coal-mining industry in Utah. Unfortunately, people have not realized the dangerous character of this disease—it has not the terrifying attributes of smallpox, cholera or bubonic plague; there were no flaring yellow or red quarantine signs, nor dreaded pesthouses, and its spread throughout the country has been much more insidious. A community would develop a few cases and then apparently the disease would disappear, but only to break out with greatly aggravated virulence.

Many of the coal camps instituted strict quarantines as soon as the disease appeared and have observed this measure since early in October. It is to be noted that when strict quarantine regulations have been in force, the disease was not very prevalent. It is interesting, however, to recall that in April of last year there was quite an epidemic of colds in some camps, as also in some metal mining towns in the state. The affection was then called LaGrippe, and many miners and coke pullers were off work with it, the coal and coke output being materially reduced thereby. The output at some of the mines has been seriously reduced because of the "flu," and surface improvement operations have in some cases had to be temporarily abandoned.

Some nationalities have strong ideals about preventive measures. For instance, the Greeks eat a great deal of garlic. In one camp there were no cases among these garlic-eating Greeks, but there were among the Italians, who are also very fond of the herb, vegetable or weed, whichever it may be. In other camps there cases of the "flu" among the Greeks—possibly their supply of garlic whichever it may be. In other camps there were cases of the "flu" among the Greeks—possibly their supply of garlic ran out. While the epidemic interfered with output, it is impossible to give accurate data concerning its exact effect on coal production.

Ordinarily, improvements made in and around coal mines can only be placed in one class—that of essentials or necessities. The custom of many well organized companies is to make yearly budgets which embrace all expenditures for improvements that can be foreseen for the year. These are then placed in two main classes—those that are imperative and those that are desirable, but that can be, if necessary, deferred for six months, or a year. Generally the first class of improvements includes equipment to maintain or increase output, but because of war conditions it has been necessary to include in it housing and other personal facilities for employees. This in some part is due to the increase in the larger number of older men employed who have families. Thus, in Utah, the operators have built a considerable number of dwellings for employees and have added more conveniences than heretofore. Perhaps it is not strictly just to attribute all this to war conditions, for the general policy all over the United States for several years past has been to make living conditions in coal camps more pleasant and comfortable.

During the year three large amusement halls were opened with great éclat, and the enlargement of another started. These halls have meant much to the inhabitants of the camps and have proved popular. All were commenced in 1917, but finished in 1918, as were also three large miners' bathhouses and some smaller ones. It has also become necessary to increase the garage facilities in many of the camps to take care of the ever increasing number of automobiles owned by miners. The custom has been followed in many instances of building central garages having 7 to 12 stalls. These are built of fireproof materials, possess low fire risks and improve the general appearances of the towns.

It is now becoming inappropriate to speak of some mining communities as "camps," for at least two are incorporated towns boasting of mayors, town councils, boards of health, town constables and sprinkling wagons. In one, at least, the citizens have a cement sidewalk and have planted shade trees along the streets. Civic pride is being developed, the manifestation of which is apparent in the much more tidy appearance of the various municipalities.

The carbon dioxide recorder used in testing the working of steam boilers should be made to pay dividends, says *Power*. This indicator does not of itself improve the efficiency of the plant, but merely shows what is being accomplished. Every engineer should be acquainted with the operation of the instrument so that he may use the information it gives to aid in the economical combustion of coal. Low CO_2 readings may be caused by excess of air or improper mixture of air and gases. Excess air may be caused by leaks in the boiler setting, carrying too thin a fire bed or too strong a draft. Low CO_2 is also caused by insufficient air or too little draft; the fuel bed may be too thick or the air spaces in the grate may be clogged with clinker or slag. Leaks about the furnace or boiler and dirty tubes or flues retard the draft. However, one of the most common causes of insufficient draft is the clogging of the grates with clinker or melted ash.

Rolls for the Preparation of Coking Coals

SYNOPSIS—*Coal is frequently crushed at coking plants in order to secure uniform and homogeneous coke. For this purpose two general types of machines are available—the hammer mill and the roll crusher. The latter appears to possess certain advantages over the former.*

THE increased attention being given in this country to the preparation of coal for coking will insure considerable interest in any details that may be available regarding the many questions raised in connection with this important problem of producing a uniform coke for metallurgical use. This article will be a description of rolls with smooth and corrugated surfaces used for sizing bituminous coal preliminary to coking.

Coking coals are crushed (1) so as to detach adhering impurities from the real coal. Preliminary to separating the worthless matter from the good by a dry or wet method of cleaning; (2) so as to reduce the non-coking impurities intermixed with the coal small enough that the resulting coke will be uniform in structure and not contain detrimental cracks or parting seams; (3) to prepare coking coals of different physical and chemical characteristics, preliminary to making a uniform mixture for charging.

The insertion in this article of data relating to hammer mills is only for the purpose of comparison, in order to learn the relative value of rolls, and show that each type of coal-reduction equipment has a field in which it excels.

Hammer mills will pulverize run-of-mine coal without preliminary sizing. In the use of rolls it is essential that the coal be sized small enough so that the largest pieces will catch between the rolls.

Rolls and hammer mills are the two distinct types of machines extensively used for preparing coal for coking. Since it is possible to purchase either type of machine in almost any size and with the assurance that the design and construction are adequate for the work intended, the choice of type can be made strictly on the basis of suitability and economy.

There are certain advantages and disadvantages that are inherent in each type of machine, and these are generally well recognized. Of greater importance, and less generally appreciated, are the characteristics of each machine for a particular size and service.

Hammer mills pound and force the coal through perforations or longitudinally placed bars, the size and spacing determining the size of the largest pieces of the coal. Rolls crack the coal by compression and no interfering impediment obstructs its free passage from the machine after passing between the rolls, the distance apart the rolls are set determining the size of the largest pieces of the coal. The difference in principle of reduction evidently results in a considerable saving of power, in favor of rolls, that is worthy of consideration in making a choice of types on the basis of economy of operation and repair. Cracking the coal by compression in place of pounding and forcing it through a certain size of hole, results in a more uniform and better product for the effective operation of the succeeding cleaning method. The pounding and forcing action creates an excessive amount of fines and dust from both the impurities and the coal, which increases the difficulties involved in any cleaning method on a commercial scale or of separating the worthless matter from the valuable coal. It also adds to the difficulties of clarifying the wash water of refuse.

Since rolls act on the principle of cracking by compression and since, when they are set to crack the coal to any particular size, the particles smaller than that size can tumble through without being further reduced, rolls yield a smaller percentage of fines and dust and a more uniform finished product for the final cleaning or charging than any other type of coal-reduction machine. Rolls will crack wet coal as satisfactorily as when the coal is dry without increase in the absorption of power and without choking. Approximately 25 per cent. less power is required with rolls than with any other type of reduction machine to reduce like coal to

TABLE I. RECORD OF TESTS MADE WITH SMOOTH AND CORRUGATED ROLLS AT COMMERCIAL COAL-PREPARING PLANTS

Line	Size of Rolls: Diameter, In.	Size of Rolls: Length, In.	Surface of Rolls	Rolls Set Apart, In.	Peripheral Speed, Ft. per Minute: Fast Roll, Ft.	Peripheral Speed, Ft. per Minute: Slow Roll, Ft.	Kind of Coal	Approximate Size of Coal Fed to Rolls	Moisture, per Cent.	Feed to Rolls Net Tons per Hour.	Fineness of Cracked Coal: Through ½-In. Round Holes, per Cent.	Fineness of Cracked Coal: Through ¼-In. Round Holes, per Cent.	Fineness of Cracked Coal: Through ⅛-In. Round Holes, per Cent.	Actual Horsepower to Crack Coal: Hp.-hr. per Ton of Coal	Actual Horsepower to Crack Coal: Net Average, Hp.
1	30	60	Smooth		1500	1050	Soft and friable	1¼ in. cubes to dust	2.10	100	75.10	97.50	99.20	0.49	49.0
2	30	60	Smooth		1500	1050	Hard and tough	1¼ in. cubes to dust	1.60	100	70.00	95.50	98.25	0.52	52.0
3	30	60	Smooth	1/16	1500	1050	Soft and friable	1¼ in. cubes to dust	1.85	80	86.00	98.25	100.00	0.63	51.0
4	30	60	Smooth	1/16	1500	1050	Hard and tough	1¼ in. cubes to dust	1.55	80	82.50	97.00	99.00	0.72	58.0
5	30	60	Corrugated		1500	1050	Hard and tough	1¼ in. cubes to dust	1.50	110	54.20	78.00	96.00	0.47	51.7
6	30	60	One smooth, one corrugated		1500	1050	Hard and tough	1¼ in. cubes to dust	1.60	105	65.60	87.10	97.50	0.50	53.0
7	42	60	Smooth		1500	1050	Soft and friable	1¼ in. cubes to dust	2.00	110	77.40	98.75	99.40	0.51	56.0
8	42	60	Smooth		1500	1050	Hard and tough	1¼ in. cubes to dust	1.65	110	74.20	97.50	99.10	0.54	60.0
9	42	60	Smooth	1/16	1500	1050	Soft and friable	1¼ in. cubes to dust	1.95	90	87.25	98.50	100.00	0.65	59.6
10	42	60	Smooth	1/16	1500	1050	Hard and tough	1¼ in. cubes to dust	1.75	90	85.00	97.00	99.70	0.75	68.5
11	42	60	Corrugated	1/8	1500	1050	Hard and tough	1¼ in. cubes to dust	1.60	121	56.80	80.20	97.50	0.47	57.4
12	42	60	One smooth, one corrugated	1/8	1500	1050	Hard and tough	1¼ in. cubes to dust	1.75	116	67.15	88.40	98.30	0.52	60.3

NOTES—Coal designated as soft and friable is Pocahontas coal. Coal designated as hard and tough is Pittsburgh gas coal. In each case the run-of-mine coal had been first sized by a Bradford coal breaker with 1¼-in. square perforations. The tonnage fed per hour is the maximum, with the designated diameter, length, surface, speed and distance rolls set apart. Speed of rolls great as permissible, without choking by the refusal of rolls to nip the largest pieces of coal. Rolls designated as corrugated have three corrugations to one inch, 3/16 in. deep.

TABLE II. RECORD OF TESTS MADE WITH HAMMER MILLS, AT COMMERCIAL COAL-PREPARING PLANTS

Line	Kind of Coal Mill	Perforations of Hammer Mill, Screen	Kind of Coal	Approximate Size of Coal Fed to Hammer Mill	Moisture, per Cent.	Feed per Hour to Hammer Mill, Net Tons	Fineness of Crushed Coal — Through ⅛-In. Round Holes, Per Cent.	Through ¼-In. Round Holes Per Cent.	Through ⅜-In. Round Holes, Per Cent.	Actual Power Necessary to Crush Coal Hp.-Hr. Per Ton	Net Hp.
1	Hammer mill	⅜-in. round holes	Soft and friable	Run-of-mine	1.55	150	91.30	97.35	99.90	0.814	122
2	Hammer mill	¼-in. round holes	Soft and friable	Run-of-mine	1.50	150	97.10	99.30	100.00	1.252	188
3	Hammer mill	¼x1⅜-in. holes	Soft and friable	Run-of-mine	1.70	150	87.10	96.60	98.50	0.733	110
4	Hammer mill	⅜-in. round holes	Hard and tough	Run-of-mine	1.20	150	86.20	95.40	99.70	0.886	133
5	Hammer mill	¼-in. round holes	Hard and tough	Run-of-mine	1.25	150	92.30	97.00	100.00	1.366	205
6	Hammer mill	1¼x1⅜ in. holes	Hard and tough	Run-of-mine	1.10	150	82.00	94.20	98.10	0.805	121
7	Hammer mill	⅜-in. round holes	Soft and friable	1¼-in. cubes to dust	1.80	80	92.10	97.60	99.75	0.754	60.3
8	Hammer mill	⅜-in. round holes	Hard and tough	1¼-in. cubes to dust...	1.95	80	85.80	95.40	99.55	0.825	66
9	Hammer mill	⅜-in. round holes	60 per cent. soft 40 per cent. hard	1¼-in. cubes to dust...	1.70	80	88.60	96.35	99.70	0.778	62.6

NOTE—The tests were made immediately after the mills were installed. Coal designated as soft and friable is Pocahontas coal. Coal designated as hard and tough is Pittsburgh gas coal.

the same degree of fineness. The upkeep and depreciation per ton of coal handled is barely noticeable owing to the few parts subjected to wear and tear. In case of choking up rolls can be relieved promptly without derangement of the covering. They are practically dustless and operate at a comparatively slow speed, have a large capacity per square foot of working surface and a minimum of skill and attendance is required. Instant and rigid adjustments may be secured in the space between rolls; automatic adjustments for instantly relieving the rolls in case tough foreign matter is mixed with the feed may be employed as well as a magnetic attachment for the removal from the feed of nails, nuts, mining-machine cutters and the like. A positive automatic feeding device to prevent overloading may be employed, while regrinding of smooth rolls when they have become unevenly worn can be accomplished without removing the rolls from their supporting frame. Rolls are comparatively reasonable in price and cost of installation.

The relation between the maximum size of coal fed to rolls, the speed at which they revolve, the diameter and the space between them determine the angle of nip. Rolls cannot be fed with run-of-mine coal as can hammer mills, but must be supplied with a sized product, the largest pieces being of a size suitable to the angle of nip provided. With a spacing of $\frac{1}{16}$ in. in the clear, and a peripheral speed of about 1500 ft. per minute, the relation between the diameter of rolls and maximum size of individual pieces of coal are as follows:

Diameter of rolls 24 in. for ¾ in. cubical form of lump and less
Diameter of rolls 30 in. for 1¼ in. cubical form of lump and less
Diameter of rolls 36 in. for 1½ in. cubical form of lump and less
Diameter of rolls 42 in. for 2¼ in. cubical form of lump and less
Diameter of rolls 48 in. for 3 in. cubical form of lump and less

When coking coal is to be charged without removing a portion of the worthless matter by cleaning, and fineness is desired only for mixing coals of different characteristics, or to reduce the intermixed impurities to a size such that the resulting coke will be uniform in structure, some coke-oven operators are of the opinion (and this is substantiated by record of comparative tests on file) that rolls will not produce as large a percentage of fine coal as hammer mills. The record of tests which has induced this opinion is not questioned, but other conditions, perhaps unnoted, occasioned such misinterpretations.

For example: Table I, line 9, shows that rolls set $\frac{1}{16}$ in. apart, handling soft and friable coal, produce a product of which 87.25 per cent. passes through a hand testing sieve provided with ⅛-in. round holes. Table II, line 2, shows that a hammer mill provided with a screen having ¼-in. round perforations, handling soft and friable coal, produces a product of which 97.10 per cent. passes through a like sieve. Upon examination of the products remaining on the testing sieves, it was ascertained that the roll product (12.75 per cent.) consisted of about 30 per cent. coal and 70 per cent. impurities, thin and rectangular in shape, averaging $\frac{1}{16}$ in. thick, ⅜ in. wide and equally as long; or in volume 0.0087 cu.in. The hammer mill product (2.90 per cent.) consisted of about 65 per cent. coal and 35 per cent. impurities, cubical in shape, averaging $\frac{7}{32}$-in. cubes; or in volume 0.0105 cu.in., or a difference in volume of 0.0018 cu.in. in favor of the roll product. The coke made from each product was uniform in structure and free from cracks or parting seams, experts declaring that no difference whatever existed in its physical characteristics.

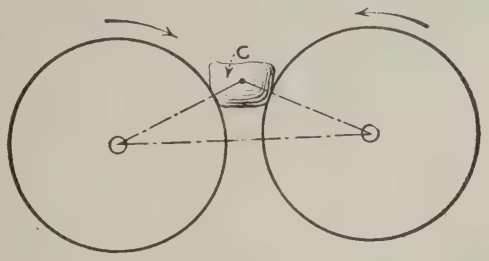


FIG. 1

FIG. 1. TOGGLE JOINT ACTION OF ROLLS

The unnoted conditions previously mentioned regarding the misinterpretations of coke-oven operators, relating to the comparative fineness of coal produced by each type of machine, are found in the difference in symmetry of dimensions of the products, revealed by testing these products for fineness on similarly perforated testing sieves. To make comparative tests useful and avoid erroneous conclusions, testing sieve perforations should have the same area, but conform in shape to the product from each type of machine. For hammer mill tests, round or square perforations should be used to conform to the cubical shape of the product, while for roll tests they should have rectangular perforations to conform to the rectangular shape of the product. If each product is properly tested there will be only a slight difference in the fineness of the two products, or in volume of individual pieces; provided both machines are maintained in operating condition.

The only advantage hammer mills appear to have

over rolls for preparing coking coal lies in their ability to crush run-of-mine and large coal; however, it is now considered economical to first size large coal, to a considerable extent, by means of Bradford breakers. Such preliminary sizing not only lessens the power required by the mill but removes any large and tough foreign matter mixed with the raw coal that might damage succeeding units of preparation. The chief disadvantages of hammer mills are the cost of frequent adjustment and renewal of the working parts, and the absorption of power necessary to force the crushed coal through the screen perforations or spaced bars.

Tables I and II show records of tests made with hammer mills and rolls, at commercial coal-preparing plants, in connection with byproduct coke ovens. The record of hammer mill tests, Table II, line 1, the mill having ⅜-in. round perforated screen, crushing soft and friable run-of-mine coal, shows that 91.30 per cent. of the product passed through a ½-in. round-hole testing sieve. The crushing operation required 0.814 actual horsepower-hour per ton of coal. Line 4 shows that the same mill, when crushing hard and tough run-of-mine coal, produced a product only 86.20 per cent.

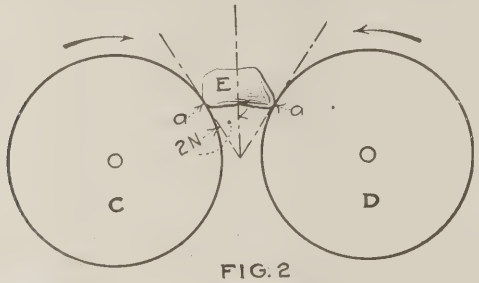


FIG. 2

FIG. 2. THE ANGLE OF NIP

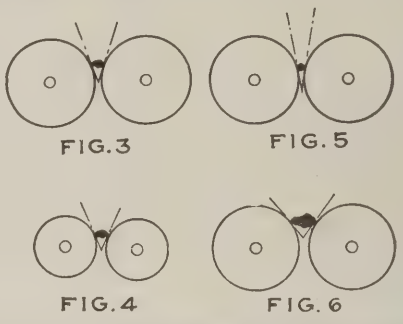
of which passed through a like sieve. Here the crushing required 0.886 actual horsepower-hour per ton of coal. Thus a difference of 5.10 per cent. in the fineness of product and 0.072 hp.-hr. in power requirements is shown. This signifies that the soft and friable coal was crushed finer and required less power.

The record of roll tests, Table I, line 9, the machine cracking soft and friable sized coal, shows 87.25 per cent. of the product passed through ½-in. round-hole testing sieves, and that 0.65 actual horsepower-hour per ton was required. Line 10 shows that when the same rolls were cracking hard and tough sized coal 85 per cent. of the product passed through a like sieve, and 0.75 actual horsepower-hour per ton was consumed. This reveals a difference of 2.25 per cent. in the fineness and 0.10 hp.-hr. in the power requirements, signifying that the soft and friable coal was cracked finer and required less power.

If the operator making the tests had used a sieve with perforations of the same area as the ½-in. round-hole sieves employed, but rectangular so as to conform to the shape of the roll product, the percentage of fines produced by the rolls would have been shown to be as much if not more, while the individual pieces would have been found less in volume than those produced as above mentioned by the hammer mill and as shown on Table II, lines 1 and 4.

In discussing this question of crushing under different conditions there are four factors to be considered: (a) Compressive strength of material; (b) extent of crushing desirable; (c) work or power required for crushing; (d) comparison of various machines.

There are four ways that force may act in crushing coal or other material: (1) By direct pressure as between rolls where there is a strong force acting at low velocity; (2) by a blow on an anvil, as in stamps, where there is a medium force acting at a moderate velocity; (3) by a blow in space, as in the hammer mill or Carr



FIGS. 3 TO 6. COMPARING ACTION OF ROLLS

disintegrator, where there is a weak force acting at high velocity; (4) by grinding, as in the amalgamating pan. In the first three cases the force acts perpendicularly to the surface to produce rupture by compression; in the last case it acts obliquely, producing rupture by compression combined with shearing.

Crushing rolls act upon the lump *C*, Fig. 1, on the principle of the toggle joint. The revolving rolls being held in position in their journals, act radially upon the lump, gradually drawing it toward the narrowest space between them and finally breaking it by virtue of a compressive force superior to the breaking strength of the lump. The lump is therefore broken by compression. The spaces between rolls vary from rolls close together up to ½ in. apart. The relation between the diameter of lump fed to rolls and the space between them, that is to say the amount of reduction, is highly important if rolls are to do their best work.

If the rolls *CD* (Fig. 2) be fed with a lump of coal *E*, the tangent to the rolls at *AA*, the point of contact

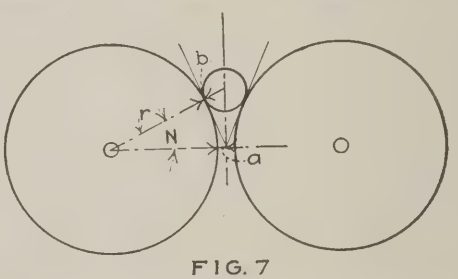


FIG. 7

FIG. 7. THEORETIC ACTION OF CRUSHING ROLLS

with the lump, meet below, forming an angle $2N$, the half of which N is called the angle of nip. This angle may have values from 0 deg., where the space between rolls is as large as the feed lump, increasing until the angle is so large that the rolls cannot nip the fragments. This angle of nip in any case will depend for its value upon the diameter of the rolls, the diameter of the lump fed and the distance in the clear at which the rolls are set. It is affected by the following factors: It is diminished by increasing the diameter of the rolls, by increasing the space (clear

distance) between the rolls, and by diminishing the size of the lumps fed to the rolls.

A comparison of Figs. 3 and 4 shows that large rolls, acting on a given size of lump, have smaller angles of nip than have small rolls. Figs. 3 and 5 show that larger spaces give smaller angles of nip. Figs. 3 and 6 show that smaller lumps give smaller angles of nip.

There are two values of this angle of nip which are of special interest; namely, when its value equals the angle of friction, and the rolls do no work; and when its value becomes the practical angle of nip, at which rolls will work satisfactorily. The angle N, Fig. 7, becomes the angle of friction when it is of such a value that a sphere fed to the rolls will just slip upon the points of contact and therefore fail to be crushed.

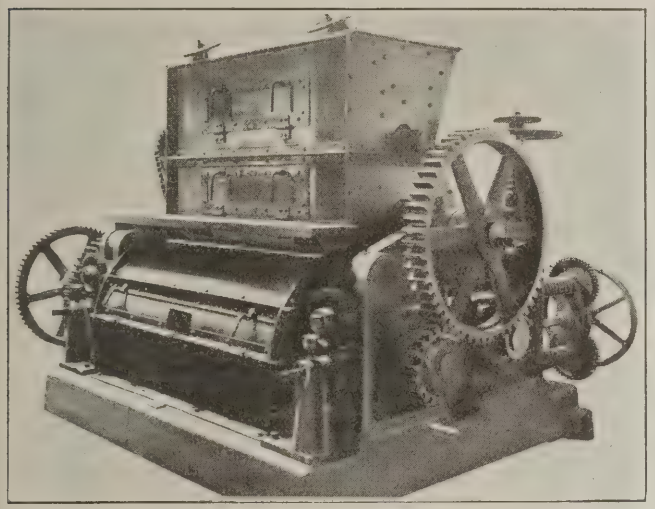
All relations between size of feed, space between rolls, radius of rolls and angle of nip can be expressed by a simple formula, which is derived as follows (see Fig. 7): If b = radius of sphere to be crushed, a = $\frac{1}{2}$ space between rolls, N = angle of nip and r = radius of roll = $\frac{1}{2}$ diameter, then

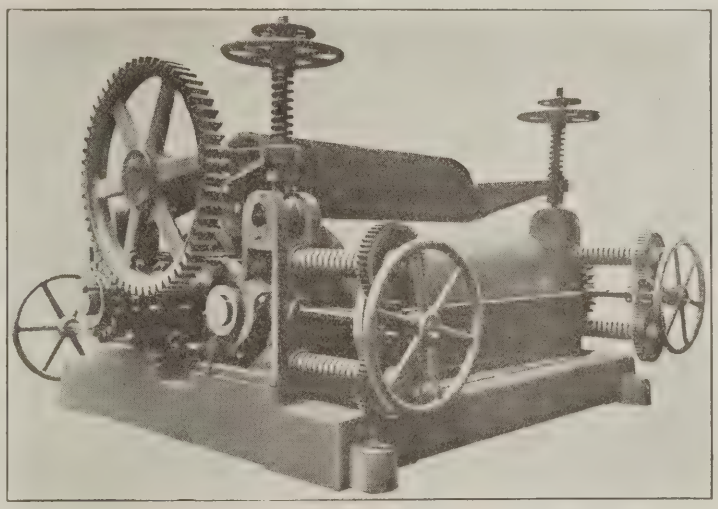
$$\frac{r + a}{r + b} = cosine\ N$$

Theoretically, increase of speed, provided the reduction in size is sufficiently slight, can be made to almost any limit; but practically, high speed with any considerable reduction will give trouble, owing to the refusal of the rolls to nip or take hold of the lumps. These fly back until a dangerous amount collects and then the rolls choke. This may be explained as follows: A lump of coal falling under the influence of gravity from heights of 6, 12, 18 and 24 in. will have final velocities of 340, 481, 589 and 681 ft. per minute respectively. Now, if the rolls are revolving at 900 ft. per minute peripheral speed, then a certain part of the friction must be used to accelerate the lump of coal to this speed before it will be nipped. This amount will be greater or less according as the peripheral speed of the roll exceeds the velocity of the particle by much or little. The use of a part of the friction for the purpose of accelerating the particle does not in itself prevent the particle from being finally nipped, but merely delays the nipping action. It is this delay during the time necessary for accelerating the particle which prevents the nipping, for until accelerated to the speed of the rolls the particle is necessarily slipping and this slipping smooths the surface to a certain extent which causes the coefficient of friction to be reduced and prevents the particle from going through.

Rolls of large diameter apparently possess three advantages over those of small diameter: (1) The increased surface allows more feed to be crushed with a single pair of rolls, but the gain is not important unless the renewals in the case of the smaller rolls are so frequent as to cause serious delay and added cost. The wear of rolls per ton crushed would probably be the same in both cases. (2) The larger rolls can make a greater reduction in size of lump, the angle of nip and the peripheral speed being the same in both cases. (3) Larger rolls have a greater capacity than smaller ones, the reduction being the same, since they can be run at a higher rate of speed on account of their more advantageous angle of nip. In case both the reduction and peripheral speed are the same for the large and small rolls, the large rolls will make the reduction more gradually and hence with less shock.

Some authorities advocate running one of the rolls slightly faster than the other in order to prevent the exact mating of the rolls with a consequent possible unevenness of wear resulting therefrom. This is especially true with geared rolls. The use of any considerable differentiation of this kind to produce grinding, with a view of increasing the crushing power, has been proved fallacious on hard brittle materials, since such an action requires increased power without corresponding benefit. In regard to soft and friable material, however, the case is different. The material which is soft, when crushed by smooth rolls running at equal speeds forms ribbons or pancakes, while a differential adjustment tears the material apart, completely overcoming this difficulty.





FIGS. 8 AND 9. A ROLL CRUSHER INCASED AND WITH COVER REMOVED

WATER-POWER HAS been used widely in industry, but it has not entered into serious competition with coal. Rather it has conserved coal for special uses in notable instances. For example, a large hydroelectric power plant in the anthracite field of Pennsylvania distributes current over a big section and releases hard coal for use in cities where smokeless fuel is at a premium.

New England Coal Dealers' Convention

SPECIAL CORRESPONDENCE

SYNOPSIS — *Retailers devote two days to exchange of views. "Coöperation," the chief note. John E. Lloyd, of Philadelphia; George H. Cushing and Arthur F. Rice, of New York, the leading speakers. Dealers impressed with need of taking coal liberally in the spring.*

THE "Victory Convention" of the New England Coal Dealers Association was held at Worcester, Mass., Mar. 19-20. The attendance at this seventeenth annual meeting broke all records, showing that retail dealers are keenly interested in coöperation and are eager to have the benefit of the best opinion and advice in facing their various problems. The ballroom of the Hotel Bancroft was admirably adapted to the use of such a gathering; the speakers were easily heard, and there was an absence of that constant going in and out that so often mars the proceedings of trade conventions. After the dealers had been welcomed by Mayor Holmes, the first session was devoted to reports that were of unusual interest.



WILLIAM A. CLARK
President of New England Coal Dealers Association

William A. Clark, of Northampton, Mass., the many-times-elected president of the Association, paid high compliment to the Worcester Fuel Committee and to the dealers of that city who distinguished themselves by their cordial and complete coöperation last year in handling the local situation. The efforts of the Association officers to be of real service to the New England Fuel Administration were also mentioned, and prominence was given a memorandum recently sent Mr. Clark by Cyrus Garnsey, Jr., a retail coal dealer of Memphis, Tenn., and assistant to Harry A. Garfield. Mr. Garnsey strongly urged the retailers to retain the great advantage that organization had been to them during the war, and he also recommended that they enlarge the scope of their association to include some of the activities that the Fuel Administration has been obliged to give up.

The address of John E. Lloyd, vice president of the National Retail Coal Merchants Association, was received with the closest attention. Mr. Lloyd was in good voice and made a deep impression. "Every successful business," he said, "must be organized nationally, and no business can be successful if it is not organized nationally. A lesson must be learned from the thorough organization of labor, whose representatives are heard in the highest circles of government.

"The organization of business men," continued Mr. Lloyd, "can do a great deal to make union labor helpful, rather than harmful. When the employer takes an active interest in labor organizations, instead of neglecting them and permitting distrust and discontent to increase, he gains results every time. In Chicago the plan of joint meetings of employers and employed has been a great success."

Mr. Lloyd then attacked price-cutting, referring to a dictum of the Federal Trade Commission that sales less than cost constitute unfair competition. "If the retail coal dealers would only make the same effort to get the maximum price for their product the benefit to the industry would be widespread." In closing, Mr. Lloyd urged the dealers to discourage direct sales to consumers outside the usual trade channels, and to bring their influence to bear against the practice of employers selling coal to their operatives at cost. The Fuel Administration had taught coal dealers not only how to organize, but to figure costs and to that extent the dealers had been helped materially in 90 per cent. of the cities. The convention was enthusiastic in its approval of Mr. Lloyd's address.

The dinner in the evening was attended by nearly 700 persons—the dealers, their ladies and friends. There were stunts and cabaret in bewildering sequence, while at intervals the big company joined in singing popular songs. The gathering was on so large a scale that in addition to the entertainment provided by the Worcester Coal Club there were several cases of local jollification that broke out in parts of the hall. After the tables had been cleared the scene resembled nothing so much as a four-ring circus. All the veterans wore their broadest smiles. A feature of the business meeting on Thursday forenoon was a question box, answers being made from the platform. After a brief talk by Jacob Asher on the need of supporting the War Savings Stamps campaign, George H. Cushing, Managing Director of the American Wholesale Coal Association, spoke on "Coal Dividends and Profits." Mr. Cushing outlined what he regarded would be the form of Government control to be exercised in future. Those in the industry should invite supervision in what he termed the right way. Mr. Cushing drew applause when he reminded the dealers that once more they were to have a buyers' market and that wholesalers could no longer be arbitrary in passing on to the retailer the onus of settling for cars lost in transit, short weight, and other details which he felt were purely matters for the original shipper to adjust.

After an informal luncheon served by ladies of the Worcester Coal Club, Arthur F. Rice, Commissioner of the Retail Coal Merchants Association of New York City, addressed the closing session, his announced subject being "The Needs of the Hour." Mr. Rice argued that prices ought to be lower for purely economic reasons. "With the present high prices," he said, "there is every inducement for substitutes. Electric companies strive to put current into all large buildings, and par-

ticularly the hotels of New York. Once the electric systems are installed no more coal will ever be used. Great business concerns are ready to spend hundreds of thousands of dollars to get people to use their products and thus lay the broad foundation for future business, whereas the future of the coal business is threatened with a huge and permanent loss. If the remedy for this bad situation is sought in the form of high prices, then I can see worse things ahead for the coal trade."

W. H. Williams, vice president of the Hudson Coal Co., spoke in general terms of the anthracite situation. He dwelt on the great urgency of keeping the mines in operation the coming spring and summer to avoid shortage in the fall and winter. Shutdowns at the collieries add tremendously to the cost of production.

The visiting dealers missed the short well-considered papers by well-informed retailers that were so valuable a feature of last year's convention, but the addresses given were timely and thoroughly appreciated.

The exhibit of mechanical contrivances for the use of coal dealers was held in the Casino. It was unusually complete, particularly in the display of self-dumping devices for coal trucks. The Providence Gas Co. and the New England Gas and Coke Co. through their interesting exhibits made special appeals to dealers to help market their byproduct coke.

Next year the Association will meet in Springfield.

Boiler Fuel Economy

By M. Meredith
Liverpool, England

From the average figures obtained from tests on 250 typical steam boiler plants in Britain, interesting data regarding the economy effected by the adoption of scientific methods in the boiler house have been obtained. Of the plants referred to only two gave efficiencies over 80 per cent., nine gave efficiencies from 75 to 80 per cent., 13 showed 70 to 75 per cent., 30 gave 65 to 70 per cent., 44 gave 60 to 65 per cent., 62 gave 55 to 60 per cent., 47 gave 50 to 55 per cent., while 43 gave less than 50 per cent.

The average working efficiency for the whole 250 plants was therefore 60.09 per cent. and, while 61 per cent. of the plants were working with an efficiency of less than 60 per cent., only 9.6 per cent. of the plants exceeded 70 per cent. efficiency. Again, 75 colliery steam boiler plants gave an efficiency of only 51.2 per cent. as compared with the average of 60 per cent. for the whole country.

For the purpose of making a calculation as to the possible saving of fuel by increased efficiency of the whole of the country's steam-raising plants, the average figure of the 250 plants investigated is taken as typical for all plants of the country. According to a recent report of the coal conservation sub-committee of the Reconstruction Committee, about 80,000,000 tons of coal are used annually for power production only. Deducting 15,000,000 tons used on railways, 65,000,000 tons remain, of which 90 per cent., or 58,500,000 tons, are used for power production through steam-raising. In many industries, however, much more steam is used for heating and general manufacturing processes than for power production.

It is therefore taken that the amount of coal used for steam generation in the United Kingdom is between 75,000,000 and 100,000,000 tons. If, then, the efficiency of the 250 plants tested, consisting of 1000 boilers, is 60.09 per cent., and the annual coal consumption of these plants is 2,166,000 tons, an increase in efficiency to 75 per cent. represents a saving of 430,000 tons. A similar increase in efficiency of the whole of the country's boiler plants would represent a saving of 20 per cent. of fuel, or of 15,000,000 to 20,000,000 tons.

Of the 287,000,000 tons of coal produced during 1913, 20,000,000 tons was consumed by the collieries themselves. Practically the whole of this coal provided steam for power to win the coal. This represents 7 per cent. of the total output. If these colliery plants were reorganized to run at 60.09 per cent. efficiency (the average for the country) a saving of 15 per cent., or 3,000,000 tons, would be effected. If they could be run on scientific lines so as to yield 70 per cent., a 27 per cent. saving representing 5,400,000 tons of coal per annum would result.

The question of coal economy is doubly important—first, as an immediate war measure, and secondly as part of a great national scheme of reorganization, essential to future progress. A plea has accordingly been made for the quick survey and reorganization by experts of all the boiler plants of the country, and the immediate reorganization of the largest as well the more inefficient plants, and those, too, which are always required to produce a large amount of steam for other purposes than power production. Such a reorganization will be in strict harmony with the future larger scheme of national coal economy.

Frank R. Weitzel Dead

On Feb. 26, 1919, Frank R. Weitzel, assistant general superintendent of the Phelps Dodge Corporation, Dawson, N. M., died of influenza-pneumonia. He had resided at Dawson for nearly 14 years, and was known to almost every man, woman and child in the camp. He was held in high esteem and respect by both his employers and employees of the company, and his popularity was further attested by the large attendance at his funeral. He was endowed with a cheerful and sunny disposition which endeared him to his many friends.

The deceased was born at Wilkinsburg, Penn., Feb. 16, 1881. He entered the employ of the Empire Coal Co. at Bellaire, Ohio, July 1, 1901, as a member of the engineering corps. Here he stayed until September, 1905, when he went to Dawson City, where he was mining engineer until 1913, when he became assistant general superintendent.

The deceased is survived by a widow and two children. A mother and a sister live in Florida. E. H. Weitzel, a brother, is manager of the fuel department, Colorado Fuel and Iron Co., Pueblo, Colo.

It has been estimated that the present annual production of hydroelectric power in the United States is about the equivalent of 40,000,000 tons of coal; 400,000,000 tons of coal is used yearly in the production of steam power and electric power generated by fuel. Of all the readily available water-power in this country, only about 10 per cent. has been developed; hardly 3 per cent. has been utilized of all the power which might be developed under proper storage arrangement. There has been little encouragement in the past for water-power development owing to our laws and the attitude of the law makers. A water-power bill has been brought up in Congress, and if it is enacted into a sufficiently liberal law it should stimulate development in this field.

Beehive Oven Supremacy Passing —But Not Yet Passed

By John L. Gans
Connellsville, Penn.

SYNOPSIS — *During the latter part of 1918 the output of byproduct coke exceeded that made in beehive ovens. It is doubtless true also that at present more byproduct coke than beehive is being made. Until the operative capacity of the byproduct plants equals or exceeds the similar capacity of beehive plants, however, it cannot justly be said that the byproduct type has gained supremacy. This condition will probably be reached in the coming autumn.*

ALTHOUGH the byproduct coke ovens of the United States gained supremacy over the beehive ovens in production in the closing months of 1918, and have maintained the lead more or less regularly since, an analysis of statistics and conditions would tend to confirm the belief that the former have yet to demonstrate their capacity to make more than 50 per cent. of the coke to be manufactured during the ordinary statistical period of a calendar year. This statement follows logically, if not convincingly, from a consideration of the fact that the outdistancing of the beehive oven has been more the result of trade conditions than of the development of the byproduct ovens to that point where they possess the physical preponderance of productive capacity.

Byproduct Plants Attain Maximum Capacity

In the last three months of 1918 the byproduct plants had attained their then maximum capacity and were holding it with only slight variations, such as were incident to interruptions in coal supply and similar considerations. At the same time the beehive ovens were combating the influenza epidemic and suffering a constant and steadily diminishing labor supply with a resultant gradual decrease in weekly output. Under these circumstances the beehive ovens yielded more readily than the byproduct to the deterrent influences on industry which followed the signing of the armistice and the removal of Government regulations on coal and coke. The merchant furnaces, feeling the necessity of curtailing operations to proportionately a greater extent than the other interests, merchant beehive coke operations were obliged to follow suit. The bulk of the byproduct ovens being associated with furnace plants, the rate of their operation was less seriously interfered with, hence the ability of the latter to maintain the lead in coke production, which was lost by the beehive ovens, not because the capacity of the former had exceeded the latter, but because of a combination of circumstances which had made the race an unequal one.

Whether a permanent handicap has thus been imposed upon the beehive industry, or its eclipse is but temporary, remains to be proved by the events of the current year. A study of the present situation is interesting, however, when considering what has come to be the generally accepted view that the leadership of the byproduct oven is even now absolute and indisputable. When considered in their entirety, and compared with 1917, the statistics of coke production in 1918, prepared by C. E. Lesher of the U. S. Geological Survey, merely show that the byproduct ovens made a further gain over the beehive as coke producers during the latter year. Only by a comparison of the weekly records —not the totals for the year—is the fact revealed that, with the exception of three weeks, the byproduct ovens led in tonnage only during the last quarter of the year. In January, 1919, beehive production made relatively the same weekly gain as the loss shown by byproduct ovens, the former thereby temporarily regaining their position as leader, which had been lost with the first week of October, 1918, when the production stood: Byproduct, 585,281; beehive, 574,000 tons. By the first week in February, 1919, the tables had been reversed and the byproduct ovens had regained first place. Since that date, upon which the collection of byproduct statistics under the Fuel Administration was discontinued, the exact status of the two divisions of the industry is not known, but the continued decline in output of the Connellsville region alone would indicate that the actual present lead of the byproduct ovens is greater than that prevailing at the close of the year.

COKE PRODUCTION IN THE UNITED STATES, FEB. 1, 1918—JAN. 31, 1919
(From Weekly Reports Compiled by C. E. Lesher, U. S. Geological Survey)

Week Ended 1918		Beehive Coke	Byproduct Coke	Total Coke	Week Ended 1918		Beehive Coke	Byproduct Coke	Total Coke
Feb.	2	470,000	366,073	836,000	Aug.	3	614,000	530,642	1,145,000
	9	510,000	367,675	878,000		10	574,000	526,955	1,101,000
	16	553,000	381,973	935,000		17	575,000	536,323	1,111,000
	23	567,000	403,296	970,000		24	593,000	546,058	1,138,000
						31	608,000	550,921	1,159,000
Mar.	2	629,000	420,228	1,049,000					
	9	635,000	458,492	1,093,000	Sept.	7	616,000	556,400	1,172,000
	16	644,000	466,307	1,110,000		14	635,000	553,371	1,188,000
	23	665,000	469,591	1,135,000		21	614,000	557,550	1,172,000
	30	649,000	473,563	1,123,000		28	610,000	576,254	1,186,000
Apr.	6	621,000	466,223	1,087,000	Oct.	5	574,000	585,281	1,159,000
	13	672,000	469,578	1,142,000		12	600,000	573,743	1,173,000
	20	667,000	470,916	1,138,000		19	572,000	578,027	1,150,000
	27	739,000	475,979	1,215,000		26	593,000	577,808	1,171,000
May	4	647,000	479,138	1,126,000	Nov.	2	558,000	577,757	1,136,000
	11	668,000	485,042	1,153,000		9	558,000	581,665	1,140,000
	18	678,000	484,688	1,163,000		16	552,000	570,990	1,123,000
	25	663,000	484,402	1,147,000		23	521,000	574,847	1,096,000
						30	522,000	572,239	1,094,000
June	1	612,000	479,824	1,092,000					
	8	636,000	481,997	1,118,000	Dec.	7	543,000	578,202	1,121,000
	15	661,000	484,290	1,145,000		14	553,000	580,930	1,134,000
	22	610,000	489,239	1,099,000		21	554,000	581,434	1,135,000
	29	604,000	496,274	1,100,000		28	440,000	563,362	1,003,000
					1919				
July	6	579,000	502,666	1,082,000	Jan.	4	479,000	546,298	1,025,000
	13	680,000	506,451	1,186,000		11	538,000	541,600	1,080,000
	20	632,000	517,671	1,150,000		18	557,000	559,298	1,116,000
	27	616,000	523,899	1,140,000		25	575,900	558,876	1,134,300

Mr. Lesher's statistics for 1918 credit the beehive ovens with having contributed 30,406,000 tons, or 53.1 per cent., and the byproduct ovens with 26,264,000 tons, or 46.4 per cent., of the grand total production of 56,670,000 tons of coke. Compared with the record of 1917 the byproduct ovens gained 4.2 per cent. and the beehive ovens lost a corresponding share of their contribution to the coke output of 1918. This was about one-half the rate of gain made by the byproduct ovens

in 1917 over 1916. In the latter year the beehive production of 35,464,224 tons—the greatest on record—was 66.1 per cent. and the byproduct production of 19,069,361 tons was 33.9 per cent. of the total.

Taking the figures for 1918, the byproduct ovens are found to have lacked 2,071,000 tons, or 3.6 per cent., of having produced a half of the coke made during the year. This fact alone would indicate that they had some distance to go before they could rightfully claim to have gained the ascendancy. Hence, as pointed out, the respective totals of the two types of ovens for the year 1918 do not make apparent the fact that the long-held distinction has been wholly lost by the more primitive of the two types. It is by a study of the month-to-month production during the closing quarter of the year that evidence is found that, for the first time in the history of the coking industry, the byproduct ovens have produced a greater quantity of coke within a given period of time than the beehive.

COMPARATIVE COKE PRODUCTION IN THE UNITED STATES
1893—1918

Year	Beehive Ovens	Per Cent.	Byproduct Ovens	Per Cent.	Total Net Ton
1893	9,464,730	98.8	12,850	1.2	9,477,580
1900	19,457,621	94.7	1,075,727	5.3	20,533,348
1910	34,570,076	82.8	7,138,734	17.2	41,708,810
1915	27,508,255	66.1	14,072,895	33.9	41,581,150
1916	35,464,224	66.1	19,069,361	33.9	54,533,585
1917	33,167,546	57.8	22,439,280	42.2	55,606,828
1918	30,406,000	53.6	26,264,000	46.4	56,670,000

On Feb. 1, 1918, when the weekly statistics of byproduct production began to be compiled, beehive production was 470,000 tons and byproduct 366,073 tons per week. The former rose and fell alternately, with a general upward trend, until the peak of 680,000 tons was reached in mid-July. Byproduct production grew gradually as new ovens and plants were placed in operation, attaining 502,666 tons by July 1 and the maximum for the year of 585,281 tons during the first week in October, overtaking the beehive ovens for the first time. During that week beehive production was 572,000 tons. The difference, 13,000 tons, was comparatively slight as coke tonnages are figured, but it was sufficient to register the first outdistancing of the beehive oven by its rival in the race for supremacy.

While the production of both types of ovens declined after Oct. 5, the byproduct output exceeded the beehive by 20,000 to 50,000 tons, or more, from week to week, with the exception of the last week in October and the closing weeks of January. Beginning with the first week in February, 1919, the byproduct ovens had regained their lost ground and, from all information at present available, and the fact that beehive production had dropped to 436,000 tons by Mar. 1, would appear to have retained their supremacy.

Beehive Oven Has Seen Its Best Days

It is by giving consideration to the recent augmentation of the byproduct equipment and that in course of construction that the conclusion becomes inevitable that the beehive oven is certain to sooner or later lose first place as a producer of coke. But from an inquiry into conditions prevailing during the closing months of 1918 and the opening months of 1919, it would appear that on the basis of the existing available equipment of the two types of ovens the byproduct will not possess the facilities for permanently wresting the honors from the beehive until well toward the close of the year. What conditions in the trade may do, with respect to the relative activity of the two types, is a different proposition and lies in the realm of speculation.

The builders' capacity ratings of the byproduct plants completed and in operation in the United States on Dec. 31, 1918, was 35,211,000 tons per annum. Practice having shown that even under the most favorable conditions the byproduct plants, taken as a whole, cannot be counted to yield more than 90 per cent. of their rated capacity, on account of repairs and other causes interfering with 100 per cent. operation, the commercial productive capacity of these plants was, in round numbers, only 31,700,000 tons per annum, or an average of 609,000 tons per week. Beehive production, on a greatly reduced schedule of operation and with many ovens on the inactive list, was 30,406,000 tons in 1918, or an average of 584,615 tons per week.

Byproduct Capacity Shows an Increase

If it is assumed that the beehive ovens will on the whole do no better in 1919 than in 1918, the byproduct ovens available for operation on Jan. 1 would, if operated at 90 per cent. capacity, maintain an average weekly lead of 24,385 tons, or a total of 1,294,000 tons during the current year. But byproduct capacity has already been increased during the first two months of 1919 by the completion of 374 ovens which, on a 90 per cent. operating basis, should add 942,000 tons to the year's output by this process. In addition to the ovens placed in operation since Jan. 1 there are 1376 in process of construction, although work has been temporarily suspended on several plants. If, as expected, these ovens are placed in operation by Oct. 1, the commercial capacity of the byproduct plants at that date will be increased by 3,467,500 tons to a grand total of 36,109,500 tons per annum, or an average of 694,000 tons per week.

Even though that capacity be attained by Oct. 1 it will be only during a part of the year that the byproduct ovens will have the capacity to produce coke at a higher rate per week than was attained by their cruder competitors in their heyday. In 1916, which was the record year in the production of beehive coke, 65,605 ovens of this type made 35,464,224 tons, and 6607 byproduct ovens made 19,069,361 tons, or weekly averages of 682,000 and 366,718 tons respectively. Assuming equated time of six months as the period of maximum production of all byproduct ovens built and building, the output for 1919 would reach approximately 34,000,000 tons, or a weekly average of 654,000 tons, or 28,000 tons less per week than the beehive average in 1916.

Since 1916 the number of available beehive ovens has been considerably reduced and practically no new plants have been built. Operations during 1918 show, however, that even under the many and severe restrictions imposed by shortage of labor, transportation troubles and the like, the beehive equipment was able to make some creditable weekly tonnages, compared with the record average of 1916. The week of Apr. 13 with 672,000, Apr. 27 with 739,000, May 18 with 678,000 and July 13 with 680,000 tons were all in excess of the banner byproduct week—Oct. 5, with a production of 585,281 tons—and reasonably within striking distance of the weekly average of 1916, had it been possible to have speeded up to near 100 per cent. capacity in 1918.

The year 1919 began with probably less than 90 per cent. of the beehive capacity of 1916 available for operation and with less than 75 per cent. of such oven

strength in blast. But with this curtailment in number and capacity a rate of operation equal to that in 1916 would still show the available beehive ovens capable of producing approximately 32,000,000 tons during the year, or an average of 614,000 tons per week, or about the same as the weekly average of byproduct ovens completed and in operation on Mar. 1. That 32,000,000 tons or more could be produced by the beehive ovens under favorable conditions during 1919 is fairly well established by the results of 1918 when 30,406,000 tons were produced when operating at much less than capacity of the ovens actually in use and with many serviceable ovens constantly out of blast.

It becomes apparent, therefore, that in point of productive capacity the lead of the byproduct oven over the beehive cannot be said to have been indisputably established until the capacity of byproduct ovens in operation has become equal to the task of making an average of more than 614,000 tons of coke per week, or a total of more than 32,000,000 tons within a twelvemonth. This can be attained when ovens now building have come to full production, but until this is an actuality the humble beehive can claim its ability to turn out the greater volume of coke if trade conditions will only provide the incentive and the opportunity to show what can be done.

Proposed Coal-Loading Machine

By H. R. Kirkbride
Allegheny County, Pennsylvania

NOW that the great war is ended and the world's markets will soon be opened up for competition, it devolves upon us to show our supremacy as the leading business nation of the world; to not only "be on the way," but to be "there with the goods" in quantity and quality, and at a price that any and every customer shall have no cause to question.

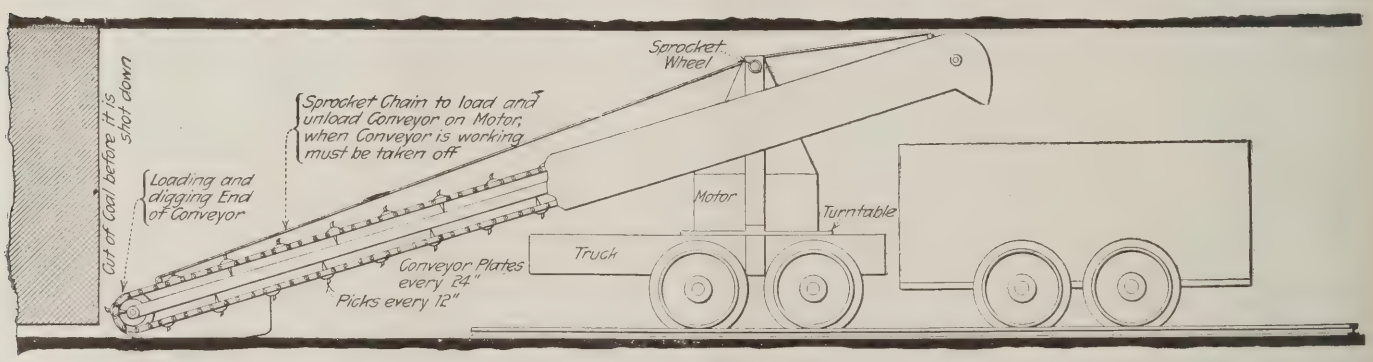
I will acknowledge that we have about reached the point of perfection in regard to ventilation, haulage, drainage and undercutting of coal, but I fail to see where we have made any progress worthy of mention in loading coal at the working face. We here employ the same old puffing and blowing, cursing and sweating, shoveling and scraping, with a little old-fashioned hand shovel, the same as our great grandfathers used when they were boys and worked in the mines. And if these old miners could come back again just to make an inspection, no doubt they would tell us that there was only one important thing about the mines that had us stuck, and that would be we shoveled and loaded coal at the face today in exactly the same way they did.

The question to me is this, and it seems to have got lost or strayed away from coal mining:

If it is economical for a coal operator to spend $1000 on a machine to undermine the coal and save 15c. on the cost per ton mined and double the amount produced, why would it not be economical for that same operator to spend $2000 on a machine to load that coal and save 30c. on the cost per ton loaded and likewise double the amount of coal produced? I have often heard it said that the cheapest thing that the mine owner had about his mine was the workingman. This might have been true in days gone by, but I could not accept it for the truth today.

In mines where the coal is 5 or 6 ft. thick and undermined with punching machines, the undercut is snubbed down. At the front the cut is 12 or 15 in. high and tapers down to about 3 in. at the back. The cut is 5 or 6 ft. deep. When the cutting is completed and the coal is blasted down, it falls away from the roof and the solid face of coal behind the cut. It is here broken up in fairly good shape for loading into the pit cars.

When the coal is mined and prepared for loading in this manner, I cannot see why loading machines should not be employed, more especially when we know that two men with a machine like the Myers-Whaley or the Halby shoveling machine can load as much as 200 tons per shift. By installing machines to load coal fewer men would be required to obtain a given output, because with machines to undermine the coal and machines to load it about two or three working places is all that would be required to keep these machines in steady operation without much moving about. One place would be getting cut while the other was being cleaned up, and *vice versa*. More coal would be produced with less rail, wire, pipe and other supplies, while lost motion would be cut down to a minimum in hunting around for a car of coal, as is often done in the mines nowadays.



SIDE VIEW AND PARTIAL SECTION OF PROPOSED COAL-LOADING MACHINE

I would not expect an ordinary shoveling machine built after the steam-shovel type to be successful where the coal is undercut with chain machines, because the coal remains too compact and solid even after it is shot down, so that the kind of a machine necessary in order to be successful in loading coal after chain machines must have the combined principles of digging and pulling the coal loose, shoveling it up, while at the same time it must convey and elevate it to a dumping point above the top of the pit car.

I herewith present my ideas of a machine which, if built and put to work, I feel sure would be a success.

In mines where the coal is 4 to 6 ft. thick and undercut with chain machines, the cut is generally 6 ft. deep and not more than 4 or 5 in. high from point to back. It takes more powder to blast this coal down than if it had been undercut with a punching machine; that is, to break it up so that it can be loosened sufficiently with a pick by the miner so that he can load it. If the average miner loads ten tons of coal per day after chain machines, he is working reasonably well. It would take a man two or three days to load out a cut as above described in a room about 25 ft. wide. Two men operating the machine shown in the accompanying illustration would clean up such a cut in about 2 hours, because with the conveyor built with an average working pitch of about 3 in. to the foot and the conveyor 18 ft. long and operating at a conveyor speed of about 200 ft. per minute and with blades 3½ in. deep, 2 ft. wide and spaced 2 ft. apart, this machine theoretically would deliver approximately 2 tons per minute. This obviously would be an impossibility in practice, but suppose that by reason of moving from one room to another and on account of the time that the conveyor would be stopped to change cars, throw off large pieces of bony, set posts, wait till butt shots were fired, etc., it would only be able to get, say, one-eighth of its theoretical output as good practical work. This would equal about 120 tons of coal loaded per 8-hour day.

To load by hand 120 tons of coal at 51c. per ton would cost $61.20; then, if two men were paid $10 each to run this machine and load 120 tons, there would be a clear saving of $61.20 — (10 × 2) = $41.20. Thus by using this conveyor coal would be loaded for less than 17c. per ton instead of 51c. as now, and this would be done with less hard work and more satisfaction.

This kind of machine, if built light and detachable from the truck, with the motor built compactly on one side of the conveyor instead of underneath it, could be used to load coal in any mine where chain machines are used for undercutting. I have seen coal as low as 2 ft. 3 in. thick cut regularly with chain machines.

A machine of this type could be built at almost any mine blacksmith or machine shop where chain machines are used. I have often noticed large pieces of sheet steel, sprocket chains, sprocket and gear wheels, car wheels and axles, cutting machines and locomotive motors that were not in use. A sorting out of the junk pile, a little time and patience and a good mechanic is about all, in my opinion, that would be required to build a loading machine of this character. I will here leave this problem for someone else to handle who may be in better shape and equally as anxious as myself to see progress made in coal mining.

THE CAUSE

Written Expressly for COAL AGE

BY BERTON BRALEY

BOLSHEVISM grows out of bitter woes.
It's a weed that tyranny has sown.
Exploitation, greed, fertilize the seed
Till a noxious jungle-plant has grown.
Ruthlessness and force cannot stop its course,
They but make it tower to the skies;
But where Justice reigns over men's domains,
Bolshevism withers up and dies!

IF it rears its dread, monstrous hydra-head,
Search the social system for the cause.
Where it waxes strong there is something wrong,
Wrong about the methods or the laws.
Bolshevism comes out of rotten slums,
Ignorance and want and discontent;
These things make it thrive, grow and keep alive,
Till it looms immense, malevolent!

BOLSHEVISM'S clutch loosens at the touch
Of the hand of Justice and of Right.
It will perish where life is fair and square,
Cease to be a menace and a blight.
Look, then, to yourself; let no greed of pelf
Blind you to the fact you may not doubt.
Guns will never cure—here's your weapon sure,
Justice put the Bolshevist to rout!

SNAPSHOTS IN COAL MINING



VIEW OF THE SURFACE PLANT OF THE SUNDAY CREEK COAL CO. MINE AT SAN TOY, OHIO



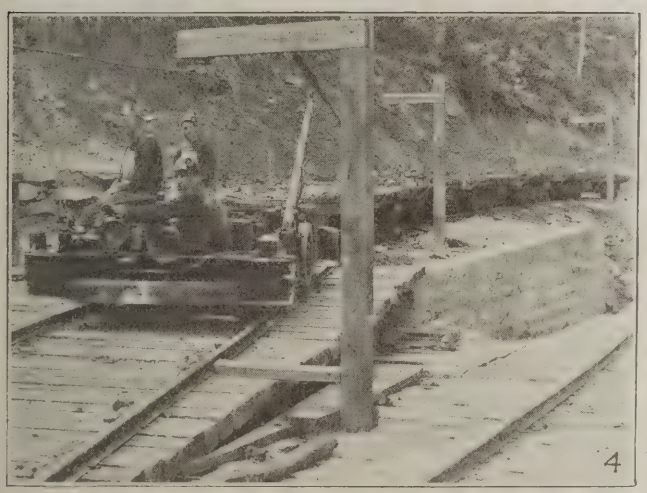
LYMN PRODUCER-GAS PLANT (BYPRODUCT PRODUCER) OF THE MONONGAHELA VALLEY TRACTION COMPANY AT FAIRMONT, WEST VIRGINIA

Seven units consuming about 75 tons of coal per day, producing the equivalent of 1,500,000 cu.ft. of natural gas in addition to other byproducts











SOME VIEWS IN AND AROUND COAL-MINING PLANTS

1—Old engine-driven pump still in use at a Pennsylvania mine. 2—Type of miner's cottage at a Western operation. 3—View of the Stag Canon Fuel Co. plant in New Mexico. 4—Trip on its way to dump, Vulcan Coal Co., Vulcan, W. Va. 5—Group of miners' children at play in a Western mine village playground.

FIVE DOLLARS FOR BEST MINE PHOTOGRAPH

A READER can oftentimes obtain more information from a rapid glance at an illustration than from a laborious reading of paragraph after paragraph of mere descriptive matter. The illustrations accompanying the write-up of a new mine plant, for instance, help convey the story; used in conjunction with a well prepared article, they are an invaluable aid to proper understanding. All this is by way of preamble to a confession. *Coal Age* is meeting with ever-increasing difficulty in obtaining photographs of general interest and technical value to colliery men. So we want to enlist the aid of every reader of this paper. To stimulate interest in this matter, the editor of *Coal Age* will pay $5 each week for the best photograph sent in by any subscriber. Prints submitted must be for the exclusive use of *Coal Age* and must not have been previously published. All photographs not awarded the $5, but accepted for publication, will be paid for at a liberal space rate. The sender's name and address, with a brief description of the picture, must accompany each photograph. All prints will be returned, if desired.

Practical Miners' Course of the University of Kentucky

Many readers of *Coal Age* will be pleased to know of the progress made in the teaching of practical coal mining, during the past decade, at the University of Kentucky, at Lexington. In December, 1907, the Board of Trustees of the University established an eight-weeks' course for practical miners, at the request of Prof. C. J. Norwood, then dean of the College of Mines and Metallurgy. In June, 1918, Professor Norwood resigned his position at the University to accept the appointment, by the governor, as chief of the Department of Mines in Kentucky.

At that time the Board of Trustees of the University merged the three engineering colleges—College of Civil Engineering, College of Mechanical and Electrical Engineering and College of Mines and Metallurgy—into a single college known as the College of Engineering. Prof. T. J. Barr then succeeded to the position of professor of mining engineering and, as such, is in charge of the present eight-weeks' course for practical miners, which will open Apr. 1, 1919. Professor Norwood will be recognized standing in the front row, the eighth man from the right, and Professor Barr the fifth from the left, in the illustration.



CLASS OF 1918 IN UNIVERSITY OF KENTUCKY PRACTICAL MINING COURSE

There is every prospect that the class this year will be a large one, and Professor Barr has prepared an elaborate schedule covering the various subjects relating to the mining of coal. In the preparation of this course special attention has been given to the requirements of men desiring to present themselves at the examination for certificates of competency, as required by the state mining law. A point worthy of mention is the fact that the University has made instruction in this course entirely free, there being no charge even for matriculation.

Instruction is given by men who have had practical mining experience and been in daily contact with miners at their work and in their home surroundings. By reason of this experience and long association with the work of mining coal they are able to approach each subject from the viewpoint of the practical miner and present it more simply and clearly than otherwise would be possible. At the close of the course, May 24, each man that has done satisfactory work will be awarded a certificate of proficiency from the University.

For the convenience of those who live at a distance, but who desire to take the examination before the State Mining Board, which meets at Lexington, it has been arranged that the Board of Examiners will be in session May 26, the second day following the close of the course at the University. This arrangement will be greatly appreciated by those taking the examination, as it will avoid the necessity of their making an extra trip to Lexington for that purpose. Following is a copy of the schedule of instruction showing the several subjects taught in the course and the topic studied under each subject:

1. *Arithmetic.*—Instruction will be given in arithmetic, according to a man's needs, throughout the course.

2. *Coal Mining.*—(a) The different systems of laying out the workings, and the applicability of each, etc. (b) Blasting; dangerous and safe methods; "permissible" explosives; care and handling of explosives. (c) Timbering; principles and different methods; good and bad joints; computing the strength of pillars, distance between props, etc. (d) Sinking shafts and slopes; safety appliances for shaft and slope mines.

3. *Ventilation.*—Principles and methods; furnaces and fans; coursing, splitting, regulating and measuring the air current; use of anemometer, water gage, etc.; overcasts and undercasts; exercises in working out problems.

4. *Drainage.*—Siphons, pumps, air-lifts; setting pumps; laying pipe lines, etc.

5. *Mining Machinery.*—Haulage and hoisting; steam engines, gasoline motors and electric motors; compressed air; coal cutters, etc.

6. *Mine Gases.*—Nature, effects and indications of the presence of each; reducing dangerous conditions; exercises in problems. Illustrated with experiments, for which ample time has now been allowed.

7. *Safety Lamps and Testing.*—Principle of the safety lamp; care and use of safety lamps; methods of testing for gas. An excellent collection of various types of lamps is available for use in explaining the features of different makes. Natural gas is used for practice in detecting "caps" on the safety lamp.

8. *Explosions.*—Causes and safeguards; management of dust.

9. *Mine Fires.*—Causes and management of fires; reopening workings after a fire.

10. *Rescue and Relief.*—Methods of procedure after an explosion; organization of parties; dangers to be guarded against; temporary ventilation; expedients for carrying the air through the mine; use of rescue apparatus.

11. *Surveying and Map Drawing.*—Use of surveying and leveling instruments; putting up sights, marking off rooms at various angles; laying off curves, etc.; drawing the mine map; making blueprints. Men may devote all the course to surveying if they so desire.

12. *Kentucky Mining Law.*—A thorough drill in the mining law is given, and the formation of mine rules is discussed.



Operators Insist on Stabilization of Coal Prices

It is evident that coal operators who met with the Industrial Board Mar. 26 and 27 convinced the majority of the members of the board that the National Coal Association is right in its stand in insisting that the Government agencies which use fuel must be a party to any agreement involving the lowering of prices and their stabilization. Chairman Peek, of the Industrial Board, was taken by surprise at the attitude of the Railroad Administration. At the outset, he apparently was of the opinion that the Railroad Administration would be a party to any stabilization program which might be agreed upon. The coal operators, however, had had more experience with the Railroad Administration than had Mr. Peek. They insisted that the Railroad Administration commit itself in a definite manner. When it came to giving positive assurances, it became apparent to all that the Railroad Administration was reluctant to depart from its practice of buying coal as cheaply as possible without regard for the effects on the industry, labor and the general public.

Two significant events of recent occurrence convinced the operators that they must take a determined stand in their relationships with the Railroad Administration. In the first place, they had seen the splendid spirit displayed in the announced railroad fuel policy of the Director General disregarded in practice by his subordinates who have in charge the actual purchases of the necessary coal. In a public statement given to the press, the National Coal Association declared that "the Railroad Administration has adopted unfair practices which would drive the price of railroad fuel below the cost of production." In the second place they had learned that the steel manufacturers had discovered, to their regret, that the Railroad Administration feels in no way bound to buy rails at the stabilized price agreed upon with the Industrial Board. These instances led to the adoption of the following resolution:

Resolved by the representatives of the bituminous coal operators of the United States, in meeting assembled in Washington, Mar. 27, 1919, at the request of the Industrial Board of the Department of Commerce, acting in conjunction with the United States Fuel Administrator, that the operators of the country declare themselves ready to go into conference with the Industrial Board with a view to coöperating with the Government in stabilizing prices of bituminous coal during the readjustment period upon their being assured by the Industrial Board that the United States Railroad Administration and other Governmental agencies purchasing coal are also willing to coöperate.

While the discussion centered largely round the Railroad Administration, because the railroads take one-third of the bituminous production of the country, other Government purchasers of coal are held to be in the same class. The Navy's purchases, for instance, are of the greatest importance to the Pocahontas district. The Army will continue to be a large consumer for many months to come. The Interior Department maintains a central coal yard in Washington from which all the Government departments are supplied. The operators contend that no price stabilization could hope to amount to anything unless the Government itself buys at the terms that it arranges for other consumers.

As an evidence that the Industrial Board recognizes the validity of the stand taken by the coal operators, it is understood that the President's cabinet is to be asked to pass upon a definite policy in regard to Government participation in the stabilization program of the Department of Commerce. It is understood that the President is to be consulted before such a policy is announced.

Asks Interpretation on Contract Clause for Railroad Coal

The Attorney General has been asked to interpret the contract clause which the President had inserted in all the contracts eliminating the payment of brokerage or commission on contracts obtained from the Government. The interpretation has been asked by the Railroad Administration. The action was taken as the outcome of conferences between George H. Cushing, for the American Wholesale Coal Association, and H. P. Spencer, of the purchasing division of the Railroad Administration. The clause is contained, of course, in all contracts for railroad fuel. This led Mr. Cushing to formulate the following questions, which are the ones which have been referred to the Attorney General:

Some mining companies employ their managers of sales on a salary and allow them a commission on all coal sold. This arrangement is covered by a contract between the operator and his sales manager, and involves the whole output of the mine. Would the existence of such a contract bar that operator from selling coal to the United States Government for the use of the Railroad Administration?

If such a mine should sell to the Railroad Administration, would it bar that sales manager from collecting his commission on that coal?

Some coal operators own mines in several fields. These operators have organized separate selling companies, which buy the coal from all these groups of mines or at least dispose of it for the mines on the same basis. Under Sec. 6, would such selling company be prohibited from selling coal to the United States Government for the use of the Railroad Administration?

A third group of mines, related but not identical, in ownership, disposed of its entire output to a selling company which is owned by the majority interest in the several mines. In some cases this selling company pays a fixed price per ton for this coal. In others it gets as its compensation a percentage of the selling price. In still other cases it is allowed a minimum fixed price per ton from the operators plus a portion of any price obtained in excess of a stipulated minimum. Is this selling company prevented by Sec. 6 from selling coal to the United States Government for the use of the Railroad Administration?

Another group of mines is owned by a railroad company. To satisfy a decree of the United States Supreme Court, these coal mines have sold their entire output to a separate selling company. This selling company owns the coal outright. Under Sec. 6, is that selling company prohibited from selling coal to the United States Government for use of the United States Railroad Administration? In a word, are the mines owned by the railroad prohibited from disposing of their coal to the owner railroad by reason of this contract of sale?

By far the largest percentage of the mines of the United States are small mines. The average production of coal per mine, in fact, is less than 500 tons a day. On the average, the coal-producing companies own less than two mines each. This means that the average operator of the United States has less than 1000 tons of coal a day to sell.

However, the average mine has a market extending over more than five states. It is impractical for an operator having less than 1000 tons a day to sell, to support a sales force large enough to cover five states or more and do so at the cost of sales which is not prohibitive. Therefore, the average coal-mining company depends upon some selling agency to distribute his coal. The wholesaler selected becomes responsible to the mine for marketing a hundred per cent. of its product. The wholesaler, sometimes, buys the coal at a fixed price per ton at the mine and gets his compensation by being able to get for the coal a higher price. In most instances, the wholesaler gets his compensation by agreeing with the producer to accept a fixed percentage of the selling price. In other instances the wholesaler gets his compensation by deducting a fixed amount per ton from the selling price on all of the coal. Such wholesaler is the selling department of the mine. Under Sec. 6 he is seemingly classified as a third party in the transaction. Does Sec. 6 prevent this wholesaler from selling coal to the United States Government for use by the Railroad Administration?

Are the coal mines which sell through such wholesaler prohibited by the fact of that selling contract from participating in the business of supplying the railroads with coal?

Ordinarily each railroad buys its normal supply of coal from a nearby producing mine. Sometimes—such as in pre-strike periods and in cases of a grave and general disturbance of the coal market—the railroad finds it necessary to get additional coal from a more distant field. In such cases the railroad has been accustomed to request wholesalers in coal to canvass the distant field and procure large quantities for them. The railroads under such circumstances have compensated the wholesaler in the customary way. Under Sec. 6, are the railroads prohibited from using this purchasing agent in this way?

In times when the supply of coal has been short in the past, it has been the practice of the railroads to avoid advancing coal prices upon themselves by saying that they were "out of the market." They knew, however, that a certain amount of coal was being shipped to market intended to be sold to them. They knew that this coal would soon be under demurrage and that the owner of it would be willing to sacrifice it in order to move it. Taking advantage of this situation, they have entered into a secret contract with a broker to purchase this "distress" coal for them and have compensated him in the customary way. Under Sec. 6, would the railroads be prohibited from using the broker in this way? Would the transaction be invalidated by the fact that the broker had been so employed and paid?

In many instances coal mines have gone into bankruptcy. They are managed by the court. The receiver has appointed one man to operate the mines and another to sell the coal. Both men are employed on a commission basis. Under Sec. 6, would the sales agent appointed by the court on a commission basis be prevented from selling coal to the United States Government for the use of the Railroad Administration?

In many cases a wholesaler in coal purchases for cash a given amount of coal per month from a mine without regard to whether it is the whole output of that mine or any fixed proportion of it. He thereby becomes the owner of that coal. Under Sec. 6, is he prevented from selling that coal at a profit to the United States Government for use of the Railroad Administration?

Navy Will Survey Alaska Coal Field

The Navy Department has announced that a commission, consisting of five members—three naval officers, a mining engineer and a geologist—will be sent to Alaska to ascertain what steps should be taken in connection with the development of the Matanuska coal fields.

The commission sailed with the vessels recently ordered to leave Puget Sound Navy Yard on Apr. 1 to patrol Alaskan waters. It will be under the direction of a line officer of rank and will include two junior officers, Sumner Smith, superintendent of mining in Alaska, and Theodore Shapin, geologist.

In the naval appropriation act, which failed of passage at the last session of Congress, was the following provision: "One million dollars of which, or so much thereof as may be necessary, may, in his discretion, be used by the Secretary of the Navy in mining coal or contracting for the same in Alaska, the transportation of the same, and the construction of coal bunkers and the necessary docks for use in supplying ships therewith, and the Secretary of the Navy is hereby authorized to select from the public coal lands in Alaska such areas as may be necessary for use by him for the purpose stated herein." With a view to reopening the whole matter before the next Congress the Secretary of the Navy ordered the present investigation.

Railroad Administration Would Retain Tidewater Coal Exchange

The Railroad Administration continues to insist on the retention of the Tidewater Coal Exchange. The principal reason is shown by the following figures setting forth the actual savings to the railroads:

Tonnage dumped	48,785,967
Number of cars dumped	967,800
Cars saved on gross detention basis	1,747,600
Saving effected on per diem basis	$1,048,560
Cars saved	47,035
Investment necessary to have procured 47,035 cars at $2900 per car	$136,401,500
Interest on above investment at 6 per cent	$8,184,090
Credits extended to members (excluding Government members) tons	3,000,000

Rapid progress is being made in the revision of the rules of the Exchange and in the reclassification of mines. That work is in the hands of the following committee:

J. R. Thomas, president, Carbon Fuel Co., Charleston, W. Va.; W. C. Ireland, sales manager, Jamison Coal and Coke Co., Pittsburgh, Penn.; Harry Boulton, president, Central Pennsylvania Coal Producers Association, Clearfield, Penn.; John J. Tierney, vice president and general sales manager, Crozer-Pocahontas Coal Co., Philadelphia, Penn.; John J. Brophy, treasurer and general manager, Piedmont and Georges Creek Coal Co., Frostburg, Md.; Arnold Gerstell, sales manager, Percy Heilner and Sons Co., Philadelphia, Penn.; W. A. Marshall, president, New York Wholesale Coal Trade Association, New York, N. Y.

EDITORIALS

The American Job and His Comforters

NO GREAT confidence in the future of business will come to the citizens of the United States by listening to the assurances of Secretary of Commerce W. C. Redfield, for that functionary has been vouchsafed many visions of a conflicting nature which he has been at no pains to reconcile. In fact, Mr. Redfield is a two-headed Janus. It has been noted for long that one head shouted "Trade with Europe" and another head cried as vigorously "Forbear."

He has indeed reached nearer than any other the Scriptural injunction, "Let not your right hand know what your left hand doeth." With one hand he would aid American trade to enter European markets regardless of any peculiar aptitude for such invasion; with another he would restrain that same trade in that identical purpose, and do it equally without regard to the fitness of things. He reincarnates for us that Launcelot Gobbo, whose uncertainty of view so greatly amuses the audience in a presentation of the "Merchant of Venice."

But in regard to domestic trade, his attitude is equally perplexing. " 'Buy only what you need, but buy it now,' seems good patriotism," he remarked when addressing the National Retail Dry Goods Association last February. By the way, this was not a well-selected audience for the delivery of such a message, for everybody, as far one can observe, is buying dry goods to the limit. Advice to purchase is not needed. The dry-goods trade needs only the vanity of the public, which never fails so long as the purse holds out.

The need is not for expenditures in trivialities, but for outlays in permanent possessions—houses, railroads, water-works, sewers and roads. Mr. Redfield stimulates these basal industries by such words as these: "It cannot be expected that prices will fall soon to their pre-war level." Surely this is cold comfort. Before the war the cost of a house might be $4500. To construct that same house today would cost $7000. After a few years, Mr. Redfield suggests, if he does not actually say it, a similar house may be constructed for $4500. The investor would lose $2500 on his expenditure and meanwhile, if he lets the house, he will get only an insignificant net rent and if he occupies it he will make little by being his own landlord, for while present-day rents may be considered high on the basis of cost of original construction and on the former costs of maintenance, they are not high on work now constructed especially when present costs of maintenance are also considered.

This is the "modest part" Mr. Redfield is demanding of the home builder and the investor in property. "It may mean," he adds, "a little sacrifice here and there in paying at this moment a *somewhat higher* price than we might pay *a month or two later*, but we have become accustomed to sacrifice for the country's sake." Mr. Redfield does not italicize "somewhat higher" and "a month or two later." The fact is, his vision should have stretched over a longer period. The word "sacrifice" would then have been well justified, for the price so regarded would be by no means only "somewhat higher."

But all this argument of Mr. Redfield's is not based on facts. The cost of living as a whole is to go up, not down, though edibles will probably fall somewhat. Above all, rents and the price of bricks and mortar are to rise and not fall. There is no risk at all in building. Construction can go ahead without any apprehension. It is not self-sacrificing to build, however patriotic it may be. It is a wise move, one dictated by prudence. The only doubt that arises in the mind finds a place there because of the attempted stabilization of prices by Government pressure.

The Government is forever alarming the public. Its action retards rather than accelerates business. Men wait for the Government price. If there is no reduction, they still wait; if there is one, they take courage to hope for more. No worth-while business was ever secured on a declining market. It is such a market Mr. Redfield is trying to secure for us, telling us all the time that it will come about very slowly. Yet he is doing all he can to hasten a fall in market prices.

No wonder the public halts despairingly. Every purchasing agent is afraid to buy lest Mr. Redfield should succeed in doing him an injury. Meanwhile that worthy pats him on the shoulder and says: "My friend, help the country by buying and I will try to hurt you by lowering the value of what you buy. Stimulate the country by your sacrifices while I scare it stiff by my actions and speeches."

Every engineering office should be furnished with a library of books containing data fundamental to the work of that department. The library should be supplied by the company and augmented as often as appears necessary. Why should the engineer be required to supply the mental aids to his work—the books—any more than the physical aids—the transits, levels and tapes? With such salaries as are paid, many men are obliged to let their work limp rather than buy the multiplicity of books necessary for complete and ready reference.

Resumption Is Already in Evidence

SINGLE-TRACK minds—and such cerebrations are in the majority—are always ready to assume that on no basis can any business structure be reared but that on which it has been reared in the past. There are engineers who, seeing an uncompleted tipple, breaker or washery, and not having the plan, would say: "Pull it down. I will design another." Certain minds seeing the present wage structure, and the attitude of labor and capital, have despaired of erecting on it anything of value and have called at once for tools of demolition. "Pull it down," was their cry, "and build a new structure on the original bed rock."

Reconstruction rather than resumption was all that would please them. Tories and radicals were equally

vocal in favor of reconstruction, each seeking a diametrically opposite end. To the tory a fall of the structure of the last few years, with dust, noise and destruction seemed better than resumption. But nevertheless the resumers are winning. We go forward from where we left off. The war structure is still a part of the building, as stable as anything that was there before and as solid as anything we may add thereto hereafter.

It is strange how many people fail to react immediately to a new order and try to persuade themselves into believing it is merely temporary. But the new order is developing a conservatism of its own. New wages and new prices have a permanency that cannot well be disturbed. A torn-up tree or other plant can seldom be replanted, and indeed few there be that want to try the experiment of disturbing such a well-developed organism.

The price of stocks have been steadily upward for the last two or three weeks. The output of coal is on the increase. Coal orders are already more numerous. The price is going up, especially the price of anthracite. The reports of all the authorities on trade which we publish weekly are now cheering. *Bradstreet*, the *Dry Goods Economist*, the *American Wool and Cotton Reporter*, *Dun* and the *Iron Age* all tell stories of resumption in all, or in their special, fields. We are growing warm toward business. What some of us have reasoned, millions of us are beginning to know. The tide has turned. In a month or two prices will be a trifle higher if anything, and yet no one will be talking about high prices for we shall realize that they have come to stay and that what we buy can be sold for more than was paid for it. When that is the case, prices are no longer high.

"A man in his time plays many parts." In the morning he dons his working clothes and goes into the mine and does service for others. Anon he leaves the mine and dresses to do his marketing, requiring others to do him service. What a marvel is in that dressing! Before it the miner is employee, after it employer; before it servant, after it master. Who shall deny the solidarity of labor and capital when the twain are one flesh and change from one to the other by the shedding of a coat?

Law of Permanence of High Prices

IN GENERAL the permanence of high prices amounts almost to the dignity of a law. There are exceptions, it is true. But speaking broadly high prices tend to remain, provided they last long enough to increase wages. The pocket which has been expanded almost never hangs with the old grace of outline. The reason is that wage rates tend to have permanence, the public mind having become receptive and favorable to the figures by which wages are denominated.

But this is not all. It appears that after a war at least some prices tend to increase rather than decrease. Wars that did little to stimulate some prices proved able to stimulate them immensely later, and some wars which raised prices greatly were followed by further price stimulation thereafter.

In what follows, the figures quoted are those of E. A. Kebler, published in the *Iron Age*. He shows No. 1 foundry pig iron sold in Philadelphia in October, 1862, at $18.61. In August, 1864, the same quotation on a gold basis was $29.44, the increase resulting from the Civil War. Lee surrendered in April, 1865. One would expect the price to fall with the ending of what, on the face, would appear to be the whole exciting cause, but the average price for the year 1866 was $46.67. The Franco-Prussian War, which was declared July 10, 1870, when No. 1 foundry at Philadelphia was selling at $32.75, ended May, 1871, with the same pig iron selling at $35.50. In June, 1872, the price had mounted to $53.37.

The Spanish-American War did little to stimulate the price of pig iron till its close. Valley bessemer, when the war really began—January, 1898—was $9.12. War was actually declared April, 1898, the price having risen to $9.66. When the war ended—August, 1898—the price was only $9.60, yet in December, 1900, it had reached $24.20. The Russo-Japanese war, lasting from Feb. 10, 1904, till Sept. 9, 1905, raised the price of Valley bessemer from $12.64 to $14.95. In May, 1907, the price had mounted to $23.28.

Thus the high prices that close a war and fill every one with alarm are followed by a flood that sweeps everything before it. There is even now a telltale white cap on the free surface of the gently receding waters which shows that the overwhelming wave of high prices, noticeable after all wars, is preparing to hurl itself landward.

Did you ever see an Italian, Slovak, Slav or Hungarian workingman wearing spectacles? Either the people of Italy, Checko-Slovakia, Jugo-Slavia or Hungary have exceptional vision or there are a large number of them stumbling along in semidarkness, unsafe not only because language makes them dumb, but because defects of vision make them blind. Faults, blamed to cerebration, which, if defective, cannot be cured, may really be due to astigmatism or to the unadjusted focal length of the crystalline lens. Such defects of this kind as are congenital are probably more likely to be found among workingmen than among superintendents and managers, for these physical defects militate against advancement in the social scale.

Coal Resources of Germany

A SHORT time ago there appeared in *Coal Age* a request from a Montana correspondent asking for any information that might be available in regard to the coal reserves of Germany. The inquiry caught the eye of George Otis Smith, director of the United States Geological Survey, and he at once appointed one of the geologists of the Survey, Eugene Stebinger, to the task of compiling the information asked, from the records of the department.

It should be stated here that the U. S. Geological Survey, under the guidance of its director, has recently been engaged in extending its service by compiling vast stores of information and data relating to the mineral resources of other countries, which are now available to those seeking such facts.

The contribution regarding the coal resources of Germany, prepared especially for *Coal Age*, by Mr. Stebinger, will be found on another page of this issue in the Discussion by Readers department. It is valuable as forecasting the future of the world's coal trade by the presentation of suggestive data.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Every prospect seems favorable to a strike of long duration soon after the Peace Conference comes to an end in Europe and the ratifications are received. It is questionable whether a strike is such an evil as some regard it. Nothing would do as much as a suspension of work to give tone to the market and make the hesitating and bargaining consumer turn in his orders early. Even the prospect of a big strike might bring the prosperity we are seeking. When purchasers begin to fear that their orders may not be filled unless placed early, they will deluge the markets with inquiries and the market place with unavailing outcries.

For the good of the United States and for the advantage of the whole world, the six-hour day must not be put in operation, certainly not suddenly. It is a revolutionary provision to say that we will do with only 75 per cent. of the prosperity we have been enjoying hitherto. It may be said that we have already cut the hours from 12 to 10 and from 10 to 8, but the reduction from 12 to 8 hours has been slow. It has been accompanied by the speeding-up process. It had its justification in the greater efficiency inherent in the short-time laborer. Few men *worked* 12 hours. Nature would not permit it. They stayed on the job 12 hours and did as little as they could.

A Six-Hour Man Will Earn a Six-Hour Living

On the other hand the eight-hour man can easily keep up his zest for every one of the eight hours. He could hardly be more enthusiastic if he worked only six, so there is no economical advantage securable in a six-hour day. It may, however, be justified by the thought that men need more leisure and could do with less goods, but if there is anywhere a man who desires less goods he is extremely hard to find; and it is well understood that the workman seeks more leisure without any countervailing reduction of his power to purchase.

Resistance to the desired shorter time is therefore a public duty of the operator which he will probably perform even if it involves a strike. He will be equally well justified in opposing the institution of Saturday as a holiday. As for increases in tonnage, daywork, yardage and deadwork, the operator could pay them and turn the charge over to the public, but the public is not disposed to pay any more for coal and might prove restive. A refusal to grant the mine worker what he wants is therefore more than likely.

If Time Is Short Coal Will Be Short Also

If we have a six-hour day and a five-day week, there is bound to be a shortage of coal. The bituminous mines have worked nearly every winter an eight-hour day and six-day week. They produced under that arrangement 60 per cent. more than they will under that proposed, and yet they barely filled the demand for that season. Formerly they got a large increase of force from across the seas month by month. A careful investigation by the National Coal Association shows that as soon as the war is over 36,000 foreign-born miners will go abroad and half of them will stay. The men going overseas constitute only 2.4 per cent. of all the present force. Those who will remain will constitute about 1.2 per cent. This does not seem much, but the flow should be the other way.

There is reason, therefore, to expect an extremely busy winter even if the mine workers work a full 48-hour week. With a 30-hour week the public is not likely to be satisfactorily or even safely supplied. As usual, the mine operators will be recommended by the public to give the 30-hour week, will be asked to concede the wage increase and then blamed when, as a result, cost rises and the demand for coal is not met.

The export activity of the United States in Sweden, Holland and Brazil is being used as a reason why Great Britain cannot afford to accede to the miner's request for a six-hour day and for largely increased wages. It is likely that the British miners will call on our miners to hobble the American coal trade with the same hampering restrictions they are able to impose on British trade. Output is hereafter to bear equal fetters the world over. That will handicap all nations equally and so will be fair. That is, it will be just as disastrous to the American workman as to the British. The real pay of both will be equally cut.

Slowness of Run To Affect All Equally

At a meeting of the officers and members of the grievance committees of the locals of eight mines of the Lehigh & Wilkes-Barre Coal Co. it was decided that all mine workers must stay away from the mines on "idle days." Each local will be asked to list such work as is regarded "necessary." At this meeting representatives declared that at some collieries the coal that was mined in two days was brought out in one day. Thus the day workers were getting only one day's pay for two days' product. To make this practice of thrifty miners unprofitable a fine of $15 or the calling of a strike was threatened.

The complaint is not so much against the company as against the men who work so steadily. The locals discussed calling on the company to break up the practice. The men are complaining that some men get nine or ten cars a day and others but one or two. They assert that the successful work of the men who thus make large wages is featured whenever increased wages are demanded. It is then shown that they have made large wages and it is argued that no increase should be given. This is the reason, say the grumblers, why meager increases are the rule. However, any one who has been around the mines knows that there are other, and extremely important, reasons for differences in output, these differences relating to the steadiness, energy and skill of the men. The best places are given to the most reliable workers. If there is a bad place it is apt to fall to the man whose work is so poor that the management wishes he would quit.

On Mar. 13 Local No. 506 passed a resolution vigorously condemning miners at the Locust Spring and Locust Gap collieries who cut coal on idle days and attached a fine of $25 for each offense. Similar resolutions providing fines have been passed by many locals in the Shamokin, Mt. Carmel and Mahanoy City districts. The locals are determined to put these resolutions into practice. The General Mine Committees of Shamokin and Mt. Carmel, which met at Kulpmont, fixed the fine, not at $25, but at $50.

What Else Could He Expect?



and until Old Man Economics changes his nature, it's about all the little fellow can expect!

Courtesy of Current Affairs

Mine Reverts to the Frick Scale

The mine workers of the W. J. Rainey Coke Co., in the Connellsville coke region, have been on strike during the past week because of a decision on the part of the company that it will no longer supply free explosives for the shooting of pick-mined coal.

The operators in the Connellsville region follow, in general, the "Frick scale," a scale made by the H. C. Frick Coke Co., which is usually posted by the other operators of the region around Uniontown and Connellsville immediately after the Frick company announces a change in wage. The Frick scale provides that free explosives shall be furnished for the shooting of machine-mined coal, but that what little explosive is needed by the pick miner shall be provided by himself.

During the war several of the Connellsville operators, seeking to hold their men, set aside this exception and supplied powder to all who needed it in their work. Now that the demand for coal is lessening and prices have shown a weakening, the practice has become a burden, and the companies are desirous of returning to the scale provision. When the Rainey company tried to get from under their revision of the scale the men struck.

It is reported that many of the men desire to continue at work, but have been detained from so doing by fear of violence on the part of the leaders of the strike. For this reason the State Police were called on for protection, and operations were resumed Mar. 27 with a partial force.

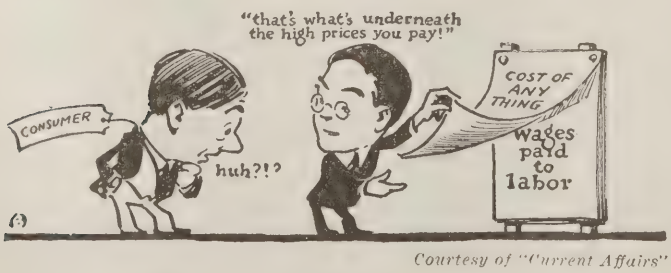
Resent Punishment of Intimidators

Trouble is brewing in Raleigh County, West Virginia, where on Mar. 19 thirteen members of District No. 29, of the United Mine Workers of America, were indicted by the Raleigh County Grand Jury charged with being parties to a shooting at the mines of the E. E. White Coal Co. that took place in November, 1917, placing the lives of several miners in jeopardy. Two felony indictments were returned against each man, one for attempted murder and one under what is known as the Red Man's Act. The men who are indicted will come up for trial at the June term of court. They are: Lawrence Dwyer, international board member; Obe Clendennin; Ed Snyder; Toney Stafford; George Lucas; Tom McGinnis; Dorr Snuffer, Tom Murphy, Ed Hornick, Will Owens, Tom Lethco, Tony Sarazzo and Karl Kram.

If the men are convicted on either count it will mean a sentence in the penitentiary. For that reason feeling runs high among the miners and some of the bolder ones are resorting to threats as to what will happen when and if the men are tried. At preliminary hearings there were manifestations of this spirit of resistance to the law.

Want Shorter Day but No Bolshevism

The convention of District 21, United Mine Workers of America, at Muskogee, Okla., adopted resolutions denouncing the Industrial Workers of the World and the Working Class Union and organizations preaching Bolshevism in the United States. The convention framed a policy to be recommended to the International Convention, the basic principle being a six-hour day, which, it was asserted, will keep the men at work and at the same time eliminate surplus production.



Courtesy of "Current Affairs"

Great Britain's Miners Do Not Strike

The miners in Great Britain, except about 7000 in South Wales, seem to be willing to accept the ruling of the majority in the Sankey commission. That unimportant 7000 are already on strike. While, however, the miners are pacified there are others who now seek an increase. The railroad men want about a half billion dollars more pay per year, and the agricultural laborers are also seeking a larger remuneration. The cotton industry is also looking for increases in wage.

The scheme has been to carry this burden as taxation and make those pay it whose incomes have been halved or more than halved already by tax charges. Others who are asked to pay it are the brain workers whose incomes have not risen to accord with the general increase in the cost of living. "Make the frugal pay," is not a safe doctrine for any nation. Spending her savings, how will Great Britain ever be able to sustain her commercial undertakings on which the prosperity of her people depends?

However glum and uncertain the situation may be in Great Britain, congratulations cannot be withheld now that a strike of the miners seems unlikely, for no one, except the railroad men, have an equal power to make matters uncomfortable. If the strike which was to have been called on Mar. 22 (in case all the demands of the miners were not granted) had actually been called, the result would have been disastrous in some places within as few as three days, if press notices are to be credited.

But the miners' conference decided to use discretion. It did not favor an automatic strike, and on Mar. 26 it decided to recommend the acceptance of the Sankey report and provided for a ballot to be taken on the subject. The conference urged the men to continue at work on day-to-day contracts until the ballot could be taken.

It will be remembered that a general industrial conference was summoned by Premier Lloyd George last February. It proposed to consider the causes of labor unrest. It adjourned after a short session, leaving a committee to make the proposed investigations. That committee has come to certain conclusions and it will report on Apr. 4. The committee was a large one. There were 30 representatives of the employers and an equal number of representatives of the labor unions. The recommendations are said to be quite far-reaching and it is declared that they were unanimously adopted by the committee. Their publication is eagerly awaited by the public.

The British troubles have been quite extensively described in these columns because they affect the United States closely. Our labor matters are quite apt hereafter to be linked with those of Great Britain, for the workingmen realize that competing nations, like competing employers, can only continue to do business if compelled to pay like increases in wages and give comparable improvements in working conditions.

On Feb. 26 Robert Smillie, who is president of the Miners' Federation of Great Britain, made an appeal to the coal miners of the United States as follows:

"I note that it is already rumored that arrangements are being made to import coal from America in the event of a strike here. I think I may appeal with full confidence to my comrades, the mine workers in the United States, to refuse to assist the British capitalists who are trying to defeat our efforts to improve the standard of living of our mine workers over here."

Shorter Hours Demanded in Germany

The miners in the Essen region of west Germany adopted a resolution, Mar. 17, demanding a further reduction in the working day. They want a 7½-hr. day to begin in April, a 7-hr. day to begin in 1920 and a 6½-hr. day to be put in operation in 1921.

A prominent Socialist member of the National Assembly, named Sachse, tried to induce the men to remain satisfied with the 8-hr. day just recently introduced, but passionate protests and threats of an immediate strike broke in on his presentation of the needs of industry and of the public.



How a Mushroomed Cutter May Raise the Devil

Safety letter from Consolidation Coal Company to its Safety Committees



On November 9, an assistant foreman was cutting a bolt from the bottom of a mine car, when a piece of the cutter flew off and struck him in the eye. The eye was destroyed.

THE blows of the sledge on the top of a cutter gradually flatten out the head, mushrooming it down around the sides. At last, under a final blow of the sledge, a burr from this mushroomed head lets go and flies away like a bullet from a gun. Around steel works and machine shops where they use chisels and cutters frequently they have found out the danger of mushroomed heads on tools and they wage a continuous war against them. But around the mines — I'll leave it to you fellows, and if I lose, I'll buy the hat — there's not a single man who has worked in the mines for a year, who has not seen so many mushroomed cutters and chisels that he almost believes that that is the way they come from the factory.

Let us wake up on this point. Let us start a war against mushroomed chisels, cutters and other tools and not stop till every last one of them has been to the shop and had some first-aid work done on it by the blacksmith. I am told that the best way is to cut the burrs off the head cold and then dress it up on the emery wheel; but don't forget GOGGLES MUST BE WORN WHEN DOING A JOB LIKE THIS. Please don't let us lose an eye in doing a safety job. Let us make this job a safety job through and through, a job for safety and done safely. This is just a little side line in our regular Mine Safety work, but let us make a good clean job of it while we are at it, so that we can report next month that every tool from the blacksmith's to the trackman's has been made safe.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Traffic with Germany

Letter No. 2—I was much interested in reading the letter of S. D. Hainley, *Coal Age*, Jan. 30, p. 243. The question he raised, in regard to whether or not we should traffic with Germany, is a two-sided one and, before it can be answered, each side must be thoroughly and carefully considered. What Mr. Hainley has said in regard to our longing to see the Huns driven back to Berlin is true. It is also true, as he has stated, that "Germany is defeated but not conquered."

Far better would it have been for Germany and for the rest of the world if she had made peace the day the United States entered the war, but her pride kept her from doing this. It would have been better for her had the Kaiser remained at his post instead of fleeing his country, which is now suffering from the spread of Bolshevism and its industries undermined.

However, viewing the question from the standpoint of the future, we have everything to gain by assisting to put German industries again on their feet. Previous to the war, goods "made in Germany" found their way into every country. Many of these manufactures could not be duplicated elsewhere. The breaking out of the war and consequent stopping of importations to this country from Germany was a matter of great inconvenience and loss to many of our industries.

These concerns were obliged to remodel their factories and study to produce what they needed to carry on the industries in which they were engaged. Instances of such conditions are found in the lack of German dyes, chemicals and various fine instruments. Some of these have since been produced in this country at a considerable cost of study and labor that, in many respects, has been a benefit to our own industries.

The question of the future traffic with Germany is a broad one, and I hope to see it fully discussed.

Rawdon, Que., Canada. C. MCMANIMAN.

Coal Resources of Germany

[In response to the request of *Coal Age* for what information might be available regarding the coal reserves of Germany, including any recent discoveries and asking for a brief discussion of the present status and probable changes in the German coal trade as a result of the war, George Otis Smith, director of the United States Geological Survey, writes: "I take pleasure in sending you, herewith, a few notes on these questions, together with a short résumé of the coal situation in that country, prepared by Eugene Stebinger, a geologist of this Survey."—EDITOR.]

Letter No. 1—Referring to the inquiry regarding the coal resources of Germany and the prospective development of the coal industry in that country, which appeared in *Coal Age*, Jan. 9, p. 71, and to which my attention has recently been called, permit me to say that there have been no recent discoveries of coal, in Germany, important enough to change her status as to reserves, or at all comparable with the finds in Kent County, England; the Campine field, in Belgium; or the additions to the Dutch reserves made by the discoveries in Holland.

The northern limits of the Ruhr Basin, lying east of the Rhine, in Westphalia, which is by far the most important coal field of Germany today, have always been indefinite owing to the gradually increasing depth of the coal beds and the uncertainties of mining under the deep cover of the overlying barren formations, which are full of quicksands and troublesome water-bearing horizons.

The estimates of the reserves in Westphalia are, therefore, subject to considerable manipulation, but there has been no additional information gained that would tend to remove any of the uncertainties, in this field. It can, furthermore, be stated that any addition to the deep-lying and inaccessible reserves of a country where the total coal supply is large enough to last many hundreds of years, can have but little practical importance for the present generation.

GERMANY'S PRODUCTION AND CONSUMPTION OF COAL

Germany's recent position in the coal trade of the world can be briefly summarized as follows: In respect to reserves of unmined coal, she ranked the first in Europe, having a total tonnage of over 55 per cent. of all the coal on that continent, as compared with 25 per cent. for the British Isles. If the known or actual reserve figures, alone, be considered, thus confining attention to what might be termed "commercial reserves," rather than to the ultimate resources obtainable, Germany's proportion then drops to 38 per cent. of the total European tonnage, as compared with 54 per cent. for the British Isles. These reserves are almost entirely bituminous coal, an unusually large proportion being of a coking grade. The reserve of anthracite is insignificant.

In world production, Germany has ranked third, following Great Britain very closely. During the ten years previous to the war, however, her output had been increasing at over twice the rate for Great Britain; and if the war had not intervened would probably soon have exceeded the British production. Her coke output had risen to 32.2 million tons, or over one-half of that of all Europe and 50 per cent. greater than that of Great Britain, her nearest competitor.

In consumption of coal, Germany has ranked second in the world, following the United States, while in exports she also ranked second, following Great Britain, her total exports being about one-half of that of the latter country, of whose coal she was one of the largest importers. In consumption per capita, however, she ranked fourth, the amount being 2.12 tons per person, as compared with 4.82 tons for the United States.

GERMAN COAL DISTRICTS WEST OF THE RHINE

There are two coal districts lying west of the Rhine, in Germany, in the territory now occupied by the armies of the Allies and the United States. These are the Saar field and the left of Rhine fields. These two

fields produced only 11 per cent. of the total coal output of Germany, in 1913, and but 7 per cent. of the coke output. The Saar field, alone, produced nine-elevenths of this coal and nearly all of the coke. The total of the coal reserves of these two districts has been estimated as amounting to only 7 per cent. of the total reserves of Germany, prior to the war. The portion of the Saar Basin lying in Alsace-Lorraine is comparatively unimportant, having produced barely over 20 per cent. of the total production for the field in 1913.

Nearly all of the coal of Germany lying east of the Rhine and amounting to over 90 per cent. of the total reserve, is concentrated in two great fields: the Ruhr Basin of Westphalia lying just across the Rhine, and the Upper Silesian field in the extreme southeastern portion of Germany. The latter of these fields is largely inhabited by Polish-speaking peoples.

The Ruhr and Upper Silesian Coal Fields East of the Rhine

The Ruhr Basin contains over 52 per cent. of the total coal reserves of Germany and produced over 114 million tons, or over 60 per cent. of the total coal for the country, in 1913, and 83 per cent. of the total coke output. The latter was used in producing over two-thirds of the iron and steel output of Germany, besides forming the basis of her extensive chemical industry, in the manufacture of coal-tar derivatives. About 62 per cent. of the immense coal reserve of the Ruhr Basin is made up of coal that can be coked, under present practice.

The great value of the Ruhr coal field is much enhanced by excellent transportation facilities. Ocean-going vessels can ascend the Rhine to the west edge of the field, thus making the export facilities equal to those of the various British coal fields bordering on the sea. Strange to say, however, a strictly overseas export trade, comparable with the British foreign trade in coal, was never developed.

The Upper Silesian field, second in importance to the Ruhr Basin, was estimated to contain about 40 per cent. of the total German coal reserve. It yielded 23 per cent. of the total output of the country in 1913. The coke of this field, however, is relatively unimportant. The coking coals make up only about 10 per cent. of the total reserve, while the annual coke output is only about 7 per cent. of the national total.

Other Coal Deposits of Germany

An account of the coal industry of Germany would not be complete without mention of the lignite and brown coal mining and the utilization of these products, which in the years prior to the war were developing very rapidly. In 1913 over 87 million tons of lignite and brown coal were mined in Germany, amounting to more than double the lignite production from all other world sources, and exceeding 31 per cent. of the production of all classes of coal in Germany. About 30 per cent. of this output was manufactured into briquets.

The lignite is mostly extracted from open cuts and, in these, is worked almost entirely by machinery, the labor involved being comparatively unimportant. During the war this feature made it possible to actually increase the output of lignite, while the output of bituminous coal fell off nearly 30 per cent., owing to labor shortage.

Immediately prior to the war, German exports of coal had risen to about 40 million tons, annually, as compared with 70 million tons for Great Britain, and about 16 million tons for the United States, the only other important exporting nations. During the previous seven years, the total German exports had increased very rapidly, which was largely at the expense of the British coal trade. The total increment for that period was over 58 per cent., as compared with a 1 per cent. increase of British exports, during the same years.

These increases, at the expense of British trade, were made principally in Belgium, Holland and France. The German exports were distributed as follows: To Austria-Hungary, 30 per cent.; Holland, 18 per cent.; Belgium, 16 per cent.; France, 15 per cent.; Italy and Sweden (together), 9 per cent.; Switzerland, 7 per cent.; and Russia, 5 per cent. It is noteworthy that the distribution of German exports was almost entirely to immediate neighbors, the strictly overseas exports, so important in the British trade, being of very minor importance.

Possible changes, in the coal trade of Germany and resulting from the war, especially with reference to exports, are obviously very difficult to forecast at present and cannot receive serious attention, before her internal problems and the complicated political and economic problems confronting the Peace Conference have been settled.

Changes in the German coal trade, however, are not likely to be so far reaching as those in the trade in the bewildering array of manufactured articles that, heretofore, have been sent to every corner of the world; because, as was pointed out above, German coal was distributed almost entirely to her immediate neighbors, over one-half of her coal exports going to countries with whom she has not been at war.

Eugene Stebinger, Geologist,
Washington, D. C. U. S. Geological Survey.

Future of Mine Labor

Letter No. 1—The foreword that appeared in *Coal Age*, Feb. 6, entitled "Perpetuating the Thrift Habit" should be of deep interest to every reader, whether he is an employer or an employee, in the coal industry. The writer draws attention, incidentally, to the labor situation in this country at the present time and finds that the proportion of married home owners is but 4 per cent. and that of married renters 11 per cent. of the entire force employed in the coal industry. The foreword urges the necessity of coal companies developing thrift among their employees, which is a most timely suggestion.

A careful analysis of the present working conditions in coal mining inclines one to the belief that the mine worker has but a poor chance to save. It is more probable that he will be obliged to draw on his savings that he has already laid by for the future. Should affairs in the coal industry take a downward trend, it is more than likely that a majority of coal miners will be compelled to dispose of their Liberty Bonds, in order to pay their store bills. This is particularly true of American miners who have their families to support.

In addition to the severe conditions brought about by the war, the spread of the influenza epidemic has thrown a heavy burden on the miner. Almost every coal miner, here, has been more or less knocked out by the "flu" and been compelled to take a lengthy

vacation, while confined to his bed or unable to leave the house and go to work. But, in the meantime, the bills have been growing; food must be bought and rent paid. The result is that anxiety and unrest have grown apace among the miners, who realize that they are not making a living.

Someone will ask what the miner did with his $150 that he formerly made in two weeks' time. Let me attempt to answer this question, at least in part, by citing a single instance that came under my observation not long ago. The facts are as follows: There worked, in one of the mines at this place, a Croatian by birth, whose name was John Seminovich. John was a champion coal loader. Last summer his output was over 445 net tons, which, at 59.85c. per ton, brought him over $266.

It may be said that this man ought to have saved $100 each month. He was stricken, however, with the epidemic that visited the town, being one of its first victims. For two months, the man was confined to his home unable to work. When he did recover and started to work in the mines, some foolish friend advised him to drink plenty of whiskey. Acting on this advice, John took more than was necessary and was unable to go to work again for a few days, which drew still further on his small savings.

This instance is but one of a hundred similar cases; and let me ask, Can it be wondered that many of our miners are, today, selling their bonds to meet their bills? I was told that some miners, in a neighboring town, sold $50 bonds for $30, being anxious to take anything they could get. One miner told me that he was not fool enough to let another man make money on his bond; but if he was unable to sell it before the ship sailed for his homeland, he would stick the bond in the fire and let Uncle Sam have the money, as he could not wait twenty years for his payment.

Importance of Maintaining Immigration

A short time ago there was an interesting discussion, in *Coal Age*, on the "Americanization of Foreigners." Some may think it an easy task; but one who is better informed and more familiar with the situation as it exists today will form his opinion only after a close study of facts and figures. The immigration statistics show that from 1900 to 1910, the influx of foreigners to this country was 13,515,886, which was a half-million more than the whole population of the United States in the year 1830. From 1914 to 1918, there was a loss in immigration amounting to 2,800,000, based on an average for the preceding eleven years.

In addition to this showing on immigration, the announcement is now made at Washington that practically 100,000 of our men have perished in camps, overseas and in transportation. Another 100,000 of our French and Italian workmen have left and returned to their native land, the State Department having received applications for that number of passports for this class of people, who were anxious to seek new opportunities abroad. In the face of these facts, our American Congress now wants to shut off immigration from European countries for four years to come.

May I ask, here, what kind of labor supply will be available to the coal industry in this country if immigration is to be stopped for a time? It is a well-known fact that the American miner has become restive under existing conditions. Being without steady employment in the mines, many have sought other occupations and entered other industries, while a number have left the country seeking more favorable conditions.

It is my belief that we are face to face with one of the greatest labor problems in history. There will be an increasing demand for coal and a lack of labor to produce it. With this prospect in view, there will be few coal miners, indeed, who will be able to purchase the Fifth Liberty Bonds, unless there is a change in the working conditions at the mines. Our coal operators need to come into a closer relationship to organized labor. There is the need of sane and sound coöperation on the part of both operators and mine workers.

Waterman, Penn. JOHN MAJER.

Barometer vs. Outflow of Gas

Letter No. 1—The suggestion regarding the utilizing of mine gas, by burning it in the power-plant furnaces, and the resulting dangers to which attention has been drawn by W. D. Owens, who discussed the feasibility of the plan, *Coal Age*, Feb. 20, p. 372, raises the question of the effect of barometric changes on the outflow of gas in mines.

It is the contention of many able mining men that the gases found in mines are more sensitive to atmospheric changes than the barometer, which we understand is designed to indicate any change in atmospheric pressure as it occurs. It is claimed that, owing to the great sensitiveness of the gases accumulated in the mine workings and abandoned places, there is liable to take place a dangerous increase in the outflow of gas from these places, into the mine airways, before any reduction of pressure is indicated by the barometer.

Personally, I fail to see why a barometer when properly constructed should not adjust itself simultaneously with any change in the atmospheric pressure when that takes place. The fact that barometers are used as altitude indicators and will readily show a difference as low as five feet, with accuracy, is proof, to my mind, that they are very sensitive to the slightest change in the pressure of the air.

However, I would like to see an expression of opinion by other readers of *Coal Age*, as this is an important point in considering the possible dangers that may arise in connection with the proposed scheme of utilizing mine gas in the manner described. Mining men have been led to rely on the indications of the barometer and if I am not mistaken, it has been stated that these indications commonly precede the effect of atmospheric changes in the mine. E. P. BRENNAN.

Thomas, W. Va.

Panel System of Mining

Letter No. 1—Referring to the inquiry of R. J. Pickett, *Coal Age*, Feb. 27, p. 419, in which he proposes a change in the panel system that is already in use in his mine, permit me to say that his proposed plan does not strike me favorably for several reasons.

In the first place, the concentration of the haulage system, in the old plan where rooms are driven to the right and left of each pair of butt entries, in my opinion, should more than equalize or counterbalance the back haul that he mentions, and which is necessary in the rooms driven toward the main heading.

Mr. Pickett's proposal is to drive one heading and an 18-ft. air-course, in place of the two butt headings of

the present plan, and turn rooms off of the entry only. His argument is that it will then be necessary to drive the cross-headings only 258 ft., instead of 442 ft., before he can turn another pair of butts and open rooms on those entries.

However, he must remember that, for the same tonnage, the time of development is rather in favor of the old plan, which gives twice the number of rooms for less than double the distance driven on the cross-entries. Again, there is a little more narrow work in his proposed plan, because he must drive 2 × 258, or 516 ft. of crossheadings, besides the necessary crosscuts in the new plan, as compared with 442 ft. of cross-entries and crosscuts in the old plan, in order to open practically the same number of rooms.

There are, moreover, certain disadvantages in the proposed plan. For example, an 18-ft. air-course 1000 ft. long will be difficult to maintain and will require much timbering. Again, the work of drawing pillars will be in progress, at the faces of the rooms in a preceding panel, only 10 ft. away from the rib of the 18-ft. air-course. The falls in the pillar workings would be liable to break over the pillar separating the air-course from the faces of the old rooms.

Finally, the ventilation will be more broken up, in the new plan, and more difficult to maintain than by the old system. In case there is a grade requiring the installation of a room hoist, the system would be less efficient where the rooms are driven off a single entry only, than where rooms are driven to the right and left of both entries. J. B. B.

Colorado Springs, Colo.

Letter No. 2—After a little study of the proposed change in his present plan of mining, described in the letter of R. J. Pickett, *Coal Age*, Feb. 27, p. 419, I must say that the proposition does not appeal to me as having any advantage that would warrant making the change suggested.

Mr. Pickett has not given many essential facts that bear on the question of mining coal, such as the direction and amount of dip of the seam; depth of cover; condition with respect to gas; and, finally, the reason why the panel system was adopted in working this seam, whether owing to the presence of gas or the liability to gob fires. In the absence of these data, it is only necessary to discuss the relative advantages and disadvantages of the old and new plan of working.

The disadvantages of the present method, as given by Mr. Pickett, are the back haul required in rooms driven toward the main headings; loss of much coal owing to bad roof conditions; poor ventilation and difficulty of maintaining good roads, owing to the drainage being poor in the rooms; and, lastly, the slow development of the mine under the present system.

Judging from the fact that the drainage in the rooms is poor, it may be assumed that these are driven practically on the strike of the seam. But this feature would still be true in the method that he has suggested as a means to avoid the back haul mentioned. There is, therefore, no advantage to be gained in respect to this item.

Again, I fail to see that the roof condition would be improved by the new plan of working. On the other hand, the driving of an 18-ft. air-course would argue against the plan. My advice is that, if the roof is bad, owing to the action of gas in the strata, or other conditions, he should study to overcome these difficulties by proper measures. A frail roof may require larger pillars and less width of opening. Excessive roof pressure, due to depth of cover, must be relieved by inducing falls in abandoned rooms and other waste places. No timber should be left standing in the gob. Avoid caving rooms when it would menace roads or air-courses.

In respect to ventilation, the new plan would require two splits of the air to ventilate the same number of rooms, where a single split only is required in the present system. Also, the ventilation of the mine would be more expensive, owing to the necessary construction of air bridges and extra stoppings, or because of an increased mine resistance if two panels are ventilated by a single current.

Speaking of loss of coal, it is important to observe that, in the new plan, there would be a larger percentage of coal in entry pillars, which I fear would increase this loss when working under the proposed change. While it is true that the plan may appear to offer a slight advantage at the start, because of the necessity of driving a shorter distance on the panel entries, before turning another pair of butts, this advantage would only be temporary, since the old plan provides the driving of two rooms for each room now turned.

In fact, in the end, the driving of the same number of rooms would be delayed by the time required to drive the 75 or 80 ft. extra on the panel entries, while the driving of an 18-ft. air-course would prove an awkward drawback to the progress of the butt headings. My conclusion is that the development of the mine, in general, would be retarded by adopting the plan proposed.

The question of the extra expense of back haul in rooms going toward the main heading must be contrasted with the greater outlay, in the proposed plan, for extra yardage, including the driving of crosscuts, labor and material for building extra stoppings, and the laying of two extra switches for the same room development, besides building extra partings or side tracks.

In conclusion, let me say that I would favor making no change, but improving the present plan of working, by adopting such measures as may be required to overcome the difficulties mentioned. My claim is that there is a greater advantage in the concentration of the work, in the old system, than would be possible if this change was to be made.

While it is true that concentration of work must not be carried to excess, it is likewise true that the hauling of coal from several partings widely separated may result in loss of time waiting for coal and require an increased length of haul in the end. W. H. LUXTON.

Linton, Ind.

Reducing Ventilation at Firing Time

Letter No. 6—Kindly permit me to say a few things concerning the question of reducing the ventilation in a mine, at firing time, to which reference has already been made by a few writers. An experience of 35 years as miner, fireboss and mine foreman leads me to believe that the practice of naming a particular time for the firing of shots is an extremely dangerous one.

My knowledge of ventilation, as far as gas and dust are concerned, has been gained while performing the duties of fireboss and mine foreman in some of the most dangerous mines in West Virginia. But it has

been my good fortune to have performed the duties of these two positions without the occurrence of a single accident.

Let me say then that, in a mine generating gas, the necessary thing to do is to employ a system of ventilation that will keep all working places, travelingways and haulage roads free from accumulations of gas and dust. In order to accomplish this, a sufficient amount of air must be kept in circulation and made to sweep not only the working faces but all void and abandoned places throughout the mine. By this means alone, can the mine be rendered safe and sanitary.

In my opinion, there never was any excuse for establishing a particular time for shooting, except where the ventilation of the workings is insufficient to keep them clear of the smoke and gases produced by the firing of occasional shots, from time to time. But such conditions only make the mine more dangerous and must be avoided.

Let me attempt to make my meaning more clear by supposing that we are operating a mine where 50 men are employed in blasting and loading coal, and the practice, in that mine, is to fire all shots at 12 o'clock noon. Is it hard to imagine what a dangerous condition must result from the smoke and gases liberated by the firing of, say 100 shots within a short period of time? No one can deny this danger, even if permissible powder is used, and the result would be much worse if black powder is employed. There would result, then, a condition of the mine air that would invite an explosion, and this would be greatly increased if firedamp was present in the mine.

Advises Having No Set Time for Firing

My custom has always been to have no set time for firing. Our practice is that a man is free to fire a shot at any time of the day when he is ready and is in need of coal. In this system, shots are fired, from time to time, throughout the mine. This gives the air current the advantage, because the smoke and gases produced by each blast are carried away as quickly as they are produced, and there is no large volume of smoke and gas contaminating the air. I am alluding here to mines where open lights are in use.

In mines where safety lamps are used, only permissible powders should be employed in blasting and no shot must be fired until the place has been carefully examined for gas and found to be safe. Every hole must be examined before it is charged and no shot permitted to be fired on the solid.

From my viewpoint there is much less danger, however, where gas is present, than exists in the presence of much dust. The gas is easier to handle and less destructive should an explosion occur. I believe that most everyone will agree with me that dust explosions seldom, if ever, occur in the summer time, while gas explosions occur throughout the year. The question arises, Can we create summer conditions in the winter time, in coal mines? This is a question worthy of careful consideration.

Allow me to pause here long enough to emphasize the fact that I am not in sympathy with the management of mines where explosions occur owing to the accumulation of gas in the workings. Such conditions can only result from the wilful neglect of duty, on the part of the mine officials in charge. The duty of every fireboss and foreman is to see to it that the mine in their charge is free from gas and ventilated in a manner that there is no danger of such accumulations taking place.

Dust must be kept down and not permitted to accumulate at the working face or on the roadways. This, however, is more difficult to accomplish in winter than in summer because the dry air circulating throughout the mine in the winter time dries out the workings, rendering them dutsy, in many portions where it is impossible to maintain a sprinkling system. The best thing to thoroughly saturate the dust in a mine, to my knowledge, is exhaust steam and this should be used until the desired effect is produced.

Morgantown, W. Va. ARTHUR STURM.

Letter No. 7—I have read carefully and with much interest the opinions expressed by different writers, as derived from their practice, in regard to reducing the ventilation in a mine at the time of shotfiring. I also followed the discussion of this question that appeared in *Coal Age* some time ago, but the result has not been to change my opinion in this regard.

Where the ventilation of a mine is by means of an exhaust fan, I can understand that there may be some reason for the suggestion of reducing the quantity of air in circulation, when firing shots. In that case, the mine is ventilated under a pressure below that of the atmosphere and the effect of reducing the ventilation would be to increase the mine pressure slightly.

Now, assuming that there is a considerable volume of gas accumulated in the old rooms and abandoned places, a slight increase of the mine pressure, due to the slowing down of the fan, would have a tendency to drive back the gases into the places where they are accumulated, and there would be less danger of their coming in contact with the work of blasting.

Observes Barometer and Water Gage

It has been my duty to oversee the firing of shots in a very gassy mine where gas was accumulated in abandoned places and much gas was also bleeding from the coal and freshly exposed strata. In the performance of my duties, having secured my lamp at the lamp cabin, I would proceed to read and make note of both the barometer and the water gage.

It was always my custom to observe whether the barometer was rising or falling. If the water gage was somewhat below the normal, which was generally caused by a low steam pressure, I would send word to the boiler room and have the fireman get up more steam, so as to increase the speed of the fan.

On going down into the mine and looking over the firebosses' reports, I would be able to judge, from those reports and from the information previously obtained, whether or not it was safe for them to proceed to fire the shots. On the other hand, if the shotfirers reported poor ventilation in the mine, owing to a reduced circulation of air, I would consider such a condition as unfavorable for shotfiring.

The result of many years' study and practice in mine gases and ventilation has been to convince me that better ventilation is needed at the time of firing shots more than at any other time. Owing to the expense of ventilating mines, it is a common custom among mining men not to produce a greater circulation of air than is necessary to accomplish the desired result. It is poor economy, however, to reduce the circulation and take a chance on the safety of a mine.

Linton, Ind. SHOT INSPECTOR.

INQUIRIES OF GENERAL INTEREST

EDITED BY JAMES T. BEARD

Enlarging an Airway

Kindly explain what increase in circulation should take place in the following instance: An airway, 3 x 3 ft. in section, is 1050 ft. long. At present, this airway is passing 2000 cu.ft. of air per minute, which is not sufficient for the proper ventilation of the mine, and it is desired to enlarge the airway so that its cross-section will be 6 x 6 feet.

The work was started at each end and continued until there remained but 50 ft. of the original 3 x 3-ft. airway. Assuming the power on the air remains unchanged, how much will the circulation be increased, at this stage of the work? STUDENT.

Denbo, Penn.

As described, the airway is now divided into three sections, the two end sections being each 6 x 6 ft., 500 ft. long, and the middle section 3 x 3 ft., 50 ft. long. First, write the formula expressing the quantity of air circulated by a given power, which is,

$$u = \frac{ksQ^3}{a^3} = k\left(\frac{Q}{X}\right)^3$$

In this formula, the potential factor (X) is evidently the ratio of the sectional area (a) to the cube root of the rubbing surface (s); and it appears that, for any given power on the air, the quantity in circulation varies direct as this potential factor.

In this case, it is necessary to find the value of the reciprocal of the cube of the potential factor X, for each section of the airway, which is expressed thus:

$$\frac{1}{X^3} = \frac{s}{a^3}$$

The rubbing surface of the original airway is 1050 $(4 \times 3) = 12{,}600$ sq.ft. The two end sections of this enlarged airway being alike, their potentials can be combined as that of a single airway having a rubbing surface $s = 2 \times 500(4 \times 6) = 24{,}000$ sq.ft., and a sectional area $6 \times 6 = 36$ sq.ft. The rubbing surface of the middle section is $50(4 \times 3) = 600$ sq.ft., and the sectional area $3 \times 3 = 9$ sq.ft. The corresponding potential values of these sections are, therefore,

Original airway, $\dfrac{1}{X^3_0} = \dfrac{12{,}600}{9^3} = 17.284$

Two end sections, $\dfrac{1}{X^3_1} = \dfrac{24{,}000}{36^3} = 0.514$

Middle sections, $\dfrac{1}{X^3_2} = \dfrac{600}{9^3} = 0.823$

$= 1.337$

Now, since the power producing the circulation in each case is the same, we can write

$$Q^3_0\left(\frac{1}{X^3_0}\right) = Q_x{}^3\left(\frac{1}{X^3_1} + \frac{1}{X^3_2}\right)$$

Finally, substituting the potential values in this formula and solving with respect to Q_x, we find, for the increased circulation in the enlarged airway,

$$Q_x = 2000\sqrt[3]{\frac{17.284}{1.337}} = \text{say, } 4700 \textit{ cu.ft. per min.}$$

We recall that this problem was answered, some years ago, in *Coal Age*, by request of a correspondent.

Prime Producer in a Coal Mine

The question is frequently asked, Who is the prime producer in a coal mine? I have listened to so many discussions of this question when the contestants did not seem to get anywhere that I decided, at last, to send it in to *Coal Age*, hoping that something worth while would develop.

My understanding is that the words "prime producer" are intended to refer to the actual producer in the operation of a coal mine. Taking the industry as a whole, is he the loader, the cutter, the driver, dayman, fireboss, foreman, superintendent, manager or operator? In other words, passing down the entire line of operatives, who can be singled out as the main spoke in the wheel?

If I may be permitted to express an opinion, it is that the actual producer is the loader who sends out his eight to twelve cars of coal each shift. But there is plenty of room for discussion here and I shall be glad to see the question argued to a finish. J. W. H.

Grant Town, W. Va

In the view of many, this is a story without an end; and it is not strange that a discussion of this nature often proves inconclusive. The operation of extracting coal from the earth and putting it on the market consists of a round of duties and performances that are interdependent. The question of which is the most important is like asking, Which spoke of a wheel performs the greater service? It is true the wheel may lose one or more of its spokes and still serve to carry the load, by increasing the burden on the remaining spokes. In the same manner, one or more of the operatives in a coal concern can be away from his post and the work still goes on.

Particular emphasis, however, may be placed on the word "producer," which means, in reference to a person, one who produces. To *produce* is to bring forth, the root meaning being *to lead out*. In that sense, the word has particular reference to the creation of value. The farmer *produces* crops by tilling the land; the miner *produces* coal by digging it from the earth. The musician *produces* harmony with his instrument.

In each several case, there is something created that is of value and which, but for the performer, would have no value. In this derivative sense, the man who digs the coal from the bowels of the earth is the real producer; because, by his labor, he has changed the potential value of the coal to an actual value that pays him for his labor. In other words, he has created value.

It will be remarked, doubtless, that the coal in place has a market value and can be sold and bought, which is true. But such value is purely speculative, until labor has made the coal of use in the world. *Coal Age* will be glad to have other views on this question.

EXAMINATION QUESTIONS

EDITED BY JAMES T. BEARD

Mine Examiners' Examination, Springfield, Ill., Dec. 17, 1918

(*Selected Questions*)

Ques.—It was found that smoke traveled in an airway 6 ft. high and 10 ft. wide, at the rate of 336 ft. per min.; what quantity of air is passing in a minute?

Ans.—The sectional area of this airway is $6 \times 10 = 60$ sq.ft. Then, assuming that the distance the smoke travels in a minute is the average velocity of the air, the quantity of air in circulation is $60 \times 336 = 20{,}160$ cu.ft. per minute.

Ques.—In a mine we are producing 40,000 cu.ft. of air per minute with 20 hp.; how many horsepower will it take to produce 50,000 cu.ft. of air per minute?

Ans.—For the same conditions in the mine airways, the power required to produce the circulation varies as the cube of the quantity of air produced; in other words, the power ratio is equal to the cube of the quantity ratio. Hence, calling the required horsepower, in this case, x, we have

$$\frac{x}{20} = \left(\frac{50{,}000}{40{,}000}\right)^3 = \left(\frac{5}{4}\right)^3 = \frac{125}{64}$$

$$x = \frac{20 \times 125}{64} = 39+ \textit{hp.}$$

Ques.—How does the change of atmospheric pressure affect a gaseous mine?

Ans.—Any *decrease* in atmospheric pressure is accompanied at once by an expansion of the air and gases confined in the abandoned workings and other void places in the mine. The action is contrary to what would take place under an *increase* of atmospheric pressure, which would compress the air and gases. A decrease of atmospheric pressure is indicated by a fall of the barometer, which is a warning of possible increase in the gaseous condition of the mine airways, which every mine foreman and fireboss should heed.

Ques.—What are carbon monoxide and carbon dioxide? Give their chemical symbols.

Ans.—Carbon monoxide (CO) is an extremely piosonous gas, the molecule of this gas consisting of one atom of carbon combined with one atom or oxygen. The gas is formed by the oxidation of carbon in the presence of a limited supply of air.

Carbon dioxide, while not being poisonous in the same sense as carbon monoxide, still produces a toxic effect on the human system. The molecule of carbon dioxide consists of one atom of carbon combined with two atoms of oxygen. This gas is produced by the complete combustion of carbon or carbonaceous matter in the presence of a plentiful supply of air. Carbon dioxide is always present to a greater or less extent in the blackdamp found in mines. The gas will not support life or combustion and is not, like carbon monoxide, inflammable.

Ques.—If a water gage placed in a door 4 ft. 6 in. high and 5 ft. wide shows a reading of 2.7 in. what is the total pressure on the door?

Ans.—Since 1 in. of water gage corresponds to a pressure of 5.2 lb. per sq.ft., a 2.7-in. water gage indicates a pressure of $2.7 \times 5.2 = 14.04$ lb. per sq.ft. The area of a door $4\frac{1}{2}$ ft. high and 5 ft. wide is $4\frac{1}{2} \times 5 = 22.5$ sq.ft. The total pressure on this door is, therefore, $22.5 \times 14.04 = 315.9$ lb.

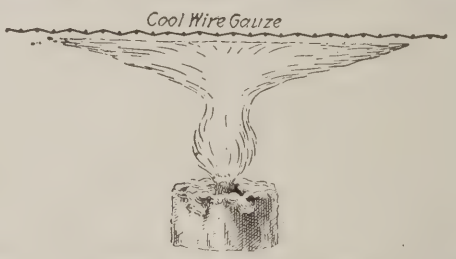
Ques.—If 20,000 cu.ft. of air and gas, at its most explosive point, is passing through the mine, what is the quantity of gas given off, and what quantity of air should be added to render it nonexplosive?

Ans.—Assuming the question refers to a mixture of pure methane and air at its most explosive point, the percentage of gas in this current is 9.46 per cent. The quantity of gas given off in this mine is, therefore, $20{,}000 \times 0.0946 = 1892$ cu.ft. per min.

Assuming that the lower explosive limit of methane and air is reached when the proportion of gas to air is 1:13; or, in other words, the gas forms 1/14 of the entire mixture, the total quantity of air and gas, in this case, when the mixture has reached the lower explosive limit, is $14 \times 1892 = 26{,}488$ cu.ft. per min. On this basis, the quantity of air required to be added to render this air nonexplosive is $26{,}488 - 20{,}000 = 6488$ cu.ft. of air per minute.

Ques.—Explain the principle discovered by Davy and embodied in the safety lamp. What is the standard size wire gauze used in the Davy lamp?

Ans.—Sir Humphrey Davy (1815) discovered the important fact that when a wire gauze mesh, containing a certain number of a given size of wires to the inch, was depressed on a lamp flame the flame spread out



SHOWING EFFECT OF WIRE GAUZE ON FLAME

beneath the gauze, as shown in the accompanying figure. It was only when the gauze became heated that the flame passed through its mesh to the other side. This peculiar effect is explained by the fact that the burning air and gas, in attempting to pass through the mesh of the gauze, is broken up into a number of tiny streamlets, which are cooled below the point of ignition of the gas when coming into close proximity to the cool wire of the gauze. The flame is thus extinguished while the air and gas pass through the mesh. The wires cool the flame and prevent it from passing through the gauze.

By experimenting with different sized wires, Davy found that the best results were obtained by the use of a steel wire No. 28 B.w.g., made into a mesh of 28 wires to the inch. This was adopted as the standard wire gauze for safety lamps, and is still in use in England and this country. The gauze mesh has 784 openings to the square inch.

Book Reviews

Economic Production, Transmission and Use of Compressed Air

COMPRESSED AIR PLANT. The Production, Transmission and Use of Compressed Air with Special Reference to Mine Service. By Robert Peale, mining engineer and professor of mining, School of Mines, Columbia University. Third Edition. Pp. xx + 466 + 19 index; 5¾ x 9¼ in.; 246 illustrations. John Wiley and Sons, Inc., 432 Fourth Avenue, New York City, publishers. Cloth boards. Price $4.25.

This volume, prepared as it is by Robert Peale, needs no recommendation. It is preëminently a practical volume and full of illustrations that really illustrate. When a book of 466 "working" pages contains 246 illustrations, the reader needs some such assurance. We give it most cordially. The pictures are not put in because Mr. Peale had them on hand, nor because Professor Peale sought to ingratiate himself with others by using them, but because they are needed and explain the text. Let us qualify that last statement. Some of the illustrations are in themselves the text.

Professor Peale does not waste time explaining the obvious, like some writers who refuse to leave the readers any other labor than that of fathoming their utterly incoherent English. Two pages give all the history and reminiscences. The "Structure and Operation of Compressors" fills 40 pages. The mathematics of compression follow in the next 26 pages. Mr. Peale shows a remarkable restraint for a college professor. What is more, this is all the mathematics in the book.

The author abruptly leaves the subject for "Wet Compressors" and "Dry Compressors," and for "Compound or Stage Compression." Then follows the important subject of valves, self-acting air-inlet valves, discharge and delivery valves and those valves that are mechanically controlled. Performances of air compressors follow and then the accessories are discussed—air receivers, steam and pressure regulators. Then follows a chapter on "Air Compression at Altitudes Above Sea Level" and one on "Explosions in Compressors and Receivers."

The author advocates oil of extremely high flash-point. One recent authority believes that in an excess of refinement an oil of too high a flash-point is often used. He is of opinion that such an oil is apt to carbonize and fill ports, valves, discharge lines and the receiver. Still there is no doubt that the flash-point should be higher than any temperature the compressed-air cylinder is liable to reach with such attention as is given it, and probably Professor Poole would be satisfied to indorse a ruling on flash-point couched in such terms as these.

"Air Compression by Falling Water" finishes Part I, the second part having to do, not with the production of compressed air, but with its transmission and use. The book divides itself about equally between the manufacture and the use of compressed air. The first chapter in Part II is on the "Conveyance of Compressed Air in Pipes." Then follows "Compressed Air Engines," including hoists, and, a most important subject, "Freezing of Moisture."

The author cites the use at the Butte copper mines of several discarded return tubular boilers as receivers, the purpose being not so much to provide storage as to cool and deposit the moisture in the compressed air by the large surface exposed, thus preventing the freezing of moisture when the air is expanded in use. He suggests that boilers sunk in water would in warm weather and in warm climates give similar satisfactory results. Ten pages are given to the reheating of compressed air. All kinds of compressed-air mining machinery are then described — reciprocating drills, hammer drills, coal-cutting machines (29 pages), channeling machines, mine pumps, air-lift pumps and locomotives.

Oxyacetylene Blowpipe Repairs Machinery Permanently and on the Spot

OXWELDING AND CUTTING, Manual of Instruction. Pp. 124 + 2 index; 5 x 8 in., illustrated. Oxweld Acetylene Co., 646 Frelinghuysen Ave., Newark, N. J., publishers. Paper boards.

This is a really adequate, practical and simple description of the art of oxyacetylene welding. It is not in popular form, but neither is it abstruse. Its language is simple and its presentation convincing. The veriest novice can understand it. So great is its clarity that one cannot conceive that a really technical man wrote it. It seems more likely that it was written by some one who did not know the art of welding as well as he did the art of writing, but who was so hedged about by competent welders that his task was made easy and his information accurate and abundant.

The work of welding takes some judgment and skill. It does not merely consist of joining pieces of metal with the molten material of the filling rod. There is much more in autogenous welding than in mere soldering, for the temperatures are so high that expansion, contraction and conduction all have their influences. There is often a risk of the contraction causing a break. In butt welding plates judgment must always be used in laying the edges of metal which are to be joined together at such an angle that on welding they will by reason of the warping which results from the heat attain a certain lay with regard to each other by the time the blowpipe reaches any given point. There are also difficulties from the oxidizing of the metal and from the absorption of gases. The edges should be so beveled, grooved or otherwise disposed as to favor a satisfactory weld. The speed of welding is also a contributory factor. In butt-welding plates, when the edges of the plates tend to come together too fast and to crowd and overlap, the welding should be speeded up to overcome that difficulty.

The little volume starts out with a glossary of such words as are used in the book and not described in the text. A few notes on autogenous welding in general are followed by a short history of the oxyacetylene process. Acetylene was discovered in 1836, but no one produced it by methods adapted to commercial needs till 1891 and 1892, when Wilson in America and Moissan in France found means to make it at reasonable cost. It was not until 1901 that it was used with oxygen for metallic welding. In 1903 oxyacetylene welding was first used industrially, but until 1907 little was done to advance the method because oxygen was not a real industrial product. In 1907 the first liquid-air oxygen plant was placed in operation and from that time onward oxyacetylene welding was assured of success.

After detailing the work for which the oxyacetylene blowpipe is suitable, the author enters into the properties of metals from which trouble arises or assistance comes—the melting points, expansion and contraction, conductivity, oxidation, absorption of gases, vaporization and separation of elements. The methods and advantages of preheating and the provisions against expansion and contraction are then treated. Preparation of the material to be welded, the character of the flame (whether reducing or neutral or oxidizing) and the manipulation of the blowpipe follow. There are sections on aftertreatment and the causes of poor welds, and notes on the work with steel, cast iron, malleable iron, aluminum and copper.

Steel cutting is dispatched in short order, as is also the matter of acetylene generators. Thereafter the book becomes even more practical. The blowpipe is described and its manner of operation, and solutions are given of 60 practical problems with corrollaries, these covering both welding and cutting.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

German Coal in Alsace-Lorraine

Alsace depends for its coal supply mainly upon the Ruhr and Saar coal fields, and to a secondary extent on Belgium and England. The relative part played by the various coal fields has varied considerably from year to year. Up to 1910 the Saar occupied first place, but has been passed by the Ruhr, says Circular No. 5399, Comitè Central des Houillières de France.

The total imports of coal immediately before the war amounted in round figures to 2,500,000 tons per annum, of which 1,300,000 tons came from the Ruhr district, 1,000,000 tons from the Saar, 170,000 tons from Belgium and 20,000 tons from England. Supplies from the Ruhr are conveyed almost exclusively by water, about 1,000,000 tons (including 70,000 tons of brown coal) being imported into Strasburg. On the other hand, the greater part of the imports from the Saar were rail-borne. The bulk of the coal delivered was consumed locally, but a considerable tonnage was passed on by water or rail to Lorraine, the neighboring departments of France, and Switzerland. In addition, 500,000 tons of coal from the Saar were conveyed over the Marne-Rhine canal system to the east of France. Inclusion of this tonnage raises the total quantities of coal entering Alsace from Germany to over 3,000,000 tons per annum.

Metallurgical Industries Used Imported Coal

Almost the entire import of fuel into Lorraine was utilized in the metallurgical industries. In 1912 the province received by rail 3,170,000 tons from the Ruhr coal field, of which no less than 3,060,000 tons were coke. There were consumed, in addition, 2,170,000 tons from the Saar (including the mines of Lorraine and the Palatinate), of which only 320,000 tons were coke. Lorraine also received 100,000 tons of coke from France and 330,000 tons of Belgian coke. The consumption of Ruhr coke in Lorraine rose by over 1,000,000 tons in the interval between 1909 and 1912; in particular, the deliveries from the right bank of the Rhine advanced from 1,900,000 tons to 2,900,000 tons. At the same time, the imports of Belgian coke showed a substantial increase in the same period, rising from 177,000 tons to 440,000 tons.

This was the position prior to the war, and it cannot be expected to change materially under present conditions, as the shortage of fuel will persist, and the productive capacity of the French coal fields is expected to fall short of the consumption by some 24,000,000 tons. The Saar collieries produced before the war about 12,000,000 tons, and during the war this fell to 5,000,000 tons. In peace time the Government collieries in this district found a market for 5,000,000 tons, or 70 per cent. of their output, in Prussia and Southern Germany; 1,500,000 tons, or 12 per cent., in Alsace-Lorraine; 1,000,000 tons, or 8 per cent., in France; the remainder being sent to Switzerland, Italy and Belgium. The net result is that, in the acquisition of these mines, France, under normal conditions, gains 8,000,000 tons, or, adding the private mines in Lorraine, 9,000,000 tons; but, in the years immediately following the war, the additional tonnage of coal secured for our allies will not exceed 5,000,000 or 6,000,000 tons, and, consequently, will not be sufficient to make good the deficit of the French collieries.

Furthermore, the Saar mines produce very little coking coals, the coke yielded being of inferior quality. In 1912 the state collieries produced only about 1,600,000 tons of coke, and the private mines about 200,000 tons at the most from a total output of 3,500,000 tons of coal. It was this deficiency that led to enlarged imports of coke from the Ruhr coal field before the war. As it is anticipated that the metallurgical industries in Lorraine will show progressive development, it is essential that Germany should be made to supply large quantities of coke or coking coal, as in the past, and the bulk of this will have to be delivered, via Strasburg, by water.

The proposal is now made that these supplies should be sent in the shape of coking coal, so as to avoid breakage of coke in transshipment at Strasburg and to enable France to recover the byproducts of which she stands so greatly in need. The total requirements are placed at 3,500,000 tons, of which 1,300,000 tons at least would be sent via Strasburg; but it is hoped that this total may be gradually increased.

So long as this town remained in German hands, the distribution of coal for local requirements, amounting to about 600 tons per diem, was exclusively in the hands of the "Kohlenkontor" (the Rhenische Kohlenhandels - und - Rhedereigesellschaft), the sales branch of the Rhenish-Westphalian Syndicate, with headquarters at Mannheim, and a branch office at Strasburg, lately transferred to Kehl, with agencies at Colmar and Mulhouse. The Kohlenkontor dealt direct with large consumers or dealers, but possessed no storage depot at Strasburg, nor any barges on the Rhine, hiring the necessary craft and delivering direct to customers. The State mines in the Saar also dealt direct with large consumers under contract. As regards the private mines, Messrs. de Wendel, before the war, maintained a sales department for their products at Strasburg, the Houve Mines had their business headquarters there, and the Stinnes and Holstenbath Collieries were represented by the Strasburger Kohlenaufbereitungsansalt und Rœchling.

If the Saar mines become the property of France, the headquarters will probably be retained at Saarbrucken under Government control, but it will be necessary, as regards the deliveries from the Ruhr, to establish some organization to take the place of the Kohlenkontor, and to supervise the distribution of coal throughout the provinces of Alsace-Lorraine; the present situation demands that measures to this end should be taken without delay.

Opportunity for American Coal in Canary Islands

Consul George K. Stiles, Teneriffe, is authority for the statement that there seems to be a splendid opportunity for the introduction of American bunker coal on a large scale in two of the more important coaling stations in the South Atlantic—namely, Teneriffe and Las Palmas, Canary Islands. There is no bunker coal on hand, with the exception of a few hundred tons of low-grade Spanish coal reserved for the use of Spanish mail boats between the peninsula and the archipelago. The efforts of the Canary Islands companies, all controlled from London, to obtain British coal have so far resulted in failure on account of the insufficiency of the British supply for home uses.

There is no doubt whatsoever that there is a market for large quantities of American bunker coal as the temporary supply until the mining industry of England has regained more nearly its normal conditions. These islands would undoubtedly absorb a hundred thousand tons of American coal in 1919 for bunker purposes. The temporary opportunity is one that needs no special emphasis. Offers by the local firms at this time for bunker coal c. i. f. Teneriffe are understood to be as high as $35 or $45 per ton, the latter being for steamer delivery. To secure a permanent hold on this trade, valued at $6,000,000 to $10,000,000 a year, would require, however, unusual efforts, as it is dominated by the South Atlantic coaling combine.

The firms in the Canaries are simply departments of London firms, which are the mine owners or are closely affiliated with mine owners. It would seem necessary, then, for American firms to secure concessions and to form a similar trade combination as the already existing British one before the American product would be able to make any showing in that market, even though it could be landed there more cheaply than the British-produced article.

Santa Cruz de Teneriffe and Las Palmas, Grand Canary, are both deep-water ports, ranging from 20 fathoms up. Cargoes range from 2000 to 7000 tons, and other than full cargoes are rarely received there, except a few shipments of gas coal for the use of the Teneriffe and Las Palmas gas companies, which occasionally buy small lots. Anthracite is also occasionally purchased, but the trade is comparatively unimportant, being estimated at less than 5 per cent. of the entire traffic. Coke is practically never imported.

The usual manner of unloading cargoes is to have the coal shoveled into sacks weighing about 200 lb. each. This is transferred to lighters by the derricks of the collier at the rate of five sacks to each shift of the derrick, or approximately one-half ton to each movement of the crane. The ordinary rate of unloading equals 250 tons per day, but as high as 600 tons have been unloaded. This could be doubled by night shifts, if exporters desired to economize the time of the collier's charter. The usual charter calls for unloading at the expense of the consignee.

All coal in Teneriffe and Las Palmas is unloaded into lighters, and exporters should therefore base their prices on contracts requiring merely the delivery of cargoes alongside lighters. The coaling firms all maintain large forces of men to unload and handle their purchases, and a section of the port is occupied by scores of lighters for this service.

The amount in storage at the depots on the shore at Teneriffe approximates normally between 60,000 and 70,000 tons, and practically the same amount is possessed by the coaling firms at Las Palmas.

Spanish Coal Imports

The following tabulation shows the quantity in metric tons (2204.6 lb.) and the value of coal and coke imports into Spain during 1916 and 1917:

	1916		1917	
	Tons	Value	Tons	Value
Coal	2,017,243	$9,440,497	1,094,806	$5,119,433
Coke and briquets	134,047	876,896	73,362	462,181

The lessened importation during 1917 was the natural outcome of the abnormal trade conditions caused by the war. In 1916 the United States exported coal to Spain to a value of $227,611. Great Britain,

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Mar. 18	Jap. S.S. Penang Maru	San Diego, Cal.	6,289	1,002
Mar. 19	Nor. Bk. Sydnaes	Rio de Janeiro, Brazil	2,953	
Mar. 20	Ital. S.S. Colombo	Gibraltar FO (Italy)	4,949	572
Sewalls Point				
Mar. 18	Amer. S.S. Chiababos	Pernambuco, Brazil	2,515	729
Mar. 21	Amer. S.S. Mojave	Rio de Janeiro, Brazil	2,404	967
Newport News				
Mar. 15	Amer. S.S. Watauga	Humacao, Porto Rico	1,481	414
Mar. 15	Amer. S.S. Choctaw	Lake Penitenco, Demerara	1,939	604
Mar. 15	Amer. S.S. Stephen R. Jones	Rio de Janeiro, Brazil	5,638	1,325
Mar. 19	Amer. S.S. Lake Fondulac	Antilla, Cuba	3,144	320
Mar. 19	Amer. S.S. Kennebec	Havana, Cuba	3,032	309
Mar. 19	Nor. Bk. Hippen	Rio de Janeiro, Brazil	1,256	
Mar. 20	Amer. S.S. Lake Galera	Fort de France, Martinique	3,135	379
Mar. 20	Amer. S.S. Cristobal	Cristobal, C. Z.	9,184	1,662
Mar. 22	Nor. S.S. Eika III	Nuevitas, Cuba	1,541	225

as was to be expected, topped the list with coal exports to Spain during 1916 to a value of $9,209,395. France came last, with coal to a value of $5694.

Spain has been forced to rely in large measure on domestic fuel, therefore coal mining has been encouraged in every way possible, with the result that 5,973,300 metric tons of coal of all kinds were mined in 1917, an increase of 1,125,825 tons over the official figures given for 1916. In 1917 the production of soft coal amounted to 5,025,600 tons, lignite to 636,800 tons and anthracite to 310,900 tons.

In many cases the production was checked by the impossibility of transportation, owing to lack of coal cars on the railroads. It is said that near many of the mines there were thousands of tons of coal ready for sale, but that there were no means by which it could be carried away. Mining was paralyzed in some parts also on account of insufficient space in which to store coal.

The progress in Spanish coal mining is indeed all that could be expected, but the supply does not yet meet the industrial demands of the country. It is natural that the increase should continue unless labor should fail, because the mining companies are now supplied with machinery. To encourage mining throughout Spain, the government authorized an organization called the National Council of Coal Miners, the principal objects of which are to group small concessions, investigate new fields, secure mining machinery, build railroads, depots and freight yards, and by concerted action increase the production of coal. Syndicates of mining companies are formed in different localities having the right to representation in the national council based on the quantity of coal produced. The government grants this organization aid by constructing such railroads as may be necessary for the development of coal fields and by advancing funds in the form of loans to groups of mine owners.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report under date of Mar. 24:

As the Chartering Committee will not allow American shippers to charter neutral steamers to carry coal from the United States to ports in Brazil and the River Plata (which boats are consequently chartering from Cardiff to these destinations), and as the Shipping Board is not able to supply enough steamers for these voyages for American shippers' requirements, we suggest to our various shippers that they charter sailing vessels for these voyages.

We have recently chartered a number of sailing vessels for this business and have a few other boats available.

We also have sailing vessels that will entertain coals to outside French ports at $30 per ton net form of charter, and to Marseilles or Genoa at $32.50 net form of charter.

The Shipping Board informs us that the Norwegian-American Sailing Vessel Agreement has terminated, and consequently these vessels are no longer under control of the U. S. Shipping Board or the British Ministry of Shipping.

The Chartering Committee's rates are as quoted below:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge. Rio, $19.50 net, 1000 tons dis.; Santos, $19.50 net, 1000 tons dis., or $21 net, 600 tons dis.; Buenos Aires, $18.50 net, 600 tons dis.; Montevideo, $19.50 net, 750 tons dis.; Pernambuco, $18.50 net, 500 tons dis. To Nitrate Range, $16.50 gross prepaid.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Rio Grande do Sul, $21.50 net, 400 tons dis.; Buenos Ajres, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. To Nitrate Range, $16.50 gross prepaid.

A cablegram from American Minister Stimson at Buenos Aires, dated Mar. 17, states that he had been informed that the labor unions had consented to return to work under the terms of the decree of the government and that the unloading of vessels in the port would be commenced immediately.

Shanghai Coal Market

Under date of Feb. 12 Wheelock & Co. report that the market for Japanese coal has been practically closed owing to the Chinese New Year holidays, and that it is unlikely there will be much business of any account for some time to come. Native dealers do not seem to be in any hurry to resume work, most of the trades being slack and money very tight.

In Japan the coal market continues firm. All government contracts, such as those for the navy, army, railways, etc., are now being considered—the Japanese fiscal year commencing Apr. 1—and mine owners are being hard put to it to meet the requirements as the demand greatly exceeds the supply.

There is no change in the Fushun coal situation, and no prospects of any coal for export in any quantity before the end of March. Also due to the Chinese holidays there has been little activity in the Kaiping coal market.

Retail Prices of Coal in Wales

Under the Household Fuel and Lighting Order, 1918, the local fuel overseer has fixed the price of household coal delivered in the residential district of Swansea (Sketty and Mumbles) at the following prices per long and short ton:

Quality	Price per Long Ton	Price per Short Ton
Best quality:		
Large and cobbles	$12.41	$11.08
Second quality:		
Large and cobbles	11.68	10.43
Third quality:		
Large and cobbles	11.07	9.88
Anthracite:		
French nuts and cobbles	13.99	12.49
Colliery screened cobbles	14.11	12.60
Large	14.11	12.60
Patent fuel:		
Briquets	10.83	9.67
Ovoids	13.38	11.95

It should be noted that the price of the best quality of anthracite coal delivered inside the residence at Swansea is fixed at $12.60 per ton of 2000 lb. This is an extremely high price when it is considered that Swansea is the centre of the anthracite coal districts of the United Kingdom, the mines being located in some cases within five miles of Swansea.

Italy Demands German Coal

Information comes from official sources that Italy intends to alleviate the extremely acute coal famine from which she has been suffering by demanding coal supplies from Germany by way of indemnity. Unless fuel can be procured in large quantities the national industries of Italy will be paralyzed. British exports of coal are insufficient to meet the demands, while exports from France have ceased entirely.

The Italian Government had hoped that American coal would help solve the fuel problem, but sea-going freight rates make American coal delivered at Genoa dearer than the British, which is selling at about $40 a ton. The lack of bottoms further complicates the situation. Negotiations with American coal exporters have been suspended until the question of obtaining German coal as indemnity is examined.

Miscellaneous Notes

American coal exporters are determined to make a strong effort to retain a big slice of the European coal trade. Orders are reported to have been booked in Sweden, Holland and Italy at low prices.

The London coal market still suffers keenly from short supplies. Many depots are closing their gates early in the day, and the overhanging cloud of labor trouble, with stocks so low, has thrown the market into grave anxiety. The seaborne quantity is improving.

The announcement that the Mexican Government intends to place a heavy duty on imports of coke has caused considerable uneasiness among Mexican importers of the product. They claim that Mexican coke is of an inferior quality and that an import duty on foreign coke would make production costs in the majority of industries prohibitive.

Coal and Coke Exports from the United States in January, 1919

Customs Districts and Countries	Anthracite Coal, Tons	Bituminous Coal, Tons	Coke, Tons
Maine:			
Canada	279	1,072	70
Vermont:			
Canada	1,793	5,642	67
Massachusetts:			
Canada	26	.....	.....
Newfoundland and Labrador	115	.....	.....
St. Lawrence:			
Canada	136,005	257,678	1,515
Rochester:			
Canada	2,876	53,654	1,405
Buffalo:			
Canada	212,905	230,746	16,449
New York:			
Italy	.....	1,349	.....
Canada	8,375	524	.....
Salvador	.....	.....	3
Mexico	.....	32	2
Newfoundland and Labrador	87	.....	.....
Cuba	.....	.....	15
Danish West Indies	.....	508	.....
French West Indies	.....	.....	6
Dominican Republic	1,905	.....	.....
Argentina	.....	700	.....
Ecuador	.....	.....	14
Paraguay	.....	.....	4
Peru	.....	55	55
Venezuela	.....	.....	471
Philadelphia:			
Netherlands	.....	11,995	.....
Newfoundland and Labrador	.....	609	.....
Cuba	4,101	.....	.....
Dutch Guiana	.....	1,001	.....
Uruguay	.....	1,785	.....
Maryland:			
Netherlands	.....	15,543	.....
Cuba	.....	4,280	.....
Argentina	.....	4,663	.....
Chile	.....	.....	831
Peru	.....	3,617	.....
Uruguay	.....	4,212	.....
Venezuela	.....	.....	1,047
Virginia:			
France	.....	936	.....
Italy	.....	9,954	.....
Netherlands	.....	10,904	.....
Canada	.....	2,756	.....
Panama	.....	6,135	.....
Barbados	.....	2,575	.....
Jamaica	.....	2,521	.....
Trinidad and Tobago	.....	1,363	.....
Other British West Indies	.....	3,994	.....
Cuba	.....	94,553	3,802
Danish West Indies	.....	1,512	.....
French West Indies	.....	592	.....
Dominican Republic	.....	3,295	.....
Argentina	.....	36,005	.....
Brazil	.....	55,546	.....
Chile	.....	26,861	.....
Peru	.....	5,992	.....
Uruguay	.....	67,705	.....
Canary Islands	.....	17,768	.....
Portuguese Africa	.....	22,255	.....
Georgia:			
Argentina	.....	2,116	.....
Florida:			
Cuba	.....	1,950	.....
Mobile:			
British Honduras	.....	100	.....
Cuba	.....	1,806	.....
New Orleans:			
British Honduras	.....	.....	3
Gautemala	.....	3	3
Honduras	.....	254	2
Nicaragua	.....	157	.....
Mexico	.....	.....	45
Cuba	.....	1,050	.....
San Antonio:			
Mexico	114	2,680	3,007
El Paso:			
Mexico	159	3,666	3,122
Arizona:			
Mexico	.....	3,452	16,632
Southern California:			
Mexico	.....	15	.....
San Francisco:			
Salvador	.....	.....	12
Oregon:			
France	.....	800	.....
Washington:			
Canada	.....	1,404	90
Dakota:			
Canada	.....	714	90
Duluth:			
Canada	.....	1,360	26
Michigan:			
Canada	0	123,492	12,995
Ohio:			
Canada	.....	89,728	5,740
Porto Rico:			
Dominican Republic	.....	.....	3
Total	366,749	1,207,634	67,526

COAL AND COKE NEWS

EDITED BY ALEX MOSS

Harrisburg, Penn.

A state tax of 1 per cent. on the value of the coal mined and prepared for market in Pennsylvania would be established for state purposes only, under the terms of a bill introduced in the House on Mar. 25 by Mr. North of Chester.

The bill would affect both hard and soft coal. The bill is similar to former laws, which it would repeal, and requires production reports to be made to the Auditor General.

It was learned on Mar. 26, that before the Davis Mine Cave Bill is reported out, if this action is taken, the word "coal" will be taken out and "anthracite" substituted. Members of the mines committee from the bituminous region, among whom are Senator W. E. Crow, interested in a number of soft coal operations, have insisted on this amendment, it is said. As the measure reads now, the entire coal industry of the state, anthracite and bituminous, is affected by its provisions. The bill is a drastic one and was drawn up principally to remedy conditions as they exist in Lackawanna County, and for this reason the soft-coal interests have announced their objections to the inclusion of the bituminous industry in the bill.

While drafts of the proposed amendments of the Workmen's Compensation Act are before the Governor and Attorney General for their final determination, and are subject to change, it is understood that the state administration is favorable to the contentions of the coal miners and other organized labor that there should be an increase in the rate of compensation and a change in the "waiting period" from fifteen to seven days. The miners urge 70 per cent. compensation against 50 per cent. of the weekly wage, as at present. Capitol gossip is that the new bill will be either 60 or 65 per cent. Compensation, however, is not to exceed $13 a week, an advance of $3. It is understood that conferences have been had with labor leaders and that while some want to put in their own bill, others are disposed to accept what Chairman Harry A. Mackey has drawn up for the consideration of the Governor.

One of the changes under discussion is the schedule of payments for mutilation and disfigurements, for which the miners have strongly contended. A bill already in provides for medical attention for 30 days instead of 15, and this is also said to be favored by compensation officials. Wider powers for the State Board to fix rates are understood to be included, although there is a difference of opinion on this point.

Leading anthracite coal operators have made overtures to Governor Sproul to submit their books, reports and other data, which, they declare, will show that the proposed increases in the price of coal to take place on May 1 are justified. It is learned that the coal operators favor a "friendly" investigation and that they are doing everything possible to prevent a legislative investigation. It is believed that nothing will be done toward pushing a resolution through the Legislature until after the operators have been given a reasonable time to discuss the situation among themselves and also with the Governor.

Uniontown, Penn.

"Hold wages up and production down," may be defined as the general policy of independent (or merchant) operations of the Connellsville region, expressed and approved at a conference of operators here which marked the first meeting of the Coke Producers' Association since before the war. That agency, long inactive, is to be called back to life to direct the coke industry through the crucial days ahead in the stabilization of the industry.

Various operators at the conference were emphatic in approving a decision not to disturb the wage scale so long as the cost of living remains at its present level. To attain that end, it was held the coke market must at least be kept firm; and to keep an active demand for Connellsville coke there seems to be no limit to the lengths to which the operators will go. With an average price now of $4.50, ovens, many operators dealing in prompt delivery frankly asserted their intention of suspending operations if the spot market went below that price.

That the turning point in this region is now near, and that it actually has been passed in the country at large, was the assertion of W. L. Byers, production manager for the fuel administration during the war. Quoting Washington advices, Mr. Byers asserted that consumption of coal and coke in the country now exceeded production by 20 per cent., and that unless some move was soon made toward increasing output a marked scarcity would be found in the market for fall and winter buying. Speaking of his experience as a coal and coke broker, Mr. Byers said that the situation was now being appreciated by buyers and that inquiries had made an encouraging increase during the past week.

A warning was given the operators not to expect too much business from the Great Lakes trade now opening up, by Fred P. Truesdale, former division freight agent for the Pennsylvania R. R. Mr. Truesdale said that a mild winter had left consumers with stock piles which must be reduced before the demand becomes active from that source.

Charleston, W. Va.

Insofar as it is possible to determine, taking West Virginia as a whole, there was a slight gain in production during the week ending Mar. 22, the increase, such as it was, being due to larger shipments to the West. Even there, however, the demand is far from being sufficient to give much impetus to mining in those fields of West Virginia which depend on the West for their market. The fact that there is and has been less activity in the Western market than was expected is attributed by West Virginia operators to the prospects of a dull lake trade during the early part of the season. In fact, West Virginia producers are inclined to believe that it will be well onto a month before there is any appreciable carrying of coal on the lakes, owing to the fact that lake consumers have a surplus of about four million tons to draw upon.

Stock piles in Western markets are being somewhat diminished, but the process is so gradual that it does not require much to replenish them. Even those districts shipping to the East during the third week of the month for the most part were still looking to the West to supplement the demand and to make possible production on more than a 50 per cent. basis, because tidewater shipments were just about stationary, with no export business at all in sight. The only coal which was going to the West in any volume was lump and egg, and lack of equipment and storage facilities made it hard to mine that coal because of the necessity of taking out other coal at the same time. However, for the reason just stated, there was a better demand in the West. Navy consumption is helping to swell shipments from certain districts.

DuQuoin, Ill.

The Kathleen mine, at Dowell, five miles south of Du Quoin, owned by the Union Colliery Co., of St. Louis, is fast nearing completion. The mine, which was started one year ago, will be the largest bituminous coal mine in existence, when completed. The property on which the mine was sunk lies on the main line of the Illinois Central Railroad Co., 1½ miles north of Elkville and five miles south of Du Quoin. This place, eighteen months ago, was a bare tract of land, but today is a thriving mining town of 500 to 600 population.

Over the main shaft of the mine, which is 28 x 19 ft. clear, is being built the largest steel tipple ever constructed, and at the air shaft, which is 33 x 10 ft. clear, a concrete tipple has been completed with a double-deck 50-man cage in operation. It is at this shaft that all the men and materials will be hoisted and lowered.

At the present time 900 to 1000 tons are being hoisted each day, but when in full operation it is expected that the plant will reach a tonnage of 6000 to 8000 daily. The power throughout the mine is electric, including all haulage, mining machines and hoisting, the method employed in hoisting the coal to the surface being by means of skip hoists holding 10 tons each. From 1000 to 1300 men will be employed in the mine when it is running full blast.

The Illinois Central Railroad Co. has announced the opening of its new five-stall roundhouse and machine shops, which it has completed at the north end of the city switchyards. This represents one of the biggest railroad improvements made in Du Quoin for years, and one which this city with its greatly increased freight and coal traffic sorely needed.

The United States Fuel Co. has completed 50 modern homes at Benton, east of here, to be used by the employees of the Middle Fork mine. On account of the scarcity of men last year the company purchased land just inside the city limits and erected houses.

The possibility of a coöperative store in this city is being discussed by the miners' unions, and the discussions have so far indicated it is likely the plan will go through. The stock of goods will be purchased through the East St. Louis offices of the Illinois Coöperative Store System, which has jurisdiction over the miners' store of Southern Illinois.

New York, N. Y.

The ratification by the General Strike committee of the Marine Workers' Affiliation of the settlement made between the private boat owners and the members of the Tidewater Boatmen's Union obviates, at least for the present, all danger of a coal famine in the Metropolitan District. The striking harbor workers at the outset of the trouble, about five weeks ago, numbered nearly 16,000. Almost half of these returned to work when Government departments, including the Railroad Administration, granted the strikers' terms, and the remainder of the men have been holding out for their terms.

During the past week the situation became serious. Retail dealers were running short of coal, and it was said that some of the city institutions were also suffering from the lack of coal. Dr. Garfield, Federal Fuel Administrator, sent a telegram to Mayor Hylan in which he suggested to the Mayor the possibility of supplying facilities for the movement of coal so that the public service corporations would not suffer.

The offer of the private boat owners took with it an increase in salary of $20 a month over what the tidewater men received before the inauguration of the strike, making their pay $110 a month. There was no suggestion of a decrease in working hours. The Railroad Administration settled its differences with the tidewater men on the same salary terms, but granted a twelve-hour day and $1.50 per night for watchmen's duty on loaded barges. The tidewater men originally asked for $125 per month, with no provision for shorter hours.

Private boat owners, individually, believe the strike is won and do not expect any further trouble. By the end of the week they expect that most of the coal barges will be running and that there will need be no further fear of a coal shortage.

Victoria, B. C.

The production of the collieries of Vancouver Island for the month of February totaled 145,750 tons in comparison with 158,327 tons for the month of January. It should be borne in mind, however, that February is the shorter month. Still this does not altogether account for the decline. Nanoose collieries, for instance, dropped to an output of 500 tons, which is explained by the interference with work caused by the construction of a wharf. While the generally changed conditions of the past six months have had no noticeable effect on the Island collieries as yet, the producing mines being operated steadily and in most cases to capacity with

results even better than when the war demand was at its height, there are slight indications that the urgency for output is not as great as it was. The work of opening up the Wakesiah Mine, which is situated near Nanaimo, B. C., and owned by the Canadian Western Fuel Co., has ceased temporarily, and a short time ago the coal miners of Nanaimo were off for a Saturday afternoon.

Both the Princeton Collieries and the Coalmont Collieries have increased their production in comparison with the results of January. In the case of Princeton the explanation of the improvement is that in the previous month a fire interfered with work.

As for the Crowsnest Pass coal field, there are no returns to hand as yet. The collieries, however, are authentically said to have operated only twelve days. A substantial reduction, therefore, is looked for. The reason for this slackness is found in the lack of demand in British Columbia for coke, following the closing down of the smelteries at Greenwood and at Anyox, particularly that of the Granby Consolidated Mining and Smelting Co. at the latter place, where a large quantity of the fuel is used when the plant is working to full capacity.

PENNSYLVANIA

Anthracite

Marysville—The river coal trade along the Susquehanna in Perry County promises to be an important industry next summer, due to the high prices being paid for coal. All along the river men who have been in this trade in the past are calking their old barges and preparing for a big summer business.

Hazleton—At a meeting of the stockholders of the New York and Lehigh Coal Co. on Mar. 20, the corporation was dissolved. It was one of the oldest concerns in the anthracite field. All the mining rights have been sold to the Lehigh Valley Coal Co.

Carbondale—New York capitalists have purchased the Horseshoe Bluff of the old gravity railroad for $95,000 and will market the coal used in the filling of the bluff many years ago. Also, the Lackawanna Coal Co., Ltd., has purchased from the Jordan McNally Co. the Northeast Colliery. This plant contains about 2,000,000 tons of coal.

Plymouth—The Hudson Coal Co. has under erection at this place the largest capacity breaker building in the anthracite field. It will be up to date in every way. It is the first breaker building to be covered, both roof and sides, with protected metal. The development and operation of this breaker will be followed with interest, as the plant establishes a precedent in the field due to the features embodied in its construction.

Bituminous

Pittsburgh—The Roberts & Schaefer Co., of Chicago, has been awarded a contract for the installation of shaker loading booms at each of the Primrose and Armeid tipples of the Carnegie Coal Co.

Brownsville—The Snowdon Coke Co., operating near Brownsville, on the Pennsylvania R. R., is putting 50 ovens out of blast. This will leave 160 ovens in blast and permit the mine to operate about three-fourths time with the present working force.

Braznell—The Pittsburgh Steel Co., which has taken over the coal and coke operations of W. Harry Brown in Fayette and Green Counties, is preparing to speed up these operations. Of a total of 400 ovens, 200 are now in operation; 185 more will be fired up, 15 being kept out for repairs which will be pushed as rapidly as possible.

WEST VIRGINIA

Beckley—A property loss of about $10,000, fully covered by insurance, was sustained by the Tolbert Smokeless Coal Co., recently, when the building which housed its store and office was burned to the ground, the fire spreading so rapidly before being discovered as to make it impossible to save the structure.

Mt. Hope—The plant of the Mt. Hope Coal and Coke Co. is a total loss as the result of a fire which not only destroyed the tipple and other mining buildings but also the company's ice plant, the loss being about $30,000, nearly half covered by insurance. Mine cars and other equipment were also destroyed in the fire. The plant had not been in operation recently, but the company's ice plant did furnish ice for local consumption, and had just placed an order for new machinery. The Mt. Hope company belonged to W. E. Deegans and his associates. It will hardly be rebuilt.

Williamson—A coal deal of considerable magnitude has been closed in Mingo County, in which the change in ownership of 1500 acres of coal land is involved, the price being in the neighborhood of $150,000, it is said. The purchasers are M. H. Pedigo, of Bluefield, and his associates, the coal property acquired from E. E. Music being on Pigeon Creek. Col. William Leckie, of the Pocahontas field, is one of those associated with Mr. Pedigo in the Pigeon Creek deal. It is the expectation of the purchasers, so far as plans have been made, to develop the territory whenever general conditions seem favorable. The United Thackers interests only a few years ago acquired a large acreage from Mr. Music, who has now disposed of all his coal holdings.

KENTUCKY

Madisonville—The St. Bernard Mining Co. is making rapid progress on its new power plant, which will furnish power and light to a number of mines and towns. Poles and wires are up to some of the mines, the transmission lines having been completed to the Fox Run mine at St. Charles and the Diamond mine at Morton's Gap.

OHIO

Carrington—The Sunday Creek Coal Co. of Columbus, recently reorganized, is going ahead with its improvements and betterments, on its properties in the Hocking Valley field. A new tipple is being constructed at Mine No. 90 at this place, and preparations have been made to build new tipples at Mine No. 19, Buckingham, and Mine No. 10, at Glouster. All the tipples are of steel construction. Shaker screens and other modern equipment will be installed.

INDIANA

Bridgeton—The recent heavy rains have caused a serious cave-in at No. 6 Zellar-McClellan coal mine, damaged the pump, placed the hoisting machine out of commission and caused a shut-down of the mine. Repair work is being pushed but it will be two weeks before the mine can be operated again. The cave-in happened when only one man was in the mine, and fortunately he escaped by way of the manhole. The mine is located southeast of Bridgeton.

Brazil—Officials of the Pennsylvania R.R. announced that beginning Monday, Mar. 31, after the clocks are advanced one hour, the Seelyville and Glen Ayr miners' train would be run one hour later. The miners' train now leaves Harmony at 5:40 in the morning and Brazil at 5:50, but beginning on Mar. 31 the train will leave Harmony at 6:40 and Brazil at 6:55 o'clock. The miners objected to arising an hour earlier, and district officials took the matter up with the railroad company which agreed to run the train an hour later. The return trip in the evening will also be made an hour later.

ILLINOIS

Litchfield—The Chicago, Burlington & Quincy R.R. has opened a new coal mine at Vallier, south of Litchfield, and is building the foundation for a town which is expected to grow rapidly. The Burlington is building a double track between Reno and Durley.

Peoria—The Crescent Coal Mining Co., operator of large mining interests south of Peoria, has secured the mineral rights to 160 acres of land in Hollis township, a few miles from the city of Peoria. The land is owned by Emil and Margaretha Stoll, the company paying $5000 for the right to mine the coal beneath the land.

Hillsboro—A syndicate which is reported to be backed by Gary, Ind., interests, has been obtaining options on a large body of coal lands between Hillsboro and Walshville. It is understood that the plan is to obtain options on at least 35,000 acres running southwest from Hillsboro to the vicinity of Walshville. The options run six years.

Carlinville—Another large coal field, embracing some 1500 acres, located in Macoupin County, has been sold. This field lies between Bunker Hill and Shipman, and as many of the other fields in this country, its sale was promoted by A. W. Crawford, of Hillsboro. Mr. Crawford secured the options on this field recently and drills have been testing the quality and quantity of coal. It is considered that this new field will not be extensively worked for at least two years.

TEXAS

Rockdale—The Federal Fuel Co. has been organized for the purpose of developing a large tract of lignite lands near Rockdale, Texas, in Cameron County. Organizers of the company are Henry G. Butler, of Hillsboro, Tex., vice-president and general manager; W. A. Butler, also of Hillsboro, and William Butler, of San Marcos. Offices of the company are maintained at 1003 Scanlon Building, Houston, Tex. The company owns 1400 acres of lignite lands southwest of Rockdale, which is underlaid with more than twenty million tons of lignite, according to estimates prepared by engineers. Much of this lignite lies sufficiently close to the surface that it can be mined by steam shovels in stripping operation. The company will build seven miles of its own track from the International and Great Northern, which will traverse the 1400 acre tract. It is planned to have the mine in operation by Aug. 1, with a daily output of 1000 tons.

MONTANA

Musselshell—On Mar. 17 the Star coal mine filed with the county clerk at Roundup a certificate authorizing the increase of its capital stock from $150,000 to $200,000. The company contemplates extensive improvements to its mine here. The operation has been producing coal for several years.

Roundup—If William Degan of this city is able to carry out his plan the old Keene coal property, a few miles west of here, will again be operated. The mine has been idle since it was abandoned four years ago by Nelson Brothers. There are a number of judgments against the property, and Mr. Degan hopes to be able to operate on a royalty basis, paying the creditors a certain sum for each ton of coal mined. The creditors are said to be in favor of the plan.

Foreign News

London, England—The sum of £15,000 is being devoted by the British Government toward the cost of experimental borings in the County Tyrone coal field, which has the town of Coalisland for its chief center. The borings are being made in the vicinity of Lough Neagh, under which coal is supposed to lie. The experimental borings are being carried out under the advice of experts from the English coal fields, under the supervision of Sir Lionel Phillips.

Calgary, Alberta—At the annual convention of the British Columbia Federation of Labor held here recently, resolutions were passed asking the British Columbia Government to order inquiries into the coal mine accidents of 1916 at Coal Creek and 1918 at Nanaimo, which resulted in the deaths of 48 miners. The convention was assured that the Provincial Government was prepared to proceed with any further investigation that might be considered necessary.

Ottawa, Ont.—C. A. Magrath, Fuel Controller for Canada, announces that the fuel situation has now cleared up to such an extent that the organization in Ottawa will terminate its activities at the end of the present month. Ample supplies of coal are now available for both domestic and industrial purposes, production for all classes of coal having overtaken the demand. The coal regulations will probably be allowed to remain in force until the actual declaration of peace, although importers and dealers will not be required to take out new licenses for the coming coal year. The Controller stated that this would be his last official statement to the press and desired to emphasize the desirability of everyone taking in coal supplies who could afford to do so in the near future. There was a disposition to hold back in the anticipation that prices will come down. While he was unable to make any positive statement as to prices, the tendency so far as anthracite is concerned seemed to be in the other direction. One or two of the large United States coal companies have announced that the usual opening reduction will not be made, and that prices will advance at the rate of 10c. per ton each month for five months during the summer.

Personals

J. B. Marks has been appointed to the position of purchasing agent of the Colorado Fuel and Iron Co., of Denver, Colo., vice **S. G. Pierson**, elected treasurer.

R. L. Baker, formerly connected with the Railway and Mine Supply Co., is now the

Chicago sales representative of the Muskegon Boiler Works, of Muskegon, Mich.

George T. McCarty, of Pittsburgh, Penn., has resigned as manager of western sales of the United Coal Corporation, effective Apr. 1, and will engage in the coal brokerage business in Pittsburgh.

C. G. Knisley, who has been secretary and general manager of the Reeves Coal Co., New Philadelphia, Ohio, for the past nine years, has resigned his position to assume his duties as vice president and secretary of the Midvale Coal Company.

William Lahm has resigned his position as superintendent of the Ellsworth Collieries Co., Ellsworth, Penn., to become general superintendent of the Washington Coal and Coke Co., with headquarters at Star Junction, Penn., effective Mar. 15.

H. G. Lewis, sales manager of the Electric Service Supplies Co., Philadelphia, Penn., has recently been made vice president. Mr. Lewis is well known in the eletcric railway, mining and power fields. He will continue his work as vice president and sales manager.

John Hanwell, of Bismarck, N. D., has been appointed state mine inspector, in pursuance of a new law enacted by the recently adjourned session of the legislature of the State of North Dakota. The duties of mine inspector were formerly covered by Jay W. Bliss, state engineer.

C. E. Hague, formerly production engineer of the Mid-West Engine Co., Indianapolis, Ind., has been appointed sales manager of the American Steam Conveyor Corporation, Chicago, manufacturers of the American steam ash conveyor and other ash-handling equipment. Mr. Hague assumed his duties Mar. 17.

Thomas Haulton, well known mechanical and electrical engineer, has opened an office in Johnstown, Penn., as a consulting engineer, specializing on mining equipment. An interesting feature in connection with a service for coal operators that Mr. Haulton is going to inaugurate is an arrangement whereby Mr. Haulton, in return for a reasonable stipulated monthly fee, will be available to mine managements at all times for information and advice. Mr. Haulton's long and varied experience with all classes of mining equipment in this and foreign countries, especially fit him for this service.

E. E. Back, formerly sociological director of the Ellsworth Collieries Co. and recently Chief of the Americanization Bureau of the Council of National Defense, has accepted a similar position for the State of Pennsylvania under Governor Sproul. His work will relate not only to the teaching of English to aliens and their acquirement of American citizenship, but also to health, safety and other welfare. Inquiries and suggestions relative to this work will be welcomed by Mr. Bach, whose address will be the 7th floor, Finance Building, Philadelphia, Penn. He will be assisted by a body of experts in all lines to be covered.

Obituary

George H. Lacey, general superintendent of the LaSalle Mining Co., LaSalle, Ill., for a number of years, died at the age of 86 years at Southern Pines, N. C. He was formerly mayor of LaSalle, Illinois.

Whiteman E. Smith, aged 39, president of the Smith-Gardner Coal Co., died in Cincinnati, Ohio, recently from pneumonia. He was the grandson of the late Richard Smith, who was editor of the Cincinnati "Commercial Gazette" for many years.

Coming Meetings

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Illinois Mining Institute will hold its annual meeting May 22, 23 and 24. Secretary, Martin Bolt, Springfield, Ill.

National Coal Association will meet May 21, 22 and 23, at Congress Hotel, Chicago, Ill. Secretary, J. D. A. Morrow, Washington, D. C.

International Railway Fuel Association will hold its annual meeting May 19-22 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

Indiana Retail Coal Merchants' Association will hold its annual spring meeting Apr. 23 and 24 at Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Industrial News

Canton, Ohio—The George A. Williams Coal Co. has been incorporated with a capital of $20,000 by George A. Williams, Charles C. Upham, Nelle M. Meysr, W. G. Brossman and J. G. Kramer.

Louisville, Ky.—The Gordon-Miller Coal and Coke Co., Louisville, has filed amended articles of incorporation, increasing the capital stock from $80,000 to $250,000. The company has mines in eastern Kentucky and offices in the Lincoln Bank Building, Louisville.

Dalton, Ga.—The Jacobs-Glaser Mining Co., which recently filed notice with the Secretary of State of a change in its corporate name to the Coosawattee Coal and Mining Co., has increased its capitalization from $200,000 to $500,000, to be used, it is understood, to provide for expansion.

New York, N. Y.—A. H. Smith, Regional Director of Railroads, Eastern Territory, shows in his report for January and February that compared with the same months in 1918, bituminous coal loading decreased 43 per cent.; and that anthracite coal loading for January decreased 2 per cent. and in February 30 per cent.

Huntington, W. Va.—D. E. Hewitt & Co. of this city have acquired 1500 acres of coal land from the Berger estate near Kermit, W. Va., and plan development when the time seems ripe to expend about $150,000 in installing a plant for the mining and shipment of coal. Associated with D E. Hewitt are Arch Hewitt and R. A. Thomas.

Charleston, W. Va.—Capitalized at $150,000, the Nelson Coal and Oil Co. has been organized, the company being incorporated by Charleston citizens. It is the intention of the organizers to do a general mining business. Chiefly interested in the formation of the company were J. M. Clark, E. M. Johnson, G. R. Krebs, C. W. Morton and C. E. Krebs.

Columbus, Ohio—George A. Borden, president of the Columbus Board of Purchase, will open bids Apr. 7 for the purchase of 1400 tons of either nut, pea and slack or mine-run for the garbage and refuse plant; 2000 tons of nut, pea and slack for the waterworks department; and 3500 tons of Hocking nut, pea and slack for the municipal light plant.

Pittsburgh, Penn. — The Epping-Carpenter Pump Co. announces the appointment of F. S. Healey as manager of sales in addition to his former office of chief engineer, vice E. F. Woods, who is now located in New York as eastern sales manager. Albert A. Scheuch, of the sales department, has been appointed as assistant sales manager, and Paul D. Goodman, formerly of the McClary Jemison Machinery Co., of Birmingham, Ala., has been added to the sales personnel.

Duluth, Minn.—The Clarkson Coal and Dock Co. has arranged to make improvements at its dock this season that will result in doubling its handling capacity and entail an expenditure of $125,000. Work will probably be started by May 1, and it is expected that the new equipment will be ready for operation by July 1. When completed the doek will have a loading capacity of 150 cars daily. The contract for the installation has been let to the Mead-Morrison Manufacturing Company.

New York, N. Y.—Through the Bureau of Foreign and Domestic Commerce, we are in receipt of information about foreign trade opportunity number 28,705. W. H. Lane, 101 Queen St., Melbourne, Australia, wishes to secure agencies for mining machinery, high speed engines, boilers, electrical generators, electrical and mechanical equipment of all kinds for timber and mining enterprises. References: J. C. Haskins & Co., Sidney, N. S. W.; Dalgety & Co., Melbourne; and The National Bank of Australia, Melbourne.

New York, N. Y.—The committee appointed to revise the rules of the Tidewater Coal Exchange and to establish a new system of classifications met in Philadelphia Mar. 28 and completed its report, which was sent to J. W. Howe, Commissioner of the Exchange at Washington. A copy of the report will be sent to the secretary of each coal merchants' association for consideration of its members. It is understood that various changes have been recommended in the rules and that the committee recommends that the coals in the pools be classified according to analysis.

Washington, D. C.—The Government plans to sell at prevailing market prices the surplus stock of 80 lb. rail and 25 lb. rail ordered for the American Expeditionary Forces overseas, but not required due to the signing of the armistice. There are about 50,000 tons of 80 lb. rail and about 7000 tons of 25 lb. rail. There are large quantities of crossings, slip switches and turnouts. Most of this material is at port readily accessible for loading. All sales are being conducted through the office of the Director General of Military Railways, Washington, D. C., where further information can be obtained.

Birmingham, Ala.—A committee of Alabama coal men, headed by S. L. Kerkes, of the Grider Sales Co., and W. C. Adams, of Adams, Rowe & Norman, Inc., appeared before the officials of the railroad administration in Washington recently seeking the establishment of a joint rail and water rate from points in the Warrior coal fields to Mobile and New Orleans. The naming of such rates is essential to the proper utilization of the facilities of water transportation on the Warrior, which the Government has made available by the expenditure of vast sums on locks and dams, and to the development of the bunker and export trade which should be supplied from this field.

Columbus, Ohio—Coal-carrying railroads that were permitted to charge $1 per ton for transporting coal from Nelsonville to Toledo after the state public utilities commission in 1911 had reduced the rate to 85c. must refund the entire amount of overcharge and are not limited to liability only of $25,000, the amount of the bond required, according to a recent decision of the Ohio Supreme Court. The cases decided were those brought by the New Pittsburgh Coal Co. and the Big Four Coal Co. against the Hocking Valley Railway Co. The common pleas courts of both Lucas and Franklin Counties had held in favor of the railroads, but the Appellate Court reversed the lower tribunals and held in favor of the coal companies. Many other suits are pending.

Kansas City, Mo.—The board of directors of the Chamber of Commerce has declined to give approval of a request which Kansas coal operators will make before the Interstate Commerce Commission for a 10c. increase in freight rates on coal from the Illinois coal fields. The Kansas operators presented their side of the case, while industrial companies of Kansas City opposed the change. Representatives of local industrial concerns pointed out the present advantage of 60c. the Kansas operators have in freight rates, stating a further advantage would be prohibitive to Illinois coal producers. The failure of Kansas operators to supply local demands was noted by the industrial representatives, who declared the increase of Illinois freight rate, by excluding Illinois coal, would create a serious shortage here.

Indianapolis, Ind.—Alfred M. Ogle is president of the Ogle Coal Co., which has recently been incorporated. The new company will take over the selling agency of the Vandalia Co., which will be operated only as a producing company. The Ogle Coal Co. will also handle the sales of the Atlas Coal Co. and the Vigo Mining Co. The offices of the company will be in the suite in the Fletcher Trust Co. building, Indianapolis, which has been occupied by the Vandalia Co. Mr. Ogle was an assistant to Dr. H. A. Garfield, Federal Fuel Administrator, and had charge of distribution of coal in Indiana. He is widely known in Indiana coal and mining circles and with the passing of the war period wishes to head his own company. Bernard R. Batty is vice president of the company and W. C. Kaiser is secretary.

Louisville, Ky.—The Louisville coal trade is aroused over an announcement of the City Administration of Licenses that the trade is to be taxed, the city alleging that such action is necessary to make up for the loss of revenue when the saloons close. Every branch of the coal trade is taxed, and all promotors are taxed. Extra taxes are arranged for each branch yard, and special taxes for each team or truck. The ordinance as written would also impose special licenses on concerns on the basis of the number of men employed. The coal schedule imposes a license of $100 for each yard, and a scale of payments based on annual business, calling for $7.50 for a $3000 business, and $45 for a business of $15,000 or over in gross sales. The ordinance as written would prove a great hardship on some of the larger concerns which have numerous yards, trucks and employees.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Coal Market Shows Signs of Improvement—Considerable Contract Inquiry—Labor Troubles at Mines—Railroad Fuel Controversy Still Unsettled—New England Overstocked—Soft Coal Consumption Exceeds Production—Anthracite Situation Better

BOTH pessimist and optimist can find enough in the present condition of the coal market to bolster up their respective views. A careful analysis, however, would indicate that the optimist has a shade the better right to his belief. Market conditions are a trifle more favorable than they have been, though the demand for coal continues to be extremely dull.

Consumers of bituminous coal are evidencing considerable interest in contracts to cover their requirements for the new coal year, but the majority of the large producers are not at all eager to sign up for this business. The labor situation in most of the important soft coal mining regions is anything but satisfactory, though labor leaders are understood to be assiduous in pointing out to their men that decreased production is essential to the maintenance of prices, and in turn of wages.

All indications at this time point to labor troubles at the mines when the peace treaty is signed, and if these eventuate in any of the fields it will have a tendency to raise the prices of coal in those producing districts that are not affected. Consumers who are not protected by contract will be compelled to meet this advance in price if they wish to obtain coal.

The question of what price the railroads are to pay for their coal is still unsettled. It is believed, however, that a definite understanding will be reached by the end of April. The railroads consume more coal than any other industry, and once the existing controversy between the operators and the railroad officials is eliminated, it will give a feeling of confidence to the entire coal industry. Another reassuring sign pointed out by the optimist is that general manufacturing and industrial conditions appear to be more stabilized. Plants that were practically at a standstill two or three weeks ago are now fairly active.

Not to crowd the pessimist entirely out of the discussion, we will permit him to point out that the New England fuel situation is not favorable to the bituminous coal operator. Stocks in that territory are not being depleted as fast as was expected. The textile manufacturers are apparently no nearer a solution of their labor difficulties, and several large mills are still closed down. Many mill owners, the gloomy prognosticator has discovered, have been obliged to refuse their February and March coal quotas on contracts now expiring. Another factor that disturbs the pessimist is the extent to which fuel oil is making inroads on steam coal in the New England states. In one case, he emphasizes, the change to oil has reduced the coal consumption nearly 50,000 tons.

Conditions in the coal-producing regions of the Middle West are improving. According to reports from Minnesota, Iowa, Wisconsin, Illinois and Michigan, soft coal is being bought in more liberal quantities than heretofore.

Consumption of bituminous coal now exceeds production by 20 per cent. Unless sufficient demand sets in to stimulate output, a marked scarcity will be manifest in soft coal next fall and winter. The many inquiries regarding contracts would lead one to believe that consumers are now sensing the true situation.

The anthracite industry is in good shape, all things being considered. Demand has improved, and this has been reflected in increased working time at the mines. There is no great surplus of the steam sizes of anthracite; and as with bituminous coal, unless production increases considerably from week to week, there is likely to be a shortage. This can be obviated if consumers order their coal early and get it into their bins during the summer months. Household consumers will doubtless put in their orders during the month of April, for an increase in price of 10c. a ton goes into effect on May 1.

WEEKLY COAL PRODUCTION

The loss of time on St. Patrick's Day, Mar. 17, brought about a 7 per cent. decrease in the output of bituminous coal during the week ended Mar. 22, compared with the week ended Mar. 15. The production during the current week is estimated at 7,477,000 net tons as compared with 8,042,000 net tons during the week of Mar. 15 and 11,121,000 net tons during the corresponding week of last year. The daily average per working day is estimated at 1,246,000 net tons and is considerably behind the daily average per working day during the present coal year to date, estimated at 1,795,000 net tons, and last year estimated at 1,762,000 net tons. The total production from Apr. 1, 1918, to date is estimated at 549,126,000 net tons as against 539,127,000 net tons during the preceding year.

The production of anthracite in the United States during the week ended Mar. 22 is estimated at 1,171,000 net tons, as against 1,206,000 net tons during the week ended Mar. 15 and 2,099,000 net tons during the corresponding week of 1918. The daily average per working day during the current week is estimated at 195,000 net tons, as compared with 296,000 net tons for the coal year to date, and 319,000 net tons for the same period last year. The production from Apr. 1, 1918, to date is estimated at 90,488,000 net tons and is 6,981,000 net tons behind the production of the 1918 coal year.

Tidewater shipments to New England, during the week under review are estimated at 93,376 net tons and exceed the tonnage loaded during the week preceding by 13.4 per cent. Considerable improvement occurred during the week in tonnage loaded at New York and Philadelphia, while the tonnage loaded at Hampton Roads decreased slightly. The rail shipments to New England were not reported.

The shipments of bituminous coal from the tidewater harbors to all points during the week ended Mar. 22 are estimated at 362,865 net tons and are in excess of shipments during the week ended Mar. 15 by 12.4 per cent. Tonnage loaded at New York and Philadelphia during the week ended Mar. 22 amounted to 155,111 net tons, as against 113,056 net tons during the week ended Mar. 15. The tonnage loaded at Hampton Roads was also in excess of that reported during the week of Mar. 15, while a slight decrease occurred in the tonnage loaded at Baltimore.

The production of beehive coke in the United States during the week ended Mar. 22 is estimated at 404,242 net tons as compared with 429,446 net tons during the week ending Mar. 15 and 623,927 net tons during the corresponding week of 1918. Production in Virginia, Kentucky, Washington and Utah was slightly in excess of that reported for the week preceding, while in other states production was somewhat lower than the output during the week of Mar. 15. The daily average per working day during the week ended Mar. 22 is estimated at 67,370 net tons, as against 70,175 net tons for the calendar year to date and 81,162 net tons for the same period of 1918. Total production of beehive coke for the period Jan. 1 to date is estimated at 5,614,012 net tons and is considerably below the production during the same period of 1918, when the output was estimated at 6,493,029 net tons.

BUSINESS OPINIONS

Dry Goods Economist—The general condition of trade in retail dry goods and department stores throughout the country, as expressed by visiting buyers, is one of extreme optimism, based on indications in every center that industry is becoming steadily entrenched in a more stable position. Labor disturbances are losing weight and force, while the agricultural situation continues to hold exceptional promise in many sections.

Marshall Field & Co.—Current wholesale distribution of dry goods is running much less than the very large volume of the corresponding week of 1918. Road sales for immediate delivery are well up to the total of last year. Fall business is spotted, handkerchiefs are selling well and many orders for blankets are larger. Retailers continue to visit the market in large numbers, replenishing stocks depleted by excellent business. Collections are satisfactory.

The Iron Age—The opinion is general in the steel trade that the reduced prices announced by the Industrial Board at Washington on March 20 will bring out in the near future a moderate amount of new business, most of which buyers have held up since the stabilizing movement loomed up six weeks ago. The reductions range from $4.25 per ton on pig iron and $5 on billets to $10 on standard rails, and amount to $7 per net ton on plates, shapes, bars, wrought pipe, sheets and tin plate and to $5 on wire, wire nails, hoops and light rails. Eastern bar iron makers have met the reduction on steel bars, dropping their price from 2.90c. to 2.35c., Pittsburgh.

American Wool and Cotton Reporter—Optimism in the wool trade still continues. The mills are demanding wools with which to fill actual orders but are not generally anticipating wants far ahead. The general market for wool is good owing to the purchases of civilian goods. While there is an undercurrent of optimism for the future of cotton, the present actual business to the mills is quiet. There is, however, a little better feeling than there was, and while mill interests are not overconfident for the immediate future they feel the country is bare of manufactured goods. During the last fortnight or so there has been more inquiry and a small amount of "dribbling business" to the mills.

Bradstreet's—Factors of the week in purely domestic trade circles have included enlarged buying both at wholesale and retail; reports of excellent moisture, soil and winter-wheat crop conditions; the beginning of spring-wheat seeding in the southern areas of the northwest; more life in building trades and in lumber and in other materials; preparations making for an early opening of navigation on the Great Lakes; good sentimental effects from and some enlargement of actual buying of iron and steel following last week's cut in prices; larger than expected demand for desirable grades of wool at the Government auctions; a continuance of the gains shown in clearings as compared with a year ago, and a slight cutting down of the unemployment totals, this latter news being accompanied by reports from the northwest and south that in those sections unemployment is negligible, or that an actual need of labor, especially farm help, is already perceptible.

Atlantic Seaboard

BOSTON

Disquieting factors. Railroad fuel problem has its local phase. Few purchases except of specialties. April and May orders scarce. New England tonnage for 1919 sure to be light. Hampton Roads coals dull. Shipping Board adheres to $2.50 rate. Fuel oil a factor. Mixed situation at New York piers. Special rate rumored on railroad fuel by water. Anthracite demand continues light. Scattered inquiry for coal is privately owned barges. Weather helps retail trade. Buyers wait for correction in rates.

Bituminous—The uncertainties seem to have been accentuated the past few days. Indeed there is distinctly a weaker tone to the current market than was noticed a week ago. There is less faith in quotations for early shipment, concessions are so freely made on all the medium grades. Operators are striving to keep their men, but because of heavy stocks on hand New England consumers for the most part find themselves in no position to support producers who want to move coal. Any canvass of the trade discloses a surprisingly heavy tonnage in storage, and curtailments in the different lines of manufacturing are so general and so drastic that it will be July and August, if then, before anything like active buying will develop. The outlook is not encouraging from a trade standpoint, and there can be no hope of large tonnages and comprehensive buying so long as the industrial situation remains in its present posture.

Recent prices to the railroads show the effect of present conditions, and in no uncertain fashion. Bids to furnish one of the New England roads a stated tonnage for April range from $1.60 per net ton on Fairmont to $1.85 on coal from the Greensburg district. These prices are so much lower than the current quotations in the open market that they are bound to react unfavorably on buyers who were considering purchases for the next 60 days. Advantage has been taken of the urgent situation facing certain operators, and it is particularly unfortunate because consumers in this territory are to slow to realize the difference between the spot market and offerings for deferred or season delivery.

Aside from scattered buying of relatively small lots for shipment during the next few months, the only transactions are on special grades for season delivery. As previously reported these are in usual channels, and notwithstanding the extent to which most of the shippers failed for one reason or another to make deliveries last year there appears to have been little shifting from one source of supply to another. Most of these renewals have been made on the basis of $2.95 per net ton for South Fork coals, with exceptions where the coal is of admittedly superior quality. On certain of these specialties as high as $3.35 has been paid. Most of this tonnage has now been placed, however, or at least on as much as the operators think it prudent now to commit themselves, and for the next few weeks we are likely in this market to hear less of contracts and more of sales for limited periods of delivery. There is a lot of selling effort today to close business on a $2.95@3.10 basis, but buyers are not responding, even on the better grades. As a broad matter, the market in New England is simply not up to it, and purchasing is still on narrow and restricted lines.

On the other hand, the extreme anxiety of certain operators only tends to demoralize what market there is. New England buyers were accepting the statement that unless shippers could command their price they would keep the coal in the ground, when a fresh campaign was started to secure orders for prompt shipment. In Somerset and also in Cambria districts there has been a strong effort to induce early buying. Some weeks ago as low as $2.50 per gross ton was freely named on Quemahoning grades, and now $2.50@2.75 has been quoted on what have always been regarded as standard coals from the Wilmore Basin. Almost no tonnage will result from these efforts in New England, and it is rather a pity that buying sentiment here should be encouraged by this to await summer developments.

The movement here of Pocahontas and New River is extremely light. An attempt has been made to net $2.75 per net ton at the mines for both grades, but present indications are not hopeful. There are still accumulations at the Virginia terminals, and something of a tonnage has already been placed on the basis of $2.35 for Pocahontas. While barges and now and then a steamer in private hands can be chartered at $2 to Boston from Hampton Roads, yet these rates are only for single trips, and only the most loyal of customers are going to keep on paying a considerable premium for smokeless coals when Pennsylvania output is pressing for sale.

Bituminous prices at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net ton as designated:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@$2.75	$2.80@$3.35
Philadelphia, gross tons	4.20@ 4.90	5.00@ 5.40
New York, gross tons	4.50@ 5.25	5.35@ 5.80
Alongside Boston (water coal), gross tons	6.10@ 6.85	6.90@ 7.65

Georges Creek is quoted at $3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at $4.70@5.25 f.o.b. Norfolk and Newport News, Va., for spot coal, the former Governmental differential of 35c. in favor of New River being fairly well maintained. Alongside Boston the present gross ton range would be $7.15@8.10.

Anthracite—The demand for domestic sizes continues light. Until the rates on railroad-owned barges are adjusted, or some kind of policy is made clear, there will probably be nothing like the usual spring shipments, at least for the present. Even all-rail, where there is no possibility of lower cost, the demand for domestic sizes is only transient. While certain of the retailers are trying hard to influence early buying on the part of the householder, there is an utter lack of snap and the public is not considering seriously all the material that is being handed out with regard to the great urgency of supplying the mines with orders thus early in the season. There is more coal in the bins of the ultimate consumer than is realized in some quarters, and there will have to be stronger inducements than are now offered to get the public to take its coal early.

There is only a scattered inquiry for coal by water, and then almost entirely in transportation that is privately owned and governed by market conditions. Coal in railroad barges is not being taken except in emergencies, and this is entirely due to the high rate that still prevails. A revision of the rate is momentarily expected, but as yet the trade cannot be certain it will be forthcoming.

NEW YORK

The new coal year finds trade in good condition and bright prospects ahead. Little coal moving because of harbor strike. Good demand for anthracite. Local consumers hesitate before ordering next winter's supply. Bituminous supplies short here, some pools reported as being empty. Shippers expect brisk business soon.

Anthracite—The start of the coal year 1919-1920 finds the industry in good condition, with bright prospects for a busy summer. Demand, while it has not been brisk locally, has been good in other nearby sections, and this has been reflected in operations at the mines. In this harbor not much coal has been moved for nearly five weeks because of the marine strike. Up to the present this has had little effect upon the local situation, as most dealers were well supplied and are now able to take care of orders by substituting one size for another when it is necessary.

Last week's blizzard, which was the worst snow storm (in fact the only snowfall) of any account here this year, caused a slight flurry in demand on the retail dealers, but they were able to take care of it without much trouble. Many of the local yards are nearly cleaned out of coal, while some have not got coal of all sizes.

The inability of shippers to get tows from the loading piers has enabled the local retail dealers to get rid of some of the immense stocks of the anthracite steam sizes which they took in conjunction with prepared coals last fall.

The trade looks forward to a heavy demand when the harbor labor troubles are ended. Dealers are expected to place heavy orders in order to replenish their stocks, and also to take advantage of the present mine prices, which according to previous announcement are to be increased 10c. per ton for five months beginning May 1. It is also expected that household consumers will begin to fill their bins for next winter just as soon as they realize that there will not be the usual spring reduction. They have been influenced in their desire to wait before placing their orders by the announcement that an investigation is to be made of the price situation.

There is a good demand for all-rail coal, and dealers in a position to get it are taking in a good supply. Salesmen say that conditions inland are brisk, and that unless production increases considerably from what it now is there will be a severe shortage before the summer is half over. The small production is due in most part to the lack of orders due to small consumption last winter.

There was a heavy decrease in dumpings at the New York Tidewater docks during the week ended Mar. 28, 986 cars having been dumped as compared with 1399 cars the previous week.

The demand for the steam coals continues active and there is no great surplus. The strike has had little effect upon the supply required by the trade in lower Manhattan, most of their coal being brought by wagons and trucks by ferry from Jersey City.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	5.85	7.70
Stove	6.10	7.95
Chestnut	6.20	8.05
Pea	4.80	6.55
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—A better demand and an improvement in harbor conditions have improved matters here. While it has not been possible to move coal from the docks with the same freedom as under normal conditions, consumers who have been in actual need have been able to get coal when they were willing to pay the additional cost of towing made necessary by strike conditions.

Public service corporations and steamships are now being taken care of without any trouble, due to the assistance given by Government agencies, but the bins of industrial concerns are nearly bare and manufacturers are becoming anxious. With the strike over shippers look for a heavy demand for coal which ought to be reflected at the mines.

Coal supplies at the docks are not large. Embargoes placed on shipments since the strike in the harbor began have kept receipts down to actual needs, with the result that it was said certain pools were without coal at the end of last week. A statement of the Tidewater Coal Exchange showed that on Mar. 26 there were 5729 cars of coal on hand in this harbor. There have been orders issued modifying previous orders, which will be the means of increasing supplies at the docks.

Wholesale dealers report many orders awaiting shipment. They say that with the labor trouble ended there will be a serious shortage of coal here. Loaded

boats are in good demand now, and some consumers are willing to pay fancy prices if deliveries can be made. Quotations on this class of business vary much, depending upon the towing distance. In some instances as high as $8.50 alongside is said to have been quoted for coal for steamships.

The trade is holding close to the late Government maximum prices for coal. There has been an improvement in contract business, and it is believed that a goodly percentage of the production for the next coal year has been signed up.

There was an improvement in dumpings of bituminous coal here during the week ended Mar. 28, reports showing 3012 cars dumped as compared with 1995 cars the previous week, an increase of 1017 cars.

Current quotations at the mine for various grades of bituminous coal for spot delivery and contract follow:

	Spot	Contract
South Forks	$2.90 to $3.25	$2.95 to $3.50
Cambria County (good grades)	2.80 to 3.10	2.95 to 3.25
Clearfield County (good grades)	2.65 to 2.95	2.80 to 2.95
Reynoldsville	2.65 to 2.85	2.85 to 2.95
Quemahoning	2.85 to 3.10	2.95 to 3.10
Somerset County (best grades)	2.75 to 2.95	2.95 to 3.10
Somerset County (poorer grades)	2.40 to 2.75	2.75 to 2.95
Western Maryland	2.50 to 2.75	2.65 to 2.85
Fairmont	2.10 to 2.35	2.35 to 2.50
Latrobe	2.10 to 2.25	2.25 to 2.40
Greensburg	2.35 to 2.40	2.35 to 2.60
Westmoreland ¾-in.	2.60 to 2.75	2.65 to 2.75
Westmoreland run-of-mine	2.40 to 2.65	2.40 to 2.65

PHILADELPHIA

Anthracite dullness increased by proposed price investigation. Little spring business offering. Some shifting of trade, both wholesale and retail. Retail price-cutting limited. Retailers do not fear investigation. Coal well prepared except pea. Steam coal contracts being made. Collections slowing up. Bituminous quiet. High-grade fuels scarce. Contracting chief activity.

Anthracite—Temporarily, at least, the spring business is in a sad state and much blame is placed on the publicity given in the daily papers to the proposed investigation of coal prices. While it appears to us that the best the public can hope for is an avoidance of increased rates, the dealers all report that most of their customers refuse to place orders because they apparently believe prices will be lowered at least 50c. a ton. We even hear of dealers offering to protect prospective buyers in the event of a reduction, but so far this offer has met with little success in getting business.

After numerous interviews we are firmly convinced that prices will advance on May 1 as per schedule and a large majority of the dealers are satisfied they will; but the fact stands out that the demand is light. Unless something happens to straighten out the market and cause the public, and then the dealers, to buy coal substantially for at least three months, there is surely trouble ahead.

Some houses report making sales to new customers and missing the orders of some of their old trade. This is an echo of the trials of 1917, when many dealers thought they would have fared better had they been doing business with another house. The retailers also notice considerable shifting of trade. No doubt they all have a number of dissatisfied customers, and they will all lose some and gain others.

One surprising feature of the trade is the comparative firmness of the retail prices. Except in the northeastern section of the city, where several dealers have made substantial reductions from the general prices, we can learn of no price-cutting.

A number of dealers in referring to the proposed investigation which it is reported may cause their margin of profit to be looked into, state that any lowering of their prices that might be forced upon them would necessarily be made possible only by reducing wages. Labor is not scarce, but it is a fact that few dealers have taken advantage of it by cutting wages. Necessarily they are employing fewer men and it appears to be the policy to lay them off when not needed rather than to ask them to work for lower pay. Any number of dealers express their willingness to throw open their books to any Governmental or State investigators.

It has been a long while since such well prepared coal has come to this market. The improvement is general and very noticeable. All shippers seem to realize that under present conditions it would be impossible to hold their trade with coal of a poor standard of preparation. Most of the coal coming here now is well above the standard set by the big shippers. If there is an exception it is pea coal. Operators do not seem to see the necessity, or at least the advantage, of improving this size. Many dealers have on hand a supply of pea coal which was shipped during the winter. They hesitate to deliver in more than one-ton lots because it is small and poorly prepared. They have been buying a few cars to deliver on the spring orders, but report little improvement as to size. This complaint is general. The coal may be cleaner and contain less buckwheat than during the past year, but it is still too small. A number of individuals are offering this size at less than circular rate, and all shippers are having trouble in disposing of their production. Stove and nut still have the call, with egg in fair demand.

The market on steam sizes is quiet. Buckwheat at $2.75 is being freely offered by some individual shippers. The big companies continue to ask and get $3.40 for this size. The companies are also doing considerable contracting on the steam sizes, but it is noticeable that on contracts covering a year's supply from Apr. 1 some are at least inserting a clause protecting the buyer in case of any reduction in the miners' wages. This is true of their contracts for all steam sizes. One big company we know of is actually not inserting any price, but simply guaranteeing to ship a specified tonnage during the year at the price in effect at time of shipment, which at this time is $3.40 for buckwheat.

Some shippers report a greater proportionate demand for rice than for buckwheat, but sales are being recorded at $2.40 to $2.50. Barley has been quoted low, and we have heard of it being offered at $1.25, but this is probably river coal, or some other low grade material.

Collections are dragging and it is believed that in their anxiety to secure business the shippers have recently become quite lenient with many old customers.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.80	Buckwheat	$3.40	$4.45
Egg	5.85	7.70	Rice	2.75	3.65
Stove	6.10	7.95	Boiler	2.50	3.50
Nut	6.20	8.05	Barley	2.25	3.15
Pea	4.80	6.40			

Bituminous—Production continues to be low due to the continued lack of demand. The trade continues to mark time until such a time as present stocks are greatly reduced and there is something of a resumption of industrial activity in this district. Producers and middle houses are spending most of their energy now on making contracts, and fair business is reported in this direction. At present there is something of a scarcity of high-grade coals, as the larger share of limited production is being placed on contracts. Prices continue their display of firmness, with price range fairly represented by the following:

Georges Creek Big Vein	$3.10 @ $3.25
South Fork Miller Vein	3.00 @ 3.20
Clearfield (ordinary)	2.65 @ 3.90
Somerset (ordinary)	2.55 @ 2.80
Fairmont	2.00 @ 2.35

BALTIMORE

Contracting for new year slow, as consumers remain in open market for light purchasing. Coal men warn that now is low period and Government officials talk of impending shortage, but to little effect. Prices on immediate sales off color. Hard coal men still undecided here.

Bituminous—With the Government fuel experts talking of shortage of coal in the months to come unless business men awaken to the fact that orders should be placed for coal at once in order to assure early production of a greatly increased nature, and with mine operators showing confidence in the future by refusing to contract at prices below the old Government figures for better grade coals, there is still a very flat immediate market.

Considerable coal caught awheel is sold at prices running all the way from $2 to $2.50 mine basis for good grade. Coal is being shipped from mines for immediate use at prices ranging from $2.25 up to $2.65 or $2.75; and yet the same coals are refused on contract for future delivery at prices below the Government maximums of the past of $2.75 and $2.95.

The immediate sales are undoubtedly due to the fact that a number of mines find that they now have but one or two days of work on hand and can not maintain organization and hold mining forces with less than a three-day-per-week operation. In the effort to spur production to such a point some operators are offering the cut prices. Meanwhile, despite the warnings of well posted fuel men, the consuming public is far behind the ordinary spring schedule for getting under cover.

In relation to the growing bunker business here Mayor Preston has received an interesting communication from H. M. Hitchcock, assistant director of operations of the Emergency Fleet Corporation, to the effect that this city may shortly be greatly increased in importance as to the handling of both coal and oil for bunker purposes.

Anthracite—The end of the past week saw the retail hard coal situation here still somewhat undecided. While independent operators for the most part have indicated that they will follow the company reduced coal price schedule and the 10c. per month advance thereon after May 1, there is a strong feeling here that some coal off that schedule is likely to be offering from mines that wish to continue operation. The local retailers have talked over the situation pretty thoroughly but have found some phases of it rather uncertain. The result has been that no definite announcement as to a spring retail schedule for Baltimore is as yet forthcoming.

Lake Markets

PITTSBURGH

Production still light. Inequality of Government prices still mentioned. Some demand for gas coal. Prices fairly well maintained.

The local coal market has not improved. Whatever help might be rendered the situation by the further depletion of stock piles has been equalized by lower rate of coal consumption, both for manufacturing purposes and as domestic fuel. There has been hardly any demand for domestic coal, and so little, indeed, as to prevent a clear-cut market price from being disclosed.

Production in the Pittsburgh district is at between 25 and 30 per cent. of capacity, as has been the case for several weeks past. A number of mines are closed entirely, but the restriction in most cases is by operating mines short time. Labor seems to be fairly content with the amount of employment it has received. Labor leaders are understood to be assiduous in pointing out to the men that decreased production is essential for the maintenance of prices, and in turn of wages.

Pittsburgh district coal operators still refer to what they consider the great inequality in some of the Government coal prices, claiming that relative to cost of production the Pittsburgh district was given about the lowest coal price of all. The aftermath, they point out, is that when the coal market in one district or another declines from the old Government level the Pittsburgh district market is expected to decline likewise, whereas it is not in position to do so.

Relatively speaking, there is a much better demand for gas coal than for steam coal. While there is little demand for steam coal there is still less for domestic. Odd lots of coal loaded on track and requiring to be moved frequently go at ridiculous prices, which are not considered in quoting the market. The large operators are holding quite stiffly to regular prices, but smaller operators frequently shade 10c. or 15c., and the market is thus quotable as follows: Steam coal—Slack, $2@2.10; mine-run, $2.25@2.35; domestic, 1¼-in., $2.25@2.35. Gas—Slack, $2.25@2.35; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $2.60@2.75, per net ton at mine, Pittsburgh district.

TORONTO

Trade continues very quiet. Ample stocks on hand. Consumers withholding orders in hope of lower prices.

Conditions in the coal trade are unchanged, business being unusually quiet for the season and dealers have large stocks on hand. The demand as a rule is limited to present requirements as consumers in many cases are postponing orders in the hope of a reduction in prices. Dealers state that there is not the slightest reason to expect any drop in prices and that any change later in the season is more likely to be an advance. Prices are generally well maintained with occasional slight shading in the wholesale rates.

Quotations for short tons are as follows:

Retail:

Anthracite egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	8.25
Slack	7.25
Domestic lump	10.00
Cannel	13.00

Wholesale f.o.b. cars at destination:

Three-quarter lump	6.25
Slack	5.25

BUFFALO

Trade improvement slight. General business hanging off. Jobbers uneasy over Government action. Anthracite slightly more active. Loading lake vessels.

Bituminous—Some slight improvement is reported by certain members of the trade, but conditions in general are not so good. The jobber is reducing his supply, but is not ready to buy liberally. As a rule he is still waiting for prices to come down, though he has been disappointed for the most part so far. Coal offered at a reduction is likely to be of poor quality, so a seeming decline may not mean anything. Jobbers are not pleased over the move to bring the operators and the Government closer together, and some say it is a direct blow to them. It will take time to decide that point.

Some Allegheny Valley prices are coming down to the Pittsburgh, but the rule is to hold to the old Government price of $4.65 for thin vein, all sizes, with $4.45 for Pittsburgh and No. 8 lump, $4.20 for same mine run and slack, $5.65 for smithing and smokeless, and $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—The demand has increased. Consumers are beginning to buy for winter supply, but the actual consumption is small as the weather has continued warm and the rule is to go back to natural gas since the restriction is off. The complaint of much impurity, especially slate, in the coal continues and it is hoped that the legislature will pass the bill forbidding it.

Most of the activity in the harbor is due to the loading of lake vessels with anthracite, more than 150,000 tons now being afloat. There is not much demand from the upper lake ports, as a surplus of considerable extent will be on hand there on May 1. Some of the smaller ports have asked for coal, but as a rule the vessels have been taken only for the head of the lakes, where there is cargo to bring back.

The lake rates for leading ports have been fixed at 42½c. to Lake Superior, 50c. to South Chicago and Milwaukee, and 60c. to Chicago. This is a reduction of about 5c. from last season. The minor ports will pay 10 or 15c. over the larger ones.

CLEVELAND

Conditions in all local coal markets, except domestic, are slightly improved. Efforts to move steam coal not bearing much fruit. Coarser grades decidedly stronger. Coal rates to head of Great Lakes for 1919 reduced. Lake trade now can be on in full swing.

Bituminous—The increasing flow of bituminous to Lake Erie ports for loading for the head of the Great Lakes is stirring the local steam-coal market somewhat, but the effect is not marked. Steam-coal users so far have not proved responsive to efforts of operators and the Fuel Administration to renew buying. Hope, however, is held out that the agreement on iron and steel prices will stimulate business, iron and steel interests being the leading steam-coal users in northern Ohio.

Meanwhile, with users still determined to clean out their stockpiles before reëntering the market, prices are decidedly firmer. Conviction is growing that not only will present prices hold, but that coal will be decidedly scarce later in the summer when the lake trade gets into full swing, present stockplies are exhausted and steam-coal users contemplate their winter supply. Purchasing by the railroads, too, is a factor that is looming large. It is understood that the administration has been anxious to place contracts with No. 8 operators, but the operators have delayed negotiations until the trend of Secretary Redfield's price-stabilizing program can be definitely ascertained. Between 30 and 40 per cent. of No. 8 coal produced becomes railroad fuel, a percentage big enough to swing prices on the rest of the market.

While a great many No. 8 district mines have not yet felt the stimulus of the opening of the lake trade and continue on a 25 to 30 per cent. basis, the majority have increased their operating percentage. Navigation on the Great Lakes will not open in earnest until about Apr. 10, so two more weeks of comparative idleness may be looked for. A growing feeling of unrest is apparent among the mine workers and operators are anxious to get them busy, believing this is to be the best cure for the radicalism that is seeping through eastern and southern Ohio coal-mining districts.

The domestic bituminous trade, along with the anthracite one, continues slow. Mine-run and lump Pocahontas are more difficult to get than a few weeks ago, but dealers still are quoting $7.20 for the former and $7.50 for the latter, net ton delivered. Anthracite demand has fallen to an almost negligible factor.

Lake Trade—A fair-sized block of coal has been covered by a local interest for 42½c. a ton to the head of the lakes, 50c. to Milwaukee and South Chicago and 60c. to the Chicago River. These rates, which are the 1917 ones revived, compare with 48c. to the head of the lakes and 50c. to Lake Michigan in the 1918 season. It is expected that these rates will be accepted all around and will prove the prevailing 1919 ones.

Considerable coal is moving toward the lakes, and probably 20 cargoes have been loaded; but the season has not yet been actually opened. Great Lakes vessel interests are not anxious to repeat last spring's performance, when the season was rushed and thousands of dollars were necessitated by repairs for ice damage, while stocks on upper lake docks still are ample. It still looks as though the season will be quite slow in getting under way.

Coal prices per net ton delivered are as follows:

Anthracite:	
Egg	$10.80 @ 10.95
Chestnut	11.00 @ 11.10
Pocahontas:	
Lump	7.50
Mine-run	7.20
Domestic Bituminous:	
West Virginia splint	7.05 @ 7.15
No. 8 Pittsburgh	6.15 @ 6.35
Massillon lump	6.95 @ 7.10
Steam coal:	
No. 6 slack	4.45 @ 4.55
No. 8 slack	4.90 @ 4.95
Youghiogheny	4.95 @ 5.05
No. 6 mine-run	4.45 @ 4.55
No. 8 mine-run	4.90 @ 4.95
No. 8, ¾-in.	5.50 @ 5.60

DETROIT

With buyers in the steam and domestic branches of the bituminous trade maintaining an attitude of indifference, Detroit jobbers are doing little business.

Bituminous—Dullness is a distinctive feature of the bituminous coal trade in Detroit. In contrast with the period before the war, orders are infrequent and of small proportions. To piece out stocks and obtain coal in a form called for by their customers, some of the retailers are said to be placing small orders for domestic lump, with the proviso that delivery must be immediate. By getting the coal at once, these buyers expect to be able to distribute it before the cold weather passes, thus avoiding adding to the excessive stocks, which most of the leading dealers will be obliged to carry into the summer. These stocks usually consist of fine coal in a variety of sizes and include considerable low grade coal and are proving difficult to reduce.

The large proportion of inferior stock in the reserve piles of steam plants also is discouraging additions to reserves. Users of steam coal want to get the undesirable coal out of the way. The magnitude of their stock piles and the diminished activity of their plants since ending war work prolong the time that must elapse before many of the buyers will be in position to enter the market.

Though there is said to be little coal on tracks due to the caution of jobbers in restricting orders to the quantity for which they have buyers, much difficulty is being experienced in selling slack and mine run. In the case of the former, prices are reported to have been quoted as much as $1 below the Fuel Administration scale. Domestic lump is firmer and prices are said to be holding at the Government basis.

Anthracite—Because of lower temperatures, there has been a slight improvement in demand for anthracite among domestic consumers recently. There seems to be sufficient coal of all domestic sizes available to meet the demand. Some retailers are warning their customers of a prospective advance in price Apr. 1, reflecting the advance announced by producers. The supply of domestic coke also seems plentiful and numerous domestic buyers are utilizing the opportunity to substitute coke or anthracite for the proportion of bituminous coal, ordered by the fuel administration.

COLUMBUS

A better feeling is shown in the coal trade, especially in steam circles. Buying is still limited to actual needs and little contracting is reported. The price question on contracts is still unsettled. Considerable cutting on spot shipments is reported.

The coal trade in Ohio is becoming more active, and the tone of the trade is steadily improving. Although business is rather slow in getting on a peace basis, still the coal trade is becoming better and producers as well as shippers are more encouraged. The pessimism of the past few months is gradually passing away, and coal men generally are preparing for a more active demand.

The steam business is still slow, as is inevitable under the circumstances. Reserve stocks are still large, and with consumption cut to a rather low point, purchasers are slow in entering the market. Iron and steel plants are in a better shape now, and orders from this source are expected within the coming few months. Rubber factories are still well stocked with fuel. Railroads are taking only a fair tonnage as the freight movement is somewhat restricted. Some of the war industries are being placed on a peace basis, and this presages a better fuel demand. On the whole the tone of the steam trade is better and more buying is expected soon.

Contracting is still unsettled. Quite a few contracts expire around Apr. 1, but so far few have been renewed. Prices are not fixed, and as a result the purchaser is holding off. The ability to buy sufficient fuel for current needs on the open market, often at reduced prices, does not bring contracting any nearer completion. Some few contracts at only a slight reduction from the last Government price have been reported.

The domestic trade is slow. Retail stocks are apparently sufficient for the present, and dealers are loath to buy under existing circumstances. There is a fair demand for the fancy grades such as Pocahontas and West Virginia splints. Hocking and Pomeroy grades are not selling well. In fact, retail stocks are in such shape that little demand from that source is expected within the coming few months. Retail prices are still fairly well maintained, although some of the dealers are cutting in order to move stocks.

CINCINNATI

Slightly improved demand is noted, especially in smokeless coal for contract. Little change is general conditions, and spot market is overloaded and weak.

While there has been virtually no change in the fundamental conditions governing the Cincinnati market during the past week, there is a more optimistic tone to the reports of leading producers and jobbers, as they state that contract demand for the better grades of coal, especially smokeless, is satisfactory, and that prices are not governed by the present surplus of fuel on the market. Demand is not heavy, but what contracts are being closed are closed under satisfactory conditions.

It is in the bituminous department of the market that the most unsatisfactory state of affairs exists, due to an oversupply of coal and an almost entire absence of demand, bringing about a weakness which will hardly disappear until there is more of an equilibrium between supply and demand.

Industrial conditions, in this section at least, are regarded by the coal trade as good, as there have been no extensive shutdowns among the factories, and employment is still general, there being comparatively few men out of work. Consumption of coal, however, appears to be at the minimum; and retail dealers are not in the market to any extent, as their customers are as a rule carrying some coal over, and there is now virtually no domestic consumption, as the weather for the past week or more has been so warm as to require no heating, either in homes or factories. The buying by retailers is consequently confined to those who can reasonably anticipate a considerable business, and who therefore are willing to protect themselves by securing moderate supplies of coal under present conditions.

LOUISVILLE

Eastern Kentucky operators meeting with slightly better demand, with conditions duller in western Kentucky fields.

Such demand as there is for coal at the present time is largely for high grades. Considering the close margin existing between eastern and western Kentucky fuel, the former is managing to get the business. Eastern Kentucky as a whole is running 50 to 60 per cent. of full-time ca-

pacity, whereas western Kentucky is hardly working two full days a week at the present time, not being able to secure business on either domestic or steam sizes. The differential existing between the higher-grade eastern Kentucky coals and the western Kentucky grades is not sufficient at this time to create a demand for the lower grades, resulting in dull business, as the western Kentucky operators are holding prices firmly.

The demand for domestic coal is lightening up somewhat, but steam is slightly better, as many industrial consumers are now running a little low, and are working out their stocks. The Lake movement should start soon, and is expected to take care of a fair volume of business.

Jobbers report that retail stocks as a whole are low, and that a fair business is being handled on immediate delivery basis. Retailers claim that business is dull as a whole, and that they can see little encouragement unless sufficient publicity is given to the production situation to force a stocking demand during the spring and summer months.

On a short-ton basis the Kentucky market is about as follows:

	Eastern Kentucky	Western Kentucky
Block and egg	$2.85@$3.00	$2.60
Run-of-mine	2.20@ 2.40	2.35
Nut and slack	1.90@ 2.00	2.05

Some eastern Kentucky operators are selling no block or egg for less than $3 and are getting $2.60 for mine-run. Others are getting as high as $2.10 for nut and slack. However, some nut and slack is selling at as low as $1.85, and some run-of-mine is quoted at as low as $2, where operators are anxious to dispose of spot coal.

Western Kentucky prices are fairly firm, but some immediate delivery nut and slack is selling at as low as $1.85, with 15 to 20c. cuts on other grades. The western Kentucky market as a whole is fairly firm, however.

BIRMINGHAM

Domestic trade improves as dealers begin to contract for next winter's supply. Steam situation without material change. Mines operating on reduced schedules hold production in the range of requirements. Prices remain stable.

Dealers in domestic coal are beginning to evince an interest in the market, and the number of contracts made during the past week is believed to mark the start of a buying movement which will hold up well through the spring and summer months. Sales agency officials express the opinion that dealers who neglect to provide for their year's requirements within the next few weeks will find difficulty in securing the coal needed later on—especially the higher grades, the production of which is always far below the requirements of the trade. The supply of the better and also the medium grades is hardly adequate to the needs at this time. Prices are as follows per net ton, mines:

	Lump and Nut
Black Creek and Cahaba	$3.85
Corona	3.40
Carbon Hill	3.15
Montevallo	5.00

Steam continues easy and the local market was not featured by any large deals during the past week. Small orders and contract business in hand have about absorbed the daily production. Quotations are on basis of the last Government schedule, prices being as follows per net ton mines:

	Mine-Run	Prepared	Screenings
Big Seam	$2.45	$2.75	$2.40
Black Creek and Cahaba	3.45	3.75	3.05
Corona, Pratt	2.85	3.05	2.45

Coke

CONNELLSVILLE

April adjustments under consideration. Narrow prompt market. Prices unchanged. Production still decreasing.

Adjustments have not been completed as to prices to be paid for shipments in April against furnace coke contracts that call for monthly negotiation when there is no Government price to control. Some of these contracts were adjusted at $4.50 for March, but the great majority were at $4.25, and it is possible that some adjustments were at still less. Operators speak now of desiring a $4.50 adjustment for April, but the probability is that they will be content with $4.25.

A difficulty in the situation as to adjustments is that there is no well defined spot or prompt market to furnish a basis for contract adjustment. There are offerings at all sorts of prices, but very little buying. Some of these offerings are at less than $4, but they are regarded as of inferior grade in any event, while the total tonnage is not sufficient to make the market. At $4 the few furnaces that have any occasion to buy prompt lots have been able to get all they needed, and this is commonly regarded as the market, though it is contended that no large quantities could be picked up at the figure.

Coke production continues to decline, but hardly keeps pace with the declining consumption, as every now and then another blast furnace goes out. Some of the by-product operations attached to steel works furnaces have had to curtail output. These operations would be glad to sell coke in the open market, but tonnages called for are so small that it is not worth while making the effort to sell, and Connellsville coke continues to make what little market there is.

Foundry coke is unchanged, there being fair brands available for prompt shipment at $4.50, while a few of the old line operators, with contracts to protect, still quote $6.

The market for spot and prompt is quotable at $4 for furnace grade of standard quality and at $4.50@6 for foundry coke, depending on brand, per net ton at ovens, Connellsville region.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Mar. 22 at 187,806 tons, a decrease of 14,502 tons.

Buffalo—The season still drags, on account of the failure of iron ore to move. The lake fleet might have been active all winter, but instead of pushing out early there is no disposition to move as yet. Even the coal loaded is to move at the option of the vessel, and it may be here a month longer. Quotations on coke remain at $7.60 for foundry, $6.60 for furnace and $6.10 for off grades, the last price being quite unsteady, with fuel coke much of a drug on the market. All prices are f.o.b. Buffalo.

Middle Western

GENERAL REVIEW

Market conditions improving. Operators not eager to close contracts, though inquiries are brisk. Railroad coal question. Prices being maintained.

There has been but little change in the coal market during the past week. There is no denying that market conditions are now a little better than they were a week or so back. The current demand for coal continues dull in the extreme, but considerable interest is now being taken by the public in coal contracts. Strange to say, the larger and better informed of the operators are not falling over themselves in eagerness to obtain contracts, and absolutely no concessions are being made in regard to price.

The reason for this interest on the part of the coal-buying public in contracts is that the labor situation in most of our important coal-producing fields is anything but satisfactory. If labor troubles occur in any of the fields, it will have a tendency to raise sharply the current prices in the coal-producing districts not affected, and those purchasing agents not protected by contracts will have to meet this advance in price if they wish coal. There is still a big amount of coal in storage in this territory, and while this tonnage is enough to affect a weak market, it is not great enough to be of much help in case of prolonged labor difficulties.

Another factor which may have some bearing on the contract question is that general manufacturing and industrial conditions appear to be more stabilized. More confidence all along the line is being felt. Industries that were practically at a standstill two or three weeks ago are now fairly active, although but few are running full time.

The question of railroad coal appears to be progressing satisfactorily, and it is believed that this matter will be settled on a permanent basis by the end of April. This item alone is enough to give the market a stronger tone than it has had for some time. The railroads consume more coal than any other industry, and this market assured to the operators cannot but give a better feeling of confidence to the entire coal industry.

Coal is moving more freely at this writing than it has for a long time. Reports come in that Minnesota, Iowa, Wisconsin, Illinois and Michigan are buying coal in more liberal quantities than heretofore. Operators in southern Illinois say that there has been some improvement in running time during the past week.

Prices for high-grade Southern Illinois coals continue firm. The Springfield district continues to run about the same, with prices holding up fairly well. There has been no shading of prices on coal from the better known central Illinois mines. When the question of railroad fuel is settled, there will be a big improvement in running time for the whole central field. In Indiana, especially in the Fourth vein district, and also Knox County, conditions are better than they have been for some time. Practically all mines are reporting better running time, more demand for coal and consequently less price-cutting; in fact, no price-cutting on the part of the larger operators.

CHICAGO

Some large steam contracts reported. Domestic situation fairly good.

The Chicago steam market shows no signs of any radical change, although some large contracts were reported. The current market continues fairly dull, although there is some improvement due to renewed industrial activities. The only news of importance is that the bids for the city business were opened, and proved a great surprise, both to the trade in general and the city fathers in particular. It was found that the bids were considerably under what the city was prepared to pay for its coal. This situation is not without a lesson to some of our best Chicago dealers.

The domestic situation is fairly good. There is a demand for high-grade domestic fuels, which will probably keep up for another month.

Prices per ton are as follows:

	F.o.b. Mines	Rate to Chicago
ILLINOIS		
Southern Illinois		
Franklin, Saline and Williamson Counties, etc.		
Prepared sizes	$2.55@$2.75	$1.55
Mine-run	2.35@ 2.50	1.55
Screenings	1.85@ 2.20	1.55
Central Illinois		
Springfield District		
Prepared sizes	$2.55@$2.75	1.32
Mine-run	2.35	1.32
Screenings	2.05	1.32
Northern Illinois		
Prepared sizes	$3.25	1.24
Mine-run	3.00	1.24
Screenings	2.75	1.24
INDIANA		
Clinton 4th Vein District		
Prepared sizes	$2.65@$2.75	1.27
Mine-run	2.35@ 2.45	1.27
Screenings	2.05@ 2.25	1.27
Knox County Field		
Prepared sizes	$2.65@$2.75	1.37
Mine-run	2.35@ 2.45	1.37
Screenings	2.05@ 2.25	1.37

MILWAUKEE

Continued dullness marks the coal market, but prices are well sustained. Yards well supplied with all grades.

Nothing has occurred to break the monotony of the coal situation at Milwaukee. The demand is light all around, and it must continue to grow lighter with each passing day, as the season is too far advanced to admit of anything like zero weather. Prices are firmly held, however, and there will be no change in this respect until the beginning of the new coal year in May. Illinois coal is selling in that state from 60 to 90c. per ton lower than last year, according to reports, but until somebody here runs out of coal and buys at the new rates, they will have no effect here.

Pocahontas coal, which was practically out of the market during the last year of the war, is again taking its place. All sizes and mine-run can now be readily secured. Anthracite is coming by rail daily.

Motor trucks are fast succeeding horses in the delivery of coal in Milwaukee. The Milwaukee-Western Fuel Co., the largest coal firm in the city, and the Gross Coal Co., are selling out their horses, wagons and kindred equipment and will rely upon motor vehicles entirely in future.

ST. LOUIS

Warm weather and a quiet market, with nothing to indicate change. An abundance of all kinds of coal. Domestic demand entirely off and steam demand light, with a little storage call here and there.

Domestic tonnage has practically fallen off altogether and there have been a few scattered orders for storage coal. General

conditions in the Illinois field are unsatisfactory, both to the miners and the operators, and it is evident that a readjustment must take place. The miner appears confident of his ability to get anything that he may ask for, and some of these demands are so unreasonable that the operator will not even listen. On the other hand, the operators have some grievances that need readjusting, judging from reports, and it may be to mutual advantage if both sides get together to straighten these matters out so that when work does resume the industry will be on a more equitable and stable basis.

In the Standard field conditions are unusually bad. The demand for this coal seems to have fallen off almost entirely, except for a little steam. Some railroads are not picking up any storage coal, but their local requirements seem to be unusually light. The northern roads are not taking the tonnage now they did in previous months, and all along the line there is a slowing up. This, added to the dropping off of domestic business, has put some mining communities in a serious plight. There is much dissatisfaction over the one day a week some miners are getting, and others no work at all, while in some places the mines are working three and four days. The men seem to think this tonnage should be divided equally among all operations.

Up to Mar. 28, Standard screenings were selling at around $1.50, 2-in. lump from $1.75 to $2, 6-in. lump from $1.75 to $2.25, egg from $1.70 to $1.90, and mine-run about $1.65 to $1.75. Effective Apr. 1 the prices were increased.

In the Mt. Olive field conditions are somewhat improved. There is little demand for Mt. Olive coal in this market, but a fairly good tonnage seems to move north. The railroad tonnage seems to hold up fairly well in this field, but working conditions are poor, almost as bad as in the Standard field. However, prices are being fairly well maintained.

In the Williamson and Franklin County field, and also in Du Quoin, there is a slowing up in business that has caused some uneasiness among the operators. As a whole, however, conditions are all that could be expected, and there is every reason to be optimistic that this field will be able to maintain its prices and at the same time provide enough tonnage to keep both the miners and the operators satisfied.

The railroad tonnage continues fairly good, but the movement on some roads is not all that could be desired. This is chiefly on account of the large number of unbilled loads that have congested the sidings in this district.

Nearly all mines that are running are getting two and three days a week and some more, but several mines are shut down entirely. The independents are still selling coal below the circular, which the association members manage to maintain. Steam sizes are heavy in this field and domestic fairly active.

In the St. Louis market proper there is little demand for anything. Anthracite is coming in, but there is little moving, and smokeless has as yet failed to make any impression.

The new coke prices to the domestic consumer in St. Louis, as announced by the M. W. Warren Coke Co., which handles the output of the gashouses and the by-product plant here, will be $9.50 on by-product and $7.75 on gashouse. The retailer will get $2.75 gross margin on these prices. These prices are f.o.b. the retailers' tracks, and the same prices will prevail at the retorts.

The circular at the present time f.o.b. the mines is:

Williamson and Franklin County Association:		Mt. Olive and Staunton		Standard	
Lump, egg and nut	$2.75	....		....	
Washed Nos. 1 and 2 nut	2.85	....		....	
Independent:					
Lump, egg and nut	2.55	2.55	Lump and egg	2.25	
Washed Nos. 1 and 2 nut	2.85	....	2x3 nut	2.00	
Mine-run	2.35	2.20		2.00	
Screenings	2.20	2.05		1.75	
3-in. lump	....	2.30		....	
2-in. lump	....	....		2.15	
2x6 egg	....	....		2.10	

Williamson-Franklin rate to St. Louis is $1.07½; other rates $0.92½.

I. C. C. Decisions

No. 9005—Rapson Coal Mining Co. vs. Colorado & Southern Railway Co. et al. Submitted Nov. 25, 1918. Decided Jan. 27, 1919.

1. Rates on bituminous nut coal, in carloads, from Rapson, Colo., to certain destinations in Oklahoma and Kansas found to have been and to be unreasonable. Reasonable maximum rate prescribed and reparation awarded.

2. Record does not warrant establishment of joint rate over route of movement.

No. 9006—Cabin Creek Consolidated Coal Co. et al. vs. Cincinnati, Hamilton & Dayton Railway Co. et al. Submitted Oct. 5, 1918. Decided Feb. 13, 1919.

Defendants' demurrage rules applicable in 1915 and 1916 on shipments of lake cargo coal held at ports on Lake Erie, awaiting transshipment by water, not shown to have been unreasonable or unduly prejudicial. Complaint dismissed.

No. 9667. Ohio Valley Coal Operators' Association vs. Louisville & Nashville Railroad Co., et al. Submitted Jan. 13, 1919. Decided Feb. 13, 1919.

Upon complaint attacking as unreasonable and unduly prejudicial the rates on bituminous coal in carloads from mines in western Kentucky on the Louisville & Nashville R.R. and Illinois Central R.R. to points in Ohio, Indiana and Michigan, and seeking the establishment of joint rates to the territory north of the Ohio River, Held; That the rates from mines in western Kentucky on the Louisville & Nashville R.R. to Cincinnati, Ohio, are and for the future will be unduly prejudicial to the extent they exceed or may exceed the rates from mines on the Louisville & Nashville R.R. in the Jellico-Middlesboro group in eastern Kentucky and Tennessee by more than 15c. per net ton; and that otherwise the prices complained of are not shown to violate the act.

General Statistics

ANTHRACITE PRICES SLOWEST TO RISE

Anthracite continues to hold the position of having shown the smallest increase in price, during the war period, of 51 commodities in general use. This is the finding of the Bureau of Labor Statistics, United States Department of Labor, set forth in the December issue of the *Monthly Labor Review*, Vol. 7, No. 6, pages 111-113. The 51 commodities include foodstuffs, textiles, leather and mineral and metal products.

According to the Government figures, which are based on wholesale prices carried up to Nov. 1, 1918, Pennsylvania anthracite has advanced only 31.80 per cent. over the price quoted in 1913, which in every case is taken as a base. Many other products doubled or even trebled. Taking the 1913 quotations as 100, prices of various staple commodities as given by this Government publication are:

Anthracite	131.80	Creamery butter	178.70
Gasoline	145.80	Granulated sugar	204.70
Copper wire	173.70	Milk	234.00
Furnace coke	236.40	Fresh eggs	219.90
Cotton, middling	253.90	Bacon	225.20
Bleached muslin, Lonsdale	304.90	Lard	241.80
		Fresh beef	188.50
Women's shoes	223.00	Scoured wool	305.10
Flour	222.70	Rye flour	264.40
Corn meal	210.80	Oak sole leather	171.50
Potatoes	161.70	Wool storm serge	291.70

In actual figures, some of the changes are: Anthracite, nut size, which was sold wholesale in 1913 for $5.318, is now given as $7 per gross ton. Gasoline, worth 16.80c. in 1913, is reported as 24.50c. Good standarde patent wheat flour, sold at $4.584 a barrel in 1913, was replaced by standard war flour at $10.210 a barrel. Granulated sugar worth 4.30c. a pound in 1913 is now held at 8.80c., and women's shoes, wholesaling at $2.175 just a little more than five years ago, are now quoted at $4.850 a pair. In the same way fresh eggs leaped from 22.60c. to 49.70c., creamery butter from 31c. to 55.40c., and fresh beef from 13c. to 24.50c. Storm serge worth 56.30c. a yard in 1913 is now quoted at $1.642.

HAMPTON ROADS TONNAGE IN JANUARY

Norfolk & Western Ry.	491,344 Tons
Virginian Ry.	305,996 Tons
Chesapeake & Ohio	272,152 Tons
Total	1,069,492 Tons

BALTIMORE & OHIO COAL TONNAGE IN FEBRUARY

The following is a statement of the coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of February, 1919, as compared with the corresponding month of the previous year:

	Tons, 1919	Tons, 1918
Coal	2,293,179	3,225,974
Coke	125,210	225,258
Total	2,418,389	3,451,232

NORFOLK & WESTERN TONNAGE IN FEBRUARY

Below is given a statement of the coal tonnage from mines on the Norfolk & Western R.R. and from other railroads, for the month of February, 1919:

From:	Net Tons
Pocahontas field	1,085,829
Tug River field	200,124
Thacker field	146,105
Kenova field	52,444
Clinch Valley field	71,037
Other Northern and Western fields	3,410
Total Northern and Western fields	1,558,949
Williamson & Pond Creek R.R.	94,929
Tug River & Kentucky R.R.	51,535
All other railroads	63,160
Grand total	1,768,573

Coal and Coke Securities

New York Stock Exchange Closing Quotations Mar. 31, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	139	141
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	40	42
Colorado Fuel & Iron, Pfd	(CF)	105	110
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	26	28
Elk Horn Coal, Pfd	(EH)	....	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	48½	49
Pittsburgh Coal, Pfd	(PC)	86	87
Pond Creek Coal	(PD)	12¾	14
Viginia Iron, Coal & Coke	(VK)	54	59

* Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd., 6s, 1922	90	....
Clearfield Bituminous Coal, 1st 4s, Ser. A., 1940	71	....
Colorado Fuel & Iron, Gen. 5s, 1943	89½	90
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74½	75½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	88	91
Grand River Coal & Coke, 1st 6s, 1919	80	....
Jefferson & Clearfield Coal & Iron, 2d Mtg. 5s, 1926	96	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	98½	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79½	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	83½	84½
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	87½	88
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	82⅞
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	92	93
Utah Fuel, 1st Sinking Fund, 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85⅝	86

COAL AGE

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America's Opportunity in Foreign Markets

By Floyd W. Parsons



NLY a man of super-courage would dare commit himself today as to just what are normal prices and normal business conditions. Industrial activity in America at the close of the war had reached a peak never before touched. Even recessions that have occurred since the signing of the armistice have not brought most lines of trade back to the volume sustained in pre-war days.

Nothing but experience will determine what level of prices is in keeping with current happenings. Old standards no longer rule. Labor has secured new power and wage reductions are being opposed successfully. The money of all nations has been inflated as never before. Pre-war scales no longer are precedents on which it is safe to base calculations.

Out of all the confusion, however, it is possible to discover a few guide-posts. Merchandise shipments from the United States during the first quarter of this year are approximately $1,750,000,000. Imports were less than $700,000,000, so that the balance of trade in our favor for January, February and March is more than a billion dollars. Since January, 1916, the trade balance in our favor totals nearly eleven billion dollars. No such record was ever attained by any nation before.

What the foregoing statement really means becomes more apparent when we say that during the thirty years preceding 1914 the favorable trade balance of the United States was not so large as this balance of the last thirty-nine months.

Such a one-sided volume of foreign trade cannot continue forever. If it did, we would soon find that we were expending our resources and our effort to no real advantage. Soon our customers on the other side of the Atlantic would be without funds to meet our bills, and the bottom of the business would drop out.

We have an advantage in foreign trade, and it is necessary that we hold it. Our continued success depends on the manner in which we finance future exports. Everyone knows that the man who buys must pay. Foreigners cannot at present meet their obligations to us with goods or gold. We must create credits against which other countries may draw if we are to retain their trade.

This being the case, we must look upon ourselves as international bankers and world investors as well as world traders. The United States Government cannot continue to provide the money for financing our merchandise exports. Corporations and individuals in America will be called upon to step into the breach and help desirable customers who are long on credit and short on funds. Our world standing depends largely on our readiness to accept the idea of a genuine community of interest throughout the earth.

In no field of trade are our foreign opportunities greater than in coal. Germany will not be able to resume her exports of fuel for some years, if ever. Great Britain is hoping to recover her position as a coal exporter, but the obstacles in her way are increasing. She normally ships 75,000,000 tons annually, but the increased cost of production now prevailing in England and Wales may change the situation materially.

The ability of Great Britain to recover her export markets for coal depends upon her cost of production. When the war commenced, the average cost per ton of large coal at the pit mouth at British collieries was $3.60; at the close of the war it was $8.40. The better-paid miners in 1914 received $10.56 per week; in 1918 they were paid $19.20 per week. Coincident with this large advance, the Welsh miners secured a 49-hour week for surface workers, and a special fee of 72 cents per day whether they worked or not.

When in addition to the foregoing statement concerning increased wages and a shorter day we add the fact that the yearly output of the British collier has continued to fall until now he produces less than a ton of coal each day, it appears certain that English and Welsh coal will have to be sold at a high price in foreign markets in the future.

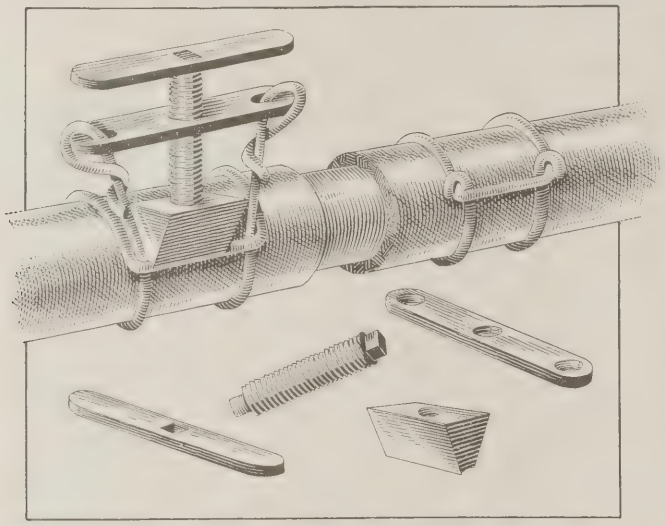
If the coal operators and miners in the United States work together in harmony, if the Miners' Union places no restrictions upon individual output, if we use more and still more machines underground, if we continue to produce from four to six times as much coal per man per day as is produced in foreign collieries, we may look forward with confidence to America's future as a coal-exporting nation. We may also rest assured that in such case the wages of American miners will be maintained on a satisfactory level.

IDEAS AND SUGGESTIONS

Hose-Clamping Tool

BY CHARLES H. WILLEY
Concord, N. H.

The tool illustrated is one that any handy man can make from a bolt and a few bits of old stock. The wire for binding the hose to its pipe or coupling is put around the hose in the manner indicated. The ends of the wire are secured through the holes of the cross-



EASILY MADE TOOL FOR CLAMPING HOSE

head. The head of the tool is placed so that the horizontal wire comes in the groove, then by holding the crosshead in one hand and tightening the screw with the other, the wire is drawn taut. When it is as tight as needed, the whole tool is turned about the wire, thus forming a hook that prevents the wire from loosening.

Accidents to Footmen

BY A PENNSYLVANIAN

Two men whom I have known for a long time were killed recently, while acting as footmen, one at the bottom of a breaker plane and the other at the foot of a slope. Both met death because of the failure of the "hitching staples."

A car weighing 13,000 lb., ascending a plane with a pitch of 8 deg., exerts a double shearing stress on its hitching staple bolts of about 7200 lb. Some collieries make a 1¼ in. hitching staple and others with heavier cars make them 1½ in. Both have four nuts on a standard thread. These staples go through the bumper sill of the car and are tightened against a plate ¼ x 3 in. punched to receive them.

The history of the accidents referred to above shows that the staple does not fail at the root of the thread, but breaks at the collar, which is drawn up against the bumper sill. When a mine car is derailed, it often falls between the ties, with the bumpers resting on the rail. To pull it on means a spread road and displaced ties. Accordingly, a bar is secured and tied under the hitching staple. The entire pull of lifting that car with its load is then put upon the hitching staple in a straight upward lift that fractures the metal at the point where it enters the bumper sill.

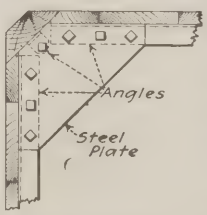
This may not always happen, but such treatment occurs again and again. Then some day, in going up a slope or plane, the staple may fail with accompanying loss of life, and destruction of cars and timber as the probable result.

Mine cars get to the shop often for repairs and their needs are tersely told in chalked inscriptions on doors and sides. But among all the cripples I have seen on shop tracks, none have been marked "Bad hitching staple." "Bad doors," "out of gage," "broken wheels," all are noted, but the car carpenters are never warned to inspect the pulling staples.

A little niche is required by law for a bottom man to step into while a car is ascending, but he cannot stay in it if he must couple trips or tend another side. He is in constant danger of falling lumps of coal coming back and hitting him, and if any inspection of the hitching staples would further safeguard him, it by all means should be made. Ropes do not often break, shackles seldom pull out, but failures of staples not infrequently bring death.

Steel Corner for Concrete Forms

Removable corners for concrete forms have been used for some time by E. H. Oneal, of Globe, Ariz. A special type for shaft concreting is shown in the accompanying sketch. It consists of a drilled and shaped steel corner plate to which are bolted angles carrying the side planks of the form and a special corner piece. While the cost of the individual forms was high, the cost per unit of concrete was low because the forms could be used over so many times. Some were re-used 26 times and were still in good condition. To strip such a form, the bolts are unscrewed and the separate plank sections lifted out.—*Engineering News-Record.*



Bushings for Car Wheels

BY E. P. HUMPHREY
Upper Lehigh, Penn.

The supply of brass bushings having become exhausted, and the demand for mine cars still remaining great, it was necessary to find some way in which to bush the worn wheels. The axle was 3 1/16 in. in diameter in some cases, but more often it was slightly less; so the idea of using 3-in. wrought pipe for a makeshift was tried. In cases where the axles were badly worn extra heavy pipe was used. This allowed some margin also for truing up. It was with a shade of doubt as to the practicability of this method that the cars were put into commission, but careful examination later showed satisfactory service with a saving.

Importance of Good Ground Connections

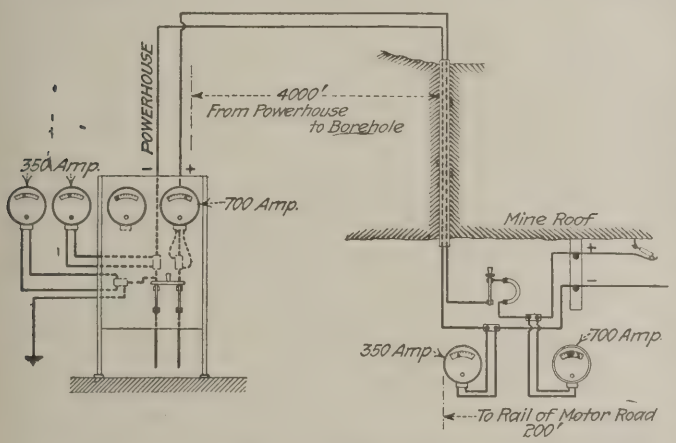
By J. J. Nolan
Linton, Ind.

The object in giving *Coal Age* readers the sketch and description of a peculiar condition experienced in transmitting electric power from one mine to another, at one of the mines with which I am familiar, is to emphasize the importance of having good ground or rail connections where locomotives and mining machines operate on direct current.

As one of the mines was in need of additional power the company decided to supply one whole side of this mine, including locomotives, mining machines, pumps and fan motors, from another mine about 4000 ft. away, which happened to have a spare unit.

A borehole was drilled near the extreme inside end of the haulage road and the transmission line brought overhead from the other power plant and passed down through this hole, connecting to the trolley and rails as shown.

A connection at the power house was made from the negative line above the main switch to the engine



COURSE TAKEN BY THE TRANSMISSION LINE

bed plates, interconnecting with pipes around the plant that extended under ground. This method was followed at all of this company's plants.

It was decided to make a test of amperage and drop the line voltage at the bottom of the drill hole with an average load to see if the line might require additional copper. Only one ammeter was used in the original test, and this was connected in the positive line.

The load varied from 300 to 700 amperes. The voltage drop was not considerable, but near the completion of the test it was noticed that the positive line became quite warm while the negative, which was of the same cross-section, remained cool. This led us to connect an additional ammeter in the negative line, as shown. The reading on this instrument was about half that of the positive line.

Making note of these readings we removed the meters, and proceeding to the power house we connected them as shown at the left of the switchboard, one in the line leading to earth and the other in the overhead line. This was done to satisfy ourselves as to whether this large amount of current could be coming through the earth for this distance, since there were no connections underground of workings between the two mines which might allow current to find its way along pipes or rails.

The readings of the positive and negative overhead lines leaving the board showed the same ratio as existed at the bottom of the borehole. The ammeter on the negative ground line showed the balance of the negative load, which amount came this distance through the earth.

Upon examination of the connections around the switch and rails at the extreme inside end of the haulage road, several poor connections were found. This accounted for a large part of the current at this point taking the path of least resistance, which was the earth. Making all connections in a proper and secure manner at this point did not materially lessen the voltage drop from the readings taken before.

Discontent and Its Remedy

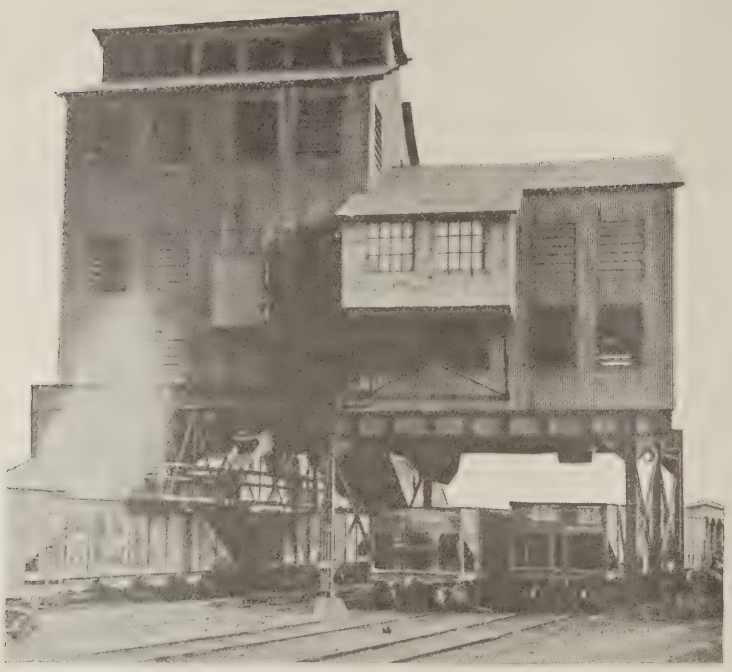
Of the many kinds and degrees of diseases the most pernicious and far-reaching is the mental disease of discontent. However, it is only when this discontent is turned into vicious channels that it becomes dangerous, because discontent may also be the index of a progressive mind. If it is correctly diagnosed, and the proper remedial measures are applied, discontent in a body of workmen may be cured. The old idea that this particular disease can be cured by the methods of an Indian medicine-man should be discarded forever. The ailment, like all human ills, especially those of a mental nature, requires delicacy in treatment inasmuch as the patient generally lacks faith in the practitioner. More and more corporations are coming to realize that labor must be as carefully considered and developed as expensive mechanical equipment. This is perhaps more true of the coal industry than of many others, owing to the varied character of the labor supply.

The problem of unrest is broad and constant. While almost all coal corporations have welfare bureaus of one kind or another, the real way in which to handle the problem is to squarely recognize that the problem exists, and to place the responsibility of its solution in charge of an official who shall pay attention to nothing else.

This official may be a full-fledged personnel efficiency expert or just an ordinary executive who knows workingmen and has the ability to handle them. His task should not be that of an autocrat with a religious fervor to crush out all discontent among his charges. Rather it should be to discover the real cause of the discontent and then to apply the correct remedy.

As stated before, this discontent may be only the desire of a workingman to advance to a better position, or it may be due to the fact that a workingman is unfitted for his present job and would be happier at another task more suitable to his inclinations. In a way the official I have in mind would be a surgeon to all the petty industrial ills to which the labor body of an industry is heir. Hand in hand with him should work the medical doctor, whose duty it would be to attend to the physical well-being of the workingmen.

Obviously, discontent means slowing up in work, in enthusiastic application, and in the desire to become more efficient. Even ill-health cannot affect a workingman's power to labor as much as can vicious discontent. And as this is a remedial disease, the only way to cure it and to keep it cured is to employ a man who is competent to handle the job wisely. While there may be no tangible dividends from this form of investment, no one can deny that it will prove profitable. It has been tried and adopted with success in other industries so it is beyond the experimental stage; and there is no good reason why the coal industry should lag behind.



In the last three months of 1918 the by-product coke plants attained their maximum capacity. Although they gained only a slight supremacy over the beehive ovens during that period, it is certain that the latter type of oven has seen its best days. The operation described in the following pages is typical of the coke-making facilities found in the modern byproduct coke plant. The illustration at the left shows the screening plant, where coke is separated into different grades.

SOME STRIKING FEATURES of a LARGE BYPRODUCT COKE PLANT*

IN order to supply coke for its blast furnaces at Hubbard, Ohio, the Youngstown Sheet and Tube Co. has increased its coke-making facilities 50 per cent. Since August, 1916, the company has operated four batteries of ovens at its East Youngstown coke plant. Ground was broken for the two new coking units in July, 1917. On Aug. 8, 1918, the first battery was placed in operation, followed by the second on Sept. 4, 1918. These two batteries consist of 51 ovens each. They are of the Koppers cross-regenerative type of 500 cu.ft. capacity.

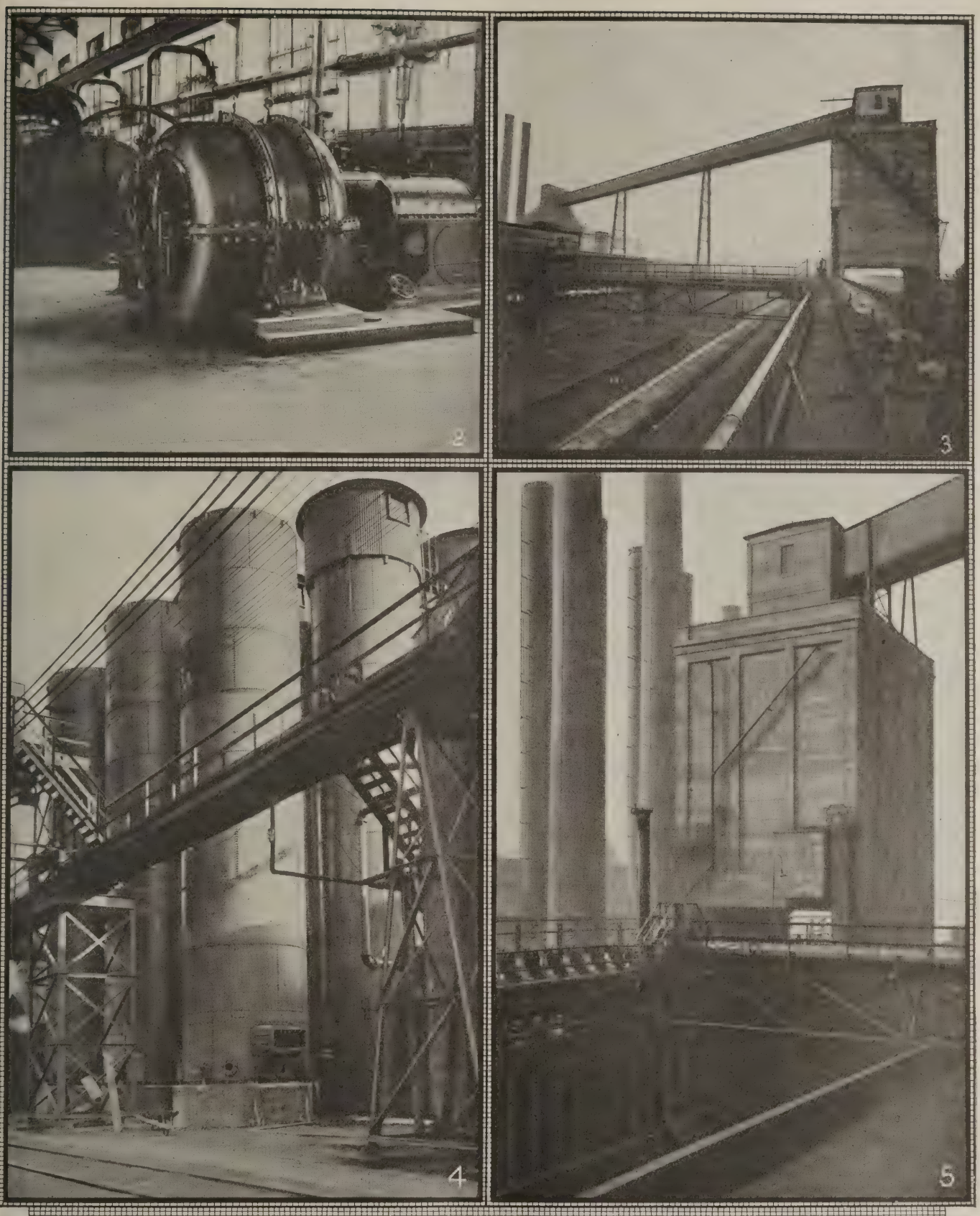
The unloading, crushing and mixing equipment for the original four batteries was designed and installed with sufficient capacity for the extension which was foreseen at that time. The coal is unloaded by means of a high-lift car dumper which is said to be the first one ever installed to serve a coke plant. It was built by the Wellman-Seaver-Morgan Co., of Cleveland, Ohio. A 36-in. belt conveyor, 350-ft. centers, with a capacity of 500 tons an hour, was installed from the top of the storage bin over Nos. 1 and 2 batteries to the new storage bin over the new Nos. 5 and 6 batteries. This bin is of 2000 tons capacity and has a partition so that different mixtures of coal can be handled on the two batteries and also so either side of the bin can be conveniently cleaned without interfering with operations. Clean-out manholes are provided near the top of the hopper in each compartment.

In leveling the coal in the ovens after charging, some coal is often pulled out through the chuck door. Therefore it was decided to incorporate in the new work an arrangement for handling this spillage which had been developed by the Youngstown Sheet and Tube Co. for the old batteries. Accordingly a small bin of about three tons capacity was built on the main bin. The coal pulled from the ovens is dropped through a chute attached to the pusher into a hopper from which it is conveyed, elevated and discharged into the small bin. The operation is designed so that the doorman on the pusher car drops the coal from the hopper and starts the conveyors. The small bin is so arranged that the larry man can empty it without getting off his larry car. This is said to be the first installation of its kind on a byproduct coke plant.

The two larry cars are equipped with a motor-driven swab crane designed by the Youngstown company and are the same as installed by them on the three larry cars on the old batteries. The object in putting a motor on this apparatus was to make the work so easy that the larry men can attend to this duty without extra help.

Owing to the increased coal consumption due to the extension, it was considered advisable to erect a thaw house for taking care of frozen coal. Accordingly a thaw house 400 ft. long was built to hold 20 cars and span two main tracks and the track to the car dumper. The construction is of reinforced precast concrete columns supporting structural steel trusses and the roof and machinery house. The walls between the columns are built up of interlocking hollow tile. The hot-air ducts run the length of the building on both sides between the roof and the bottom chord of the roof trusses; the return air duct is between the hot-air ducts. From the hot-air ducts pipes convey the heated air up under the cars every 5 ft. on both tracks the entire length of the building.

*Reprinted from the Jan. 23, 1919, issue of the *Iron Trade Review*.



Some Views of an Up-to-date Byproduct Coke Plant

Fig. 2—Boosters shown increase the pressure of the coke-oven gas after the byproducts are extracted. Fig. 3—This concrete storage bin is partitioned for each compartment. Fig. 4—Cooling towers near the byproduct building. Fig. 5—Concrete storage bin of 2000 tons capacity. Coke ovens below.

The furnace and machinery houses contain two heating units and fans for delivering and exhausting the hot air. Temperature regulators are provided for automatically controlling the temperature of the air used in the furnaces. Recording pyrometers and thermometers are also installed. Coke-oven gas is used for heating the air. Automatic control is provided for shutting off all the gas except the pilot lights when the fans are shut down accidentally or intentionally. The fans are each designed to deliver 60,000 cu.ft. of air per minute at standard conditions. The air is delivered under the cars at about 225 deg. F., and after passing up along the sides and bottoms of the cars passes into the return air duct through openings in the bottom and on to the heating furnaces. The openings in the bottom of the return air duct are adjustable so that an even distribution of hot air throughout the length of the building is obtained by making the proper adjustments in these openings.

The coke wharf is 125 ft. long and is located at one end of the batteries. Considerable care was given in selecting the location of this wharf so that it would not be in front of the ovens, thereby avoiding the troubles—especially prevalent in cold weather—from steam along the coke side of the batteries. Two locomotives for pulling the quenching car are provided. They were built by the General Electric Co., Schenectady, N. Y. The quencher car track is built with 100-lb. rails and is supported by a reinforced-concrete bed.

From the wharf the coke is conveyed on a 36-in. conveyor, 340-ft. centers, to a new screening station erected for the new batteries. Provision is made by means of a tunnel underneath the quencher track between the wharf and the screening station, so that if in the future the company builds blast furnaces on the coke-plant site a conveyor can be installed to take the coke to a screening station over the blast-furnace trestle and deliver into a transfer car running over the blast-furnace bins. The coke is screened over bar grizzlies, of which there are two; one is reserve equipment and can easily be pulled into position in front of the conveyor when it is desired to remove the bars of the other grizzly.

As a somewhat softer coke is desired in the present operation, special precautions were taken to save breakage of the coke and wear on the chutes from the bar grizzlies to the railroad cars. Coke may easily be delivered into cars on either of two tracks running underneath the screening station. The undersized coke from the bar screens drops onto a 20-in. belt conveyor and is delivered to a revolving screen in which the separation is made into domestic and breeze grades.

Coke, after being screened, is delivered into small bins and from there transported over the river on a trestle to the blast-furnace bins by means of a 35-ton electrically driven transfer car. All chutes are lined with hard brick laid on edge and the sides of the chutes are lined with chilled cast-iron plates. In the new plant glass windows are practically eliminated and steel louvers substituted. Owing to the wharf having been located below the sewer level, an automatic electrically operated bilge pump is installed to take care of drainage water. A car-pulling winch which handles 12 loaded cars and serves both coke-loading tracks is installed to spot empty cars and move away the loaded ones.

A brick quenching hood 58 ft. high is provided. Steel baffles inside of the hood return any coke into the quencher car which may fly into the air during the process of quenching. All concrete foundations for the hood which might come in contact with water from the quencher car are veneered with brick. The same type of solenoid-operated balanced quenching valve, which the company was the first to adopt for this use, is installed in the new quenching station in the same manner as in the old plant.

Except for lowering the horizontal flue 2 in. there is practically no change in the new ovens over the old. In both cases the oven width is 17 and 19½ in., or an average of 18¼ in. wide. It was considered desirable, primarily on account of the men's comfort in hot weather, to insulate the regenerator end walls. Accordingly, the company conducted some exhaustive tests in a specially built furnace, on a variety of insulating materials; finally a moderate-priced grade of infusorial earth was put in between the firebrick and the red brick closing the face of the regenerators. The pusher machines, which were built by the Wellman-Seaver-Morgan Company, are practically the same as on the original installation. The cast-steel end trucks are provided with countershaft bearings on both sides so that the end trucks are interchangeable and but one spare need be carried for both trucks. The ovens, pusher track, walls, coal bins and concrete battery stacks are carried on concrete piles.

The original installation in the byproduct building consisted of three positive-type exhausters delivering through tar extractors and preheaters to three large oval-type saturators, one unit being a spare one. Two positive-type boosters were provided for delivering surplus gas to the mills, one being a reserve. The exhauster and booster fans were built by the Connersville Blower Company of Connersville, Ind. The extension consists of a General Electric turbo exhauster, tar extractor, preheater and saturator and one General Electric turbo booster for the surplus gas. The gas



FIG. 6. CENTRIFUGAL WHIRLERS FOR RECLAIMING SULPHATE IN CRYSTALLIZED FORM



FIG. 7. QUENCHING BUILDING EQUIPPED WITH 58-FOOT HOOD AND PLANT WHERE COKE GOES THROUGH FINAL PROCESS OF MAKING

is admitted to the continuous oval cracker pipe in the new saturator at both ends. This type of saturator was adopted in preference to the type originally built, in which the gas was all admitted at one end into two separate cracker pipes.

The regulation of the gas in the collecting main is accomplished by the turbo exhauster and governors on the offtakes, the other exhausters being run at constant speed. Two new primary coolers, a storage tank for weak liquors and an ammonia still were added.

The Youngstown Sheet and Tube Co. designed and built a jib crane operating a one-half yard, single-line, grab bucket for cleaning out accumulations in the hot-drain and flushing tank. This bucket, which was furnished by Edgar E. Brosius, of Pittsburgh, Penn., empties into a small dump car running on a narrow-gage track. The car delivers the material to a pit within reach of a standard railroad track where it can be gathered by a locomotive crane. By this device men are never required to enter the hot-drain or flushing tanks to clean out accumulations. An interesting feature of this tank which was designed by the company is the absolute and simple control of the proportions of tar and liquor for flushing purposes. The mixture is ordinarily carried at 50 per cent. each, but can be varied almost instantly by a valve to any desired proportion of tar and liquor. By means of this and other control features the primary coolers, which ordinarily have to be steamed out every few days, are run from four to six weeks at a time without such attention, which effects considerable saving of steam, labor and deterioration, due to expansion and contraction of the large number of tubes in these coolers.

In the sulphate storage room is a hopper, with a chute extending through the wall, whereby bulk shipments can be made by means of the overhead crane loading into the hopper; the salt runs directly into the box car instead of having to be wheeled into the car by hand. A loading hopper for bag shipments is also built. Sulphate of ammonia often cakes more or less while in storage, and when loading into bags through the usual hopper it is necessary to have a man on top of the hoppers to push the salt down. By means of a special design of toothed rolls the salt is fed into the bags without any hand labor.

The original benzol plant and the addition were built by the Semet-Solvay Co. The latter consists of two light-oil stills and one refining still, also auxiliary apparatus, wash-oil coolers, gas coolers and gas scrubbers. A new acid washer building was erected entirely separate from the main benzol building and so arranged that all apparatus can readily be taken down and removed from the building for any repairs which might be dangerous in this location. Overhead hand-operated traveling cranes are installed in both the main benzol building and the acid washer building. All new work rests on concrete piles, as was the case with the original work. In constructing the additions particular care had to be exercised on account of the hazards of the industry. The concrete pile driver was furnished steam through a hose to avoid the use of the boiler. All field work on the structural steel was bolted, no riveting being permitted on the site.

One new Babcock & Wilcox boiler was installed with Coxe traveling chain-grate stokers, with which the entire boiler house is equipped. Coke breeze produced at the coke plant is used for fuel. Gas burners are installed for emergency use only or for use Saturday night or Sunday in case the surplus gas would otherwise be wasted.

The three Wheeler forced-draft cooling towers originally installed were made large enough to take care of the extension. It is necessary in summer to use two of these towers for cooling the river water for use in the primary coolers and the first section of the wash-oil coolers. The third tower is used for recirculating water for the first cooling of the gas leaving the byproduct building and is a closed system. Cold water from a nearby reservoir is used for apparatus inside the benzol building, final cooling of the gas before the benzol scrubbers and final cooling of the wash oil, but this is reduced to a minimum by cooling as far as possible with the cooling-tower water as a preliminary step.

Coal and Phosphate in Southeastern Idaho and Western Wyoming

Coal has been mined in a small way in the Bighole Mountains, Teton County, Idaho, for many years, to supply the local demand. The coal is of excellent quality and the chief drawback to its wider use has been the remoteness of the mines from the railroad. During the war the greatly increased demand for fuel led to an increase of interest in this field, and late in 1918 preparations were being made to build a railroad spur to the mines from the Teton Valley Branch of the Oregon Short Line Railroad. When this track is completed Idaho may rank higher as a producer of coal.

The United States Geological Survey, Department of the Interior, has recently issued, as Bulletin 680, a report by A. R. Schultz, which describes the coal fields of the Bighole Mountains and other districts in this part of Idaho and the adjacent part of Wyoming. The report also describes extensive phosphate deposits in the same general region. The existence of these deposits has been known for more than 10 years, but their extent was not known until they were mapped in detail and sampled by Mr. Schultz.

Selection of the Electrical System, Voltage and Frequency for Mine Service

By Terrell Croft
University City, St. Louis, Mo.
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SYNOPSIS—*For direct-current distribution a voltage of 250 is practically a standard at American coal mines. Some installations have been and still are made at 500 volts, but such a potential should be avoided where possible. In alternating-current distribution a frequency of 60 cycles is usually adopted, although some plants operate at 25. Alternating-current voltages range from 110 upward.*

WHETHER direct or alternating current should be used in a mine must be determined by local conditions. If mining locomotives are to be operated, the use of direct current is almost imperative. For a mining property of any considerable extent, high-voltage alternating-current transmission and low-voltage direct-current distribution are usually the most economical and satisfactory course to follow. If energy is to be transmitted for over, say, four or five miles, high-voltage alternating current is ordinarily the only logical solution on the basis of sound economics; 2200 volts can be used for distances of possibly up to four miles, although it is probable that 6600 or even 13,000 volts may be more desirable, particularly if there is a possibility of the system being extended to greater distances in the future. Where power purchased from a public utility company is to be utilized, this will, in practically every case, be alternating current. Substations and transmission system will be designed accordingly.

TABLE I. PROPORTION OF MINING LOCOMOTIVES OF DIFFERENT TYPES IN MINES IN THE UNITED STATES

(The data for this table were furnished by two of the largest manufacturers of electric mining locomotives)

	Coal Mines		Metal Mines	
Type of Locomotive	Manufacturer A Per Cent.	Manufacturer B Per Cent.	Manufacturer A Per Cent.	Manufacturer B Per Cent.
500-volt, direct current	8	15	10	20
250-volt direct current	67	70	64	70
Storage battery	25	15	26	10.
Three-phase and single-phase, alternating current	0	0	0	0

Concerning whether single-phase, two-phase or three-phase alternating current should be used, it may be stated that the three-phase system only is used in modern installations. This is because this system is much more satisfactory and economical for the majority of installations than is either the single-phase or the two-phase. Two-phase equipment is seldom if ever installed now except as additions to existing two-phase installations. Single-phase equipment is never used except for electric lighting and where the power requirements are exceedingly small. The three-phase system requires only 75 per cent. of the copper of an equivalent two-phase or single-phase system and necessitates only three wires as against the four ordinarily used with the two-phase system.

The standard frequency for alternating-current power transmission and distribution may now be stated to be 60 cycles. It appears that it is desirable in practically every case to adopt this rather than any other frequency. The economies and advantages which were expected to result from the use of 25 cycles for electrical energy transmission have not, in general, materialized. A number of plants which generate at 25 cycles have been constructed, which necessitates the installation of 25 to 60 cycle frequency changers where 60 cycles is the utilization frequency.

Voltages used in mines may be classified into (a) low pressure, (b) medium pressure and (c) high pressure. These terms are defined by "Standardization of Electrical Practice in Mines," Circular No. 23, Bureau of Standards, as follows:

A low-pressure system is one where the conditions are such that the pressure between any two conductors or between any conductor and the earth, at the terminals where electricity is being used, cannot exceed 300 volts.

A medium-pressure system is one where the conditions are such that the pressure between any two conductors or between any conductor and the earth, at the terminals where electricity is being used, can exceed 300 volts but cannot exceed 600 volts.

A high-pressure system is one where the conditions are such that the pressure between any two conductors or between any conductor and the earth, at the terminals where electricity is being used, can exceed 600 volts.

The power lost in an electrical circuit transmitting a given load varies inversely as the square of the impressed voltage. This is strictly true if certain factors which affect only very high voltage alternating-current lines are disregarded. If the voltage impressed on a line is doubled, the watts of line loss (a certain amount of power being transmitted) will be quartered. If the impressed voltage is trebled, the loss will be one-ninth of that with the original voltage. The truth of these statements may readily be verified by applying Ohm's law to hypothetical cases. This explains why a high voltage is, from the line loss standpoint, desirable for electrical energy transmission.

The weight of conductor is, for a given loss, inversely proportional to the square of the impressed voltage. That this is true follows from the statement of the preceding paragraph.

The proper voltage for the distribution of electrical energy in and around a mine must be determined by the requirements and conditions affecting each installation. Formerly, 500 volts was the standard pressure but because of the life and fire hazard which this potential involves it has been superseded by a lower one. In mines where electric locomotives are operated, direct current at a pressure ranging from 220 to 275 volts is preferably used. Some mines in West Virginia (Ohio Brass Co.) operate a three-wire system at 500 volts between outside wires and 250 volts between outside and neutral.

A generally accepted rule is to limit the range of distribution for 250 volts to one mile and for 500 volts to four miles. However, it is frequently necessary to carry electric power at 250 volts into mines for greater distances than one mile. This necessitates a correspondingly greater investment for feeder copper. Pressures exceeding 300 volts are usually fatal to life, particularly so under the conditions of dampness often occurring in mines; hence these are undesirable for mine traction service.

TABLE II. VOLTAGES ADVISABLE FOR LINES OF VARIOUS LENGTHS IN THREE-PHASE TRANSMISSION (GENERAL ELECTRIC CO.)

Length of Line	Voltage
Up to 1 mile	500 to 1,000
1 to 2	1,000 to 2,300
2 to 3	2,300 to 6,600
3 to 10	6,600 to 13,200
10 to 15	13,200 to 22,000
15 to 20	22,000 to 33,000

Where a haulage system extending for a considerable distance is to be installed, it is desirable to locate underground substations so as to minimize the direct-current transmission distance so that 250 volts can be used economically. In such substations synchronous converters or motor-generators can be installed whereby high-voltage alternating current can be converted to low-voltage direct current. A 125- to 250-volt direct-current three-wire system is often desirable.

For alternating-current distribution to medium capacity motors 220 volts is usually the preferable pressure. Large motors may be served economically with 2200 or even a higher voltage.

About 1000 volts per mile for alternating-current long-distance transmission (H. B. Gear) is a rule of thumb which serves as an index. This is based on the fact that with copper conductors and a pressure of 1000 volts per mile with a current density of one ampere per 1000 circ. mil the energy loss will be about 10 per cent. That is, a line designed on this basis will carry its current without excessive heating and at about 10 per cent. loss. For relatively short lines transmitting considerable power the rule provides a conductor too small for most economical operation—that is, for minimum annual costs. Hence, for the short-distance transmission of much power a pressure greater than 1000 volts per mile may be more economical. Where a transmission system serves an extensive distance and the load is small, a voltage smaller than "1000 per mile" may sometimes be adopted with economy.

TABLE III. SIZES OF WIRE FOR THREE-PHASE TRANSMISSION SERVICE

Approximate distances over which 100 kw., three-phase current, can be transmitted with different sizes of wires at different voltages, assuming an energy loss of 10 per cent. and a power factor of 85 per cent.

No. B.&S.	Area in Circular Mils	Voltage of Line — Distance of Transmission of Various Potentials at Receiving End, in Miles								
		2000	3000	4000	5000	6000	8000	10,000	12,000	15,000
6	26,250	1.32	2.98	5.28	8.27	11.92	21.12	33.1	47.68	74.50
5	33,100	1.66	3.75	6.64	10.40	15.00	26.56	41.6	60.00	93.75
4	41,740	2.10	4.74	8.40	13.15	18.96	33.60	52.6	75.84	118.50
3	52,630	2.54	5.96	10.16	16.55	23.84	40.64	66.2	95.36	149.00
2	66,370	3.33	7.51	13.32	20.85	30.04	53.28	83.4	120.16	187.75
1	83,690	4.21	9.48	16.84	26.32	37.92	67.36	10.53	151.68	212.00
0	105,500	5.29	11.92	21.16	33.10	47.68	84.64	132.4	191.72	298.00
00	133,100	6.71	15.11	26.84	41.97	60.44	107.36	167.9	241.76	377.75
000	167,800	8.45	19.04	33.80	52.85	76.16	135.20	211.4	304 64	476 00
0000	211,600	10.62	23.92	42.48	66.42	95.68	169.92	265.7	382.72	598 00

Example—What size wire should be used to deliver 500 kw. at 6000 volts, at the end of a three-phase line 12 miles long, allowing an energy loss of 10 per cent. and a power factor of 85 per cent.? Solution—If the example called for the transmission of 100 kw. (on which Table III is based), look in the 6000-volt column for the nearest figure to the given distance, and take the size wire corresponding. But the example calls for the transmission of five times this amount of power, and the size of wire varies directly as the distance, which in this case is 12 miles. Therefore, look for the product $5 \times 12 = 60$ in the 6000-volt column of the table. The nearest value is 60.44 and the size wire corresponding is No. 00, which is therefore the size capable of transmitting 100 kw. over a line 60.44 miles long, or 500 kw. over a line 12 miles long.

If it is desired to ascertain the size wire that will give an energy loss of 5 per cent., or one-half the loss for which Table III is computed, it is only necessary to multiply the value obtained by 2, for the diameter varies directly as the per cent. of energy loss.

Do British Miners Shirk Tax Payment?

BY AN ENGLISH COLLIER

The coal scarcity in Britain has become a serious problem. To a large extent the existing situation has been brought about by Bolshevism, and the remedy must be patriotism to a similar extent. The miners' leaders are appealing for support from their men. Only a little time back, however, they would not hear anything of the suspension of the Eight Hours Act, although at the time it was going through the various stages of enactment they allowed a section to read that in the case of emergency the act could be suspended.

If Great Britain is not in a national emergency at present, I do not know, and dare not think, what conditions will be like when it is. But the miners will not even give way to let the 60 hours per year extra be worked. Apparently some men will not work as it is, but there are quite a number who would put in extra time for the sake of the country if allowed to do so. Such men, of course, find other work of national importance to do, such as gardening, etc. The most recent figures show that in 1917 there were 7,875,232 tons less coal turned out than was produced in 1916, in spite of the fact that 23,277 persons more were employed. There was an increased output in the Yorkshire and North Midland district, but there were here 244,329 persons employed against 239,331 in 1916.

Considering the output per man in 1916, there ought to have been turned out 300,000 tons more in 1917. The actual figures for the districts named were:

1917	69,128,836 tons
1916	68,005,505 tons

Only three districts in the country had an increased output in 1917 over 1916.

This side of the question then must be absenteeism. What is the cause therefor? There may be many causes, but the one that could most easily be removed is the income tax. This is undoubtedly the cause of much absenteeism. It is next to an impossibility to get some men to make any overtime if their ordinary six days bring them anywhere near being taxed. Scores who used to work well would rather take holidays than pay out any portion of their wage in income tax, even if their income is made considerably less through this.

Bumps and Outbursts of Gas in the Crowsnest Pass Coal Field*

THE Crowsnest Pass coal field is located in the extreme southeastern corner of British Columbia only a few miles removed from the northern boundary line of the United States. It is regarded as the most important coal field in the province. The field presents unusual natural difficulties to mining as the coal beds are at the base of an elevated plateau; the coal is under heavy cover requiring great care in mining to avoid squeezes and "bumps," and it practically can only be reached through the outcrop.

This coal field is in the form of an elevated trough, narrow at the north end and wide at the south, the southern part broadening toward the southeast (Fig. 1). The extreme length north and south is 35 miles and the greatest width along the southern half, a little south of Coal Creek, is 13 miles. The field covers 230 square miles and is estimated to contain in seams over 1 ft. thick, 22½ billion tons of bituminous coal in actual reserve, 20¾ billion tons in probable reserve and two billion tons, in beds 2 ft. thick and over at depths greater than 4000 ft. and less than 6000 ft., which might be expressed as possible reserves—or a total of over 45 billion tons. A number of the seams are too thin and too impure to mine with commercial success at the present time; it is considered that the available coal does not have an aggregate thickness—in beds 3 ft. or more thick—of more than 100 ft. Furthermore, some of the thickest beds, 10 to 20 ft. thick, owing to friability of the coal and poor roof, cannot under present conditions be cleanly mined out, and there is in consequence much loss of coal.

The Crowsnest basin has been buckled into a north and south synclinal trough by the great dynamic forces pressing from either side in the uplifting of the Rocky Mountain ranges. As a consequence, around the edges of the basin the beds have been steeply uplifted. While the more rigid sandstones and conglomerates overlying the more important coal seams have protected the latter, there is abundant evidence of disturbance, including a lateral squeezing of the coal to increased thickness in which it was badly crushed in places. Also there has been some local faulting of the coal beds, which causes much difficulty in mining operations. The dips of the coal beds from the edges of the basin probably carry the lowest beds down, in the middle of the trough, to such depths that under the highest ridges there is from 3500 to 5000 ft. of cover over the lowest beds. The accompanying cross-sections, Figs. 3 and 4, referred to the mine map, Fig. 2, for location, indicate the direction and amount of dip of the beds at the Coal Creek colliery.

The coal beds in any one locality are well defined, but it seems to be difficult to correlate the beds in the different sections as the beds change their characteristics and the adjacent rocks are said to lack distinctive features. The coals in the different beds that have been worked at Coal Creek, Hosmer and Michel do not differ much in chemical composition and are coking coals; but the coal at Morrissey had evidently been subjected to more intense crushing and the percentage of fixed carbon is higher. The Crowsnest field produces a good grade of bituminous coal, the different beds in any one locality having about the same kind of coal. Except at Morrissey, where the fixed carbon is too high to permit of making coke in beehive ovens, the coal makes a good

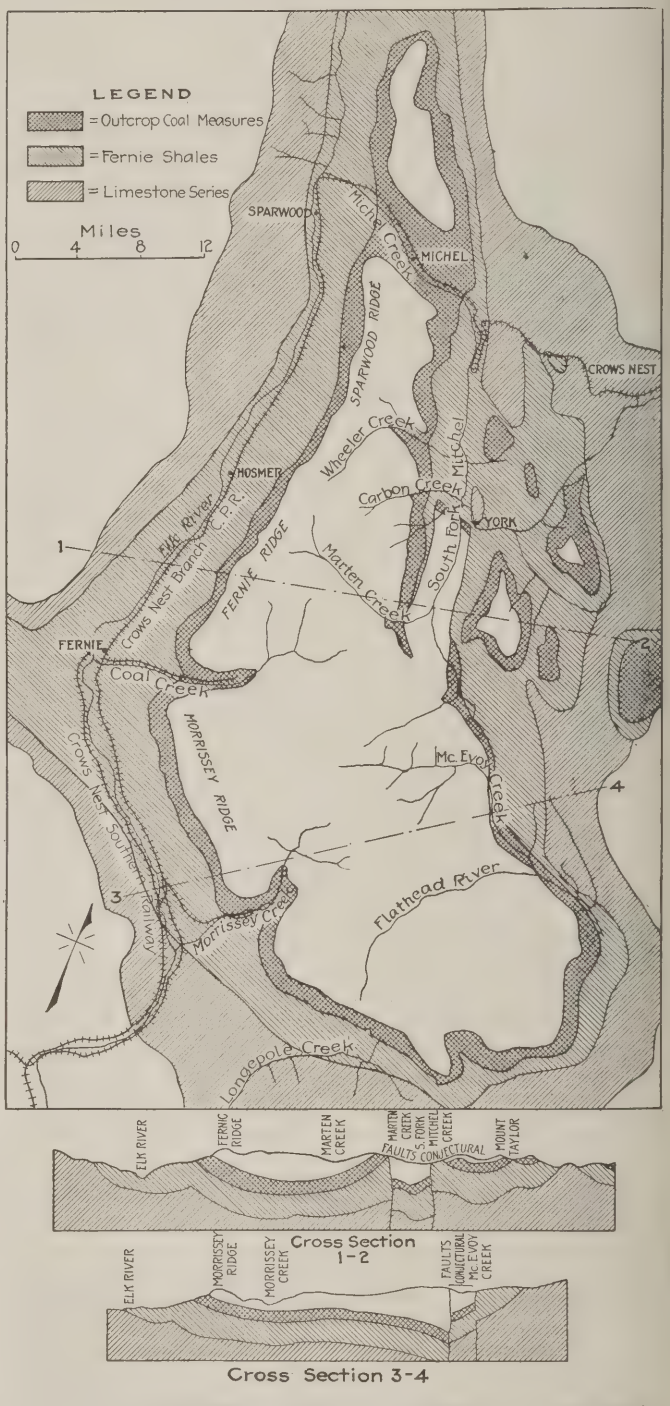


FIG. 1. CROWSNEST PASS COAL FIELDS IN BRITISH COLUMBIA, CANADA

*A digest of Bulletin No. 2, 1918 (British Columbia Department of Mines), on "Bumps and Outbursts of Gas in the Mines of Crowsnest Pass Coalfield"—a report by George S. Rice, E.M., chief mining engineer, U. S. Bureau of Mines.

metallurgical coke. There are 440 ovens at Fernie, coking Coal Creek coal, and 480 at Michel.

In this article the principal interest centers on the beds at the Coal Creek operations. Six seams have been prospected here, but of these only Nos. 1 and 2 have been found to be commercially minable at present. Normally these beds are from 75 to 150 ft. apart, but in certain parts of the Coal Creek mines the beds come together. The following are typical sections of these beds:

SECTION NO. 2 BED

Roof, Strong Shale (in Places Sand, Shales and Sandstone)

Coal	3 ft. 6 in. to 8 ft. 0 in.
Rock with streaks of coal	1 ft. 8 in.
Coal, high in ash (gaseous)	1 ft. 4 in.
Floor, shale	

SECTION NO. 1 BED

(75 to 150 ft. Above No. 2 Bed)

Main roof, massive shale and sandy shale	
Roof coal clean, friable	2 ft. 6 in. to 3 ft.
Rash, slickensided shale with coaly layers	1 ft. to 4 ft.
Coal, columnar structure, soft, clean	9 ft. to 13 ft.
Floor, shale (strong)	

ANALYSIS FACE SECTION SAMPLES, COAL CREEK MINES

Coal Creek Mine	Location in Mine	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	B.t.u.
No. 1 east....	Face, No. 10 east.	0.50	23.25	63.60	12.65	0.31	13,529
No. 1 east....	Face No. 1 north.	0.50	21.35	65.05	13.10	0.34	13,462
No. 3.....	Face main level....	0.70	24.05	66.05	9.20	0.57	14,081

The Crowsnest coal mines have the unenviable position of being among the most gaseous mines in the world, according to records of analyses of mine-air samples through the British Columbia Mining Department. In No. 1 East mine of the Coal Creek collieries on Apr. 14, 1916, when the mine was working, 2906 cu.ft. per minute of methane was given off. This quantity represents the maximum discharge from any of the mines in the field according to the records. At this rate there was thrown out of the mine in 24 hours 4,184,600 cu.ft. of methane, which would weigh 78 tons. The production of coal was then about 1500 tons, or about 2790 cu.ft. of methane for each ton of coal mined. It was thought that the greater part of this flow came from the coal stratum rather than that it was liberated from the breaking down of the coal in mining.

As illustrating the great outbursts of gas which take place in this field, a remarkable case is cited which occurred at the Carbonado mines of the Crowsnest Pass Coal Co. These mines were opened up on Morrissey Creek, about seven miles south of Coal Creek. In 1903, when the main entry had been driven in 2000 ft. from the outcrop, a great outburst of gas occurred in which it was stated that over 1400 tons of coal was blown out of the face of the main entry. In 1904 there was another great outburst in which 14 men were killed, the coal thrown out filling the entry for 400 ft. according to the inspectors of the district. The displacement of coal in this instance was estimated by the management to amount to 3500 tons. The volume of gas given off in the last 30 minutes after the outburst was estimated by various authorities at from two to five million cubic feet. No such great instantaneous outbursts have occurred in mines other than the Carbonado, but lesser, slower outbursts have taken place in the Coal Creek mines. In some virgin areas of this latter mine, when entries have been advancing on three shifts, it has been found necessary to slow the advance, on account of gas given off, by cutting out one or two of the shifts.

Methane outbursts into coal mines have not been uncommon in many coal fields besides the Crowsnest, but such outbursts have occurred only when the coal bed being mined is deeply covered to a depth of over 1000 ft. or more by strata containing impervious shales. Methane found in coal measures is generally believed to have been derived from partial distillation of the bituminous matter in the coal seams and bituminous shales, in the natural process of coal formation by chemical reactions aided by heat and pressure from deep burying and mountain upbuilding. It is therefore believed that all coal beds have produced large amounts of hydrocarbon gases; where the beds are thinly covered or are covered only by previous rocks like sandstone, or the cover is much broken by fault planes extending to the surface, then the gas has escaped. Generally, the more deeply buried the coal beds, the further advanced is the coal from the lignitic stage; also the larger will be the volumes of the residual gas—methane—contained in the strata, and furthermore the greater the pressure under which the gases are confined. In Great Britain, in deep boreholes from the surface to the coal beds, the pressure of gas attained 500 lb. and at Belgian mines 657 lb. per square inch. Great outbursts of methane (chiefly) have occurred in the deep Belgian mines, in one of which many years ago about 140 men were smothered, the gas taking fire at the surface and burning for a day or two. Several hundred other outbursts have occurred in Belgian mines, causing many deaths of miners; being accompanied by the dislodgment of quantities of coal blown out in large part as dust. The great outbursts of methane which occurred on several occasions in the Morrissey mines in the Crowsnest coal field have been unparalleled except by the Belgian outbursts.

One method of protecting men from gas outbursts is to keep boreholes in advance. This is the method practiced in many mining districts of the world, but hitherto it has been argued that it would not permit the advance discovery of a stored pocket of gas such as was encountered by the Carbonado mines. It is Mr. Rice's judgment that if a sufficient number of boreholes be drilled, spreading fan-shaped from the main advance entries, that these would approach near enough to such a pocket of gas and crushed coal to show by the gas flow from the pipe that there was a dangerous area ahead; until this area had been drained by other boreholes, then the entry or room which developed the gaseous territory should be stopped. The matter of gas flows and outbursts, although not so immediately acute in the operation of the Coal Creek mines as that of "bumps," yet is a most serious and vital consideration in planning for future operations in the mines of the Crowsnest field.

While the consequences of the outbursts of gas in the Crowsnest coal field have been most serious, still the "bumps" common to this section have occasioned far more alarm and the destruction of property due to this cause has been greater; it was due to fortunate circumstances that serious loss of life did not attend the most serious "bump," which occurred at a time when the miners were not in the Coal Creek mine. "Bumps" are not related to gas outbursts but they may occur, as in the State of Washington and in Great Britain, where the overlying rocks are rigid and there is great weight of cover; coupled with these conditions may be incor-

rect mining in which too much coal has been extracted in advance and the robbing of pillars has not been conducted so as to bring about proper breaks in the overlying rock. They are believed to be caused by the subsidence of the roof directly over the coal in certain areas under rigid rocks, leaving a great unsupported span of rock stratum. In time this inflexible layer of rock gives way and there is profound rock movement resulting in earth vibrations—on a sufficiently large scale it would be called an earthquake. When one of these extensive movements takes place it means a blow of thousands of tons of rock on the immediate roof of the mine, breaking timber, causing extensive falls in the mine and sending rock tremors through the strata. The history of the Coal Creek mines of the Crowsnest Pass Coal Co. shows several periods during which "bumps" predominated. During the years 1906 and 1908 a series of "bumps" occurred in the No. 2 mine at Coal Creek. In January, 1907, the first loss of life took place here through this cause; after that other "bumps" occurred of increasing intensity until in July, 1908, four men were killed and 20 others, temporarily entombed, narrowly escaped suffocation from gas. No similar disaster took place at these mines until the nights of Nov. 7 and 8, 1916, when three bumps occurred, the first two somewhat local in effect but the third of tremendous force which broke down timber and shook down falls of roof through a large part of the active mine workings. It caused earth tremors which were felt for miles, not only in Fernie, five miles away, but also in other towns to the north and south of Fernie. In spite of the intensity of the "bumps" only one man was killed and that death resulted from the second disaster. Several men were badly bruised in the third great "bump," and some of the escapes of the men in the mine were almost miraculous on account of the great area of roof which had fallen. Had this great "bump" occurred during the day shift, the loss of life must have been great, as areas in the rooms and entries through the most active working section, aggregating thousands of feet in length, were heavily caved. A fourth, milder and more local "bump" occurred on No. 13, 1916, and one of considerable severity on Jan. 12, 1917.

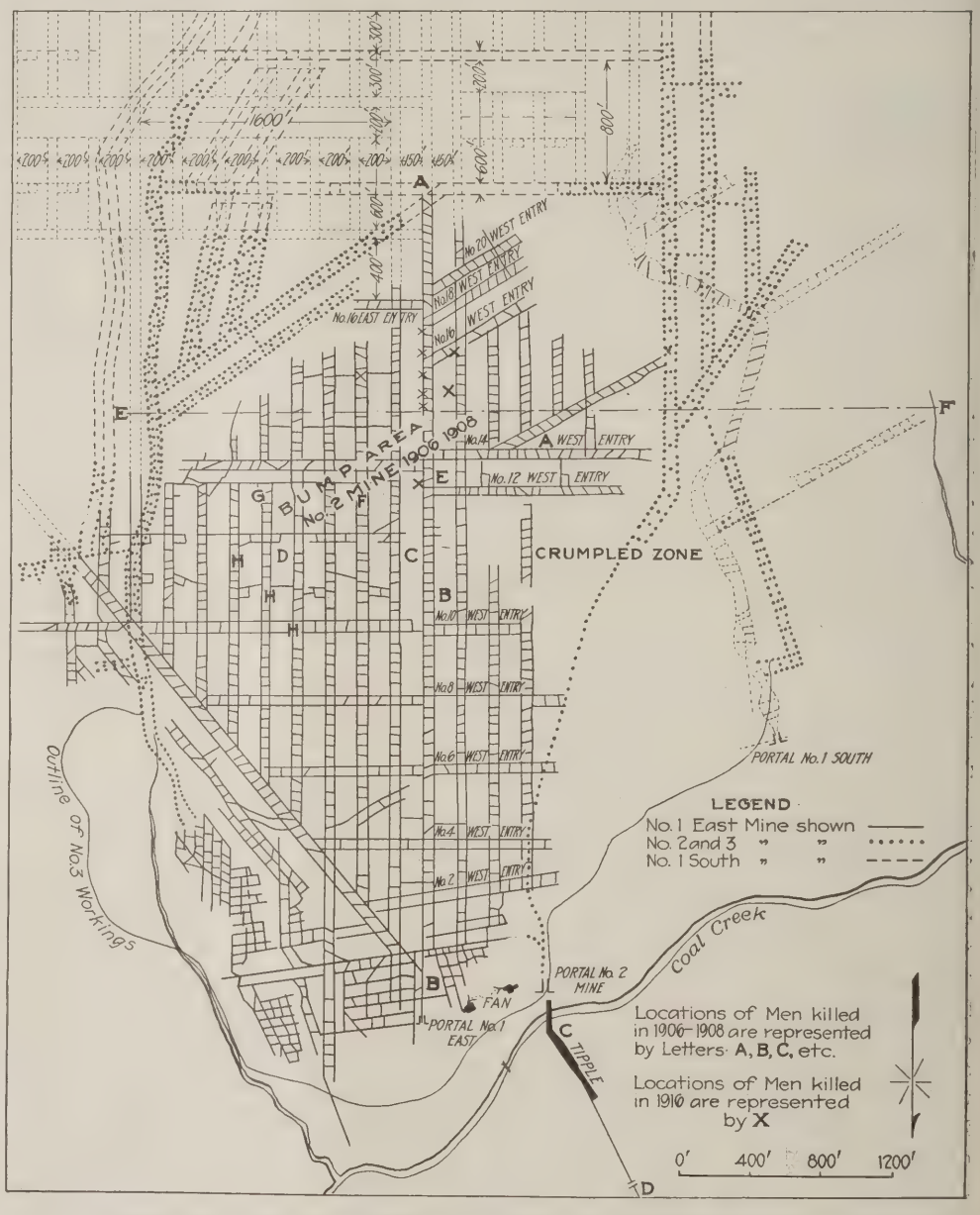


FIG. 2. MINE MAP OF COAL CREEK COLLIERY, CROWSNEST PASS COAL COMPANY

As a result of the "bumps" of November, 1916, a thorough investigation of the whole matter was undertaken and a report made by Mr. Rice, of the United States Bureau of Mines. A better understanding of the situation at the Coal Creek mines can be obtained from a brief description of the workings and referring to the mine map, Fig. 2, and sections Figs. 3 and 4. The No. 2 seam at Coal Creek was opened first and mined extensively in the old No. 2 and No. 3 mines on the south side of the creek. The coal varied in thickness from 4½ ft. on the dip or east side of No. 3 mine to 11 ft. on the west side of No. 2 south. On the west side there is a crumpled zone in which the coal in places is 20 ft. or more thick, but it is crushed and dirty. Throughout the inner central portion of the No. 2 mine, affected by "bumps" and now closed off, the coal is said to have been 4½ to 5 ft. thick. The general method of mining in the Nos. 2 and 3 mines was by the pillar-and-stall system, the stalls or rooms being turned off water-level entries which were driven from inclines. The entries were 12 ft. wide and the rooms 16 to 20 ft. wide with a 40-ft. pillar. The workings were extremely irregular. In some places longwall mining was

started in irregular panels; in other places the pillars were withdrawn. In the "bump" area 50 to 60 per cent. of the coal had been mined out; this correspondingly increased the load on the pillars, which bore the weight of 2000 ft. of cover. This area of disturbance includes a section of about 1000 x 1500 ft., or a territory of some 35 acres in extent. Following the shutting up of this "bump" area in No. 2 south mine, the work in this seam was continued only in the east and west portions. In these later developments, large 150-ft. pillars were left between each pair of rooms; between the two rooms comprising the pair there was a 50-ft. pillar.

The No. 1 seam overlying these old workings runs from 9 to 12 ft. thick; it was developed over the west part of old No. 2 mine by what is termed the No. 1 south mine; subsequently No. 1 east mine was developed over the central part of old No. 2 mine. The No. 1 east mine was the only mine systematically planned of all the Coal Creek workings, and the advance plan was rigidly adhered to. The main entries run due south,

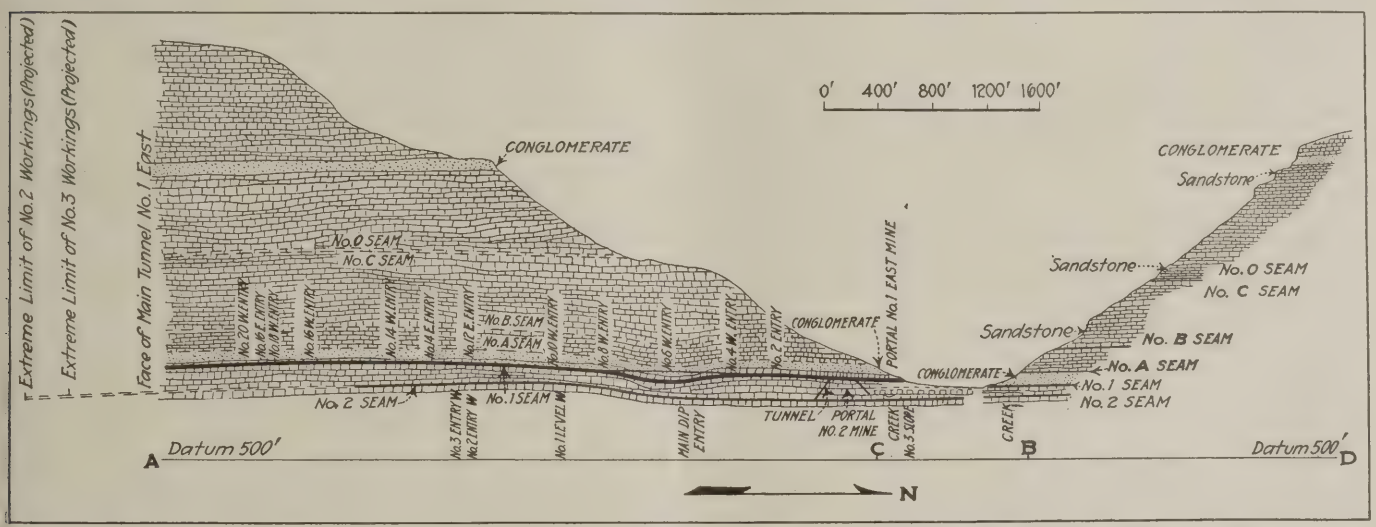


FIG. 3. GEOLOGICAL SECTIONS AT COAL CREEK COLLIERY. SECTION A-B ON LINE OF NO. 1 EAST ENTRY. SECTION C-D SHOWS GEOLOGICAL FORMATION ON THE NORTH SIDE OF COAL CREEK

which is approximately on the strike of the bed; the pairs of cross entries were turned off the main every 600 ft. at the start and in the inner part of the mine every 1000 ft.; there is a 60-ft. pillar between each entry of the pair. Rooms only 14 ft. wide are also driven in pairs and parallel to the main entries; each one of the pair is 60 ft. apart. There is a 150-ft. pillar between each pair of rooms. Only 25 per cent. of the coal was taken out by this method on the advance and no pillars were to be drawn until the mine was retreating as a whole. The method of timbering the rooms in these workings is shown in Fig. 5.

The No. 1 east mine developed rapidly; the mining conditions were good except the immediate top, consisting of the rash and soft coal, which after a time was allowed to fall. The timbering was then carried up to the main roof. The mine passed over the "bump" area of old No. 2 mine without noticeable effect; by November, 1916, the rooms to the east of the main entries were 300 to 400 ft. beyond the abandoned No. 2 mine, and the main entries were about 700 ft. in advance of the No. 2 mine workings or some 5000 ft. from the mine mouth. These were the conditions which prevailed on Nov. 7 and 8, 1916, when the "bumps" occurred which were recorded earlier in the report, and which led to the investigation noted. As already implied, "bumps" are manifestations of pressure and occur only when the mines are at great depth, usually exceeding 1000 ft. If these overlying measures are soft and pliable, such as shale beds, "bumps" will not occur. "Bumps" only take place when there are beds of massive and rigid rock of great thickness above, such as strata of sandstone, conglomerate and limestone.

In commenting further and more in detail on the cause of "bumps," Mr. Rice stated that when an area in a coal bed has been mined out or when a squeeze has occurred so that a subsidence or separation of the immediately overlying softer rocks from the upper rigid rocks has occurred, then the massive stratum will span the subsidence. If the diameter of this subsided area is small, a strong stratum would easily be self-supporting; but if the subsidence of the lower measures was several hundred or a thousand feet in diameter, so that the under side of the massive rock was not supported over this space, then it is improbable that such conditions would continue. In time the massive rock, bearing the weight of the mountain, would fall, giving a blow of tremendous force and produce the effect called a "bump." The larger and heavier the stratum the greater would be the "bump." Above such a great fallen slab there would in all probability be almost the same depth of space as was represented by the subsidence, and there would be a flat dome-like arch as before. After one rigid stratum has given way in the interior of the measures there is opportunity for similar giving way of successively higher strata with less and less effect on the mine workings as the spaces become more or less filled with broken rock and the blow cushioned, also as the vertical distance above the workings becomes greater with each successive fall. If the subsidence of the lower measures continued through enlargement of the area of mining or of squeeze, then the second "bump" might be more serious than the first. In the case of the Coal Creek workings such aggravated conditions may have been brought about by the opening of the overlying or No. 1 seam.

The direct blow of the "bump" on the mine roof may

break timbers, throw down great amounts of soft roof material and cause slabbing of all the coal; or where the coal is strong and the floor weak there may be a sudden heaving or uplifting of the floor. The latter effect was the chief characteristic of the "bumps" which occurred in No. 2 mine from 1906 to 1908, whereas in the recent "bumps" in the upper bed of No. 1 mine the chief manifestation was through the breaking of timber and the release of the soft rash and coal above it. The great danger to the workmen is in being buried by the material, which in the case of No. 1 mine lies above the usual timbering, or from the sudden thrusting up of the floor against the roof or side as was the case in No. 2 mine. In the latter mine the giving off of large amounts of gas was an additional danger. Another secondary but dangerous condition for the men in the area affected was in the greater No. 1 mine "bumps" recently, due to falls of roof which suddenly checked the air current. This sudden arrest of a large volume of air caused the bursting in of many wood stoppings and brought about a momentary pressure which hurled the men in its path in reverse direction to the former current.

"Bumps" are known in other coal-mining districts of the world. They have been a serious menace in a certain South Staffordshire coal mine in Great Britain working the "10-yard" seam, which is 24 to 30 ft. thick. This mine is worked by a square chamber system and, the pillars being quite high, there is probably a subsidence of the immediate roof, opening an equivalent space at some unknown distance above. The strong massive strata higher up which are no longer able to span such areas of subsidence break and cause "bumps." In these mines in such cases the timber is broken down, the coal slabs off and accidents result to the miners. The South Staffordshire workings are 1500 ft. or more below the surface. "Bumps" in coal mines are known in various coal-mining districts of the world and are akin to air blasts in metal mines, which are of such serious account in the deep mines of the Rand and in the Lake Superior copper district.

From the evidence obtained in the investigation leading up to this report the following conclusions are noted: It is believed that had the massive rock strata, found in the rock overlying the coal seams, been frequently broken in mining (in No. 2 mine) from the outcrop then "bumps" would not have occurred. One piece of supporting evidence for this belief is that on the north side of Coal Creek, where the coal is mined by longwall, the cover was broken over the mine for a height of 1200 ft. vertically without causing any "bump" effects.

It is also believed that if the advance mining had been as systematic in the first mines opened up in the lower seam as at present, and coal had not been removed to exceed 25 per cent., then the weight thrown on the pillars would not have been great enough to have caused their being crushed into the floor and probably the "bumps" of 1907-8 would not have occurred. Furthermore, it is believed that the condition of subsidence brought about in the "bump" area of old No. 2 mine is directly responsible for the "bumps" affecting the new No. 1 mine. In other words, had the No. 2 bed been unworked, the "bumps" would not have occurred from the method of mining carried on in No. 1 mine. There did not seem to be any evidence of subsidence in driving the No. 1 entries and rooms. Moreover, in going into undisturbed ground beyond the No. 2 mine subsided area, the danger of further "bumps" would be reduced to a minimum, provided from 75 to 80 per cent. of coal be left intact and the pillars be left undisturbed until the mine is retreating.

After conditions in the Crowsnest coal field had been thoroughly investigated, a conference of local and district mining officials developed a future remedy for "bumps" as shown by the dotted lines in the plan of the mine workings, Fig. 2. Under this system less than 15 per cent. of the coal will be taken out on the advance. For the protection of the employees in No. 1 mine, the rash and roof coal is to be taken down to a point as near the face as practicable; by taking this precaution, it is not probable that should a "bump" occur any one would be injured. The method of mining out the roof coal in advance of the main seam and the necessary timber required is shown in Fig. 5. In this sketch is shown a plan which is recommended for trial; the numbered blocks (dotted) of coal and rash are indicated in the order of their extraction. In this plan an attempt is made to avoid mixing the coal and the rash, as the addition of the latter impurity to the coal would seriously damage the coke.

A problem of great importance in working the coal beds in the Crowsnest field is that of adequately taking care of the large quantities of gas met with; this applies especially to the future developments under deeper cover and at greater distances from the outcrop. Very wisely the mines are not allowed to equip with elec-

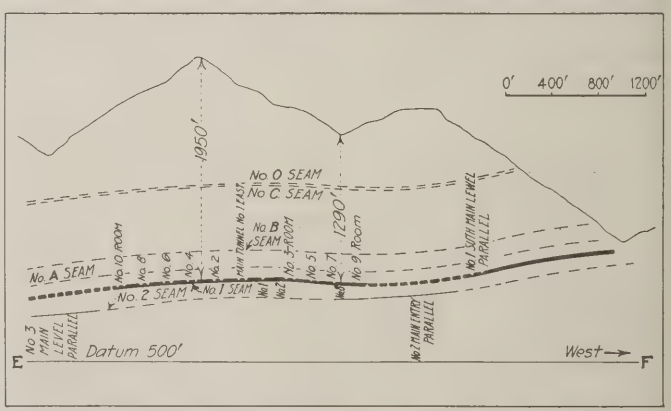


FIG. 4. GEOLOGICAL SECTION AT COAL CREEK COLLIERY ON LINE E-F (FIG. 2)

tricity for haulage or lighting, as the danger is too great.

The following important facts developed during the investigation of these mines: The flow of gas as measured by the analysis of the air in the returns and the outbursts of gas which occurred at the Morrissey collieries show that the Crowsnest Pass coal field mines are among the most gaseous in the world. Gas in these mines is derived from two sources—that stored in the crevices and joint planes of rock and coal; and that occluded or the gas held in the pores or cells of the coal. An unusual condition has been found in testing the amount and kind of gas given off by the broken coal, which shows that an unusual quantity of hydrocarbon gas is given off by the coal on grinding fine

in vacuo, and that three times as much ethane and other hydrocarbons are given off as methane under these conditions.

The following recommendations are made regarding gas flows: Since the gas pressures rapidly lessen from about 18 lb. at a distance of 21 ft. from the face to nothing at the face of the coal, it is indicative of the importance of draining the coal measures by advance headings. Drill holes should be kept in advance of the main heading and in faulty ground, and such entries

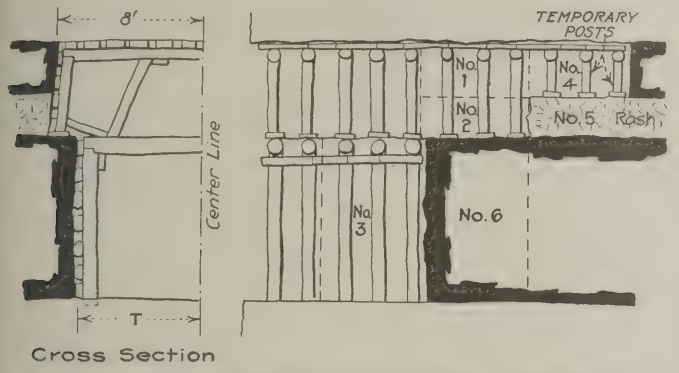


FIG. 5. SECTIONS SHOWING PROPOSED METHOD OF MINING AT COAL CREEK COLLIERY

should be advanced at only a moderate rate in order to permit the slow draining of the gas. In those portions of the field which permit of mining by the longwall advancing system, this method should be used from the outcrop. Longwall would probably drain off the gas more slowly and safely than pillar-and-stall work. This system could probably be applied to the mining of the No. 2 bed.

It was found in this investigation that there are obscure matters which can only be cleared up by further investigation. The recommendations for such investigation by a commission are as follows: (1) The carrying on of experimental methods of mining the coal, especially in No. 1 bed, so as to lessen the danger in the case of "bumps" and to look into the best method of timbering. (2) To determine the amount of occluded gas in the different coal beds, how it is held—if there is any chemical instability which might be connected with any shrinkage of the coal in pillars. In this connection plugs or monuments in the roof, ribs and floor might be established at various points in the mine to determine whether movement or shrinkage is going on. (3) In the matter of protection from firedamp, to continue the gathering of samples of mine air and to obtain data on the drainage of gases from the coal beds both when the mine is working and when it is idle. (4) To drill a number of long boreholes in advance of the working faces to determine the amount of gas given off and to record the gas pressure at regular intervals from the inner end of the hole to its mouth. This information should determine the rate at which the entries should be allowed to advance. (5) The greatest function of this commission would be to determine how the mines in this field should be laid out so that all the coal may ultimately be obtained. It seems to be impracticable to sink shafts in the larger part of the field, and if the coal has to be attacked from the outcrop, then it will take entries six, eight or even ten miles in length to mine the interior of the field. (6) It is recommended that an advisory commission be created to confer with the officials of the province and that it be made up of men of authority on scientific and technical matters, including a geologist, a mining engineer, a chemist and an experienced mine operator.

Minecdotes

A Dud?

One day while making an inspection of some of his working places, the inside foreman had a rather exciting though somewhat amusing experience. The place pitched about 70 deg., and after calling up to the men who were apparently at the face, and being assured that everything was all right, he proceeded to climb up the manway. He passed the first crosscut, and when about midway between that and the next one above, he was somewhat startled to look up and see the stolid face of the miner peering down at him saying, "Better watchen, Mr. Boss, one hole he no go off yet."

Some Man

An old man who had picked on the breaker platform for a great number of years at a mine where the coal was all hand loaded, had the surprise of his life when some stripping coal, loaded by a steam shovel, was dumped on the table.

A new stripping had been started, and without his knowledge the shovel loaded its first trip this day. The big lumps of coal passed down the table, each time accompanied by a bulging of eyes and a shaking of his head on the picker's part.

Finally the platform boss could contain himself no longer over Steve's strange actions, so he asked him what was the matter.

"Oh," said Steve with a deep sigh and a great shrug of his shoulders, "I work this place long time, I never see big ones like come today. By gee, must be strong man some place."

A Fast Day for the Driver

At a certain mine there is a traveling way for both men and mules. At one place in it the top is about 6 ft. high. Very often the drivers would ride up on one of their mules and when coming to this low spot lean forward along the mule's neck and pass under without a mishap. But this day the unexpected happened, the driver and the mule became wedged fast.

It was of course a rather ticklish although ludicrous predicament. Just how to get them free without physical injury to either was the question. The driver's yells and squirmings only increased the mule's restlessness. The beast was not of the circus variety, so would not lie down when asked; and, with the small amount of space in which to work, it was quite a problem.

Along comes John Hunk. He blankly took in the situation, sort of sniffed at the men being at a loss as to what to do, and said, "I fixen." He strode away to come back shortly with an ax. He walked up to the mule and was just restrained in time from cutting off the mule's legs.

* * *

It might be added that the man was safely rescued by using a lever across the mule's back.

British Columbia International Mining Convention

By Robert Dunn
Mines Department, Victoria, B. C.

HOW can present coal-mining operations in the Pacific Northwest be so improved as to obtain better commercial results in disposing of the product? Generally speaking, this was the question most to the fore in discussion affecting the coal-mining industry at the International Mining Convention held at Vancouver, B. C., from Mar. 17 to 19. The speakers were G. W. Evans, coal mining engineer, U. S. Bureau of Mines, Seattle, and Francis W. Glover, manager of the Princeton Coal and Land Co., Princeton, B. C.

Mr. Evans' paper contained valuable information to operators and was much appreciated. Emphasizing the constantly growing necessity of placing the smaller sizes of coal on the market in such shape that they will satisfy the trade because less of the lump coal is being mined and because present conditions in this respect are bound to become accentuated, he referred to the problem of the utilization of much that heretofore has been considered waste in the form of powdered fuel. Dealing with the latter development, he told of plants installed in various parts of the northwest, and particularly in the City of Seattle, which were equipped for the use of this fuel for heating purposes and were obtaining satisfaction therefrom.

In this connection the coal-mining delegates were afterward given ocular proof of what can be accomplished in this direction by witnessing the powdered fuel plant recently set up at the factory of the British Columbia Sugar Refining Co., Vancouver, B. C., in operation. The new furnace, which supersedes one designed for oil consumption, had been in operation for just two days prior to the demonstration. The interested visitors were informed that up to the present the installation has given entire satisfaction. The fuel in use was being obtained from a Vancouver Island colliery. It was waste coal which had been submerged for seven or eight years and, until very recently, never considered as an asset owing to its high ash content, running between 26 and 30 per cent. in ash. After being pulverized, however, no difficulty was experienced in respect of combustion in the furnaces with which the sugar refinery is provided. The expectation was that it would prove just as satisfactory as the oil and more economical.

Mr. Glover's address was more local in its application. He advised Government supervision of coal-mining operations to the end that wasteful methods in extraction of coal might be prevented. The practice of speculators acquiring coal lands and holding them for high prices was deplored. There should be more of the spirit of coöperation between employer and employee, the former making it his business to see that working conditions, both as to safety and convenience, were of the best, and the latter undertaking to see that all miners gave the best that was in them while at work.

Complimenting the collieries of the Province on their good work during the four years of the war, Hon. William Sloan, Minister of Mines, in opening the convention said: "I wish further to congratulate the collieries on the splendid effort they made during the war to meet the urgent need which we, and the empire as a whole, has for their product. Both the operators and the miners are to be felicitated on the plucky manner in which they stuck to their guns. They have the satisfaction of knowing that they did their bit and I would have them understand that their work is appreciated." He pointed to the production of 1918, the outputs of both coal and coke exceeding 1917 figures; the increased production of coal being some 142,093 tons, while that of coke was 30,751 tons. As the value of coal had advanced substantially, the product of the coal mines during 1918 represented about $12,794,932, an increase over 1917 of $4,310,599.

Addresses were given by the different Government mining engineers, W. M. Brewer referring to the coal-mining development of Vancouver Island; R. W. Thomson touching on operations in the Nicola District; P. B. Freeland dealing with the promising bituminous fields of the Princeton section; while J. D. Galloway briefly described coal-mining operations in the Twelkwa section on the line of the Grand Trunk Pacific Ry., and predicted the opening up of more good mines when this country is further prospected.

A digest of the address made by G W. Evans, of the United States Bureau of Mines, which was referred to in the opening paragraphs of this account, is given in the following:

Better Preparation and Utilization of Coal

G. W. EVANS, coal mining engineer, Northwest Experiment Station, U. S. Bureau of Mines, Seattle, stated at the outset that his remarks would not be specifically with regard to the bituminous coal of British Columbia. As, however, the coal of this character in the State of Washington was similar to that of this Province, the problems confronting the people of the two countries in this respect also were similar. His plea was for the greater use of the smaller sizes of coal, largely disregarded by both producer and consumer. Coal operators in both British Columbia and Washington knew that the percentage of large sizes was decreasing and the quantity of small coal was increasing. This change, he said, had been brought about partly by the inferior class of coal miners of now compared with former years.

Today some of the coal miners, particularly in the State of Washington, knew only how to drill a hole and fire a shot; some did not know even how much powder should be used. The result was that the coal is shot into small pieces, and in steeply pitching coal beds the coal is further broken up by falling down the chutes. It was therefore necessary to face the inevitable fact that the percentage of lump coal will decrease and the small sizes are going to increase as time goes on unless new coal fields are discovered. It behooved us, for these reasons, to make preparations to save more of these smaller sizes and offer them to the public in the cleanest possible condition. To separate impurities

from the coal in the smaller sizes was a more difficult matter than to clean the coal of larger size. In the anthracite coal fields of Pennsylvania dry cleaners were used for the smaller sizes and, at one bituminous mine in the State of Washington, a spiral separator was tried with only partial success.

It has been found, the speaker asserted, after years of experimenting that treating the coal in a liquid, thus taking advantage of the difference in specific gravities between the coal and its associated impurities, is the only practical way of making a proper separation. Experience, he said, has taught that, in order to get the best results in the washing of coal, the washer should be of proper design, properly adjusted and operated. He had seen plants where tubs appeared to do pretty good work, but for a new plant would not recommend the tub except in an emergency.

Mr. Evans proceeded then to describe some of the coal-washing plants that are now being built, and after describing the various methods of their operation declared that to get the best results a thorough study should be made of the coal to be washed and the type of jig installed that would best suit the purpose. Such studies and designs should be by someone competent to make such investigations. He did not advise ordering from a catalog, suggesting that the operator should take his coal-washing problem to a specialist and ask for a guarantee so that the resultant product would measure up to certain specifications. In this connection he said, "Our coal-washing plants are being built with more refinements each year, in order to successfully meet the requirements exacted by more complex coal and an effort to practice true conservation."

Jigs Require Careful Attention

Mr. Evans recommended that operators should pay more attention to the efficient operation of their jigs. Very few could tell what results they were getting, and little did many of them realize that the amount of good coal going to waste or the percentage of absolute waste in the wash product can be determined by a proper study with a "float-and-sink" machine, and the necessary corrections made in the jig.

Briefly outlining the manner in which this work is done, he said: "Samples are taken every 30 minutes for a period of eight hours at different parts of the plant. Careful head samples are taken of the material going into the washery; also samples are taken at each of the refuse discharge gates of the machine, and as the washed product passes over the conveyor from the jig it too is carefully sampled. Next day each of these samples should be treated about as follows: The original samples should be coned and quartered—care being taken not to break the particles in the sample—until a representative sample of about 40 or 50 lb. is obtained. This smaller sample is further quartered until the required size sample is secured, which is to be used in the 'float-and-sink' machine. The machine is then filled to the required height with a solution of zinc chloride of the proper density.

"This particular density is called the 'permissible bath' for the coal under consideration, and might range from 1.35 to 1.65 specific gravity, depending on the amount of adherent ash in the coal and the amount of ash the coal market will assimilate. The head sample is then run through the machine. The marketable product will float and the refuse will sink. Each part is weighed and in this manner the percentages of each are determined. The results obtained on the head sample indicate what the washers should produce if they are working at an efficiency of 100 per cent.

Percentage of Coal Wasted

"The 'float-and-sink' machine, by the way, is assumed to be a 100 per cent. efficient separating machine. The refuse is treated in the same bath, and if the washer is doing perfect work, there will be no float; and in treating the product there should be no sink. This seldom happens. The percentage of float in the refuse and the percentage of sink in the product are used as factors in determining the efficiency of the coal washer. By making these determinations adjustments of the length of stroke of the jigs and experiments with the sizes to be treated to get the desired results can be made. The man who operates the jigs will more clearly understand what is required of him and the machine he is paid to operate."

Quoting from a bulletin published by the Commission of Conservation of Canada on the conservation of coal in 1914, Mr. Evans enumerated the equipment of which the principal collieries of British Columbia were provided in respective washers at that time. He pointed out that the same authority estimated that the cleaning losses are as follows: Hosmer mine, no loss because small size is coked; Nicola Valley Coal and Coke Co., no estimate; at the Western Fuel Co.'s mine the sludge and other unmarketable coal is used under the company's boilers, and in the Northfield mine of the same company it is estimated that the sludge loss is 2 per cent.; at the Vancouver Nanaimo Co.'s plant the coal less than ¼ in. was wasted; no estimate was made as to the amount. There is 15 per cent. of the output of the Fiddick mine of the Pacific Coal Mines, Ltd., that is wasted; at the Extension colliery of the Canadian Colliery Co. it is estimated that about 34 per cent. is wasted in bone and slack, and at the Union washery of the same company there is a waste of 24 per cent.

"Of course, these percentages," Mr. Evans said, "do not all represent clean coal; but it is safe to assume that between 5 and 10 per cent. greater recovery could be made in treating the Nicola Valley and Vancouver Island coal if crushers were used on the larger impurities, such as bone and coal and coal and shale from the picking tables and the middlings from the jigs, and the crushed material either treated on tables or in jigs; and if the bird's-eye or sludge now being wasted were treated on properly designed tables. These are features well worth considering carefully. A 7 per cent. saving on the coals for these two fields would probably equal 140,000 tons, which in itself is worthy of an effort."

At one plant in the State of Washington using a well known jig, Mr. Evans stated he personally saw 80 lb. of white rock picked from seven tons of coal that was supposed to have been cleaned by that jig, yet the company, which was paying a man good wages to attend to the jig, wondered why the people of Seattle complain at the amount of impurities in the coal. Let us have more study and education along this line, he said.

Until recently we were satisfied to let the refuse from the jigs go to the waste dump without further thought, he continued; today many of the progressive companies are crushing some of the refuse and all the middlings, and treating them either in another jig or on properly designed tables.

Also until within the past few years little thought was given to the waste water and smaller sizes, usually called bird's-eye or sludge, but at present in some plants the waste water along with its load of small coal and associated impurities is conveyed to a settling tank and from the settling tank is fed to properly designed concentrating tables. The tables generally used are what might be called nephews of the old Wilfley table, familiar to ore-dressing engineers. As a rule the riffles used are higher and the surface of the table is differently arranged.

Efficient Plant Wastes Nothing

A coal-cleaning plant operating along most modern lines does not waste very much except the color in the water. Probably some enterprising engineer will attempt to recover the color by means of an Oliver filter.

Mr. Evans stated that coal operators might ask what was the use of all this refinement in coal preparation and saving of small sizes when they were unable to dispose of one-half the small coal on hand. This led him to the second part of his paper under the heading, "The Better Utilization of the Small Products from the Washers." He said that the product of such a field as that of the Crow's Nest gave rise to no problem because the smaller sizes can readily be used in making coke. It was different, however, with noncoking, bituminous and sub-bituminous coals.

Continuing, he said, "In many of the large steam plants mechanical stokers of some form are in successful operation. They burn the small sizes efficiently with little or no smoke given off. The ash formed is disposed of mechanically. In fact everything goes along pretty well in a large plant, but only the larger plants can afford to install mechanical stokers. In the smaller

plants where the installation of large stokers is not justified because of the expense, the boilers usually are fired by hand. In plants where the expense of installing large mechanical stokers is not justified or even where justified in some instances, powdered coal equipment is now being installed. Today we find that pulverized coal is being used in many steam and heating plants of some cities. Several large buildings in Seattle have recently replaced California fuel oil with powdered coal and, according to the statements of the engineers in charge of those plants, they like the powdered coal best."

The speaker proceeded to enumerate some of the powdered-coal installations in the State of Washington, mentioning the Western Avenue plant of Seattle, the Puget Sound Traction Light and Power Co., and describing equipment. The coal was ground so that 95 per cent. of it will pass a 100 mesh screen. Renton buckwheat and bird's-eye or sludge is used. "In this connection," Mr. Evans stated, "it might be well to mention the fact that at the Renton coal mine the company years ago was forced to dike the bird's-eye and not allow it to go into the streams with the waste water because of protest from the neighboring farmers. Today they are loading coal from the pile of 160,000 tons saved by means of a drag scraper and utilizing it in their Seattle powdered coal plant. This is a plan that others might follow to their advantage."

Other installations mentioned were the Superior Portland Cement Co.'s plant at Concrete, Wash.; that at Briquettville, Wash., where the powdered coal used in some of Seattle's largest buildings is pulverized; that of the Pacific Coal Co. at the Black Diamond coal mine. At Black Diamond, he said, the smallest sizes of the Black Diamond coal is used which is non-coking bituminous; at the Coal Creek plant of the same firm they were using the smallest sizes of the subbituminous coal of the Coal Creek mine; at Briquettville they were using a mixture of Black Diamond-Coal Creek and the coking bituminous coal of the Burnett mine.

The following well-known buildings of Seattle, it was stated, are using powdered coal: The Seattle Natatorium, or Crystal Pool; New Richmond Hotel; Broadway High School and the 42-story L. C. Smith building. The air pressures used at these plants ranged from 2 to 3 lb., and the pulverized coal was hauled to Seattle in five-ton air-tight tanks from Briquettville, a distance of 12 miles.

Mr. Evans followed with some notes taken from a detailed report of a 24-hour test made during February, 1919, on a Babcock & Wilcox boiler of 600 hp., which during the test had a rating of 125 per cent. Without going into details he quoted a few of the economic and efficiency results obtained:

Water fed per pound of coal fired	8.50 lb.
Water evaporated per pound of dry coal	8.35
Equivalent evaporation from and at 212 deg. F. per pound of combustible	11.30
Calorific value of one pound of dry coal	11,660 B.t.u.
Calorific value of one pound of combustible coal	13,700 B.t.u.
Efficiency based on coal fired	78.95 per cent.
Efficiency based on combustible	60.05 per cent.

Continuing, Mr. Evans said that there was quite an accumulation of slag on the sloping sides of the furnace which is removed at intervals of one to two months when it has accumulated to a thickness of 6 to 12 in. The ash accumulated in the boiler tube was removed by the aid of a soot blower. The condition of smoke was light; there was no backlash; the effect on the brickwork was not noticeable; there was no pulsation and it was the opinion of the engineer who made the test that the results were satisfactory. The coal used was screenings from the Issaquah mine of the Pacific Coast Coal Co., which is sub-bituminous.

Dealing with comparative costs of fuel oil operation versus powdered coal, Mr. Evans quoted some observations by C. F. Harrington, mechanical engineer, on the use of powdered coal. After giving statistics the speaker pointed out that the conclusion was that, with fuel oil at $2 per barrel and washed bird's-eye coal at $2.50 per ton, there is a marked saving in favor of powdered coal.

Comparing powdered coal with fuel oil Mr. Evans pointed to the analyses of some Western coals. These show that they average 10,000 B.t.u. per pound—that is, figuring conservatively, 20,000,000 B.t.u. per ton. If California fuel oil averages 18,500 B.t.u. per pound and 7.8 lb. to the gallon, 42 gal. to the barrel, we would have 6,000,000 and 60,600 B.t.u. to the barrel. It takes therefore approximately 3⅓ barrels of oil to the ton of coal. The oil would have to be sold at 80c. per barrel to be on a parity with coal at $3 per ton. With fuel oil at $2 per barrel, one could afford to pay $6.66 per ton for the coal except the cost of handling the ash, which is not great. There is no smoke given out by the stacks of these smokers when they are operated properly.

Concluding, the speaker said: "By definite teamwork on the part of the coal producers, the coal salesmen, the fuel engineers and the public a large percentage of the small coal now being wasted can be saved to the coal companies and the state or province. Such teamwork will be a factor in successfully overcoming the inroads made into fuel markets of the northwest by California fuel oil and cause this same oil to be utilized along lines where it will do the greatest amount of good. The oil supply of the world is limited and should be conserved. The supply of coal in the Province of British Columbia and the State of Washington, not to consider the coals of Oregon and California, are sufficient to last the needs of the Pacific Coast states for hundreds of years, and why not utilize these coals to the best advantage? By practicing true conservation we will make the supply last longer, and the consumer will be able to buy a better grade of coal at a cheaper price.

Francis Glover, of the Princeton Coal and Land Co., Princeton, B. C., in dealing with the better utilization of British Columbia coal suggested that the Government should introduce legislation preventing the coal lands falling into the hands of speculators whose one idea was to hold them in order to sell at a profit. Engineers, he said, should be appointed by the Government to see that coal was not extracted by wasteful methods. As to operators, he declared that they should realize that all conditions relative to the human element should be of the best. By this he meant safety conditions, living conditions and working conditions. They ought to have the most up-to-date machinery and tackle, and should be ready at all times to work in harmony with labor, referring disputes to the Government Board of Control and abiding by the decisions. On their part the laborer should realize that production is imperative to the success of the coal industry.

He spoke of the necessity of the railways providing the best transportation facilities possible, and expressed the opinion that in the past one of the great drawbacks to the profitable mining of coal in British Columbia has been the intermittent tonnage. By this he meant periods of slackness and periods of great activity. This led, during the slack period, to the deterioration of workings and roadways, and had the effect also during the periods of great activity of tempting operators to attain a fictitiously high output by following the line of least resistance and neglecting development work.

In speaking of the present methods of burning coal, Mr. Glover termed them a disgrace and thought that there should be some effort at an educational campaign that would result in the practice of economy by the general public. He also dealt in a general way with the problem of utilization of the many valuable by-products of coal.

Of the 500 odd delegates, between 25 and 30 were representatives of the coal industry. Some of the latter were Mr. Evans, already referred to; D. C. Botting, Commissioner of Washington State Coal Operators Association; Professor Landis and Dean Roberts, of the University of Washington; George Wilkinson, Chief Inspector of Mines for British Columbia; Ralph Smith, vice-president of the Pacific Coast Coal Company;

S. H. Greene, superintendent of the same company; John Ryczeh, sales manager of the Roslyn Cascade Coal Co., Roslyn, Wash.; G. E. Rockefeller, mining engineer, United States Government; Percy E. Wright; Mr. Knouse; Mr. Bogardus; H. H. Sanderson; G. E. Collins; Mr. Dalby; Mr. Seagraves; F. W. Glover; Donald MacLean, manager of the Coalmont collieries; R. Stirling, Thomas Price and William Walls, engineer, master mechanic and superintendent of diamond drilling respectively for the Canadian Western Fuel Co.; Joseph Daniels, coal geologist, and Dudley Michel, superintendent of first-aid work for the British Columbia Department of Mines; Frank Good, superintendent Carbondale Coal Co.; D. S. Hanley, president Carbon Coal and Clay Co.; Mr. Pearce, general sales manager Carbon Hill Coal Co., and Irving Gard, engineer for Frank Waterhouse Co.

Coal Near Mesa Verde National Park

Fuel is scarce in southwestern Colorado, so the coal found in the vicinity of Mesa Verde National Park is of considerable interest. The coal beds in the park are not at present minable, but those that lie northeast of the park, near Mancos, Colo., could supply a large part of the region west of the San Juan Mountains, which must obtain its coal either from this field or from others farther north. The coal near Mancos is found near the tops of rugged mountains that are cut off from the Mesa by deep canyons and must be lowered down the mountain sides on inclined tramways for shipment. A mine operated in this way on Menefee Mountain, at an altitude of 1100 ft. above Mancos, may be seen from the Rio Grande R.R. at that town.

The Mancos field is on the northern edge of a great expanse of land containing coal that ranges from a bituminous coking coal, mined at Durango, Colo., to a high grade sub-bituminous coal mined near Gallup, N. Mex. The coal near Mancos has nearly as great heating value as the coal near Durango and is of nearly the same quality as the coals of southeastern Illinois, western Kentucky, Ohio and southeastern Kansas.

Geologists describe the rocks of these mountains as the Mesa Verde group, which consists of the Point Lookout sandstone at the base, about 300 ft. thick, the Menefee coal-bearing formation in the middle, about 400 ft. thick, and the Cliff House sandstone at the top, about 400 ft. thick. The Point Lookout sandstone was named from Point Lookout, the northernmost point of the Mesa Verde National Park, about 7 miles southwest of Mancos, and the Cliff House sandstone was named from the prehistoric ruins in the park called cliff houses, near which it is most strikingly exposed.

The coal beds are confined to the summits of the mountains and were recently examined at many places by a geologist of the United States Geological Survey. They are very irregular, but at almost every place where the whole section of the coal-bearing formation is exposed, from one to four coal beds, each thick enough to mine, have been found.

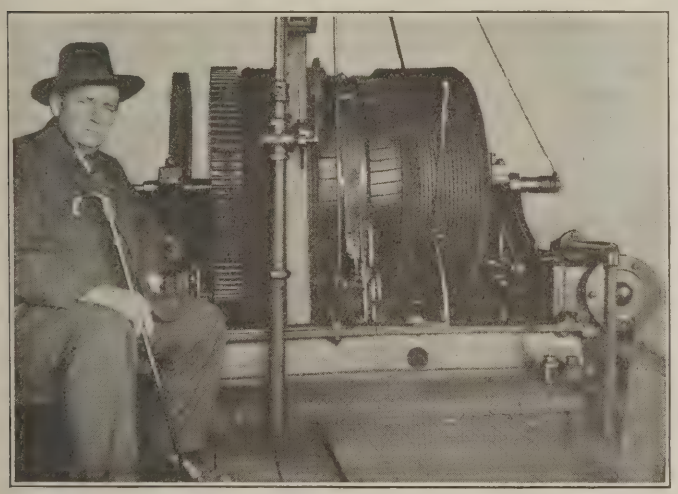
A report entitled "Coal South of Mancos, Montezuma County, Colorado," by A. J. Collier, describing the rocks and coal resources of this region, has recently been published by the United States Geological Survey, Department of the Interior, as Bulletin 691-K, and may be had an application to the Director of the Survey.

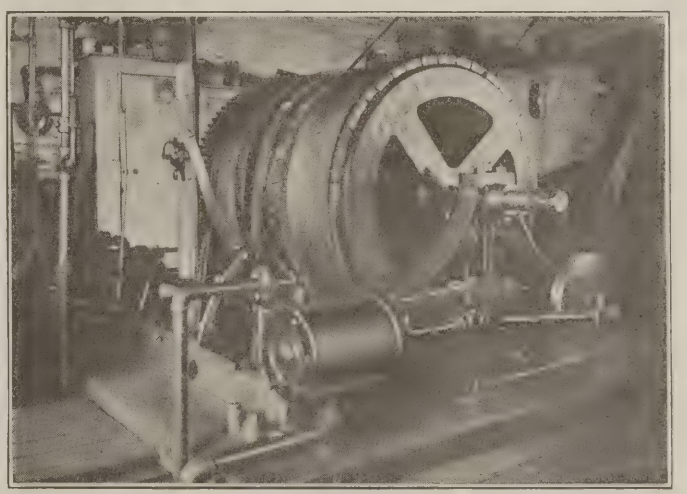
Handling 2¼ Million Tons in 37 Years

Thirty-seven years of continuous operation is not a bad record for any machine. Such, however, is the record of the mine hoist of the Centerville Block Coal Co., at Centerville, Iowa. This machine is shown in the accompanying illustrations.

The hoist, a single-drum, back-geared Lidgerwood, was purchased and put to work in the early eighties and has been kept in practically continuous daily operation ever since. Alex. Dargavill, superintendent of the mine (shown at the left in one of the photographs), says concerning this machine: "Our company bought this engine in 1882. It has been in continuous operation ever since, hoisting out of a shaft 170 ft. deep at a present rate of 350 tons per day. The unbalanced load at each trip amounts normally to 3000 lb. A careful estimate of the acreage mined out shows that 1¾ million tons of coal has been produced. The dirt and slate removed in driving entries and turning rooms is estimated at another half million tons."

These tonnage figures tell their own story. They show chiefly two things: (a) The engine must have been built and installed right in the first place, and (b) that it has been handled and cared for properly. Engines do not last for any such long term of years unless both of these conditions are fulfilled.





MINE HOIST WHICH HAS SEEN 37 YEARS OF CONTINUOUS SERVICE AT ONE OPERATION



More Light on the Railroad Fuel Situation

Unless the President takes mandatory action, which it is not expected he will do, the efforts at peace-time price-fixing have come to naught. It is generally recognized that it was the coal operators who forced the issue and established conclusively that the Railroad Administration would not be a party to the effort of the Secretary of Commerce to promote business activity by stabilizing prices until the end of the year.

The Industrial Board of the Department of Commerce, which has the matter under its supervision, was not taken seriously at first. Much prestige came to it, however, as the result of the success in obtaining a 10 to 14 per cent. reduction in steel prices. The steel men, apparently, took it for granted that the Government would hold up the hands of its own board, and learned through the coal men that the Railroad Administration would not buy rails at the price agreed upon.

The coal men, having clearly in mind the repudiation of the Peabody committee, called upon the Industrial Board for assurances that the Railroad Administration, the War Department, the Navy Department and the Interior Department would buy coal at the prices agreed upon. Much to the surprise of Chairman Peek, the Railroad Administration insisted upon continuing the purchase of coal in its own way.

The disclosures confirmed the suppositions of the National Coal Association that the railroads are making use of every means in their power to beat down the price of their coal. Tart exchanges took place between Director General Hines and J. D. A. Morrow, general secretary of the National Coal Association. Mr. Morrow declared that the Railroad Administration had returned to "unfair practices which would drive the price of railroad fuel below the cost of production." Mr. Hines retorted by characterizing Mr. Morrow's statement as "interesting fiction," but leaving the inference that the coal operators are conspiring to boost the price to the Government and to the public. This led Mr. Morrow to go into detail as to the practices being resorted to by the Railroad Administration in the purchase of coal. A portion of his statement in this connection follows:

> The United States Railroad Administration claims that its present arrangements in obtaining railroad fuel coal will adequately safeguard the public interest involved. For example, to avoid unduly depressing the prices of coal, the Director General has prohibited the purchasing agents of the various roads from naming prices which the operators must meet to obtain a share of the business, but he permits coal speculators to bid on the railroad business without naming the mines from which the coal is to come, and without having their commitments covered in advance, whereupon these speculators adopt precisely the tactics which he has forbidden his own agents to use.
>
> It is stated that the tonnage will be distributed fairly through permitting the purchasing agent of each railroad to buy his own coal. So far as is known, however, there is no practical provision to prevent the purchasing agents of different railroads from bunching their orders in the same district or in the same mines. Since it is the policy of the Railroad Administration to buy cheaply, it is the inevitable tendency to bunch orders in the low-cost districts and in the low-cost mines. As an illustration, when the Pennsylvania Lines West closed their Pittsburgh district fuel business for the month of April, within the present week, a half dozen operators were given the entire business at low bids, some of which were below the cost of production and were so specified when the bids were sent in. Other operators who have normally shared in this business were deprived of their orders.
>
> In the Hocking Valley district of southern Ohio, railroad fuel orders have been placed with a number of smaller operators producing inferior grades of coal at reduced prices, while the mines which have in previous years regularly supplied this road have been denied participation in the business. In this case the coal now being taken was rejected by the Railroad Administration when tendered to it for locomotive purposes within the past year.
>
> When the Missouri Pacific Ry. arranged for its coal supply recently, the determining factor was the bid submitted by the Western Coal and Mining Co., a subsidiary of the Missouri Pacific Ry. Other operators were given an opportunity to share in the business at the price named by the Western Coal and Mining Co. Even if the price named was above the cost of production, we consider the method employed in this case, and which can be employed in other cases, to be manifestly unfair. It is an old-time method of purchase which resulted in grave abuse.
>
> As evidence of good faith and of fairness to all parties concerned, the coal operators asked that all bids on railroad coal be made public, as is done by every other Government department. This request has been refused, and only information made public as to the price at which the business is finally placed. Despite the Director General's public statement of Feb. 19 that this information would be available to any interested party, it has been refused coal operators and their accredited representatives as late as Mar. 28, on the ground that local representatives of the Railroad Administration have no instructions to give out such information.
>
> In short, the bituminous coal operators have endeavored to obtain the coöperation of the United States Railroad Administration in an effective manner, to deal with a question which they consider of vital interest to the general public. The Industrial Board appears to them to afford a medium by which a practical solution of the difficulties could be obtained with all the rights and interests of the general consumers of coal entirely safeguarded. They are still ready to coöperate with this board and the Director General of Railroads in what seems to them an eminently broad and sensible program to meet an extraordinary condition.

Government Will Record Fluctuations in the Price of Coal

A permanent record of price fluctuations in coal, prior to the war, during the war, and after the signing of the armistice, is to be made by the Government. The work is under the direction of C. E. Lesher, the geologist in charge of coal for the Geological Survey. Commenting on the Peabody prices, Mr. Lesher says:

Whether the reduction in prices effected by the voluntary action of the producers would have satisfied the public and met the needs of the situation never will be known, for no sooner were the results announced than the Secretary of War publicly repudiated the action of the Committee on Coal Production, stating that the prices agreed upon were unwarrantably high.

It is not necessary to pass judgment on the reasonableness of the Peabody prices. That they were higher than necessary to return the cost of production and a moderately fair profit to the producer has been shown clearly by the subsequent investigation of the committee of engineers of the Fuel Administration. The important point is that the Peabody prices were substantially below those prevailing at the time. They were, from their inception, understood to be a temporary stop gap, pending a determination of more exact and proper prices. They were the first and practically only prices representing a reduction, established by an industry as a whole for the benefit of the entire public.

The Peabody prices did not apply to coal sold for export and, as a result, Canadian consumers were able to outbid those in the United States. New England and Canada depend upon the fields in central Pennsylvania for their supply by railroad routes. Under these circumstances, New England consumers were unable to obtain satisfactory deliveries of bituminous coal and induce operators in central Pennsylvania to break away from the Peabody price. Although the Peabody prices were claimed to be exorbitant, the only important divergence from the price resulted from the action of consumers, and was an increase.

The flurry in prices for Clearfield, Somerset and Cambria County coals in the winter of 1915-16 was the first evidence of the impending shortage that became such a feature from October, 1916, to the end of the war. The orders of the Allies for war materials first were placed largely in New England, and the speeding up of industries in that section made the demands for coal from the tributary all-rail fields of eastern Pennsylvania so insistent that spot prices soared to more than double those obtaining a few months previously. Beginning in July in many districts, and by August in all districts, prices started upward in response to a demand the insistence of which was not appreciated at the time. With a suddenness and to an extent unequaled in the history of the bituminous-coal industry, spot prices rose nearly 300 per cent. in six months. In Ohio and Pennsylvania the increase was greater. The highest spot price recorded was more than 400 per cent. above the pre-war level.

Public discontent with the continued high prices was manifested strongly. Notwithstanding that it was the bidding of consumers, one against the other, that was responsible for the high prices to an extent equal to if not greater than the setting of the price by the producer, the producer was held responsible for the condition.

Effective Mar. 15, 1919, embargoes which were in effect since December, 1915, and January, 1916, against coal to Hudson River gateways for reconsignment, have been cancelled, according to a recent announcement issued by G. N. Snider, coal traffic manager of the New York Central R.R. The combination of rates to and beyond these gateways, however, exceed the joint rates from the mines, so if benefit of the joint rate is desired, reconsignment requests must be made to the New York Central R.R. direct, in accordance with Reconsignment Circular C. T. D. 237.

Coal Operators May Recover Part of 1917 Income Tax

Coal producers may be able to recover some of the money they paid to the Government in income taxes in 1917 if they will file with Commissioner Roper of the Internal Revenue Division of the Treasury Department the necessary data to enable the Commissioner to fix the proper basis for the different classification of those engaged in the coal industry, with a view to applying the law in a uniform manner.

The foregoing is the substance of a conference had by W. A. Marshall and Charles S. Allen, president and secretary respectively of the Wholesale Coal Trade Association of New York, with Commissioner Roper in Washington recently, when the subject of unequal assessment of income and excess profits taxes on those in the coal industry was discussed. In substance Mr. Roper said to Mr. Marshall and Mr. Allen:

"I know there are inequalities; I am anxious they should be eliminated and that the tax should be applied uniformly. The facts concerning those inequalities are so diversified that it is impossible for my department to determine them. Therefore I must depend upon your industry to gather the necessary data and submit them to me. When that is done for a substantial part of the industry, I will then fix proper bases for the different classes of those engaged in the industry, with a view to applying the law in a uniform manner."

Investigation shows that there were large sums paid in taxes for 1917 which should and will be refunded when the facts are placed before Mr. Roper, says Mr. Marshall in a Bulletin issued by the Association of which he is president. When these data are placed before the Commissioner the 1918 taxes will then be fixed upon a proper basis.

Mr. Marshall and Mr. Allen have arranged with Gibbs L. Baker, who has looked after the interests of many coal men in Washington during the past year, and with James T. Lloyd, a former Congressman, to take care of the interests of the coal men who are members of the New York Association.

Mr. Baker has discussed the entire matter with Commissioner Roper and says the Commissioner agrees that the present classification of the coal industry is entirely unscientific and unjust, and is anxious to have the coöperation of the industry in trying to reach a satisfactory classification.

As tentative returns for the 1918 tax have been made and an extension of 45 days has been granted to file permanent returns, Mr. Baker says it is absolutely necessary that coal men give the matter immediate attention. Mr. Baker is of the opinion that all the wholesalers should be classified as personal service concerns, not only for 1918, but also for 1917, where no actual investment of capital is involved. "And when I say 'actual invested capital,'" says Mr. Baker, "I mean invested capital as an income producing factor."

There may be wholesalers who have some investment in mines or stock of mining companies, and that will take a different classification under another section of the law. There is still another class of wholesalers who have a considerable investment, but disproportionate to their incomes. This class of cases is in the same position as the operating companies with a small capital and a comparatively large income, and will take a still different classification.

EDITORIALS

What Shall Be Done to Trouble-Makers?

AT EVERY period of the world's history society has tried to suppress its trouble-makers, for at all times it has been possible for a man diligent in promoting discord to set his neighbors by the ears. With false stories and innuendoes, with lavish promises and baseless visions of advantage, it is easy to separate fast friends and make coöperation between them impossible. Strange to say, the professional peace-makers are among the most prolific spreaders of doubt and suspicion.

Early in the history of common law, the crime of barratry was defined as an attempt to stir up trouble either in the courts or elsewhere. It was ultimately decided that three such meddlings in other people's business justified the courts in meting out punishment. Then came the period when the trouble-makers became so persistent and annoying that communities established and courts condoned such instruments of torture as the scold's bridle and the ducking stool.

Today we are face to face with somewhat different but more troublesome bodies of disturbers—the Bolsheviks or Industrial Workers of the World. The emissaries of this organization make all kinds of impossible claims for a new order they intend to establish. Sneaking around from camp to camp they leave their literature advocating, it is said, a working day of about two hours and all kinds of phenomenal pay, and claim that the other six hours and the difference between the pay they advocate and the pay now received represents capitalistic peculation.

With the outcome of the work of these disturbers we may soon have to cope. Without any militia and with no state police in many of our commonwealths it will be an impossible matter to keep order. It is a question whether freedom of speech and of the press requires us to give place to such disturbers in peace or in war. To all matters there is a limit.

The peddling of information is subject to the same laws as the peddling of medicine. No man may sell talcum powder as aspirin or water as antitoxin. To do so is a fraud. Similarly, a man is not allowed to advertise a company's stock in a fraudulent manner. Even particularly unscrupulous religious healers have been arrested and punished because they imposed on certain of the feeble-minded and credulous.

If we can interfere with such freedom—freedom of trade and of religion—we surely should have ample justification for suppressing at least the most dangerous forms of freedom of speech. Some attempt should be made to have all men tell the truth. If the jail is not to be used, at least the bridle and the ducking stool and the rail might serve to make such perversions of truth appear as ridiculous and odious as they really are; and make the dissemination of such untruths an employment not unaccompanied by discomfort. These men cannot be martyred, for they know their faith is vain and that their "facts" are made to suit the gullibility of their hearers.

Do Not Die Too Soon to Get Tuberculosis

SUBJECT to revision, the United States Bureau of Mines says that 3.39 persons were killed per 1000 employed in 1918. If, therefore, 1000 men, subject only to accidental death, went to work at 16 years of age, 295 years thereafter all of them would, at length, have succumbed to the dangers of the mine by the laws of probability. The last man to die would be 311 years old when he was gathered to his fathers.

The number of men dying of accident year by year, assuming that the risk of death is independent of age, would decrease in proportion to the time, because the number exposed to the risk would be reduced by death year by year. Thus the average age of death would be the age of entrance into the mine, sixteen, plus a half of 295 years, or about 163 years—nearly three generations.

No wonder the mine worker expects to entertain the grim reaper in the village rather than at the mine. Miss Alice Hamilton, of the Bureau of Labor, speaking recently before the Academy of Political Science, said confidently of the mine workers: "Of course, we know that a great many of them do not live long enough anyway to get consumption; they die of accident." This, of course, is unfair, for the accident rate is not so high as suggested; and hence the accident rate does not in any way explain the low tuberculosis rate. She added, however, most creditably, "But even those who survive do not seem to get consumption when one would expect them to."

Miss Hamilton suggests that the miner may be subject to pneumonia, and the probability is worth inquiry. Especially does it seem likely in view of the large number of mine workers who have recently succumbed to "influenza." The actual cause of death was doubtless influenza's twin sister, pneumonia.

The Department of Commerce says, "Buy even at a sacrifice, for such purchases are patriotic." The Railroad Administration is making no effort to buy coal—and hence is surely to be numbered among the unpatriotic slackers.

Making a Mock of Thermo-Dynamics

WHAT is the efficiency of a miner? He consumes at least 3000 calories in food a day, which is the equivalent of 5400 British thermal units, or 4,201,200 foot-pounds of energy. In an eight-hour day, working steadily and at limit of capacity, he probably does 800,000 foot-pounds of work. He rarely does anything near as much as that, but when he does his best he is about 19 per cent. efficient. It is more than likely that his average efficiency does not rise above 10 per cent., and often it is far less. Shall we argue therefore that the farmer should work less hours for the miner, seeing that the mine worker's efficiency in making use of the food values supplied him is only about one-tenth and

never exceeds one-fifth of the ideal performance?

Yet that is just the line of argument adopted by Mr. Smillie, the miners' leader in Great Britain, when he addressed the Sankey Commission on the wage demands of the mine workers. He said that the public did not utilize from the coal mined more than 10 per cent. to 15 per cent. of its heat content, so why should the miner be sweated to supply coal to the public when it used his product with such real or apparent wastefulness? It is certain that it is impossible for the public to convert more than about 25 per cent. of the heat in coal into work. It should do more than it is doing to reach that figure; but the miner also, who can produce 19 per cent., should not be content with only ten.

It is extremely easy to say that we should work without waste, that there should be an exact balance between work performed and heat expended; but this is absolutely impossible. We all need to be more efficient, but it must be remembered that if we render an account for 25 per cent. of the heat units delivered, regardless of whether we are stationary engineers or manual laborers, we shall do most excellently. Waste and work are unfortunatetly twin brothers.

If, however, there is to be economic use of material, surely the profit of economy should go to those who institute it, or to the consumer, and not to the raw-material man. Economy is attained not without labor and expense; and if another party is to reap what the first party has sown, there will be no economy, for it will not be a profit but a loss to the man who puts the economy in operation.

Government ownership is coming like a steamroller, crushing down all opposition. We do not dare to deny it, but would delay it as long as possible. Where workmen are all combined, and perpetually striking for more pay, shorter hours and more privileges, government control must come. Then the industrial army will be formed and everyone will be conscripted and subject to court-martial. The striker will be a traitor liable to summary punishment. The men who will not work will languish in jail. There is no cure for this desperate outcome—other than sanity in the public. There is, of course, another solution. Government need not be tyrannical under government ownership—for we can always starve.

Increasing Reliability of Mechanical Equipment

A RATHER significant indication of the increased confidence the coal producer has in the machinery end of his operation is shown in some figures taken from the mine inspectors' reports of Pennsylvania. It was customary, even as late as 1910, to allow a large factor of safety with any mechanical equipment, and especially with mine pumps, since any failure of these would occasion serious results.

In more recent years, however, the higher grade machinery, as well as the coalman's increased knowledge and confidence in it, has tended to reduce this safety factor decidedly. The mine inspectors' reports, for instance, show that during the period 1910 to 1915 the capacity of the mine pumps in the bituminous field of Pennsylvania only increased from 510,000 gal. per minute to 727,000 gal. per minute, or 18 per cent., while the actual water handled during this period increased from 300,000 gal. per minute to 418,000 gal. per minute, or 40 per cent.

This increased confidence in the reliability of their mechanical equipment has been accompanied by a substantial increase in the capacity of the individual units. In 1910 the average number of gallons per minute handled by each pump was 184, and the same figure for 1916 was 256.

The increased use of machinery and mechanical equipment in the mining industry is showing a growth that the well-informed operator is watching carefully. In fact, with labor costs continuing at existing high levels, the operator who fails to adopt all possible means of replacing man-power with machinery may find himself driven out of business.

Since and including 1913 Great Britain has bought 27 billion dollars worth of goods and sold 16 billion, incurring obligations of 11 billion dollars. The pound sterling, the value of which never changed, was $4.87. It now is $4.57. No wonder Great Britain is not keen to plunge any further into debt.

Dig Deep!

THE vital necessity for American industry at this moment is the success of the Victory Liberty Loan. Success of this loan is required for the maintenance of our national prestige. That goes without saying. The United States pays its debts, pays them quickly, fully, generously, and particularly does not allow the expenses of a war to drag on in endless claims long after the war is over. Four loans are already out. In order to enhance their value, the present loan must be heavily oversubscribed.

So much for the national side of this loan. The industrial aspect strikes home just as forcefully. We are no longer standing at Armageddon; the tide of battle has flowed with tremendous force in our direction. Now we are on another tide, which also must be taken at the full, or this country will lose all it has to gain of the benefits of peace. The industrial tide is setting in.

Before industry can function without friction several things have to be accomplished. First, the finances of the country must be in a settled state. This cannot be until the loan is a success. While money is withheld from its proper use by the Government it cannot be freely loaned to individuals; the risk of taxation, of new flotations, is too great. Second, the men who were in the army must be quickly taken into the fabric of industry. A floating population of discharged soldiers, or even the keeping of a million and more soldiers under arms, will destroy the even balance of industry, affecting capital, as much as it affects labor, with a sense of insecurity. Finally, the war industries of the country must be turned to other purposes.

For these things, as well as for the care and education of wounded and crippled men, the Victory Liberty Loan is the essential. It comes at a time when the prospects of expansion for American industry are brighter than ever. With Europe begging for the products of our fields and factories, it would be folly for us to hold back. It is possible for America to take the commanding position in the world of finance and industry. But no country can command which cannot settle its own affairs. To settle our affairs we have, first and above all, the Victory Liberty Loan. We must dig deep into our money pockets, or we shall never dig at all in the industrial mines of the world.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

How can we carry over to the mine worker, who is bone of our bone and flesh of our flesh, that he is the person of all others who wants more than anybody else? The rest of the world is satisfied with the eight-hour day, the mine worker wants six hours. Others are content with a 5½-day or a six-day week, the mine worker wants his week to be of five days and yet he asks for more and more pay.

When he realizes that everyone else has to pay him how can he make these demands, except on the ground that he has a harder time than other people or more risk than the generality or loses more time on his way to work or has some other unspecified or unspecifiable disability? The first statement—that his work is unusually hard—does not seem to be true or why is there an equal scale inside the mine and on the surface. As to the second count, it is true there is some risk in mining. It is partly compensated by legal provision, but after all it is not so great as some people think. It deters almost no one from entering the mines, and its importance is mainly apparent because it has been emphasized statistically whereas other industries competing for the same labor have had no statistics on which the public could base an indictment.

Has Miner Right to Shorter Day Than Others?

As for the time needed to reach the working face that is usually met in big mines by the man trip, and it is fair that it should be so wherever the underground distance to the working face is over a mile. The day man is quite generally getting pay for all the time he is at the plant. He gets a full eight hours for eight hours corporeal presence regardless of whether he is working or walking or merely gathering up his tools. The miner does not work eight hours for the most part, and if he does it is because he elects so to do. He can easily let the eight hours cover the trip in and out of the mine.

So there is little reason for the mine worker's insistence on short time, especially in this country, except as the mine worker makes it a temporary practice to fill a temporary need. The general Industrial Conference in Great Britain has just established the eight-hour day. Yet at the same time the Sankey committee has promised to the privileged mine worker the seven-hour day to date from July 16 and the six-hour day from July 13, 1921. But that does not satisfy the mine worker. He wants wage increases also and big ones, and in America he wants the six-hour day now and forever hereafter and wage increases also.

Short Time as Unfair as Short Weight

On Mar. 31 we read that the South Wales miners reject the promised *six*-hour day (to which indeed there is a small qualification) an increase in wages of 50c. a day, and a voice in the management. On Apr. 7 we read that the Industrial Conference provides throughout England an *eight*-hour day, a national minimum wage, complete and unrestricted recognition of the trade unions, responsibility of the State for the unemployed and a National Industrial Council.

This is hailed as a Magna Charta Libertatum by the British public. The mine workers will have nothing to do with such a document. They would have the industrial workers of Great Britain work for them eight hours while they work for them in return only six hours a day. It is not a square deal. Can it be that the miners of Great Britain, after whom our miners are trying to pattern, are not square and don't pretend to be? This cannot be believed. The probabilities are that they do not understand the implications of their actions. They do not realize that there is no one so mean and miserable in the slums of the British cities, no farmer's laborer however humble, that they are not robbing by the fact that they give them short time in return for a day of eight hours.

A short day, like a short weight, is an abomination that rich and poor should hold in abhorrence. The short-time worker, rich or poor, robs the public of service. A man is only faithful to his trust when he plods along as unwearyingly as his fellow worker. He cannot take up his tools and quit at 2 p. m., when his neighbor works for him till 4 p. m. The miner should play the man, and when time is reduced it should be reduced everywhere and not in one occupation alone.

Apparently some of the anthracite miners of this country do not like the provision of the union that they may not work on idle days. They say they will strike if they are not allowed to prepare coal when the breaker is idle. It is to be hoped that the public will soon make this dispute between miners and other mine workers purely academic by providing work for 6 days in the week.

Contrary Currents in Hard-Coal Region

On Apr. 1 Christ J. Golden was formally inaugurated as president of District No. 9, United Mine Workers of America, a district which covers the Schuylkill field of the anthracite region of Pennsylvania. In connection with the inaugural ceremony came one of the greatest labor demonstrations ever held in the lower end of the coal fields. In his inaugural address, President Golden supported the recent demands enumerated by National President Hayes, in which he demands a six-hour day for the miners and a substantial wage increase.

The mine workers of Pine Ridge and Laurel Run Collieries of the Hudson Coal Co., in Luzerne County, recently called a strike when the grievance committee of the company and the officials of the concern failed to reach a settlement over a minor grievance. As a result the collieries are not working.

The strikers do not have the sanction of the organization because they acted before notifying the district officers. From what can be learned, it appears that the cause of the trouble is alleged partiality shown a member of the grievance committee, because of his activity in organization affairs. It is fully believed that the difficulty can be readily handled.

In the Lehigh region, the miners have served notice that they will tie up the Beaver Brook colliery indefinitely unless they are permitted to cut coal on idle days. The men claim that they are rushed in production on the days that the breaker works if they are not given a chance to get a supply on hand.

All the strippings in the Hazleton region operated by the Central Pennsylvania Quarrying, Stripping and Construction Co. started on a nine-hour basis on Apr. 1, following the winter's suspension. Heretofore the men worked ten hours, but the union asked for the reduced shift and this was agreed to without any trouble. The new schedule will remain in effect until next March, when the present contract will expire, the date being concurrent with the expiring of the anthracite mine wage schedule. Approximately 5000 employees are affected.

The Bolsheviki are still trying to get a firm hold in the Wyoming Valley, a place they have thought for a long time suitable for their operations. Many threats have been made against mine foremen and mine owners. On Mar. 31 James Dixon, mine foreman of the Delaware, Lackawanna & Western R.R. Co. Coal Department, was attacked by two men, being stabbed in the arm and in the breast. Three shots were fired at him, but without effect.

Don't Start Anything You Can't Finish



If the mine worker insists upon shorter hours, others will want them too. If as large a wage is paid the mine worker for the short day as for the long day, others will want to be paid in the same measure. As a result, the mine worker will have to pay more for all he gets. There's no such thing as doing less and having more. It's production, not wages, that really counts. Suppose Mrs. Mine Worker decides to work six hours a day with two days off, instead of 16 hours and no days off, where will Mr. Mine Worker be?

Beware of starting a fight you can't finish. Other working men and women have two hands as well as you.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Contents of Conical Water Tank

Letter No. 1—In looking over some back numbers of *Coal Age*, which are always interesting to me, my eye rested on an inquiry (Vol. 11, p. 113), asking for the method of calculating the depth of water in a conical tank, of given dimensions, when the tank is half-full. It was stated that the height of the tank in question was 18 ft., while its diameter at the top was 10 ft. and that at the boteom, 14 ft.

By a trial method, it was found that the depth of water in this tank when half-full would be 7.54 cu.ft., which is correct. However, I set to work and succeeded in developing a general formula, that gave a direct solution of such a problem. Believing that this is of interest to *Coal Age* readers, I submit the formula for consideration. It is as follows:

Let D = the larger diameter and d the lesser diameter of the tank and indicate its height by h. Then, if x = the depth of water in the tank when half-full,

$$x = h\left(\frac{D - \sqrt[3]{\tfrac{1}{2}(D^3 + d^3)}}{D - d}\right)$$

Substituting the given values in this formula, we find for the depth of water in the tank when half-full,

$$x = 18\left(\frac{14 - \sqrt[3]{\tfrac{1}{2}(14^3 + 10^3)}}{14 - 10}\right) = 7.54\ ft.$$

The use of this formula avoids solving such a problem by trial, as was suggested. CHARLES E. WALLER.

Allentown, Penn.

Drawing Pillars in Machine Mining

Letter No. 12—Allow me to add a word in the discussion having reference to drawing pillars with machines in rooms that have been opened to a width of 27 ft. and driven up 250 ft., under 200 ft. of cover and a strong sandstone roof, as suggested in the inquiry of "Operator," *Coal Age*, Jan. 2, p. 32.

In the first place, in driving rooms with the Sullivan shortwall machine to a supposed width of 27 ft., it will generally be found that the actual width is 30 ft. and the remaining pillars are far too thin for the proper support of the roof, to say nothing of drawing them back with machines. It has been assumed by one writer that these rooms are probably driven on 40-ft. centers, which would allow for pillars 13 ft. wide; but, even supposing that the pillars were 20 ft. wide, it would hardly be practicable to follow his plan when mining with machines, under the conditions mentioned.

Let me say then, assuming the rooms have been driven 27 ft. wide, under the conditions named, I would not use machines to draw back the pillars; but they should be removed by pickwork and not with machines. Coal cutters are too costly to risk in this work. The best miners should be employed and the work double-shifted, so as to draw the pillars rapidly.

Too much cannot be said in emphasizing the fact that it is a wilful waste of coal resources to open out work under the conditions described and in the manner mentioned. It would generally be found impracticable to recover more than but a small percentage of the coal remaining in the pillars.

Instead, the work should be planned to drive the rooms as narrow as possible and avoid paying yardage. This will require the use of comparatively little timber in the first workings, and the posts will not be crushed and broken but can mostly be used again. The rooms must be driven on such centers as will give a good width of pillar to be drawn back when the rooms have reached their limit. Such a plan will give opportunity to use machines on the pillars and a larger percentage of coal will be recovered.

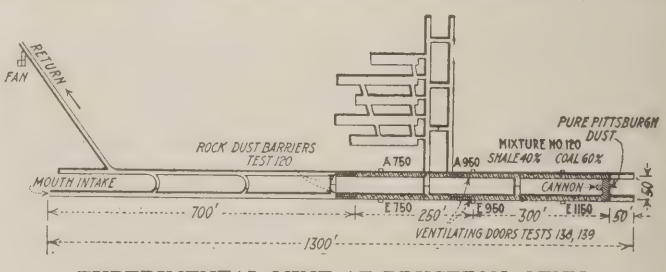
Looking over the district here, one can find hundreds of rooms standing full of timber left to decay, and many thin pillars that have had to be abandoned, because they could not be drawn with safety. I have gone into these rooms and drawn great quantities of timber that had been left; but the pillar coal cannot be taken out as the work is too dangerous, and the coal would not pay for moving the rubbish, which would have to be done before work could be started on the coal.

Linton, Ind. W. H. LUXTON.

Current Velocity re Mine Explosion

Letter No. 1—In the article of G. S. Rice and W. L. Egy, which appeared in *Coal Age*, Feb. 13, p. 308, entitled "Effect of the Velocity of Ventilating Current upon Mine Explosions," the writers refer to three tests, Nos. 138, 139 and 120, at the Bruceton experimental mine, to support their conclusions that air movements and ventilating conditions have no appreciable effect in starting and extending explosive combustion in mines.

The arrangement of the experimental mine at Bruceton is shown in the accompanying diagram. In all



EXPERIMENTAL MINE AT BRUCETON, PENN.

the tests regarding explosions, a cannon that was placed in an offset in the inby crosscut, 1250 ft. from the mine entrance, was employed as a means to initiate the explosion. The cannon was charged with 4 lb. of black powder and fired electrically from the outside of the mine.

The main features of the three tests mentioned were the following: Two heavy doors were located, one in the intake entry and the other in the return air-course, at points 300 ft. outby from the crosscut where the can-

non was fired. The door in the intake entry was hung to open inby, while that in the return air-course opened outby. When the tests were made, both of these doors were closed, so as to form a dust-charged explosion zone within the doors.

The dust charge, consisting of a 50 per cent. mixture of coal and shale, was distributed throughout this zone, at the rate of 4 lb. per ft. of entry. It is stated that, under these conditions, no difficulty was experienced in obtaining an explosion and the resulting flame or explosive velocities were high and the pressure strong, as indicated by the recording instruments that were installed for the purpose at several points on the intake and return entries.

Effect of the Inrush of Air Following the Firing of the Cannon

The conclusions of the writers are based on their assumption that there was no air current moving, in the immediate vicinity of the cannon, at the time the shot was fired. Let us see. Only a short time ago, it was stated by a mining engineer, in a previous discussion on the influence of the air factor in producing explosion in a mine, that "all will concede that an inrush of air follows the firing of a shot."

This statement has a particular significance in the present instance. Following the firing of the cannon in the Bruceton mine, the air was compressed in the space between the cannon and the intake door, which could only open inby; but the door on the return entry, opening outby, gave vent to an outrush of air. As a result, there was an area of depression at the cannon, followed immediately by the rush of the compressed air from the intake side toward the cannon, and causing the intake door to open inby and admit an inflow of fresh air into the explosion zone.

There can be no question but that this rush of air carried with it a probably greater amount of dust than the first outrush through the air-course. The effect of this difference is plainly shown by the presence of the greater pressure in the intake entry, which was due to a higher rate of explosive combustion. The records show that, in test 139, the pressure in the entry was nearly 50 per cent. greater than that in the return air-course, Notwithstanding this pronounced discrepancy, the writers of the article dismissed the matter with the remark that "the development of the explosion was roughly symmetrical in both branches."

Important Test Carefully Analized

Test 120 was made in the presence of members of the Mine Inspectors' Institute of America who were present in large numbers. The arrangement and result of this test are explained in great detail by the writers, who deemed it of special importance and who state that the ignition zone was prepared with pure Pittsburgh coal dust, consisting of 60 per cent. coal and 40 per cent. shale, distributed at the rate of 3½ lb. per ft. of entry. Barriers of various kinds limited the explosion zone at different points.

It is stated that "the explosion was a relatively weak one, with low velocities. . . . The development of the explosion in the two entries was quite similar, the velocities in the return air-course being a little greater than those in the intake entry. . . . The pressures developed were light, being 5 lb. at E 1150 and E 750, and 2 lb. at A 1150 and A 750." This description is followed by the statement, "Thus, there was practically no difference in the development of the explosion in the intake and return."

From the data given here, the writers have concluded that the rate of velocity of an air current moving toward the place of origin has no appreciable effect in the development of a dust explosion. To show that such a conclusion does not appear to be warranted by the facts of other tests, let me call attention to tests Nos. 9, 10 and 11, made at the Bruceton experimental mine, for the purpose of ascertaining the extent of pressure produced by the firing of the cannon alone, in the entire absence of coal dust and with the entries sprinkled throughout their entire length.

In test 9 all the circuit breakers, seven in number, were adjusted to operate at a 2-lb. pressure. When the shot was fired, only three of these circuit breakers, located within a distance of 300 ft. from the cannon, operated and the remaining four failed to work. In test 10, only two circuit breakers were used. These were placed about 100 ft. outby from the cannon and set to operate at pressures 3 and 4 lb., respectively. Both of these operated. In test 11, two circuit breakers were installed, in the same manner as in the previous test; but arranged, the one to operate at 5 lb., and the other at 6 lb. pressure. Neither of these operated.

What the Low and High Pressures Really Show

In my opinion, the low pressure of 2 lb., in the air-course, which resulted in test 120, was caused by the shot alone; and, notwithstanding the presence of flame observed in the air-course, the absence of additional pressure proves, also, the absence of explosive combustion. In the entry, however, the situation was different. It is evident that the pressure due to the shot should not be appreciably greater in the entry than in the air-course, the resistance of which caused the pressure. But, at Sta. E 1150, a 5-lb. pressure was registered, which fact clearly proves the occurrence of explosive combustion in that vicinity.

Let me urge, here, that if the velocity of the air movement toward and away from the cannon, at the time the shot was fired, is not a factor in the development of explosive combustion *in the entry*, and if its absence is not responsible for no such explosive condition *in the air-course*, how are we to account for the difference in these results? I submit that the claim of the writers that "there was practically no difference in the development of the explosion in the intake and the return," is not supported by the recorded facts, since there is apparently no evidence whatever of the development of explosive combustion in the air-course.

It is unfortunate that no attempt was made to check the conclusions of the writers, by repeating test 120, under the same conditions, except with the fan reversed, so as to make the air-course the intake and the entry the return. Allow me to suggest that such a test can still be made. I feel safe in the prediction that the resulting difference in pressure between the air-course and the entry will probably be more pronounced than in the test already made, and that the greater pressure will then be found in the intake air-course, which would unquestionably show the development of explosive combustion at that point. Should this be the case, the effect of air movement and ventilating conditions will be clearly and definitely proven to be important factors in the development of explosive combustion in mines.

John Verner,
Chariton, Iowa. Former State Mine Inspector.

Efficiency of Mine Officials

Letter No. 5.—If I have a hobby, it is efficiency, and I was glad to read the letter of William Gorman, *Coal Age*, Jan. 16, p. 159, inviting a discussion of the efficiency of mine superintendents.

When a man is called "efficient," I understand it to mean that he is possessed of the art of doing things in the right way, at the right time and with the least expenditure of time and energy. I think that most men will agree with me in this opinion.

Now, there are several things to be considered before one can say that a man is efficient, or that he fails in this respect. As Mr. Gorman suggests, many a good man has been hampered by conditions that are beyond his control. He may be handicapped by internal friction existing in his organization; and the results that he is able to accomplish must be judged in the light of these hindrances, and not by comparison with the work of another whose problem is simpler.

To obtain good results in efficiency, there must be the coördination of effort in the work of individual employees. A mine superintendent must have the coöperation of the underofficials, from the mine foreman all down the line and including the most humble worker. Not only this, but he must have the coöperation of the office and the higher officials whose duty it is to supply him with what is needed to enable him to accomplish the best results.

In other words, there must be the coördination of the work of every department. While it may be said that this is the efficiency of the organization rather than of the man, it will be admitted, readily, that no man can be efficient in his work without such coördination and coöperation on the part of everyone employed.

Efficiency Depends on Ability to Perform and Knowledge of the Game

In addition to the two factors mentioned, efficiency requires that a man be possessed of a certain degree of ability to perform, and the knowledge required to direct his efforts intelligently. I wonder if Mr. Gorman's barber didn't know more about coal mining than he knew of the tonsorial art. I have known men quick to learn a new trade; but does that show efficiency? Efficiency is revealed in the performance. The men who employed this erstwhile barber must have observed the characteristics he possessed and that fitted him for other duties. It was the recognition of such characteristics that induced them to put him in charge of their mine.

Ability to perform and a knowledge of the game, from the sump to the tipple, should be and are the requisites of an efficient superintendent. Who would select a man to boss a job who doesn't know, or who isn't sure, how that job should be done? In the operation of any property of any size, there are always a number of men employed who are not only well versed in the game but who possess, besides, the tact and diplomacy that fit them for a superintendent's job.

This fact should recommend that promotion, in an organization, should be within the grasp of these men. Such a policy will do more to hold an organization together and coördinate the work, than any other plan that can be adopted. I have been in the game a number of years and have seen all manner of men employed as bosses who were promoted from the ranks. Rarely have I seen jealousy shown when a man on the job was promoted through merit. Instead, it is generally recognized that he possessed the necessary qualities and deserved advancement.

In closing, let me say that, in every instance where efficiency is evident, each worker from the superintendent down is personally efficient. Organization makes the men a unit and all work for the common good.

Golden, Colo. Fred L. Serviss, Sr.

Letter No. 6—It has been a pleasure to read and study over the many interesting letters that have been written in *Coal Age*, and particularly those bearing on the efficiency of mine foremen and superintendents. The letter of William Gorman, in the issue, Jan. 16, p. 159, has taken me back over past experiences and recalls many interesting thoughts and incidents of my own observation.

The remarks that follow will bear more on the inefficiency of superintendents, hoping by that means to show by contrast what is required of a truly efficient man holding that office. My memory carries me back to the time when, as a plain miner, I observed instances where the company would spend money right and left for work that could accomplish no good end, save the employment of men needing to work. The undertaking would probably be done on the recommendation of a superintendent who had no practical knowledge of underground requirements.

Superintendents Without Practical Experience

It has been my lot to come in contact with some of these men. They remind me more of a young boy who runs wild and must have his fun, without a thought of where his next suit of clothes or next pair of shoes will come from. In other words, a superintendent of this class directs work, without stopping to *think;* or, if he thinks at all, it is not in the right direction. The reasoning of a plain, practical mining man falls on deaf ears. Such a one, as we say, will not listen to common horse sense regarding a proposed plan of mining, system of haulage, drainage or ventilation. He prefers to follow a plan of his own that may look well on paper but will seldom work in the mine.

My experience has taught me that the efficient mine official must get his men together, talk over a proposition and get their ideas, which will enable him to view the matter from every angle. The idea is to have a plain, old-fashioned, straight talk with all parties concerned, and adopt such a plan as will meet every requirement. When this is not done changes will have to be made later that are expensive, if indeed the entire plan does not have to be abandoned.

I can well remember working in a mine, some time ago, where the workings had been extended to a point that required the laying of a 4- or 5-in. pipe line, in order to drain a certain section of the workings. The superintendent was a man that had few practical ideas, and whose visits to the mine were few and far between. He was chiefly interested in keeping down expenses and making a good showing on the cost-sheet, each month.

While this superintendent may have had a vague idea that the laying of the pipe line mentioned would enable his company to take out a large tonnage for a considerable time to come, the one thought uppermost in his mind was what the expense would mean on the showing of his cost-sheet for that month. As a result, he made

this necessity of purchasing a few hundred feet of 4- or 5-in. pipe the excuse for his recommendation to abandon the mine.

Without further investigation, on the part of the company, the order was given to pull the tracking from rooms and entries, and take out all equipment that could be moved. In other words, the mine was henceforth and forever abandoned. The tipple was removed and the surface plant transported a mile further, around the side of the mountain, to another opening that had been made in the top vein of coal. Here the superintendent set men to work to clean up the entry and put down a slope to the lower seam, which was the same that we had just abandoned in the old mine.

A Foreman After the Superintendent's Own Heart

About this time, a change in mine foremanship took place. The new foreman was a man very much after the superintendent's own heart. His main idea was to get out cheap coal. I need not add that six months later this mine was shut down, for the reason that it was not paying expenses.

Now, notwithstanding the fact that $65,000 to $75,000 had been spent in opening and equipping this mine, orders were again given to pull everything movable and set up the plant at another opening, about a mile further around the mountain, at a place where the output had been 900 tons of coal a day. There, the entry was cleaned up and three more slopes were sunk to the lower seam, which was the same seam of coal worked in the two previous openings.

It is not possible for me to attempt to describe the superintendent's thoughts. To me, a practical miner, the entire proceedings appeared as boy's play. A few years later, the same company went into the hands of a receiver, and every practical mining man will say that this was the result of employing inefficiency in the practical work of mining coal.

Let me say, in closing, what has already been remarked in one of the letters I have read, that the most disagreeable thing to a mine foreman who is practical, is to be compelled to work under the instructions of an inefficient and unpractical mine superintendent. I am sorry to say that it has been my bad fortune to experience this difficulty in more than one instance.

As long as things go well, and the coal keeps moving, the foreman is all right in the eyes of the superintendent. But, when conditions change, as they ever will in coal mines, the superintendent lays everything to the foreman and suddenly charges that he is "a most inefficient man." Too often, there is no investigation made by the company to ascertain the actual facts. The increased cost of production is the one thing that blinds the eyes of the company to everything else, and the mine foreman is the man who must stand the blame.

Pruden, Tenn. EXPERIENCE.

Efficiency in Firebossing

Letter No. 10—In the discussion of this subject, kindly permit to say that I do not agree either with those correspondents, who take the position that a fireboss should never, under any circumstances, be called upon to do anything else than his own particular work; nor yet with the idea advanced by Edward H. Coxe, *Coal Age*, Jan. 23, p. 199, that "a fireboss will often have time to busy himself looking after a pump, laying a piece of track or setting needed timbers.

From the trend of Mr. Coxe's letter, one is led to believe that he has never performed the work of firebossing himself and does not fully appreciate the dangers of the situation.

The mining laws of Tennessee provide that all mines, generating gas in sufficient quantity to be detected with the safety lamp, are to be classed by the chief mine inspector as "Class-A mines," and must be examined by a certified gasboss (fireboss). The law further provides that this inspection must be made within three hours immediately preceding the time for the men to enter the mine for work.

Imagine, for a moment, the arduous duties of a fireboss who must go into the mine at 4 a.m. and proceed, alone, to explore the dark recesses of the mine, entering many dangerous places and climbing falls, lighted only by the dim flame of his safety lamp.

Even one who has not performed this task can imagine that it is not a pleasing job, and yet it is suggested by this writer that, after the fireboss has thus braved the dangers of the early morning alone, in his examination of the mine, he must finish out his shift by laying track, timbering, or running a pump, in common with other workers in the mine.

Here, in Tennessee, it is the custom for the fireboss when he has completed his morning examination, to notify the mine foreman in regard to the condition of the mine and explain the nature and location of any dangers that he may have found. Also, he informs the miners working in places that he has found to be dangerous that they must not proceed to work until their places are made safe. At times, he will assist the foreman in arranging the work for the day, by giving him any information in his power regarding the condition of the section or sections of the mine he has examined.

Standard of Firebossing Must Not Be Lowered

Speaking of the efficiency of firebosses, the work in their charge is of such a nature that the man who undertakes it should be the most efficient man in the mine, next to the foreman. The task and its duties should be so arranged as to make this position attractive to men who are capable and efficient. But, if the policy advocated by the writer to whom I have referred is to be followed, the result will surely be to lower the standard of firebossing, which would be a menace to the safety of the mine.

A few years ago, the Board of Mine Examiners, in Tennessee, concluded not to issue a fireboss certificate, on the ground that the only mines requiring the employment of a fireboss were those of "Class A," generating gas. They held, therefore, that a man capable of performing the work of fireboss should hold a Class-A certificate. This action of the examining board has had the tendency to raise the standard of firebossing in this state, both in respect to qualification and compensation for the work.

I have known places where the fireboss was only required to make the round of the mine and enter his report in the book kept for that purpose and then his work was done. I have known other places where the fireboss, upon completing his morning examination and reporting the condition of the mine, would continue to assist the foreman for a few hours in the early morning and then be relieved from further duty for the day.

I consider that it is the proper work of a fireboss to assist the foreman, in any manner that lies in his power, and to give him all the information he can regarding

the condition of the mine and work that requires immediate attention. I do not think, however, that the fireboss should be required to re-enter the mine to perform the work of timbering or tracklaying, or to serve in other capacities except those I have mentioned.

Briceville, Tenn. U. S. WILSON.

Panel System of Mining

Letter No. 3—Kindly permit me to refer to the inquiry of R. J. Pickett, *Coal Age*, Feb. 27, p. 419, regarding a change that he proposes to make in his present panel system in his mine. Allow me to suggest that it would seem that Mr. Pickett has not taken into consideration the comparative costs when considering this plan. Without meaning to criticise his judgment, I may say that the expense of the proposed plan would be much greater, especially in regard to the yardage paid for driving entries and crosscuts.

In my opinion, the difficulties he mentions in regard to bad roof, ventilation and drainage must be overcome by some other means. At present, he is driving one pair of entries and turns 20 rooms off of each entry or 40 rooms in all. In his proposed plan, he would drive two 12-ft. entries and two 18-ft. places for air-courses, in getting the space for 40 rooms. In doing this, even if he paid no yardage for driving the 18-ft. place, he would have the same yardage to pay in driving the 12-ft. entries as before and, in addition, he would have to pay extra yardage, in driving two lengths of panel entries 268 ft. each, with their crosscuts, besides twice the number of crosscuts on the butt headings. This would make a considerable increase in yardage, which must be paid for at the rate of $1.12 per yard.

In addition to the increased expense for yardage, it will be necessary for him to junk all the right-hand switches that he is at present using in the rooms driven toward the main heading. His proposed plan calls for left-hand switches only, since rooms are driven only off the 12-ft. entries, in each pair of butt headings. An item that is worth considering, also, is the upkeep of the 18-ft. air-course, which I assume will cause much trouble and expense because of the poor roof.

SOME HELPFUL SUGGESTIONS

Allow me to make one or two suggestions which are as follows: First, reduce the width of the 12-ft. entries to 8 ft., which will increase the width of the entry pillar from 18 to 26 ft. This should prove a great help, under the poor roof conditions he mentions.

Again, while turning the rooms on the same 40-ft. centers, I would widen out to only 22 ft. This would leave 18-ft. pillars between the rooms, which would afford three 6-ft. cuts with the machine when drawing back the pillars. Here, also, increasing the width of the pillars and decreasing the width of opening, would give better roof conditions and the loss of coal would be less when drawing back the pillars.

In order to overcome the poor ventilation, a close examination should be made to discover air leaks in the stoppings and doors, which should be repaired wherever this is needed. All airways and crosscuts should be cleaned up and every obstruction to the flow of air removed, in order to give better ventilation in the workings. In regard to the development advancing slowly, let me suggest the double-shifting of the entries and the employment of the best entrymen obtainable.

Clinton, Ind. MINE FOREMAN.

Perils in Reconstruction

Letter No. 5—Speaking of the perils in the work of reconstruction following the war, *Coal Age* writers have recently reflected the worry that is present in the minds of many mining men, concerning the future of industrial America. They appear to recognize that, in the past, the labor of our great industries has been recruited from central and southern Europe. Foreigners have been brought here, not alone to promote our industrial expansion, but as a means to an end, the purpose being to keep down wages.

One of the effects of the war has been to decrease our great army of industrial workers, and the cry has been raised that labor is scarce. It has even been suggested, by a writer in *Coal Age*, there should be greater laxity in the immigration laws of this country, at least for the present. I cannot agree with this suggestion. America should not be made the dumping ground for the off-scouring of Europe.

Now, this is no reflection on the great mass of foreign labor that has come to our shores and which our immigration laws are designed to sift out and select only those who are capable of making good American citizens. While it is true that the foreign element in this country provides the most radical of our labor leaders, it is still true that the great mass of foreigners admitted to this country are loyal to its principles. The list of dead, on our honor rolls, is replete with the names of boys whose parents were born across the water. One of the perils in reconstruction work is, then, the assimilation of this class to make them Americans at heart.

PERIL IN THE LACK OF THRIFT AMONG ALL INDUSTRIAL WORKERS

Another peril that faces us is the lack of thrift in the labor classes, both foreign and home born. One has said that a laborer whose expenses, in support of his family, are $30 a week, will work six days in the week at five dollars a day, when he will only work four days in the week if his pay is raised to $7.50 a day. My belief is that there are men who will not work steadily at any wage; and the man whose pay is raised to $45 a week will find his expenses increase in the same ratio. My observation is that the wage earner is never so far ahead of the game that he can safely take a nap. We must study, then, to impress the idea of thrift on our workers.

The question of wage adjustment is another peril facing us. The prevailing opinion among mine workers with whom I have talked is that there can be no decrease in wages until the cost of living has been reduced, which is fair and just. Obervation inclines me to the belief that the great mass of workers want to be fair toward their employers; and employers are coming more and more to see that authority and position do not excuse acts of injustice.

No men or set of men can cry down organization of either capital or labor. If the one is needed, so is the other. The monthly men, working on salary, are an example of what results from a lack of organization. It is sad that we cannot place ourselves in the other fellow's shoes and consider all problems from his standpoint. How greatly this would assist us in solving these problems of reconstruction, which confront us, as captains or privates in the great industrial army of mine workers and mining men throughout the country.

————, Penn. PENNSYLVANIA.

INQUIRIES OF GENERAL INTEREST

EDITED BY JAMES T. BEARD

Estimating Percentage of Grade

Kindly permit me to ask how the percentage of grade is estimated, as I am in a tangle and have had many useless controversies on the matter. To illustrate my case, I have drawn a square having a diagonal line reaching from corner to corner. Suppose the two sides of the square are each 100 ft. in length. I calculate the length of the diagonal would be $\sqrt{100^2 + 100^2} = 141.4$ ft. Now, if this line represents a grade line, I am told that it would correspond to a grade of 100 per cent. I shall very much appreciate being put right on this question. STUDENT.

Morgantown, W. Va.

As was explained in *Coal Age,* in answer to a previous inquiry (Vol. 14, p. 756), there are two methods of estimating percentage of grade. One of these is based on the rise per hundred feet of *horizontal distance,* while the other is based on the rise per hundred feet of *pitch distance.*

In the case cited by this correspondent, the rise is 100 ft. in 100 ft. of horizontal distance. Therefore, estimating the grade on horizontal distance, the incline represented by the diagonal of the square illustrates a grade of 100 per cent. A 25 per cent. grade would be a rise of 25 ft. in going 100 ft. of horizontal distance. In this method of estimating, the grade is always the rise in 100 ft. of horizontal distance.

However, by the second method, when estimating the grade on pitch distance, the grade referred to in this case would be $100 \div 141.4 = 0.707$, or 70.7 per cent. Either method is correct, the first being used in fairly flat seams, while the second is more often used in steeper seams where the measurements are taken on the pitch. We can do no better than to refer this correspondent to the excellent letter of Richard Bowen, discussing this question in *Coal Age,* Jan. 9, p. 70.

Centrifugal-Pump Motor Heats

At the mine where I am employed, we are operating a centrifugal pump. The pump is located at the foot of a slope 200 ft. long and having a pitch of 40 deg. A 20-hp. motor is used for driving the pump, the speed of the motor being 1700 r.p.m. There is a 4-in. discharge and 5-in. suction, the suction pipe being 20 ft. long and the discharge the length of the slope or 200 ft.

The pump works all right when using the 5-in. suction, but gets overheated and starts to smoke when a 4-in. suction is used. Please explain the cause of this overheating of the motor, also explain the method of calculating the horsepower required to drive a centrifugal pump. PUMPER.

————, Penn.

Centrifugal pumps are designed to give the best results or develop the highest efficiency when the head under which the pump must operate is proportionate to the required discharge, the latter varying as the square root of the head. For a head of, say, 80 or 90 ft., the velocity of discharge may be estimated at about 12 ft. per sec., to enable the pump to develop the highest efficiency in its performance.

On this basis, it is easy to see that a pump designed to work under a given head must have a diameter of discharge portal in proportion to the head in order to enable it to handle any given quantity of water with equal efficiency. When such a pump is required to work under a greater head than that for which it was designed, there is an overload thrown on the motor, which causes it to heat.

In the case before us, the pump is discharging up a slope 200 ft. long and having a pitch of 40 deg. The static head on this pump is, therefore, $200 \times \sin 40° = 200 \times 0.6428 = 128+$ ft. Likewise, the suction head, for the same slope, is $20 \times 0.6428 = 12+$ ft., which makes the total static head on the pump, say, 140 ft.

To this static head must be added the friction head caused by the flow of water through a 4-in. discharge pipe, say 220 ft. long, to make some allowance for the friction in the suction lift. Assuming the proportions used in designing centrifugal pumps, the friction head h_f (ft.), for a length of pipe $l = 220$ ft.; a rise, $h = 140$ ft.; and a diameter, $d = 4$ in., may be calculated thus,

$$h_f = \frac{0.7l}{d\sqrt{h}} = \frac{0.7 \times 220}{4 \times \sqrt[4]{140}} = \text{say, } 11\ ft.$$

The total head under which the pump is operating, in this case, is then $140 + 11 = 151$ ft. Roughly estimated, a No. 4 centrifugal pump, or one having a 4-in. discharge portal, when operated by a 20-hp. motor at its full capacity, would develop its maximum efficiency under a head of about 95 ft.

Approximately, the horsepower required to operate a centrifugal pump under conditions that will develop the maximum efficiency of the pump may be calculated by the formula.

$$H = 0.00134d^2\sqrt{h^3}$$

In this formula, the h is the total head against which the pump must operate and includes the static head and the friction head; and d is the number of the pump or the diameter of the discharge portal. The formula also assumes that the diameter of the column pipe is equal to that of the discharge portal of the pump, both in inches, multiplied by four-ninths of the fourth root of the head expressed in feet, which conforms to the best pumping practice.

In answer to the question as to what is the cause of the overheating of the motor when a 4-in. suction is used instead of 5-in. suction, it can be said that the friction head is increased, by this change in the suction lift, about three times what it was in that lift, or, say nearly 5 ft. Judging from the data given, it appears that this pump is operating under a head greater than that for which it was designed and developing a very low efficiency.

EXAMINATION QUESTIONS

EDITED BY JAMES T. BEARD

Miscellaneous Questions

(Answered by Request)

Ques.—What are the dangers incidental to the operation of haulage on a steep slope and how would you guard against them?

Ans.—Haulage on a steep slope is subject to the following dangers: Cars may get loose at the top of the slope and run down the incline; the haulage rope or car couplings may break, allowing the trip or a portion of it to run back down the slope; men may be caught and injured or killed in attempting to travel up or down the slope; if the track is not well secured, danger may arise from its tendency to slip downhill, breaking a joint or otherwise dislocating the track and making a wreck possible. A wreck may also be caused if the empty trip is permitted to run down the slope with too great a speed.

To guard against these dangers, the top of the slope should be protected by suitable safety devices, such as safety blocks and automatic derailing switches to prevent cars running down the slope uncontrolled. A drag bar should be attached to the rear end of each trip hoisted. The haulage rope must be of sufficient strength for the load hauled, and inspected regularly at frequent intervals. All car couplings must be carefully made and have the required strength. These also should be inspected regularly and discarded when worn. The same is true also of the coupling pins and drawbars on the cars. The haulage rope should be recapped at least every six months or as often as may be necessary, as this is the weakest point in the rope and must be closely watched.

Men must never be permitted to ride on loaded trips or to travel the haulage slope when going in or out of the mine. The speed of haulage on a steep slope should be regulated not to exceed 8 miles per hour, or 6 miles per hour when hoisting or lowering men. The track in a slope must be well laid and secured from slipping downhill, and inspected regularly and cleared of all obstructions, such as coal or dirt that may fall from loaded trips. For the protection of the men working at the foot of a slope, there should be refuge holes cut in the rib and available for use in time of need. There should also be provided a good signal system and telephone or speaking-tube connection between the foot of the slope and the engine room.

Ques.—How would you protect a miner working at the face of a steep slope when hoisting operations are in progress?

Ans.—Refuge holes should be cut at frequent regular intervals in the rib, and a drag bar or "dog" attached to the rear of every loaded trip when it is being hoisted. As a further precaution men working at the face of a steep slope should cease work while the trip is being hoisted.

Ques.—What safety devices would you expect to find at a well-equipped shaft and on the hoisting machinery connected therewith?

Ans.—The top of the shaft should be protected by automatic safety gates arranged to rise and fall with the cage as it reaches and leaves the landing. The cage must be provided with a substantial hood or cover to protect men who are riding on the cage, from any loose material that may chance to fall into the shaft. The cage must also be provided with good safety catches operated by a strong spring. The winding drum of the engine must be provided with a powerful brake and there should be an indicator in the engine room, arranged to show the position of the cage in the shaft. In addition to such an indicator, the hoisting rope should be marked in a way to show the near approach of the cage to the upper landing to avoid danger of overwinding.

No engineer should depend entirely on the indicator to show him the correct position of the cage in the shaft, but must watch the marks on the hoisting rope as well. As an extra precaution against overwinding, many well-equipped mines have an automatic device that shuts off the steam when the cage has reached a certain position in the shaft; and, at the same time, the brake is applied to the drum to prevent the cage from being drawn into the headsheave.

Ques.—What tests would you make to assure yourself that these devices were in good condition?

Ans.—The safety devices requiring special tests other than a close inspection are the safety catches on the cage and the overwinding devices. In order to test the working of the safety catches, it has been suggested loading the cage and cutting the rope, or otherwise adopting an arrangement that will permit the cage to fall suddenly in the shaft, and observing the action of the catches to see if they arrest the fall of the cage. An overwinding device should, likewise, be subjected to the practical test to ascertain if it will properly perform the service intended.

Ques.—What is the horsepower of a pair of haulage engines, the diameter of the cylinders being 18 in., stroke, 32 in., number of strokes per minute, 30, pressure of steam, 40 lb.? The engine is geared as follows: The crank is connected to a shaft containing a pinion with 15 teeth, which drives a spur wheel having 75 teeth. On the same shaft containing this spur wheel is a pinion with 20 teeth, which drives a spur wheel on the drum shaft with 80 teeth.

Ans.—Since no mention is made of the cutoff in this engine, it may be assumed that the 40 lb. steam pressure is the mean effective pressure in the cylinder. The area of each cylinder is $0.7854 \times 18^2 = 254.47$ sq.in. The indicated horsepower developed in each cylinder is equal to the continued product of the mean-effective pressure in the cylinder (lb. per sq.in.), length of stroke (ft.), sectional area of the cylinder (sq.in.) and the number of strokes per minute. The horsepower is independent of the gearings, which need not be considered in this case.

$$I.hp. = 2\left(\frac{40 \times 2\frac{2}{3} \times 254.47 \times 30}{33{,}000}\right) = say\ 50\ hp.$$

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Coal Situation in England

The following account of the fuel situation in England is taken from a letter by C. W. Barron, which appeared in the Apr. 3 issue of the *Boston News Bureau*:

The economic foundation of England is coal. With coal she not only gives power to her ships, but economic balance to her trade. She exports coal to Argentina, or did before the war, and brings back the cheapest beef. Her ships carried coal for the round trip or could fill from English bunkers in ports around the world. You needed not to leave London to charter your ship and buy her coal supplies around the globe.

But England paid her coal producers an average pre-war wage of 6s. 6d. per day, or about $1.50. Measured by the day s work in the shift she paid 8s. 10d., or a little over $2 per day per working coal hand above and under ground. And per man there was never a ton of coal produced, only a fraction of a ton per man.

Higher Wages and Less Output

The war very nearly doubled the wages. The average in November, 1918, was 12s. 5d., or about $3 per employee, and 16s. 12d., or about $4 per man per shift. But the output per man diminished, due in part to poorer quality of employee as men were drawn off for the war, in part to the lengthening distances from the mining shafts, and in part no doubt to the labor union heresy of restricted output.

In South Wales the output per employee which had gone down from 269 tons to 243 tons from 1906 to 1913 fell to 224 tons in 1918. In this district labor cost per ton had more than doubled. Supplies had increased in cost per ton from 2s. 10d. to 8s. 10d. But it was the restricted output that troubled the country more than the cost, and Lloyd George in the fall of 1918 had to go personally to the coal-mining districts and stimulate the output with his inspiring addresses. He told the miners that they were the real fighters against the Huns and that more and more they must "heave coal at them."

When the armistice came there was another effort to increase the coal output, and 200,000 coal miners were given preference in demobilization. Other soldiers protested by riots. Coal was more sharply rationed than ever before in England, and the miners have now demanded a 30 per cent. increase in wages and a reduction from eight hours to six hours per day.

No Exports

A coal commission is now daily taking testimony, receiving volumes of statistics, sifting out the facts, and promises a report before April 1. If the demand is complied with it will add 9 shillings per ton to the price of coal, and this in turn will add 10 per cent. to the cost of steel making.

At today's prices, neither coal nor steel can be shipped abroad in competition with the United States, except by Government subvention or assistance in transportation.

There are one million men and two hundred thousand boys (under sixteen) and women who draw their wages from coal-mining, and of two hundred and seventy million tons produced in normal times, one hundred million tons go into ships in the proportion of about 25 million tons for bunker coal and 75 million tons for export.

England faces the situation calmly and fully understands that English coal which cost in 1913 eleven shillings per ton at the pit's mouth now costs 18s. and will cost not less than 26 shillings if the demands of the miners are granted and Lloyd George tells Parliament that Pocahontas coal in Virginia, the best that America now can produce, is now costing but 11s. per ton at the pit's mouth.

The American Competition

How to compete in the future with the United States paying twice the wages, yet producing coal at about one-half the English cost, presents many problems. Bunker coal f.o.b. in English ports is costing today 36 to 37 shillings per ton, or about $9. It is of course a controlled commodity, the Government naming the price, raking off a profit, and paying not less than 6d. per ton as expense of control.

Nevertheless the price of bunker coal f.o.b. at American ports is $5, or less than 20 shillings per ton. If the Government keeps the control, and adds 9s., or $2 per ton, the cost of English coal f.o.b. becomes more than double the ship's cost per ton in the United States.

Can England put in coal machinery? The answer is that English coal veins run down to 23 in. in width while American coal seams run up to 40 ft. in width, and in the United States 16,000 machines cut 253 million tons of coal, while in Great Britain 4000 machines cut only 27 million tons. In many mines a large part of the miner's day's work is consumed in walking between the shaft and the distant coal face at which he must work.

"Nationalize the mines," cry out the coal miners. Nationalization of coal mines has been a cry in English politics for a generation. It has taken on a new phase of late—a Bolshevik demand in some quarters—that as the Government wants output, and this is more important than profit, let the Government buy the mines and give them to the coal miners, who will run them for output for the public and profit for themselves. The miners say: "We know our own slackers and if we had all the profit we would quickly throw out all the slackers." Thus does Bolshevism in practice propose to undo the philanthropy of its theories. The main response in England is: "A man in this country shall get what he pays for; stealing is not yet recognized."

Combination to Meet Competition

There is one sensible suggestion, and that is to nationalize the mines by buying out the 1452 coal owners of whom 434 produce less than 2000 tons a year, and by consolidation of interests and concentrated energies reduce the expense and enlarge the output. It is thus proposed under the form of a national trust to remove the waste of disjointed ownership.

It would be a singular outcome if England should turn to a trust combination to meet American competition where the economies of combination in trust are forbidden under the Sherman law and the legal decisions superimposed thereupon.

Combination of mines may afford some relief, but confiscation of all the royalties and mining operators' profits would not give one-half the increased wages demanded by coal men. Royalties are about 6d. per ton and the pre-war profits per ton were only 1s. The coal operators' profits have been expanded during the war to 3s. 6½d. But of the 60 cents per ton increase the Government in excess profits and income taxes takes the major part.

As near as can be estimated the total capital in the English coal industry, not including freehold realty, is 128 million pounds sterling.

The Controlling Factor

The British official record shows that in 1916 the worker in the United States produced 896 tons of soft coal per annum, and in anthracite mines 548 tons of coal per annum. This compares with 207 tons of anthracite per man per annum in the mines of South Wales and only 222 tons of soft coal per man per annum in South Wales.

The comparison shows more than four tons of soft coal for the American worker as compared with one ton of soft coal for the English worker. Many mines in the United States have a much higher production per man, but the average English production in soft coal ranges from 230 to 260 tons per man per annum.

The coal hearing occupies a page or two in the daily press. But neither from the hearing nor the press will you learn the supreme and controlling fact and factor, if there is to be an international coal situation.

Please don't ask me where I get the fact or the figures, for they are not in the possession of any government and they cost too much money to be otherwise than privately controlled.

But the fact is that in normal times the United States has a 20 per cent. surplus coal capacity. Now as the production in the United States is twice that of Great Britain, the United States has normally a coal capacity that is 40 per cent. of the strained and maximum coal capacity of Great Britain.

Definite Program for American Shipping

Declaring for private ownership and operation of the American merchant marine, with Government control of the maximum rates to be charged American shippers, the American Manufacturers' Export Association has adopted resolutions which outline a practical plan for utilizing the $2,500,000,000 fleet which the country will own at the end of 1920.

In February Senator Ransdell, in a speech before the Senate, called upon the business men of the country for concrete suggestions as to the disposition and operation of the vessels which the nation has built or is building. In that speech he stated that at the end of 1920, if present plans were carried through, the United States would have expended $2,500,000,000 for Government-owned boats, and would have a total tonnage of 19,000,000 under the American flag. He declared that thus far no definite program had been adopted for utilizing this immensely valuable national asset.

The views of the exporting manufacturers who must use these vessels are expressed in the resolutions of the American Manufacturers' Export Association, which comprises 1200 of the larger manufacturers throughout the country. As adopted by the Board of Directors of the Association the resolutions read as follows:

"The nation's foreign trade cannot be successfully developed without an American merchant marine able to transport American products as cheaply, as regularly and as efficiently as products of other countries are carried.

"Our naval authorities have declared that both for the training of American seamen, and for the necessary victualing and sup-

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunker
Lamberts Point				
Mar. 24	Ital. S.S. Adriatico	Gibraltar, for orders (Italy)	6,675	814
Mar. 25	Amer. S.S. Lake Cayuga	San Juan, P. R.	2,331	230
Mar. 26	Amer. S.S. Rijswijk	Barbados, B. W. I.	1,996	405
Mar. 26	Amer. S.S. Alapaha	Mollendo, Peru	2,187	970
Mar. 27	Amer. S.S. Ulysses	Cristobal, C. Z.	12,031	1,224
Mar. 27	Nor. S.S. Stavangeren	Curacao, D. W. I.	1,146	245
Sewalls Point				
Mar. 26	Amer. S.S. Moraine	Pernambuco, Brazil	2,979	654
Mar. 28	Amer. S.S. Garibaldi	Rio de Janeiro, Brazil	3,184	1,135
Newport News				
Mar. 25	Amer. Sc. J. G. Shaw	Guayanilla Bay, P. R.	1,019	....
Mar. 26	Amer. S.S. Camaguey	Acajutla, San Salvador	2,742	566
Mar. 27	Nor. Sp. Gantock Rock	Rio de Janeiro, Brazil	2,266	....
Mar. 27	Nor. Sc. Pusey Jones III	Sanchez, D. R.	497	....
Mar. 27	Amer. S.S. Barnstable	Sagua la Grande, Cuba	1,271	218

plying of the Navy when operating in foreign waters, an auxiliary merchant marine is essential. In fact, the Secretary of the Navy, in a letter to this Association, said: 'I feel that the proper enlargement, the influence, and the wise use of such a merchant marine is the biggest question now to be solved by the American people.'

"The establishment and maintenance of an American merchant marine is therefore a matter in which every citizen of the country is vitally interested.

"Be it resolved therefore that the Board of Directors of the American Manufacturers' Export Association, after consideration of the problem, recommend the following means of utilizing the ships now built and building by the United States Government to the end that a permanent and available American merchant marine may be established.

"First—All ships owned by the United States Government or building or contracted for by the Government, should be sold to American ship operators at the earliest moment after proper basis for such sale can be established.

"Second—The price at which these ships are sold should not exceed the cost of foreign-built ships of the same class and tonnage.

"Third—The Government should exercise control to the extent of establishing maximum rates.

"Fourth—Some guaranty should be given to operators of American ships that under certain conditions and for a limited time they will be reimbursed for losses sustained in handling business at competitive rates where the revenue is not sufficient to cover operating cost."

The provision that private ship operators must be guaranteed against operating at a loss on rates fixed by the Government is based, it is explained, upon the fact that our present navigation laws compel the payment of higher wages upon American ships than are paid on the ships of any other nation.

Furthermore, to properly expand the country's export trade, new ocean routes must be established which cannot be profitable until a larger volume of trade has been built up.

The Export Association would guarantee private ship owners against loss while these conditions continue, but its resolution is framed to prevent a subsidy resulting in excessive profits. Private operators, under this last provision, would be guaranteed against unavoidable losses, but their profits would still depend solely upon their own efficiency and enterprise.

Italy's Coal Needs

That Italy needs 200,000 tons of semi-bituminous coal from the United States each month for at least a year, and that American coal producers have an opportunity to continue to hold whatever trade it may secure, is the declaration of Francesco Quattrone, the High Commissioner for Italy in this country.

Mr. Quattrone also stated there was no truth, so far as he knew, in the dispatches received in this country to the effect that Italian orders for 4,000,000 tons of American coal had been placed and that shipments were to begin shortly. He believes, however, that there is a splendid opportunity for operators in this country to secure new markets and that the coal is sadly needed if Italy is to meet the reconstruction period successfully.

The fuel situation in Italy is serious. Owing to conditions in England, that country finds it impossible to supply Italy with fuel as in former years. Italy is unable even to get sufficient coal to meet her minimum requirements for the railroads and industries, the normal needs being about 1,000,000 tons a month. At present there are no supplies of coal on hand, factories are suffering from the lack of fuel, while other industries are partially closed down.

Every effort is being made to meet the situation by encouraging the production of lignite and the burning of the best woods of the forests, which will of necessity create a shortage of lumber for building purposes.

During the war, said Mr. Quattrone, it was recognized that Italy could not afford to have less than 600,000 tons of coal a month. This tonnage was kept up for some time, but for the past several months has shown a decrease, so that in March of this year less than 400,000 tons were received.

The ports of Aveiro and Caminha, which had been closed by order of the Portuguese Government, have been reopened to navigation.

United States May Become Largest Coal Exporter

The serious complaints of a coal scarcity in Great Britain coupled with the proposition recently presented in Parliament for an investigation by a commission to be created by the King lends interest to figures compiled by the National City Bank of New York regarding the world's coal production in the last half century and the relative share of Great Britain and the United States therein.

The figures show that the coal output of great Britain grew from 124,000,000 short tons in 1870 to approximately to 255,000,000 in 1918, while the output of the mines of the United States grew from 33,000,000 tons in 1870 to 685,000,000 tons in 1918. The British output in 1918 was double that of 1870. The United States output in 1918 was 23 times as much as in 1870. In all parts of the world aside from Great Britain and the United States, the output grew from 80,000,0000 in 1870 to 500,000,000 tons in 1918, or about six times as much in 1918 as in 1870.

The United States produced about 14 per cent. of the world's output of coal in 1870, 80 per cent. in 1880, 28 per cent. in 1890, 32 per cent. in 1900, 39 per cent. in 1910, 48 per cent. in 1918. Curiously, however, the United States, although turning out two and a half times as much coal as Great Britain, has not been until very recently an exporter, in any considerable sense, of coal. Our exportation of coal had never reached as many as 20,000,000 tons prior to 1913, and even in the highest war record of exports only reached 26,000,000 tons in the fiscal year 1918, the highest record ever attained. On the other hand Great Britain's exportation of coal was in 1913, 72,000,000 tons, or nearly four times as much as that of the United States in that year, in 1910 62,000,000 tons against 13,000,000 tons exported by the United States.

Growth in production in very recent years has been much more rapid in the United States than in Great Britain or Germany, or in fact any other part of the world. Our own production of coal, according to the bank's statement, grew from 270,000,000 tons in 1900 to 685,000,000 in 1918, while that of Great Britain was, in 1900, 252,000,000 tons, and in 1918, 255,000,000 and that of Germany 165,000,000 tons in 1900 and 260,000,000 in 1915, the latest year for which figures are available. In the remainder of the world output in 1900 was only 160,000,000 tons, and in 1918 230,000,000 tons.

The possibility of the United States becoming a large exporter of coal and perhaps the world's chief coal purveyer looks comparatively easy when the relative supply of coal is compared in the various sections of the globe. The world's total available stock of coal is 7,397,553,000,000 metric tons, of which the United States has 3,838,657,000,000, or 52 per cent. of the world's total. Canada ranks next to the United States, with 1,234,260,000,000 tons; China, 995,587,000,000; Germany, as it existed in 1913, 423,356,000,000; Great Britain, 189,533,000,000; these figures being supplied by the Geological Congress held at Toronto in 1913.

Miscellaneous Notes

The National Bank of Denmark is raising its discount rate from 5 per cent. (at which rate it has been since July, 1915) to 5½ per cent.

Coal cargoes passing through the Panama Canal during the week ended Mar. 15 are as follows: Norfolk to Pearl Harbor; Norfolk to Arica; Norfolk to Puget Sound; Philadelphia to Pearl Harbor; Norfolk to Antofagasta; Kingston to Callao.

Copenhagen harbor authorities are proposing a budget for 1919 in which the fees are to be increased to cover the expenses. The 100 per cent. increase now applying will be in force for all of 1919 for all fees levied on imported goods, while the increased quay and mooring fees will only be maintained provisionally for six months of 1919. It is estimated that at the end of 1919 the harbor authorities will have a cash fund of over $6,000,000.

Industries in Greece were severely crippled during the war for want of fuel and labor. They have, however, during the months of December, 1918, and January, 1919, received a stimulus in the freeing of some coal and other fuel by the local ministries and in the granting by the military authorities of long leaves of absence to mobilized men.

Coal and Coke Exports in February

Exports of coal and coke, as reported by the Department of Commerce for February, 1919, and the figures for February, 1918, as finally revised, are as follows:

(In Tons)	February 1918	February 1919
Coal		
Anthracite	227,319	221,018
Bituminous	919,999	713,951
Exported to:		
Italy	1,000	4,933
Canada	578,442	446,429
Panama	42,332	8,661
Mexico	12,967	5,142
Cuba	145,104	40,644
Other W. Indies	13,313	16,965
Argentina	22,609	38,993
Brazil	64,747	67,825
Chile	.....	49,056
Uruguay	2,755	12,007
Other countries	36,730	23,296
Coke	83,758	48,806

All imports of coal during February were from Canada. They aggregated 55,834 tons.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Mar. 31 states that freight market conditions have not altered during the week under review.

The Chartering Committee's rates are as quoted below:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge. Rio, $19.50 net, 1000 tons dis.; Santos, $19.50 net, 1000 tons dis., or $21 net, 600 tons dis.; Buenos Aires, $18.50 net, 600 tons dis.; Montevideo, $19.50 net, 750 tons dis.; Pernambuco, $18.50 net, 500 tons dis. To Nitrate Range, $16.50 gross prepaid.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net.; Santos, $19.50 net; Rio Grande do Sul, $21.50 net, 400 tons dis.; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. To Nitrate Range, $16.50 gross prepaid.

England Losing Coal Contracts

Considerable comment has appeared in both the American and British press relative to the recent American contracts for export coal. Before the war England was able to sell coal far more cheaply than could the United States, not only in Europe, but in America. At the present time several large coal buyers who formerly purchased Welsh coal, are giving their orders to American firms. Thus, Teneriffe has contracted for 100,000 tons of American coal; Italy for 80,000 tons; France, 50,000 tons; and the Swedish Government 250,000 tons for the state railways.

It is said that the Central Brazilian Railway Co. has bought 600,000 tons of American coal at 144 francs ($28.80) a ton, which is reported to be below the present English price.

Would Embargo United States Coal

A deputation from the Nova Scotia Federation of Miners, it was announced at Halifax, N. S., on Mar. 31, will wait on the Government authorities at Ottawa soon to discuss with them the feasibility of placing an embargo on United States coal. Owing to lack of ships, several Nova Scotia mines have been closed and considerable unemployment is reported to exist, it is said, because of the curtailed market due to loss of the bulk of the St. Lawrence coal trade to American operators.

American bituminous coal is now said to be finding its way into New Brunswick through Quebec. At a recent informal conference between miners' delegates and members of the legislature, it was stated that the Nova Scotia coal mining situation had reached an acute stage.

COAL AND COKE NEWS

EDITED BY ALEX MOSS

Harrisburg, Penn.

Recognizing the demand from large employers of labor that ample time should be given for consideration of the many proposed changes in the Workmen's Compensation law, Harry A. Mackey, chairman of the board which framed the draft of the bill, at the opening of a meeting held on Apr. 1, announced that any public discussion of the merits of the bill at this time would be deemed unfortunate, for the reason that it might lead to acrimonious debate, eventuating possibly in serious misunderstanding.

The sensational statement was made at the conference, just before an agreement was reached, to hold another meeting to discuss the matter on Apr. 15, that Pennsylvania mines might be compelled to suspend operations unless the Federal Government shall change its plans for dealing with coal-producing companies. Henry I. Wilson, representing the Central Bituminous Operators' Association, asked for time to figure out what the amendments would cost the operators, and in this he was joined by the Pennsylvania Manufacturers' Association and Henry A. Gordon, of Wilkes-Barre, representing the anthracite operators. The labor people were against granting an extension of time.

In a statement issued Apr. 4 Governor Sproul declared that after a study of the anthracite situation, including the wage question, railroad rates and conditions in general, he had come to the conclusion that the increase of 10 cents a ton for five months beginning May 1, recently announced by the operators, is justified.

The governor attacked railroad rate inequalities, gave figures showing the cost per long ton of coal delivered on trestles in several eastern Pennsylvania cities, and said that the advance was necessary in order to maintain the wage schedule for miners and to prevent derangement in the trade. The governor also advocated the establishment of municipal fuel markets for the sale of coal at cost.

Uniontown, Penn.

Brought back to life after having been permitted to lapse for the duration of the war, the Coke Producers' Association, an organization of 35 merchant operators of the Connellsville field, is giving promise of growing into an active agency through which the Connellsville coke region may be represented in matters pertaining to the entire coke industry. The crisis in the present industrial uncertainty has resulted in binding the operators together into a compact body for their mutual benefit in working out a solution best applicable to the coke industry.

That solution is now being sought through a series of almost daily conferences among the region's leading producers. Virtually all of the largest independent operators have offices in Uniontown, or have representatives here, and it is a simple task to call them together in conference. It is expected that within a week or ten days a definite statement will be made by an appointed spokesman of the organization outlining the conclusions reached at the conferences.

Coal shipments down the Monongahela River during the first three months in 1919 almost doubled those of the corresponding period in 1918. The shipments for March alone were 24,274,000 bushels, an increase of 4,000,000 bushels over January and February. Combined, the shipments for the three months were 67,715,000 bushels as against 35,477,000 bushels during the first three months of 1918.

Charleston, W. Va.

Decreases in production during the last week in March featured mining conditions in West Virginia, these being traceable directly to embargoes which shut off the shipment of coal from the New River, Pocahontas and Fairmont regions. Indirectly, of course, there were slight decreases due to the general condition of the market. In contrast to conditions affecting eastern shipments was a perceptibly steady improvement in the demand from the west, as seen in an increased production in fields essentially engaged in shipping coal to that consuming area. The increases did not average over 3 or 4 per cent., but were highly encouraging.

Taking the state as a whole, production was much under 50 per cent., and mines were not operated as a general average more than two days during the week. Of considerable help in keeping up production were heavy navy shipments. While transportation facilities were much improved over the earlier part of March. the labor shortage became a little more pronounced, though not sufficient to interfere materially with production under present circumstances.

West Virginia producers are looking forward to the opening of the lake season by Apr. 15, when they anticipate an increased production. Renewal of contracts and the signing of new contracts, effective Apr. 1, is counted upon to give impetus to production in all the fields of the State.

Victoria, B. C.

"This year the coal mines of the northwest will not operate 40 per cent. of the time, which means a heavy expense for operators," stated James S. Ramage, head of the Continental Fuel Co. and the Hawkeye Fuel Co., recently in Spokane. "For some time," he continued, "there has been serious over-production of coal in Canadian and other districts from which Spokane City receives its supply. About 80 per cent. of the steam coal used here comes from the Canadian mines, and a serious situation has developed in that country as is evident by a recent report issued by the Workmen's Compensation Commission making the definite statement that cost of labor in producing coal is $2.60 a ton, which is above previous calculations and more than in other fields with which Canada competes."

As to the situation in western Canada in regard to coal production and trade, it is interesting to note the comments of Premier Charles Stewart, of the Province of Alberta, made recently to the Legislative Assembly of that Province. He pointed to the stored up surplus of 2,000,000 tons of coal and admitted that the position was a serious one, especially with the embargo taken off American coal and with production costs at a high level. The premier declared that the only solution of the problem was the reduction in the price of coal to the extent of at least $2 a ton, in order that American competition might be met. This reduction, he said, had to be achieved by cutting the price of production, though some slight decrease might be attained in freight rates. He believed that the difficulty might be remedied, at least in a degree, by lengthening the time of production, assuring the miners of steady work for a period of eight months in the year instead of but six months as at present. While Premier Stewart declared that he was against cutting wages, his remarks led to the conclusion that, with the lengthening of the period, the miners' daily wage would have to come down. He virtually admitted, however, that the Alberta Government was helpless in face of present conditions.

New York, N. Y.

The strike of harbor workers appears to be as far from settlement as ever. As a result of a conference held last Saturday night in the Hotel Manhattan between representatives of the Boat Owners' Association and the strikers' representatives, it was decided that the strikers' organizations would on the following Monday vote on a proposition involving an increase in wages, said to be 15 per cent., and a 10-hour day. The original demands included a larger increase in wages and an 8-hour day.

When the vote was announced late on Monday of this week it showed that the proposition was rejected by a vote of 300 to 29, the majority holding out for an 8-hour day. Several meetings have been held during the week but the strikers appear to be "standing pat" for at least the shorter working day.

The breach between the Tidewater Boatmen's Union and the remaining organizations in the Marine Workers' Affiliation seems to be broadening. The former organization accepted the terms of the boat owners early last week and broke away from the Affiliation.

The failure of the men and employers to come to an agreement concerning their difficulties is likely to prove serious to coal consumers here, should it continue much longer. With the decision of Governor Sproul of Pennsylvania sustaining the producers' announcement of an increase in prices it is expected that users of coal will want their next winter's supply put away.

It is expected that representatives of the United States Department of Labor, who have been endeavoring to bring about a settlement, will now make further efforts to effect an agreement and insist that the owners and strikers should consider the public and come to terms.

PENNSYLVANIA

Anthracite

Shickshinny—The Stackhouse Coal Co. on Apr. 1 ceased work for thirty days to permit the company to make needed repairs to the machinery. Several hundred men and boys will be thrown out of work.

Kulpmont—The Susquehanna Collieries Co.'s mammoth breaker at Scott colliery was menaced by fire which destroyed the carpenter, machine, repair and blacksmith shop immediately adjoining the breaker. The fire, caused by defective wiring, was discovered by a night watchman.

Peckville—The Mount Jessup Coal Co. has brought suit in equity against the Winton Coal Co. for an injunction restraining the latter from carrying out an alleged forfeiture of mining rights. In the bill the Mount Jessup company states that during the past ten years it has paid to the Winton concern, lessors of the tract, $393,961.88.

Coleraine—While mining conditions at present are slack, anthracite operators are preparing for a return of brisk times in the market. The Beaver slope of the E. S. Van Wickle Estate Co., abandoned 25 years ago, and filled with water ever since, is being pumped out. The coal remaining will be removed.

Plains—Alleging that the defendant company mined, removed and sold over 125,000 tons of coal of small sizes and failed to account therefor, heirs of the estate of J. Robinson Williams have brought suit in equity against the Lehigh Valley Coal Co., in which they ask the court to decree an accounting for all moneys withheld. The suit is based on a coal lease made in 1872.

Shamokin—Sparks from a motor-driven generator set fire to the engine house of No. 6 slope, Hickory Ridge Colliery, operated by the Susquehanna Collieries Co., on Apr. 1, completely destroying the building and ruining the big motors used in hoisting coal from the mine. Several hundred men and boys have been thrown out of employment.

Raven Run—Under the direction of several state mine inspectors and mine officials, every effort is being made to get control of the fire raging in the Girard Mammoth Coal Co.'s mine. Concrete barriers have been constructed, sealing that portion of the mine on fire and cutting off the air currents. By this method officials hope to confine the blaze to the slope workings in which it started. For some time, a culm bank has been burning near the mine, and all efforts to extinguish it have been of no avail. It is thought that when the wind was blowing with the force of a gale on Mar. 27, the fire was carried down an old slope into the mine, where workmen discovered that the coal had ignited.

Pottsville—The Philadelphia & Reading Coal & Iron Co. is planning to apply to the United States Supreme Court to appeal from the decision of the local referee awarding the sum of $5800 to Mrs. John Hancock as compensation for the death of her husband, which occurred near Locust Gap. Mr. Hancock was employed upon a trip between the Locust Gap colliery and

the road at Locust Summit, over which the coal from the colliery is shipped to Shamokin scales. It is held by the company that Mr. Hancock was engaged in interstate commerce in his employment, and it is contended by the attorneys for Mrs. Hancock that the coal was not in interstate commerce until reclassified at the Shamokin yard. It is noted that thus far every court, including the State Supreme Court and the State Compensation Board, has decided in favor of Mrs. Hancock as regards this very fine legal point.

Bituminous

Brownsville—The H. C. Frick Coke Co. has closed down its Fairchance coal and coke plant, located near here, indefinitely.

Brinkerton—The H. C. Frick Coke Co.'s stables at the Mutual No. 4 mine at this place were entirely destroyed by fire the night of Mar. 30, causing a loss estimated at $15,000, partially covered by insurance. Thirty-two horses perished in the blaze, only two animals being rescued. The fire is believed to have been of incendiary origin.

WEST VIRGINIA

Charleston—The Gallatin Mining Co., which has been operating on Wet Branch of Cabin Creek in the Kanawha County field under a lease from J. C. Blair, has subleased the plant to the Wet Branch Mining Company.

Welch—Develcpment work will be undertaken in the near future or as soon as circumstances seem favorable, by the Pulaski Iron Co. on holdings of the company near this place. Percival Johnson, of Pulaski, Va., is the general manager of the company.

Huntington—The Logan Fuel Co., recently chartered, expects to confine its activities for the present to the sale of coal produced in the Thacker, Logan, Kanawha, Pocahontas and New River fields. A. H. Land has been elected president of the company. Others interested are L. B. Ramsey and C. H. Land, the latter of the First National Bank of Logan.

Fairmont—Affairs of the defunct Dakota Coal Co. were wound up when the trustees in bankruptcy of that company presented their report to the former stockholders of the company and paid over $5000 to the stockholders, the bankrupt company thus being able to meet more than all its outstanding indebtedness. This, however, became possible through the purchase of the plant and assets of the company some time ago by the Jamison Coal and Coke Company.

Fayetteville—Work has been started on the plant of the Simrall Coal Co., chartered a month or so ago, a force now being engaged in grading for a sidetrack to the company property in the Winding Gulf field in Raleigh County, where the company has two seams awaiting development —the Beckley and the Pocahontas—surveys of the property having been completed. A number of miners' dwellings will be erected between now and the first of the year, when the company expects to begin operations. Dr. Gory Hogg is president of the company; P. M. Snyder, vice president, and F. D. Drumheller, secretary-treasurer. Among others interested is S. A. Scott of the New River Company.

Morrisville—The Rich Block Coal Co. has changed hands, Charles H. Bronson, J. L. Broh and others of Huntington having acquired the property and assets of the company, the plant being located near here. The officers are: Charles H. Bronson, president; I. J. Rhodes, of McDowell County, vice president; H. L. Broh, of Huntington, secretary-treasurer. The Rich Block Co. originally represented the investment of Roanoke men, having been placed in operation about two years ago. The plant was shut down on Jan. 1 and since that time has not been in operation. Just as soon as a number of improvements contemplated are finished the company hopes to be able to start operations again and on a larger scale than has heretofore been the case.

KENTUCKY

Hellier—The Allegheny Coal and Coke Co. is understood to have completed plans for the construction of the proposed new coal tipple at its plant.

Lynch—The United States Coal and Coke Co. at this place is increasing its development in order to ship 300 cars of coal daily to Gary, Ind., for the United States Steel Corporation.

Hazard—A slate slide in the mine of the Midland Mining Co., on Lotta Creek, resulted in the death of two miners, who were working on the face of a seam. Two other men in the same room were uninjured.

ILLINOIS

Auburn—An explosion in which two miners were killed, occurred early Saturday morning, Mar. 29, at the Panther Creek mine at this place.

Taylorville—Mine No. 8 of the Peabody Coal Co., located here, has been closed for two weeks during which time the machinery will be completely overhauled. About 500 men are temporarily thrown out of employment.

Maryville—The water train on the Troy & Eastern R.R., which supplied the Donk Bros. mine here, has been taken off because the mining company has laid a pipe line to a spring half a mile away which gives promise of supplying all the water that is needed.

Matherville—The mine of the McCraney Sand and Gravel Co., of Rock Island, Ill., has closed down, all the coal having been worked out. It is probable that the tipple will be taken down and moved away. About 25 men were employed in the mine when it closed.

Duquoin—Work has been started on the reopening of the old Barwell mine, which is located on the Wabash, Chester & Western R.R., west of here. Operations are being pushed by a new concern known as F. Soper & Co., of Cutler. The mine was abandoned some time ago, and it will be a long while before the mine is in working condition.

Belleville—State Mine Inspector Wright has filed suit in the court of Justice Wangelin against the St. Louis & O'Fallon Coal and Mining Co., alleging that it has violated the state mining law by failing to provide an adequate washhouse at the so-called Nigger Hollow Mine No. 2, and failing to provide water under proper conditions. The mine employs between 500 and 600 men.

Carlinville—For the second time in a month the record for coal hoisted in a day was broken Saturday, Mar. 29, at the Standard Oil Co. mine here. The day's hoist was 1212 loads, or 968 tons. The mine is being operated every day. Coal is also being produced at the Standard mine at Berry, and the finishing touches are being given to the installation of machinery. Coal is being taken from both the main shaft and the air shaft of the big mine at Shafer, which, when all the machinery is installed, will be the largest producer in the world.

Valier—The village of Valier, east of Duquoin, is rapidly developing into a thriving mining town as a result of the construction of what will be one of the largest mines in the state when completed. The mine, which is on the Burlington R.R., and is owned by that company, was started about a year ago. At the present time several hundred tons of coal are being hoisted each day from the air shaft, while a new steel tipple is being erected at the main shaft. New houses have been built in the town, and at the mine one engine-house, supply-house, washhouse and office building have been finished. A hospital will be erected at the mine in the near future.

TEXAS

Rockdale—The Federal Fuel Co. is understood to be arranging plans for the early commencement of work on the development of a total of about 1400 acres of lignite coal properties in the vicinity of Rockdale, the works to have a capacity of about 1000 tons daily. Headquarters of the company are in the Scanlon Building, Houston. Henry G. Butler is vice president and general manager.

COLORADO

Trinidad—An explosion in the Empire mine of the Empire Coal Co., near Aguilar, on Mar. 31, caused the death of eleven men. At this writing rescue crews are searching for two additional bodies believed buried. Six bodies have been brought to the surface and the bodies of five other dead have been located. Of 36 men who were in the mine when the explosion occurred, 23 made their way out through a connecting shaft.

OREGON

Marshfield—The Southern Pacific Company, which has recently purchased the Beaver Hill coal mine, plans developments to increase the coal output.

Foreign News

Merritt, B. C.—Work has been resumed at the Diamond Vale coal mine.

Personals

George Ing, engineer of the Black Diamond Coal Co., Marion, Ill., has resigned to accept a similar position with the Bell Coal Co. at Zeigler, Illinois.

R. E. McLain, until Jan. 15 superintendent of the Hewittville mine at Stonington, Ill., has been appointed superintendent of the Peabody mine at Stonington, succeeding Superintendent Anderson, who goes to Kentucky.

Lieutenant-Commander H. J. Elson, U. S. Naval Reserve, has been released to inactive status and has resumed his civilian work as secretary and treasurer of the Walter A. Zelnicker Supply Co., of St. Louis, Mo., with which company he was in charge of internal management and manufacturing operations.

E. C. Cherrington and **T. R. Cooley,** who for the past few years have been in the sales service department of the Cutler-Hammer Manufacturing Co. at Milwaukee, have been transferred to the Pittsburgh office of the central district, Mr. Cherrington becoming office manager and Mr. Cooley, engineering correspondent.

Lieut. A. Koenig, of the coast artillery, has been discharged from the service and has joined the forces of the Advance Machinery and Supply Co., Denver, Colo., as sales engineer. Lieutenant Koenig graduated from the Electrical Engineering Department of the University of Colorado in 1913 and has spent about four years in the employ of the General Electric Co., Schenectady, N. Y. The last two years of this time was spent in the Experimental Department.

Charles L. Smith, who has become associated with the newly formed St. George Coal Co., 149 Broadway, New York City,



CHARLES L. SMITH

was connected with Whitney & Kemmerer for 12 years. Mr. Smith came to New York from Pittsburgh in 1899 and became associated with J. Samuel Smoot, now a vice president of Burns Brothers. He remained with Mr. Smoot until 1907, serving as Deputy Commissioner of the Coal Merchants' Association of New York the last three years of that time, Mr. Smoot at that time being the Commissioner. During his connection with Whitney & Kemmerer Mr. Smith was city salesman for that concern and has been largely interested in the trade of large steam consumers. In addition to his other duties, Mr. Smith has for 15 years been the eastern representative of the *Retail Coalman* of Chicago.

Obituary

E. B. Sturgis, president of the Pinehill Coal Co., with offices at 17 Battery Place, New York City, died Tuesday, Apr. 8, at his home in Scranton, Penn. He was in his 74th year and had been in the coal business for upward of 50 years.

William Clayton, a pioneer coal operator of Illinois, died a few days ago at the home of his son, Thomas Clayton, near Collinsville, Ill. He was 80 years old. Thirty-five years ago he sank the first mine shaft in the vicinity of Collinsville. This was followed by another. Both mines were sold to the Consolidated Coal Co., of St. Louis. He was born in England, but came to America in 1863. Until the war prevented he made an annual trip to England. His last voyage was made on the "Lusi-

tania" a few months before it was sunk. Since he retired from mining he has lived on a farm.

Coming Meetings

Illinois Mining Institute will hold its annual meeting May 22, 23 and 24. Secretary, Martin Bolt, Springfield, Ill.

National Coal Association will meet May 21, 22 and 23, at Congress Hotel, Chicago, Ill. Secretary, J. D. A. Morrow, Washington, D. C.

International Railway Fuel Association will hold its annual meeting May 19-22 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

Indiana Retail Coal Merchants' Association will hold its annual spring meeting Apr. 23 and 24 at Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind., subject to ratification of executive committee. Secretary, J. W. Paul, Pittsburgh, Penn.

American Manufacturers' Export Association will tender a luncheon at 12:30 p.m., to all its members who may be in attendance at the National Foreign Trade Convention in Chicago, Apr. 25 to 26, at the Congress Hotel.

Kentucky Mining Institute after having skipped two years, one on account of the war and the other due to the influenza epidemic, expects to hold its annual meeting this year. While the date and place of meeting have not definitely been set, it will probably be held on May 30 and 31 at Lexington, Ky. Secretary, C. W. Strickland, Huntington, W. Va.

Recent Coal and Coke Patents

Furnace. C. D. Mosher, New York, N. Y., 1,289,037. Dec. 24, 1918. Filed Aug. 9, 1917. Serial No. 185,227.

Ash Sifter. H. C. Miller, Parkesburg, Penn., 1,288,958. Dec. 24, 1918. Filed June 2, 1917. Serial No. 172,514.

Mine Car Wheel and Axle. T. A. Parker, Brazil, Ind., 1,289,249. Dec. 31, 1918. Filed Apr. 30, 1918. Serial No. 231,638.

Smoke Washer. R. J. Johnson, Lake Benton, Mich., 1,289,797. Dec. 31, 1918. Filed Mar. 1, 1918. Serial No. 219,929.

Smoke Washer. S. W. Glassford, Sr., Cleveland, Ohio, 1,289,439. Dec. 31, 1918. Filed June 8, 1916. Serial No. 218,843.

Manufacture of Coke. A. McD. Duckham, Ashstead, England, 1,289,045. Dec. 24, 1918. Filed May 19, 1915. Serial No. 29,145.

Attaching Device for Miners' Cap Lamps. J. M. Brock, Brooklyn, N. Y., 1,289,631. Dec. 31, 1918. Filed June 19, 1918. Serial No. 240,870.

Automatic Coaling Station. M. Miller and T. S. Leake, Chicago, Ill., 1,288,959. Dec. 24, 1918. Filed Apr. 27, 1914. Serial No. 834,796.

Coke Oven. R. S. Moss, Chicago, Ill., and A. Roberts, Evanston, Ill., 1,289,870. Dec. 31, 1918. Filed Jan. 7, 1914. Serial No. 810,809.

Mining Machine. N. O. Levin, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,290,022. Dec. 31, 1918. Filed Aug. 7, 1913. Serial No. 783,564.

Furnace Cleaning Door. C. E. Robinson, assignor to E. Keeler Co., Williamsport, Penn., 1,289,917. Dec. 31, 1918. Filed Feb. 28, 1918. Serial No. 219,574.

Pulverized Fuel Burner. H. S. Flanegin, assignor to Eastern Steel Co., Pottsville, Penn., 1,289,144. Dec. 31, 1918. Filed May 15, 1916. Serial No. 97,666.

Mining and Loading Machine. N. O. Levin, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,290,020. Dec. 31, 1918. Filed Aug. 7, 1913. Serial No. 783,564.

Coal Loading Shovel. W. Ferris, W. M. Bager and M. L. Fykse, assignors to Bucyrus Co., S. Milwaukee, Wis. 1,289,426. Dec. 31, 1918. Filed Apr. 28, 1917. Serial No. 165,215.

Trade Catalogs

Sullivan Drill Sharpener.—Sullivan Machinery Co., Chicago, Ill. Bulletin 72-C. Pp. 24, 6x9 in., illustrated. A compressed air machine for making rock drill and hammer drill bits by hammering.

Flory Hoists. S. Flory Manufacturing Co., Bangor, Penn. Catalog No. 26. Pp. 160, 6 x 9¼ in., illustrated. Eighth edition of the company's catalog of improved hoisting engines and other machinery.

Deister-Overstrom Diagonal Deck Concentrating Tables. Deister Concentrator Co., Fort Wayne, Ind. Bulletin No. 3. Pp. 24, 9 x 6 in., illustrated. Descriptive of the company's diagonal deck types of ore concentrators.

"Imperial" Tie Tamping Outfits. Ingersoll-Rand Co., New York, N. Y. Form No. 9123. Pp. 24, 6 x 9 in., illustrated. Profusely illustrated catalog showing application of outfit on many railroads in the United States.

C-H Wiring Devices—Push Button Specialties. The Cutler-Hammer Manufacturing Co., Milwaukee, Wis., Catalog. Pp. 64, 8 x 10½ in., illustrated. Lists describe and give prices of a full line of push-button sockets.

Plymouth Gasoline Locomotives. J. D. Fate Co., Plymouth, Ohio. Catalog No. 4. Bulletin O. Pp. 8, 8½ x 11 in., illustrated. Gives views of these motors in use at the coal mines and quotes from the testimonials of a number of large operators.

Wheeler Steam Jet Air Pump. Wheeler Condenser and Engineering Co., Carteret, N. J. Premliminary Bulletin No. 113. Pp. 8, 8 x 10½ in.; illustrated. Explains the operating principles of the pump and gives reasons for high efficiency. The inter-condenser is minutely described. The pump is applicable to jet condensers as well as to surface condensers.

Industrial News

New York, N. Y.—Charles F. Ames & Co., Ltd., 90 West St., have been appointed to act as the New York sales department of the Platt Iron Works, of Dayton, Ohio, manufacturers of pumping and power plant equipment.

Chicago, Ill.—F. V. Sargent has been appointed by the Chicago Pneumatic Tool Co. as district manager of sales in the Boston territory, succeeding F. S. Eggleston. Mr. Sargent's headquarters will be at 182 High St., Boston, Mass.

Charleston, W. Va.—Further development of Elk River territory is indicated by the execution of a lease on 113 acres from E. J. and W. E. Thomas to J. G. Vaughn, and should conditions become propitious further plans will be made for mining coal.

Orange, N. J.—The Edison Storage Battery Co. has a new price list, effective Mar. 1, 1919, reducing the price of type A, B and G Edison cells approximately 16 per cent. This company is also boosting prosperity by using the slogan: Procrastination murders industry—stir things up!

Wilmington, Del.—E. I. Du Pont de Nemours announces that effective Apr. 1, T. E. Doremus has been transferred to the E. I. Du Pont de Nemours Export Co. as general eastern manager, with headquarters in Shanghai, China. E. R. Galvin has been appointed manager of the sporting powder division to succeed Mr. Doremus.

Petros, Tenn.—The State Board of Control has recently awarded contracts for the furnishing of the necessary washing machinery, conveying and elevating equipment, belting, etc., to be used in connection with the construction of the new coal tipple at its Brushy Mountain mines, to replace the structure recently destroyed by fire.

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces the discontinuance of its office at Wichita, Kan., and the transfer of stock to Eldorado, Kan., where an office and warehouse have been established. The company also announces the opening of a new office at Tulsa, Okla., 313 Richards Building, with warehouses at 102 No. Cheyenne Street.

Louisville, Ky.—Western Kentucky coal operators have petitioned the Louisville District Freight Traffic Committee for establishment of a rate of $1.35 from the section to Camp Taylor, at Louisville, as against a present rate of $1.40 to $1.60 per ton, and further requests that the rate of $1 per ton from southern Indiana be raised to $1.35, alleging that discrimination is now practiced.

Buffalo, N. Y.—Work on the byproduct plant of the Donner-Union Coke Co., which was suspended when the armistice was signed, has been resumed, the Government taking part. A large force is employed, but the work will take several months. The plan is for the Bonner and Union furnaces in the city to use the coke in their furnaces here. It is reported that the coke ovens of the Lackawanna Steel Co. will also be rebuilt.

Morgantown, W. Va.—The Department of Mining, West Virginia University, has issued a poster descriptive of its short course in coal mining, which begins June 16 and ends July 26, 1919. At the close of the course the State Mining Department will conduct an examination for mine foreman and fireboss certificates. The poster is quite complete with information. It contains the list of subjects to be taught during the course and gives the schedule of classes.

St. Louis, Mo.—The Standard Rail and Steel Co. announces that I. H. Cohn, formerly of the National Steel Rail Co., has become associated with the company and will be in complete charge of the rail department, handling all matters relative to relaying rails and railroad equipment. The modern plant of the company in Madison, Ill., is now nearing completion. On and after Mar. 31, 1919, the company will occupy Suite 1108-1115, Boatmen's Bank Building, St. Louis.

Charleston, W. Va.—The Lewiston Black Coal Co. will hereafter conduct operations on a more extensive scale at Seth, Boone County, where the plant of the company is located, this operation being on Coal River. The capital of the company has been increased to $100,000. It is proposed to install an electric power plant and electrical machinery throughout, giving the plant a capacity of about 140,000 tons a day. Coal will be mined in the Cedar Grove seam, which at this company's mine is about 5 ft. thick.

Cumberland, Md.—The statistics of the Cumberland coal trade for the year 1918, recently compiled from official sources by the auditor's office of the Cumberland & Pennsylvania Ry., Cumberland, shows a total production of 7,122,441 tons for the Georges Creek and Upper Potomac region in West Virginia. Of this amount 3,205,500 tons were from the Maryland or Georges Creek field and the remaining 3,916,551 tons from the Upper Potomac field. The total output of the two fields has been exceeded in only three previous years—1906, 7,188,033 tons; 1907, 7,360,336 tons; 1910, 7,148,968 tons.

Morgantown, W. Va.—Weather conditions permitting, there will be no further delay in the completion of the Indian Creek & Northern R.R., a coal-carrying road which is being built into the Empire tract in Monongalia County in order to permit the New England Fuel and Transportation Co. to open mines and develop its large holdings in the county. It will require five months to complete construction work started last year, but which was suspended during the winter months. The coal company is going ahead with its work of making openings and getting ready for operations on a very large scale.

Jefferson City, Mo.—The lower House passed the Washhouse Bill on the fourth instant. This bill, which requires all mining companies in the State of Missouri to provide hot and cold water showers for their employees, is one that prevails in nearly all the mining states, with the exception of Missouri. The bill will work a hardship on many of the mining companies, for all companies that have more than five employees come under the law. There are a lot of little strip mines and little drift mines that will evidently have to close down because they cannot stand the expense. A large number of these mines are what is known as "local mines," which provide coal for the little communities close by in the winter months.

St. Louis, Mo.—The Interstate Commerce Commission, in a brief forwarded by Joseph W. Folk, general counsel of the St. Louis Chamber of Commerce, is asked to throw out in its entirety the report recently filed by Examiner Mackley, which held that the bridge arbitrary of 20c. a ton on coal transported from East St. Louis to St. Louis is justified. The examiner's report, he declares, is based on erroneous assumptions and erroneous conceptions of law. He asks that the Commission require the railroads to make and maintain a basis of group rates from the Illinois mines to St. Louis, East St. Louis, Dupo, Venice, Madison and Granite City, composing the St. Louis industrial district. In his brief Folk takes 25 exceptions to the findings of the examiner. The arbitrary has been in dispute for several years, and has been in litigation and before the Interstate Commerce Commission much of the time.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Railroad Fuel Controversy Still at Its Height—Buying of Bituminous Still of a Desultory Character—Contract Business Being Closed—Best Grades of Soft Coal in Demand —Anthracite Investigation Discloses That Price Increase Was Justified

OF CHIEF interest in the coal situation during the past week was the turn of events in the railroad fuel controversy. The Railroad Administration has come out flat-footed against a price-fixing program. Until this vexatious question is settled the general market cannot be said to be on a firm basis.

The efforts of the Industrial Board of the Department of Commerce to promote business activity by stabilizing prices have, by the attitude of the railroads, been brought to naught. The steel men, who had taken it for granted that the Railroad Administration would purchase rails after they had reduced prices from 10 to 14 per cent., are now disillusioned. The coal men, when approached by the Industrial Board with a similar proposition to fix coal prices, profiting by the developments in the steel situation, demanded assurances that the Railroad Administration and other Government departments would buy coal at the prices agreed upon. Chairman Peek, of the Industrial Board, upon taking the matter up with Director General Hines was informed that the railroads insisted upon purchasing coal in their own way and at their own price.

Stripped of all camouflage, this means that the railroads insist that coal be sold to them below the cost of production, and that the public be made to pay more than a just price for the coal it consumes. In other words, the Railroad Administration asks the bituminous coal operators to gouge the public in order that the railroads may purchase their coal supplies at a ridiculous price.

In the meantime the attitude of the Railroad Administration is working the bituminous coal industry a great deal of harm. Large consumers are buying only from hand to mouth, as it were, hoping that the railroads will prove successful in their attempt at beating down prices, and expecting to make the lower prices the basis for much of the now-delayed contract business for the coming coal year. The result is that there is much idle time at the mines. Operators, however, have learned some lessons during the recent war period. They purpose adhering to their policy of selling coal at a reasonable profit—and in this they have the backing of their employees.

Market conditions in bituminous coal show signs of improvement in spite of the many deterring influences, though buying is still on a relatively small scale. The best grades of coal are most in demand, consumers as a rule exercising the keenest sort of discrimination in the selection of fuel to meet their needs. In some cases concessions have been made on coals of medium to inferior grades. Many industries, however, have not yet resumed anywhere near normal activity and will not buy and store coal regardless of price.

Some contracts have been closed for the new coal year by purchasing agents who have carefully surveyed the situation. Labor troubles are impending, a car shortage is almost certain when crops begin to move in the summer and fall, and production of soft coal is lower than ever. In fact, the daily output of bituminous for the week ended Mar. 22 is the lowest recorded during the past three years, the total tonnage mined for the week in the entire United States being 7,599,000 net tons. Consumers who are not covered by contract will find themselves unable to procure all the spot coal they need as the months go by.

Of the utmost importance to the anthracite industry was the statement made by Governor Sproul of Pennsylvania on Apr. 4 that the increase of 10 cents a ton in the price of hard coal beginning with May is justified. It will tend to stimulate buying on the part of consumers who were of the belief that investigation would lead to a charge of profiteering on the part of the operators.

Owing to the lack of demand, the production of anthracite has been decreasing steadily, though the output of 1,437,000 net tons during the week ended Mar. 22 is 216,000 net tons better than the output the week previous. Production at the mines should be stimulated as much as possible during the coming spring and summer months, or else hard coal will be scarce and prices much higher in the fall and winter. Consumers should heed the "Order Early" injunction of Dr. Garfield and lay in their coal supply now.

WEEKLY COAL PRODUCTION

The output of bituminous coal in the United States during the week ended Mar. 29 is estimated at 7,599,000 net tons, as against 7,488,000 net tons during the week ended Mar. 22, and 11,006,000 net tons during the week ended Mar. 30, 1918. The increase during the current week of slightly over 100,000 net tons was slight, and by no means records the improvement which was expected as a result of the "Order Early" campaign inaugurated by the United States Fuel Administration several weeks ago. In fact, the present daily output is the lowest recorded during the past three years. Estimates place production for the coal year ended Mar. 31 at 558,000,000 net tons, which production was approximately 6,300,000 net tons in excess of the output of the coal year 1917-18, or slightly over 1 per cent. During the current week the average production per working day is estimated at 1,266,000 net tons in comparison with 1,784,000 net tons for the coal year 1918-19, and 1,763,000 net tons for the year preceding.

The production of anthracite in the United States during the week ended Mar. 29 is estimated at 1,437,000 net tons, and is a considerable improvement over the output during the week ended Mar. 22, estimated at 1,221,000 net tons. The output of the corresponding week of 1918 was estimated at 2,099,000 net tons. The total production for the coal year to date is estimated at 91,975,000 net tons, as against 99,568,000 net tons during the same period of last year. The daily average per working day during the current week is estimated at 240,000 net tons, and is considerably in excess of the daily average recorded during the past few months.

Carriers' reports for the week ended Mar. 29 show increased loading in all districts with the exception of the southern West Virginia fields, southwestern Virginia and the Iowa, Texas and southwest states. The decreases where they occurred were slight, while in central Pennsylvania there was an increase in loading of 1100 carloads, or approximately 5 per cent., and in Ohio 1200 carloads, or 10 per cent. Slight increases occurred in all other fields.

Bituminous coal shipped to New England by tidewater during the week ended Mar. 29 is estimated at 89,166 net tons, and is a slight decrease compared with the tonnage shipped during the week ended Mar. 22, estimated at 93,376 net tons. Shipments to New York and Philadelphia during the current week were extremely light, amounting to but 14,235 net tons as against 40,432 net tons during the week preceding. Shipments from Baltimore were slightly in excess of those of the week ended Mar. 22, while the tonnage loaded at Hampton Roads exceeded that of the preceding week by 4 per cent.

Total shipments of bituminous coal from all tidewater harbors, during the week ended Mar. 29, are estimated at 402,126 net tons, and exceed the tonnage shipped during the preceding week by approximately 11 per cent. The improvement occurred at all harbors with the exception of Baltimore, where the tonnage loaded amounted to 25,538 net tons, as compared with 32,040 net tons during the week ended Mar. 22.

The production of beehive coke in the United States during the week ended Mar. 29 was extremely low, and the estimate of 365,107 net tons for that week is 39,168 net tons, or approximately 10 per cent., below the production of the week ended Mar. 22, and 244,056 net tons or approximately 40 per cent. below the production of the corresponding week of 1918. For the calendar year to date, the production is estimated at 5,979,152 net tons, as against 7,102,192 net tons during the same period of last year, all states falling behind the output recorded during 1918. The daily average per working day during the current week is estimated at 60,851 net tons, as compared with 78,673 net tons, the daily average for this year to date, and 93,000 net tons, the daily average for the same period of 1918.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running much less, compared with the same week of 1918. Orders from road salesmen for immediate delivery were in smaller volume and commitments for fall were much below the total of the comparative period of last year. Trading is very active but in small lots, and many more merchants were in the market. They report a continuance of excellent retail business. Collections were satisfactory.

Bradstreet's—More irregularity is shown in the general trade and industrial situation with a rather sharply defined difference in the tone of reports from purely distributive trade as opposed to those dealing with big primary lines such as iron, steel, coal and kindred trades. In the former, despite weather irregularities such as rain and snowstorms actual buying of spring goods, men's wearing apparel, clothing, shoes, women's wear in general, millinery, implements and hardware has expanded at many points.

The Iron Age—The second week of the new iron and steel prices has brought little broadening of demand. Inquiries and specifications have increased, but practically all the business offered is still recognized as having been held back awaiting the reductions. The Railroad Administration's refusal to accept the Industrial Board's prices on steel or to be bound by those yet to be fixed on coal and building material seriously threatens the whole stabilizing program, since the railroads would buy normally over 25 per cent. of the country's production of coal and 20 per cent. of its steel. It is not surprising in view of the jumble at Washington, that individual buyers are in no haste to spread sail.

American Wool and Cotton Reporter—The Boston wool market is fairly active and there is still a good demand for fine wools of all kinds. Although it is a bit early for many transactions in the new domestic clip, growers and country dealers are showing a keen interest in prospects. Heavy buying of domestic fleeces is looked for, and some are predicting that the season will open with prices around 40 to 45c. to the growers. Shearing is under way in Arizona, and the cutting of the new clip in eastern Utah and northwestern Colorado started this week. Cotton mill treasurers feel optimistic and several authorities in Boston predict that the mills will soon be in the market for more of the staple. The United States seems to have a splendid future ahead of it in cotton and in other commodities.

Atlantic Seaboard

BOSTON

Somewhat better inquiry. Concessions made for prompt shipment all-rail. Large buyers still withhold purchases. No developments in railroad buying. Differential heavily against distribution inland from tidewater plants. Hampton Roads coals confined to seaboard. No active market looked for until July. Shipping situation not helpful. Railroad-owned barge rates announced. Will help movement over New York piers. Much talk of fuel oil. Reduced rates named on anthracite barges. Fair volume of business for April mining, but demand lacks snap. Light receipts everywhere in March. Retailers advise householders to take on coal. Screenings and steam sizes not so plentiful.

Bituminous—The past week there have been signs of improvement, but buying is still on a relatively small scale. Inquiry for the higher grades all-rail is more noticeable; there is more discrimination than was usual in normal years, and instances multiply where consumers are taking pains to select coals that will meet their individual requirements. This is particularly true among those who have ordinarily used Pocahontas and New River from Hampton Roads. The few coals in central Pennsylvania that have coking qualities are being especially sought by consumers of this kind. A considerable tonnage has been placed in this territory at $3.10 per net ton f.o.b. mines through selling agents who are in position to assure their trade that coal of Navy standard will be furnished.

At the same time, on practically all but the quality grades, there are considerable concessions made to induce consignees to take coal in April and May. Grades that are held with reasonable firmness for contract at $2.95 are being offered for spot shipment at $2.65@2.80, and with little result. In the Fairmont district every effort is being made to get orders for the next 60 days, but the outlook is discouraging so far as New England is concerned. In the Greensburg and Pittsburgh districts there is the same light output and the same pressure on consumers to supply shipping instructions. A few comprehensive orders will soon be in the market, and there will be a great deal of interest in the trade to see whether contracts are closed for season delivery or whether it is decided to buy from month to month as the railroads have begun to do.

Buyers now completely understand the heavy differential that applies against rail-and-water deliveries to inland points. There are industrial centers like Fitchburg, Mass., where reliance was ordinarily placed on water coal via Providence and Boston, but where there is now a freight rate inland from Boston of $1.40 besides a largely increased charge at the rehandling point. It is a foregone conclusion that Hampton Roads coals will have no chance whatever this year to meet all-rail competition at such a point, or even at Lawrence, Mass., where the rate from Boston is $1.05. Current prices at Boston are $7.50@7.75 on cars, while to most points the all-rail rates are $3.20@4 from central Pennsylvania. It is easy to see therefore that Hampton Roads coals this year will be pretty generally confined in this territory to a fringe along the seaboard. At present minimum freights from Norfolk or Newport News the quality of Pocahontas and New River will doubtless hold such tonnage, but the loss inland is going to be very large. The smokeless agencies are making efforts to place their coal on the $5.14 per gross ton basis at Hampton Roads, but even at $2 freight to Boston the proposition is not favorable enough to induce much buying. A share of what business was to be had was closed on the basis of $2.35 per net ton f.o.b. mines for Pocahontas.

No active market on Southern coals, at least, is expected before July, although the quiet purchases now being made from time to time tend, of course, to discount any really active market the coming season. Factors who own their own steamers are certain of their seaboard trade, to an extent, but those who are not so situated will doubtless find very light picking. Certainly that is the state of things today, and the attitude of the Shipping Board in not making a further reduction of rates on steamers belonging to the Government is not calculated to help.

A feature of the marine freight market is the recent reduction of rates on bituminous in railroad-owned barges. From Port Reading, N. J., to Boston the rate has been reduced from $2.05 to $1.30, the rate to points east of Newburyport being fixed at $2. This reduction is not expected to have any marked effect upon the situation, the reduction to points east of Newburyport amounting to only 40c. It will not, however, dispose the railroads in Maine to turn any more readily to steamers from Baltimore or Hampton Roads.

Bituminous prices at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net ton as designated:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.80@3.35
Philadelphia, gross tons	4.20@4.90	5.00@5.40
New York, gross tons	4.50@5.25	5.35@5.80
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.65

Georges Creek is quoted at $3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at $4.69@5.14 f.o.b. Norfolk and Newport News, Va., for spot coal. Alongside Boston the present gross ton range would be $7.15@8.10.

Anthracite—The important announcement this week was the revision downward of rates on hard coal in barges under the jurisdiction of the Railroad Administration. Just at a time when the trade was beginning to despair of an equitable decision the new freights were given out. The $1.80 rate to Boston was reduced to $1.25, and to other points in proportion. The rate of $1.75 to Long Island Sound ports is scaled down to $1.15, and the rates to ports east of Newburyport from $2.10 to $1.35@1.50. The effect upon many retailers along the coast was almost immediate. They began filing their orders for spring shipment, realizing that the present basis is in all probability the lowest cost price of the year.

Steam sizes, and particularly dock screenings, are in short supply at all the loading piers. There seems to be a liberal inquiry for these coals, but buyers are discriminating and do not make purchases unless they can get the quality desired.

NEW YORK

Retail dealers are receiving all-rail coal in large quantities. With the mines working but little more than half time, stocks of the steam coals are kept down and prices are maintained. Consumers expected to place orders for next winter's supply. Bituminous operators watching controversy with Railroad Administration. Loaded barges scarce and good prices are obtained for them. High grade coals in demand.

Anthracite—The continuation of the marine tie-up in this harbor has resulted in more all-rail coal coming into Manhattan and the Bronx than has been received here in many years. In this way the problem of keeping the inhabitants of these two boroughs from freezing, if such a thing were necessary, has been solved, and its value may be proved in the event of a tie-up or any serious transportation difficulty at some future time. The loaded cars are brought into the city via the Poughkeepsie Bridge route and the New York Central lines and are easily transferred across the Harlem River and canal by railroad lighters. Those dealers whose yards are not located along the tracks can load the coal into trucks and cart it to the consumers.

There has not been much activity in spring buying. While retail dealers have placed orders with the wholesale dealers, the receipt of orders by them has not been up to expectations. A decided improvement is looked for during the next few weeks when consumers are satisfied that there will not be any spring decrease in prices. Dealers are circularizing their trade and advising them to place their orders early.

Retail prices in Manhattan and Brooklyn show a difference of 50c. per ton for the domestic coals, the schedule being as follows:

	Manhattan	Brooklyn
Broken or egg	$10.00	$10.50
Stove	10.25	10.75
Chestnut	10.35	10.75
Pea	8.50	9.00
Buckwheat	6.90	7.00
Rice	6.40	6.50
Barley	5.95	6.00
Soft coal	7.25	7.25

For the first time in a couple of years city departments are advertising for coal and buying it according to specifications. Since shortly after this country entered the war the specifications have been suspended and the buying was done in the open market.

Dumpings of anthracite here for the week ended Apr. 4 show an increase of more than 1000 cars over the previous week, 1917 cars having been dumped as compared with 986 the week before. During March 6439 cars were dumped as compared with 15,137 cars in February and 23,756 cars in January.

The steam sizes, because of the slow work at the mines, are not in over-supply and prices are being held firm.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	5.85	7.70
Stove	6.10	7.95
Chestnut	6.20	8.05
Pea	4.80	6.55
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The local trade has had much to engage its attention this week. Most dealers are watching the developments in the controversy with the Railroad Administration regarding coal purchases and no doubt would like to see it ended. They are also interested in the outcome of the marine strike and daily expect a settlement. Many consumers are almost without coal and are on the anxious seat regarding future supplies.

Loaded barges which were obtainable are now nearly all taken. Following the settlement with the tidewater boatmen last week there was a rush to fill the waiting boats, and many shippers were successful. Some of the barges were on their way to destination when the tugmen were ordered to stop work, and further shipments were stopped. Altogether it was estimated there were 100 barges tied up at the various terminals.

There were dumped at the local docks during the week ended Apr. 4, 3449 cars as compared with 3012 cars the week previous, and during the month of March 11,516 cars as compared with 23,668 cars in February and 23,769 cars in January.

There is a good demand for high-grade

coals, and while the range of prices does not show any change from those of a week back, there were some slight changes in individual sales on certain coals.

Buyers continue to cling to the notion that prices are going downward and hesitate before closing up for a year's supply.

Current quotations at the mine for various grades of bituminous coal for spot delivery and contract follow:

	Spot	Contract
South Forks	$2.90 to $3.25	$2.95 to $3.50
Cambria County (good grades)	2.80 to 3.10	2.95 to 3.25
Clearfield County (good grades)	2.65 to 2.95	2.80 to 2.95
Reynoldsville	2.65 to 2.85	2.85 to 2.95
Quemahoning	2.85 to 3.10	2.95 to 3.10
Somerset County (best grades)	2.75 to 2.95	2.95 to 3.10
Somerset County (poorer grades)	2.40 to 2.75	2.75 to 2.95
Western Maryland	2.50 to 2.75	2.65 to 2.85
Fairmont	2.10 to 2.35	2.35 to 2.50
Latrobe	2.10 to 2.25	2.25 to 2.40
Greensburg	2.35 to 2.40	2.35 to 2.60
Westmoreland ¾-in.	2.60 to 2.75	2.65 to 2.75
Westmoreland run-of-mine	2.40 to 2.65	2.40 to 2.65

BALTIMORE

A little better line of inquiry developing in soft coal and prices on immediate sales somewhat stronger. Contract quotations firm and closings few. Hard coal retail schedule is announced for a month.

Bituminous—The larger factors in the soft-coal trade here all say that there is a better inquiry for fuel. Letters are now coming in asking for quotations both on contract and on immediate sales. On immediate sales there is a tendency to stiffen now that the mine production curtailment has about reached the proportion of the demand for coal for quick delivery.

Few contracts are being made for the time being, the consumers apparently standing by the plan to purchase in the open market. The idea that the Government talk of lower coal prices is to be a real element for the future is being encouraged by consumers and laughed at by the better posted coal men. The latter say that the Government's well known attitude of discouraging any attempt to cut mine wage scales in order to allow production at a price that would enable a cut in coal prices and at the same time assure fair profits to the trade is too assured to make any material cut possible.

Locally one part of the trade, that interested in bunker coal, is not satisfied with the railroad administration rule at this point which is forcing all except coal cargo taking ships to bunker from lighters. They say that the added cost of the lighter plan is sending ships for bunker coal to Newport News, where it is possible to take bunker coal direct from the chutes. This end of the trade is also looking to the early clean-up of some 18,500 tons of navy coal stored here, which was bought by the Shipping Board to be sold to vessels under its control, to the exclusion of just that much private business in the trade.

Anthracite—The hard-coal dealers have announced their retail schedule, which is to remain in force until further notice. The prices are 40c. below those set last Nov. 11 by the Maryland Fuel Administration and which remained in effect until the present new rate was given out the past week. Dealers are now urging consumers to take coal at once, and warning that the wholesale advance of 10c. per month from May 1 will ultimately force up the retail rates. Just how and when the 50c. wholesale advance to Sept. 1 is to be absorbed by the retail trade has not as yet been decided upon. The new retail schedule, based on the long ton of 2240 lb., with 25c. off for cash within ten days of delivery and 50c. a ton added for all bag or wheelbarrow haulage from carts to cellars, is as follows:

	Ton	Half Ton
Hard White Ash—		
No. 1 (broken)	$11.50	$5.90
No. 2 (egg)	11.50	5.90
No. 3 (stove)	11.75	6.00
No. 4 (chestnut)	11.85	6.10
Pea coal	10.00	5.15
Buckwheat	8.20	4.25
Sunbury—		
No. 2 (egg)	11.50	5.90
No. 3 (stove)	11.75	6.00
No. 4 (chestnut)	11.85	6.10
Lykens Valley—		
No. 2 (egg)	12.20	6.25
No. 3 (stove)	12.60	6.45
No. 4 (chestnut)	12.60	6.45

PHILADELPHIA

Anthracite trade improved by cold spell. Dealers clean up old stock. Better April outlook. Retailers discuss credits. Criticism of freight rates. Stove and nut in demand, egg fair, with pea lagging. Buckwheat moving well, rice also. Barley very heavy. Bituminous shows little improvement. Shippers ask fair rail fuel price. Interest in exports.

Anthracite—Due to the unusual change in weather conditions business at present is enjoying quite a spurt. Cold weather as severe as any during the past winter, together with high winds, caused many householders to hurry to their coal man. The demand for immediate deliveries in small lots was too great to be taken care of to the satisfaction of the buyers, and many homes were cold for a day or two. It has been a long while since the dealers were flooded with so many orders for half tons.

Most representative dealers seem inclined to carry capacity stocks, but they point out that the present high prices, together with the heavy freight rates, makes the investment in a big stock too much to carry without considerable cash business. With this end in view several of the larger dealers have been advocating, and some have actually agreed to advance the present prices 25c. a ton, with a discount of the same amount if bills are paid within five days. Another plan was to continue the present prices and offer a discount of 25c. therefrom as an inducement to pay cash.

There is considerable dissatisfaction among the shippers as well as the dealers over the freight rates. The dealers located on the Pennsylvania R. R. tracks are protesting because under the regular tariff they are compelled to pay 10c. per ton higher rate than their competitors on the Reading Ry. Some shippers cannot compete for business on the Reading Ry. because of prohibitive rates. In some cases it amounts to an additional 20c. per ton, and their trade say they cannot afford to pay the difference. In no cases have we learned of the shippers absorbing the excess.

The demand for stove and nut exceeds that for the other sizes, and all shippers have a comfortable supply of orders for them. Egg is quite fair, while pea coal still lags. Several shippers report having changed their screens and to be shipping a larger size pea, but the dealers claim there is still room for improvement. It will probably be some time before this former most popular size recovers from the setback caused by the lowering of the standard of preparation and increase in price.

While the demand for buckwheat is light, yet the production is reported to be well absorbed on account of the former light working time; but with increased operating days it is believed that there will soon be more than enough to go around. Contracting is very slow, and while shipments to the large buyers continue, the signed contracts for some of them have not been returned to their shippers. The price for transient business is being cut by some of the individuals, but not to the extent of several weeks ago. We hear of sales around $3. Rice is in somewhat better demand than buckwheat at this time, but can still be bought for close to $2.25. Barley is away off and most shippers are having trouble with it. Sales are reported as low as $1.50.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5 95	$7.80	Buckwheat	$3 40	$4 45
Egg	5.85	7 70	Rice	2.75	3 65
Stove	6.10	7.95	Boiler	2.50	3 50
Nut	6.20	8.05	Barley	2.25	3.15
Pea	4 80	6.40			

Bituminous—The trade continues quiet. Whether there is any improvement over the previous period is hard to determine. Some shippers admit conditions to be better, while others are inclined to believe the reverse. Certainly there is little activity. Contracting continues to be uppermost in the minds of most shippers, and with some new business closed occasionally as the manufacturers begin to realize that there is little chance of better figures being offered.

We give below a list of prices prevailing in this market, although it is difficult to compile them with accuracy, for while the table represents prices the operators feel they should have, we believe that they are being shaded in quite a few instances:

Georges Creek Big Vein	$3.00 @ $3.10
South Fork Miller Vein	2.90 @ 3.10
Clearfield (ordinary)	2.65 @ 2.90
Somerset (ordinary)	2.55 @ 2.80
Fairmont lump (ordinary)	2.40 @ 2.50
Fairmont mine-run	2.25 @ 2.35
Fairmont slack	2.10 @ 2.20

Lake Markets

PITTSBURGH

Market but little changed. Steel industry consuming less coal. Lake shipments will largely be deferred.

The controversy regarding prices the railroads will pay for coal has not had any great influence upon the local coal market, for the reason that transactions had been of a hand-to-mouth character. Of more importance to the local market is the fact that the reduced prices for steel, as developed by the Industrial Board and effective in the open market Mar. 21, have not resulted in increased buying. Some orders for steel that would have been placed at the old prices if there had been no prospect of reductions were held back and have since been placed, but no new buyers have appeared.

The investment buyer was not brought out by the steel reductions, and so the Director General of Railroads, in refusing to buy at the Industrial Board prices, is merely keeping company with the public. Steel mill operations have decreased further and the outlook for coal consumption in the steel industry is far from good. The tinplate mills, which consume a particularly large amount of coal per ton of output, are not running as well as it was expected they would be by this time.

Domestic coal trade is poor, the season being practically over. A little lake coal is being moved, but not much, and it seems probable that nearly all the season's movement will occur in the second half of the navigation period.

There is more cutting on steam coal, $2 being frequently accepted. Quotations of a week ago are repeated except for mine-run steam coal: Steam coal—Slack, $2@2.10; mine-run, $2.10@2.35; Gas—Slack, $2.25@2.35; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $2.60@2.75, per net ton at mine, Pittsburgh district.

BUFFALO

Some report of improvements. Others are calling the situation unfavorable. An increase of bullish reports ought to mean something. Anthracite going afloat fast. Retailing moderately active.

Bituminous—"I am decidedly optimistic," said a Buffalo jobber. He sells about as much coal as anyone and ought to know the market. At the same time there is not much improvement in sight. However, it looks as if the turn in the trade was not far away, so the shippers are hopeful. The despondent coal jobber is not so numerous as he was.

The Canadian market does not improve, for manufacturing there is not so good as it was, and it does not appear to be increasing. Jobbers are still covering that territory as carefully as they can, but the salesman who can sell much coal is a genius. This condition is likely to last some time yet.

Bituminous prices are pretty firm. Some bidding on contracts has been low, but it is asserted by the trade generally that the coal offered was not up to standard. Jobbers quote, as before, $2.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump; $4.20 for same, mine-run and slack; $5.65 for smithing and smokeless, and $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

Anthracite—The trade is better than usual, considering that many consumers laid in so much coal. We have just passed a week of the steadiest cold weather of the season, the capriciousness of it being shown by the fact that on the night of Mar. 26 we broke the high temperature record—70 deg.—and on the night of Apr. 1, six days later, we broke the low record—11 deg.

The real activity in anthracite is in the loading of lake vessels, about 35 now having received cargoes, totalling a matter of 200,000 tons altogether. The other side of this is that nobody wants the coal, and the vessels are waiting for something to bring back before they sail. In spite of the open water the opening of the season promises to be late.

Local anthracite prices range as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8.55	$10.35
Egg	8.45	10.20
Stove	8.70	10.10
Chestnut	8.80	10.50
Pea	7.00	9.05
Buckwheat	5.70	7.75

With 25c. additional for loading to lake vessels.

CLEVELAND

Contracting in the first week of the new coal year, which has opened quite briskly, has developed decided weakness in bituminous coal. A good-sized block of No. 8 ¾-in. lump for the head of the lakes has gone at $2.35, a reduction of about 25c. over last season. Offers of No. 8 ¾-in. lump to northern Ohio users have ranged all the way from $2.60 to $2.20. Weakness is in evidence all along the line, and the general appearance is that the market will grow softer before it again grows stronger.

Bituminous—After having held for weeks to their claim that they could not afford to shade former Government maximums, and permitting operations at their mines to drop to 20 and 30 per cent. in substantiation of this claim, operators in the No. 8 district of Ohio have weakened. Any amount of standard No. 8 ¾-in. lump can be contracted for now at as low as $2.20, and an inquiry for a tonnage of alluring size doubtless would shave another 10 or 15c. off this figure.

One big No. 8 operator has opened the new coal year by selling 200,000 tons of No. 8 ¾-in. lump to an upper lake dock interest for $2.35. Not only is this a reduction of 25c. over one year ago, but the commission and handling charges were lowered proportionately. Last week the 1918 lake carrying charge of 48c. a ton was abandoned and the 42½c. rate of 1917 revived.

A fair-sized contract for No. 8 district prepared sizes is reported made at $2.50. The last Government price on this grade was $2.60. Several good-sized sales of No. 8 ¾-in. lump to northern Ohio users at $2.35 also are reported.

Efforts still are being made by operators to persuade steam-coal users to stock now in anticipation of a shortage of both coal and cars Nov. 1 or shortly thereafter. The only ray of hope for the domestic trade is the threat of the natural gas company supplying Cleveland to double its price in order to force domestic consumers to abandon gas in favor of coal for heating purposes next winter.

Lake Trade—Bituminous cargoes are in greater demand for lake shipment than last week, and the trade is picking up a great deal faster than even the most optimistic had hoped for. The first cargo probably will not be unloaded at an upper lake dock much before the first of May. With the 1919 carrying charges fixed—42½c. a ton to the head of the lakes and 50c. to Lake Michigan—and the first authenticated sale of lake coal announced, every obstacle to a free movement in the lake trade has been eliminated.

Prices of coal, per net ton delivered in Cleveland, are:

Anthracite:	
Egg	$10 85 @ 10 95
Chestnut	11 00 @ 11 10
Grate	10.90 @ 11.05
Stove	11.05
Pocahontas:	
Lump	7 50
Mine-run	7 20
Domestic Bituminous:	
West Virginia splint	7.05 @ 7 15
No. 8 Pittsburgh	6.15 @ 6 35
Massillon lump	6.95 @ 7 10
Steam coal:	
No. 6 slack	4 45 @ 4 55
No. 8 slack	4 75 @ 4 90
Youghiogheny	4 95 @ 5 05
No. 6 mine-run	4 45 @ 4 55
No. 8 mine-run	4.85 @ 5 10
No. 8, ¾-in	5.40 @ 5 60

DETROIT

Lack of demand, owing to large reserves on hand, is a feature of the unsatisfactory conditions in the Detroit market for bituminous coal.

Bituminous—With only a small volume of buying, jobbers and wholesalers say the Detroit market could scarcely be more unsatisfactory than they now find it. Orders come irregularly and in a scattering way, and are seldom for quantities greater than one or two cars at a time, suggesting a sort of hand-to-mouth effort on the part of buyers to fill in for current requirements. Retail dealers are taking domestic lump in small consignments, stipulating speedy delivery, with a view to getting the coal to their customers before higher temperatures arrive.

While lump and prepared sizes are usually holding at the fuel administration prices, slack and mine-run find buyers less readily and with only a small amount reaching Detroit; quotations are said to have been made on slack as low as $1.65 at the mines, with similar shading of price on mine run. Jobbers say that Government prices are the basis of quotations on prospective contracts, though little interest is noted in that direction.

Anthracite—With receipts of anthracite only moderate in amount, the market is apparently well supplied. Numerous retailers are urging domestic consumers to stock up now for next winter and are announcing their ability to fill orders for any size to the full extent of the customer's requirements.

COLUMBUS

The oversupply of small sizes is one of the big features of the coal trade in Ohio. Operators are at a loss to dispose of the slack and consequently are curtailing their production of lump. Contracting is still slow.

Operators and shippers are finding it difficult to dispose of their screenings. Because of lack of demand for the small sizes screenings have become a drag on the market and as a result the production of prepared sizes is being reduced. There appears to be no remedy for this situation, and operators see little indication of an increase in demand for slack.

General steam business is still rather slow, as contracting is being held up by the unsettled price situation. Quite a few contracts expired around Apr. 1, but few have been renewed. Because of the large amount of spot coal available, much of it at reduced quotations, consumers are slow in entering into contracts.

Sales agents are now devoting their time to calling on the trade and getting an expression as to when the purchaser will be in the market. Some contracts have been made with the price left blank, to be filled in when settled quotations are developed. Some lake contracts have been made in the same way. But generally speaking, the consumer is playing a waiting game and is not disposed to rush matters.

Domestic business is rather quiet. Retailers are not buying to any extent. Some demand for the fancy grades is reported, and there is quite an inquiry for Pocahontas and West Virginia splints. Retail stocks are fairly large, and consequently dealers are slow to buy. There will be a considerable tonnage carried over by consumers. Retail prices are being cut to a small extent, but the larger yards are still maintaining quotations.

LOUISVILLE

Demand slightly better for steam coal, but large operators figuring on a dull market for 30 to 60 days. Lake movement slow in starting. Prices fairly well maintained.

There has been a slight improvement in the demand for steam coal during the past few days, but domestic is rather draggy, and more effort is being made to sell straight mine-run than any other grade, as it enables the operator to produce coal more profitably, considering the weakening demand for domestic. Some of the small mines not equipped for screening have been offering mine-run at considerably under the market, resulting in close competition.

Prices as a whole are about the same as they have been, although many operators are quoting no domestic for less than $3 in eastern Kentucky, and the Jellico district has set a price of $3.25 for domestic during the months of April, May and June. Some little spot coal is reported to be selling at low prices, but jobbers say that when they go to buy such coal they find that it has been taken up, or that the reports were not correct. However, a few operators on the Louisville & Nashville lines are known to have quoted at low as $1.90 per ton on mine-run direct to large industrial consumers for immediate shipment. Some of this coal is under grade.

A few of the leading operators foresee dull business during the rest of April, and probably well into May, due to the fact that immediate delivery business is not heavy, and neither the operator nor the buyer can get together on contract prices. The mine operator is not anxious to contract at even the so-called Government figures, and the industrial consumer wants an even lower price.

Demand for steam coal is picking up somewhat, due to the fact that some industries are running low, and others are opening up for the spring season. Brick plants are just getting started and report a fair volume of business, considering the generally dull building movement.

Quotations on a short-ton basis for eastern and western Kentucky fields are as follows:

	Eastern Kentucky	Western Kentucky
Block and egg	$2 85@$3 00	$2 60
Run-of-mine	2 25@ 2 40	2 35
Nut and slack	2 00@ 2 10	2 05

Brokers are allowed 15c. per ton on these prices.

BIRMINGHAM

Steam demand continues light. High-grade domestic sizes readily taken, the supply not being equal to requirements of the trade. Some improvement shown in sales of cheaper grades. Production slightly heavier than previous week.

Buying of steam fuel continues to lag and trade conditions have not improved over the previous week. Consumers who have exhausted their stocks are only taking such tonnage as will supply their needs of the immediate future. The Frisco R. R. closed contracts for approximately 20,000 net tons per month with mines on its lines in Walker County, to extend over a period of twelve months from Apr. 1. The agreements embodied a clause allowing the cancellation of such contracts at the option of the railroad upon 30 days' notice in the event the lines were returned to private ownership, Government prices being paid for the fuel.

High-grade domestic coal is reported to be exceedingly scarce and the demand good. Contracts for this grade of fuel are being readily signed, and some improvement is also noted in the demand for cheaper coals. Several days of wintry weather boosted the retail market to some extent. Quotations remain steady as follows per net ton mines:

	Lump and Nut
Montevallo	$5.00
Cahaba and Black Creek	3.85
Carbon Hill	3.15
Big Seam	2.90

Coal production for the week ending Mar. 22, as reported to the Alabama Coal Operators' Association, totaled 289,071 net tons, a small increase over the week previous.

Coke

CONNELLSVILLE

Spot furnace coke easier. April adjustments not completed. Production continues to decline.

Instead of the meeting of coke operators at Uniontown stiffening the market situation, prompt furnace coke has been offered at lower prices than formerly. The Uniontown meeting developed a general opinion that furnace coke should bring $4.50 and that when that price could not be secured production should be restricted. Furnace coke of excellent grade has since sold at $3.75 in spot lots, and while the price has not been done on a month's supply, it is thought in some quarters it could be done.

Operators having adjustments for April shipments to make under contracts started out by asking $4.50, but this proved quite unacceptable to furnaces, and operators will do well if they settle at $4.25, the price that obtained in most of the March adjustments. Contracts that were written at "last Government price" are running at $6 in one or two instances, others remaining at the $5 price the operators conceded some time ago. Operators holding such contracts would probably be glad to make concessions if the furnace interests would undertake to run fuller and thus take more coke, but the furnaces are not in position to do this, finding it practically impossible to sell pig iron and depending entirely on their contracts, deliveries against which are slowing down.

Foundry coke is in only fair demand, and some operators who were asking the higher prices have reduced quotations; but the lower grades are unchanged. The market is now quotable as follows for spot and prompt shipment: Furnace, $3.75@4; foundry, $4.50@6, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Mar. 29 at 185,660 tons, a decrease of 2140 tons.

Buffalo—The trade is quiet and shows no improvement. As a rule the furnaces have a large supply of iron ore on hand and are in no hurry to bring down more, so it is quiet all along the line. The prospect is for some weeks of quiet, and then the trade will proceed with at least the normal activity. Coke is obtained mainly at the byproduct ovens here at prices that correspond with the prices of the Connellsville district, which are $7 for 72-hour foundry, $6 for 48-hour furnace and $4.50 to $5 for the lower grades, all f.o.b. Buffalo.

Middle Western

GENERAL REVIEW

Uncertainty characterizes attitude of buyer and seller alike. Railroad officials predict car shortage in near future. Feeling that dull period is past.

The coal market in the Middle West is more interesting today than it has been for some time. There is a feeling of uncertainty throughout the industry itself, as well as through the consuming public. Purchasing agents have not yet made up their minds whether they want to make a contract or whether they want to purchase coal on the open market. One week the purchasing agent is in favor of the open market plan, and the next week he favors a contract at all costs. The operator, although he is on the opposite side of the fence, has the same mingled feelings. In a great many instances the producer is not anxious to make a contract at present prevailing prices, because he feels that the labor situation is such that coal will be hard to get in some fields within 30 to 90 days, and he wants to have a lot of free coal, in order to take advantage of any such situation, should it arise. On the other hand, a contract looks pretty good to him, because it will allow him a small margin of profit, and he will be able to give his mines a steadier running time. It is noticeable that many more contracts have been reported this week than any previous week so far this season.

Railroad officials in North Dakota, South Dakota, Iowa, Wisconsin and Minnesota are predicting a great car shortage along about next July to October. The grounds for this prediction are that from all figures obtainable, our grain crop will be tremendous: in fact, very much greater than ever before. This, of course, is brought about by the Government's protection of wheat. This expected crop of wheat will have to be moved, and box-cars will be used. As a result there will be a tremendous shortage of box-cars, and the Northwest will have to depend on open equipment for its coal, something heretofore unknown.

A rather curious situation has arisen in the retail trade. The retailer does not take very favorably to the increased cost of anthracite coal, however just this increase may be. As a consequence, the retailers are predicting that less anthracite will move into the Middle West than ever before, and that this hard coal will be replaced by coke and by the better grade bituminous fuel from southeastern Kentucky and West Virginia. This situation is already beginning to be felt, as those operators producing very good coals from the eastern bituminous fields are reporting excellent market conditions, while we understand that but little anthracite is moving into the territory.

CHICAGO

Steam trade still dull. Prices being cut on eastern coals. Eastern Kentucky mine-run has obtained hold on local market.

The steam trade in Chicago continues dull, although a little more coal is moving than moved last week. The Chicago purchasing agents, however, do not seem to look with favor upon contracts, and we believe that the majority of them are planning to purchase their fuel on the open market. It will be interesting to see what the future has in store for these gentlemen.

The domestic trade is curious. West Virginia is anxious to get back its old standing in the Chicago retail market. There are many sales agencies in this city handling West Virginia coal, and as a result competition has been keen, rather than healthy. As a natural result, prices have been cut, and those dealers wishing Pocahontas, or other high-grade eastern coals, are able to buy them considerably under the market. The southeastern Kentucky operators, however, have not entered into this price-cutting orgy, as they are maintaining their prices in the face of the slices made by the West Virginia people. Some of the better grade eastern Kentucky coals have won a place in the Chicago market which cannot be taken from them.

We understand that a number of plants formerly using Pocahontas coal are now using eastern Kentucky mine-run. The demand for Franklin County, Clinton fourth vein coal, and other high-grade products produced in the Middle West, appears to be good, although there could be an improvement. The public—that is, the householder—is doing some buying, as he has just about come to the end of his winter supply of coal, and will need a few more tons to keep going until the summer sets in.

Prices per ton are as follows:

ILLINOIS

Southern Illinois Franklin, Saline and Williamson Counties, etc.	F.o.b. Mines	Rate to Chicago
Prepared sizes	$2.55@$2.75	$1.55
Mine-run	2.35@ 2.50	1.55
Screenings	1.85@ 2.20	1.55
Central Illinois Springfield District		
Prepared sizes	$2.55@$2.75	1.32
Mine-run	2.35	1.32
Screenings	2.05	1.32
Northern Illinois		
Prepared sizes	$3.25	1.24
Mine-run	3.00	1.24
Screenings	2.75	1.24

INDIANA

Clinton 4th Vein District		
Prepared sizes	$2.65@$2.75	1.27
Mine-run	2.35@ 2.45	1.27
Screenings	2.05@ 2.25	1.27
Knox County Field		
Prepared sizes	$2.65@$2.75	1.37
Mine-run	2.35@ 2.45	1.37
Screenings	2.05@ 2.25	1.37

MILWAUKEE

Warm weather and a glutted market fail to affect the price of coal. Slow buying continues. Coke piling up.

The coal market continues lifeless. There is a great surplus of supplies for the season, which continues warm. Private consumers and industries are simply buying enough to cover immediate needs. The problem of sustaining prices has been an easy one thus far, as there has been no disturbing competitive influence from the outside. A shading in soft coal is expected when Western operators get busy in the interior for the new season. Coke stocks are piling up at the byproduct plants, but prices are being maintained.

ST. LOUIS

Easy weather conditions and nothing to stimulate market. Everything is quiet, with domestic demand off to the extent that steam coal is beginning to strengthen. Outside coals plentiful with no demand.

The local situation continues easy. The weather has eliminated nearly altogether the demand for domestic coals. A week or two ago steam sizes were extremely heavy and the mines were idle on account of their inability to move them. The condition has changed now, and screenings are somewhat scarce. This, of course, is occasioned by reason of the fact that there is no demand for lump coal for domestic purposes, and with the falling off in this tonnage there is a decreased amount of screenings offered. There is no unusual demand for screenings, but it is the ordinary call at this time, which is commencing to catch up with the supply. This has a tendency to strengthen the steam market. On the other hand, nut is the slowest size right now. Egg size follows this, and the 2-in. lump is moving more freely than anything else on account of the usual call for this as the steam fuel.

Several of the mines have been down entirely on account of the dropping off of business and others are working one and two days a week. The railroad tonnage dropped off suddenly on the first, except temporary orders and temporary contracts.

Conditions are in a deplorable state throughout the Standard field, but with the operating companies getting at least cost for their output there is always room for improvement. The railroads are not taking up contracts as fast as was expected.

In the Mt. Olive field conditions continue in the same quiet, usual way characteristic of that section. The domestic tonnage is extremely light and there is nothing heavy in the way of steam. The mines are getting a couple of days a week and the coal is moving north.

In the Carterville field in Williamson and Franklin Counties, as well as the DuQuoin field of Perry County, lack of business is beginning to be felt more keenly by the larger operators, and a substantial supply of unbilled coal is usually on hand overnight. This has been mainly steam fuel, the demand for which, however, is beginning to catch up to the supply. A number of mines in this field are idle because many of the railroad contracts which expired on Apr. 1 have not been renewed.

The Missouri Pacific contract, with a maximum of 3000 tons daily, went to the West Virginia Coal Co. with mines in Williamson County, at a price, it is rumored, of $2.07½ per ton f.o.b. mines for mine-run. Other contracts have not been made public as yet, but the majority of the contracts in this field have not been closed. The open market price on some of this tonnage at the present time is $2.

The market is quiet and easy, and there is nothing to indicate that business will improve until some time in May.

In St. Louis proper everything is slow. Little anthracite is moving in, although the demand for country business is picking up some on chestnut size. Smokeless coal is plentiful, with no orders, and the demand for domestic coke is unusually light.

The prevailing circular at the present time f.o.b. the mines is:

Williamson and Franklin County Association:		Mt. Olive and Staunton		Standard	
Lump, egg and nut	$2.75	....		....	
Washed Nos 1 and 2 nut	2.85	....		....	
Independent:					
Lump, egg and nut	2.55	2.55	Lump and egg	2.25	
Washed Nos. 1 and 2 nut	2.85	....	2x3 nut	2.00	
Mine-run	2.35	2.20		2.00	
Screenings	2.20	2.05		1.75	
3-in. lump	....	2.30		....	
2-in. lump	....	....		2.15	
2x6 egg	....	....		2.10	

Williamson-Franklin rate to St. Louis is $1.07½; other rates $0.92½.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Apr. 7, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	143	145
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	42	43
Colorado Fuel & Iron, Pfd	(CF)	105	110
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	26	28
Elk Horn Coal, Pfd	(EH)	..	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, Pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	48⅛	49
Pittsburgh Coal, Pfd	(PC)	86⅝	87
Pond Creek Coal	(PD)	14	17
Virginia Iron, Coal & Coke	(VK)	53	59

* Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	....
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	....
Colorado Fuel & Iron, Gen. 5s, 1943	89⅛	90
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74⅛	75
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	88	91
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79½	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	83⅜	84⅜
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	86¾	87½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	82½
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	91	92
Utah Fuel, 1st Sinking Fund 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	86

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations are f. o. b. cities named, unless noted otherwise.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$30.35	$37.60
Northern Basic	27.55	31.80
Southern Ohio No. 2	28.55	32.80
NEW YORK, Tidewater delivery		
2X Virginia (silicon 2.25 to 2.75)	32.40	36.15
Southern No. 2 (Silicon 2.25 to 2.75)	34.70	39.95
BIRMINGHAM		
No. 2 Foundry	25.75	31.00
PHILADELPHIA		
Eastern Pa. 2X (silicon 2.25 to 2.75)	31.90*	36.15*
Virginia No. 2	33.25†	38.10†
Basic	29.65*	33.90*
Grey Forge	29.65*	33.90*
CHICAGO		
No. 2 Foundry Local	26.75	31.00
No. 2 Foundry Southern	33.00	37.25
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	26.25	31.00
Basic	25.75	30.00
Bessemer	29.35	33.60

* F.o.b. furnace. † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2.45	$3.47	$4.19½	$3.39	$3.47
Channels, 3 to 15 in.	2.45	3.47	4.19½	3.39	3.47
Angles, 3 to 6 in., ¼ in. thick.	2.45	3.47	4.19½	3.39	3.47
Tees, 3 in. and larger	2.45	3.52	4.19½	3.39	3.47
Plates	2.66	3.67	4.44½	3.39	3.67

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
2.75	3.44	3.80	3.50

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.25	$4.00	$5.11	$4.37	$4.50	$5.00	$4.75
Cut	3.45	6.50	5.61	6.50	....	6.75	....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.25	$6.00	$4.27	$5.04	$6.15	$5.25	$5.55
Track bolts	4.90	8.90	5.17	Prem.	7.20	8.00	6.55
Standard section angle bars	3.00	....	4.22	Prem.	4.95	....	4.95

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List —5%	List —2%	+15%	+30%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.50	$6.50	$7.25	$8.50	$7.35
Assorted	6.40	7.50	6.50–7.00	6.40	8.75	7.60

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$60.70	$65.70	$58.35	$59.80	$53.00	$82.55	$65.00
6 in. and over	57.70	62.70	55.35	56.80	50.00	79.55	62.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$45.00	$55.00	$45.00	$65.00
Standard openhearth rails	47.00	57.00	47.00	67.00
Light rails, 8 to 10 lb.	2.58½*	3.13½*	2.83½*	3.13½*
Light rails, 12 to 14 lb.	2.54*	3.09*	2.79*	3.09*
Light rails, 25 to 45 lb.	2.45*	3.00*	2.70*	3.00*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$18.50	$15.00	$15.50
Stove plate	16.00	15.00	15.50
No. 1 machinery cast	22.50	20.00	19.50
Machine shop turnings	8.50	6.00	7.00
Cast borings	10.00	7.00	7.50
Railroad malleable cast	13.50	15.50	14.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.13	$0.18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	13c.	15c.
Hol'ow	24c.	.....	..

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Steel Black	Steel Galvanized	Iron Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	50½%	24%	¼ to 1¼	39½%	23½%
½	54½%	40%			
¾ to 3	57½%	44%			

LAP WELD

2	50½%	35%	2	32½%	18½%
2½ to 6	53½%	41%	2½ to 4	34½%	21½%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	46½%	29%	¾ to 1½	39½%	24½%
½	51½%	39%			
¾ to 1½	55½%	43%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	48½%	37%	2	33½%	20½%
2½ to 4	51½%	40%	2½ to 4	35½%	23½%
4½ to 6	50½%	39%	4½ to 6	34½%	22½%

Stocks discounts in cities named are as follows:

	New York Black	New York Galvanized	Cleveland Black	Cleveland Galvanized	Chicago Black	Chicago Galvanized
⅛ to 3 in. steel butt welded	47%	31%	46½%	31%	57½%	44%
3½ to 3 in. steel lap welded	42%	27%	42½%	27½%	53½%	41%

Malleable fittings. Class B and C, from New York stock sell at list + 12½%
Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+12½%
Galvanized cast steel rigging	+ 7½%
Bright plain rigging	35%
Bright cast steel	22½%
Bright iron and iron tiller	5%

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Chicago Current
*No. 28 black	4.35	5.62	6.22	6.45	5.27	5.37
*No. 26 black	4.25	5.52	6.12	6.35	5.17	5.27
*Nos. 22 and 24 black	4.20	5.47	6.07	6.30	5.12	5.22
Nos. 18 and 20 black	4.15	5.42	6.02	6.25	5.07	5.17
No. 16 blue annealed	3.75	4.77	5.37	5.65	4.67	4.77
No. 14 blue annealed	3.65	4.67	5.27	5.55	4.57	4.67
No. 10 blue annealed	3.55	4.57	5.17	5.45	4.47	4.57
*No. 18 galvanized	5.70	7.42	7.57	7.70	6.62	6.72
*No. 26 galvanized	5.40	7.12	7.27	7.40	6.32	6.42
No. 24 galvanized	5.25	6.97	7.12	7.25	6.17	6.27

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 15c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	$0.25	$1.00	$1.75	$1.40	$1.28	$1.05
Hot pressed hexagon	.25	1.00	1.60	1.20	1.08	.85
Cold punched square	.25	1.00	1.50	.75	1.30	1.00
Cold punched hexagon	.25	1.00	1.50	.75	1.30	1.00

* List plus.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	50—10%	40%
Chicago	50%	50%
Cleveland	50—60%	60%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
¾ by 4 in. and smaller	40%	50%	45—5%
Larger and longer up to 1 in. by 30 in.	50%	40%	40%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York, $2.00 Cleveland, $2.00 Chicago, $2.25

For cast-iron washers the base price per 100 lb. is as follows:
New York, $5.00 Cleveland, $4.00 Chicago, $4.00

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	4-10-5%	55%	45%
Tinned	30%	55%	40%

Boiler, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York, $6.35 base Cleveland, $5.00 Chicago, $4.87 Pittsburgh, $4.65

Structural, same sizes:
New York, $6.25 Cleveland, $5.10 Chicago, $4.97 Pittsburgh, $4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Raw in barrel	$1.55	$1.55	$1.68	$1.65	$1.66	$1.65
5-gal. cans	1.70	1.65	1.85	1.80	1.86	1.75

WHITE AND RED LEAD—Base price.

	Red Current Dry	Red Current In Oil	Red 1 Year Ago Dry	Red 1 Year Ago In Oil	White Current Dry and In Oil	White 1 Year Ago Dry and In Oil
100-lb. keg	13.00	14.50	12.25	12.50	13.00	12.25
25 and 50-lb. kegs	13.25	14.75	12.50	12.75	13.25	12.50
12½-lb. keg	13.50	15.00	12.75	13.00	13.50	12.75
5-lb. cans	15.00	16.50	14.25	14.00	15.00	14.50
1-lb. cans	16.00	17.50	14.25	14.50	16.00	14.50

500 lb. lots less 10% discount. 2000 lb. lots less 10-2½% discount.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati, $15 and 16 Birmingham, $15.00
St. Louis, salmon, 10.00 Denver, 12.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply C.l.	1-Ply L.c.l.	2-Ply C.l.	2-Ply L.c.l.	3-Ply C.l.	3-Ply L.c.l.
No. 1 grade	$1.35	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.45	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $2.10 per roll in carload lots and $2.35 for smaller quantities.

Shingles, red and green slate finish cost $5.75 per square in carloads, $5.75 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots N. Y.	Carload Lots Chicago	Less Than Carload Lots N. Y.	Less Than Carload Lots Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$52.00	$52.50	$53.00	$53.50
Tar pitch (in 400-lb. bbl.)	19.00	16.00	20.00	17.00
Asphalt pitch (in barrels)	36.00	36.00	41.50	41.50
Asphalt felt	67.50	67.50	72.00	72.00

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0.056	$0.11	$0.162
Seattle	.09	.175	.30
Los Angeles*	.082	.154	.236
New Orleans	.17	.23	.34

*F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price of pine per M in carload lots:

	1-In. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$38@41	$38.00	$40.00
Birmingham	39.00	33.00	31.00
Denver	45.00	38.00	44.00
Cincinnati	43.00	42.00	37.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	.....	$0.27½	$0.30	.....	$2.40
Boston	$0.22½	.24½	.26½	$0.31	2.40
Cincinnati	.19½	.21½	.23½	.....	2.35
Kansas City	.20½	.25½	.30½	.38½	2.45
New Orleans	.....	.24½	.28½	.....	.....
Seattle	.....	.18½	.21	.....	.....
Chicago	.18½	.21½	.25½	.29½	2.35
St. Paul	.19	.25½	.30½	.....	2.45
St. Louis	.19	.23½	.25½	.30	2.35
Denver	.17½	.24	.29	.35	2.60
Dallas	.21	.27½	.32	.38	.....
Los Angeles	.23	.30	.37	.....	2.95

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7.2	8	14½
Fiber or sponge	8	13	9	18
Transmission	7	13	8½	20
Axle	4½	4½	3½	5½
Gear	4½	7½	6½	8
Car journal	22 (gal.)	4.9	3½	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Best grade	87.00	90.00	77.00	90.00	75.00	90.00
Commercial	42.00	50.00	18.50	30.00	15.00	30.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	70c. per ft.
Common, 2½-in.	30%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.40	$0.30

Steam—Discounts from list

First grade, 25% Second grade, 35% Third grade, 40%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	50%
Denver	35–5%	30%
Birmingham	30%	35%
Chicago	45%	35%
Cincinnati	40–10%	30%

RAWHIDE LACING—20% for cut; 45c. per sq.ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.60
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.80
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅜-in., 8 ft., ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.26	Atlanta	$0.30
New York	.29	Denver	.29
Cincinnati	.29	Kansas City	.28½
Chicago	.26½	New Orleans	.72½
St. Paul	.30	Seattle	.27
San Francisco	.26	Los Angeles	.34

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin.Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1-in.	.30
1½-in.	.45
2 -in.	.60
2½-in.	.75
3 -in.	.90
3½-in.	1.05

85% magnesia high pressure, List

For low-pressure heating and return lines, 4-ply, 58% off; 3-ply, 60% off; 2-ply, 62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ⅙ lb. rolls	48c. per lb.
Rubber tape, ⅙-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver Single Braid	Denver Double Braid	Denver Duplex	St. Louis Single Braid	St. Louis Double Braid	St. Louis Duplex	Birmingham Single Braid	Birmingham Double Braid	Birmingham Duplex
No. 14	$11.00	$14.50	$30.40	$21.00	$16.00	$33.30	$10.95	$15.25	$27.75
10	19.20	25.70	49.00	27.20	31.00	69.00	20.25	21.25	46.90
8	26.95	34.22	67.00	38.00	42.00	78.00	27.60	32.60	.....
6	43.90	46.20	.....	.....	65.00	130.00	48.25	54.75	.....
4	62.35	65.15	.....	.....	93.00	.....	66.90	73.75	.....
2	92.60	96.25	.....	.....	140.00	.....	96.00	104.50	.....
1	120.95	125.20	.....	.....	182.00	.....	121.00	136.40	.....
0	164.80	164.80	.....	.....	242.00	.....	169.00	174.60	.....
00	.....	203.35	.....	.....	290.00	.....	203.50	214.00	.....
000	.....	208.40	.....	.....	360.00	.....	246.50	257.00	.....
0000	.....	302.55	.....	.....	435.00	.....	295.50	358.50	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains etc., the following freight rates per 1000 lb. are effective:

Boston	$0.30	New Orleans	$0.38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	.49*
Denver	.99	Pacific Coast (all rail)	1.25*
Kansas City	.59		

Note—Add 3% transportation tax. Minimum carload, 80,000 lb.

COAL AGE

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Some Further Thoughts on Labor

By Floyd W. Parsons

IF anyone has ever believed in the unqualified control of business by the state, the case of the railroads in this country should at least bring a doubt to his mind. Our recent experience has caused many to decide that when politics comes in at the door economics goes out through the window.

In 1914 the average annual wages of the railroad employee was $810. This year the average annual earnings of each employee will be at least $1460. In the past three years nearly $1,400,000,000 have been added to railroad wages, and in less than ten years the average increase has been upward of 120 per cent.

Although the Government has increased fares and rates more than a billion dollars, it has been unable to catch up with the wage increase. Rates must be raised at least another 20 per cent. if the railroad deficit is to be wiped out. In view of this wage situation it is no wonder that the holders of railroad securities are in no hurry to have the transportation lines turned back to private control.

The high prices for necessities are clearly due to the high wages paid to those who produce and distribute the things we use and consume. It is therefore vital that industry shall be again placed on a sound economic basis, and that the Nation's business shall not be used by any party as a pawn to curry political favor.

Notwithstanding the fact that American conditions differ considerably from those prevailing in Europe, our industrial history has shown that business in the United States has generally followed along the same paths trod by our cousins in Great Britain. Many American employers still hold views that were current in England four or five years ago. The British now recognize generally the desirability of capital and labor bargaining collectively. In fact the English employer is decidedly in favor of the national union as opposed to a purely local works committee. Where shop committees do exist, the owners desire that such bodies come under the discipline of their unions. It is commonly recognized that this contributes to the stability of industry.

As for British employees, they are unanimous in their opposition to the use of force in attaining their aims. Almost none approves of a sudden change, as in Russia. The radicals among the workmen oppose collective bargaining on the ground that it fosters harmony, which they claim helps to continue the present system of society. But the majority of British workmen are of the conservative type, and although they are earnest in their desire to strengthen their unions, they are in accord with the employers in believing that it is best for the Nation if there is no restriction on output except as it affects the health of the employee. Most workmen also wish to leave control of business policies in the hands of those managing the business.

All of which leads to the conclusion that although we are entering a new era in industry, the leading nations are confronted by no problems that cannot be sagely met. Government ownership has been tried and valuable lessons have been learned. The loyalty and patriotism of workmen have been tested and sanity prevails among the great majority. Cooperation and conciliation are the national watchwords. Farseeing employers are not attempting to bring back pre-war conditions, and right-minded employees are commencing to recognize the danger to business from crowding labor's demands.

Let us, therefore, discard our blue glasses and see affairs in the full light of a new day.

IDEAS AND SUGGESTIONS

Responsibility of Labor

By N. H. Seaburg
Boston, Mass.

Employers have always chafed under the industrial arrangement whereby labor is given power without responsibility. It has been their most grievous complaint against and objection to collective bargaining, because even the state must bend to the wishes of labor—be those wishes right or wrong—if it but exerts its full power. Several concrete illustrations in support of this latter statement have been afforded during the past two years, and employers are more confirmed than ever in their conviction that there is no court of appeal to which they may carry their cases against labor. Labor, they argue, has placed itself above the state.

During the troublesome times just past, employers were unanimous in their oft-repeated assertion that "Labor can get anything it wants in Washington these days." More recent developments have not caused them to change that opinion, and consequently employers are sorely depressed by the outlook. In the coal industry, with its great labor problem, the extent to which labor has Washington under its thumb may be put to the test should there be a general strike. A strike, however, at this time would be no serious calamity to the operator. On the contrary, it would relieve him of much anxiety, principally that of trying to keep his men working a few days a week, if possible, under the present discouraging conditions. The great danger of a clash today lies in the potential effect it may have upon the future industrial peace of the operator and miner. On both sides seeds of bitterness may be sown that may ripen into disaster sooner or later.

Like war, strikes are destructive and in that sense are wasteful to an industry. It is a shortsighted policy to dam up at considerable expense the small loopholes of waste in business and leave the front door wide open for its entrance. Labor is the front door in the coal business, and to keep it safely and securely closed today the operators must take cognizance of the change which labor has undergone.

Perhaps the most confusing demand that the miners may make of the operator today is their desire as growing human beings to have a voice in the management. Throughout the labor world this ambition has long been smoldering, but it has never before now crystallized into an actual demand. The English employer is face to face with it, as, of course, is also disrupted Russia. It is a desire international in demand. Superficial consideration of this new problem may possibly arouse the fighting instinct in many employers, but when subjected to the calm test of reason it will not seem so destructive in character.

Employers, as remarked before, have always bemoaned labor's power without responsibility. Instead of trying to break that power, as some employers have done and are doing, the best way to remedy it is to increase labor's responsibility. Responsibility is a stern policeman, and is far more effective than mere authority. Possibly, therefore, in this new ambition of the workers for a place in the management the employer may find his salvation, as it will mean sharing his responsibilities with his workers.

This course would be of particular advantage in a period like the present, when the miners, through their councils or committees, would be kept fully informed of the depressed status of the market. Knowing the truth about conditions, they would be apt to mark time as best they could, realizing that the operators were not any more responsible than they themselves. So, too, they could be educated and kept informed on all other phases of the industry which might affect their work from time to time.

It is true that operators could carry on this task of enlightenment just as well without a miners' council or committee, but it would not have the confidence of the workers. The latter cannot, on the other hand, doubt the information their own representatives would furnish them. Thus, by an intelligent understanding of their industry the workers would be in a better position to judge of the reasonableness and justice of the demands they might make upon their employer. Local disputes and questions of every kind could also be settled by these councils without recourse to a national upheaval.

The old belief that neither side can gain except at the expense of the other should be relegated to the dumping grounds for myths. While they have many interests that are entirely different, yet they have so much in common that coöperation and not conflict should be the basis of their relations. And if this is so, why should labor not bear its share of the responsibilities? Labor's power would then also be the employer's power, their interests being mutual.

Various Timbering Methods

By M. M. Haley
Sturgis, Ky.

In the "Ideas and Suggestions" department of *Coal Age*, Feb. 20, appeared an excellent article on mine timbering by Joseph R. Thomas, of Plymouth, Penn. Some time ago I had made what might be termed a suggestion sheet on methods of timbering. This sheet I had blueprinted and distributed to all timbermen and others interested in or charged with the upkeep of the mines. Such drawings are always welcome to those who are ambitious and anxious to improve mining conditions or the quality of their own workmanship.

No hard or fast rules can be applied to any or every set of conditions, and the experience and good judgment of the timberman must always be relied on if the best results are to be obtained. The sheet shown on the facing page therefore contains suggestions, but not rules or instructions, for almost any contingency likely to be encountered in timbering in actual mining practice. The idea is merely an adaptation to the mine of methods in everyday use in shops and factories.

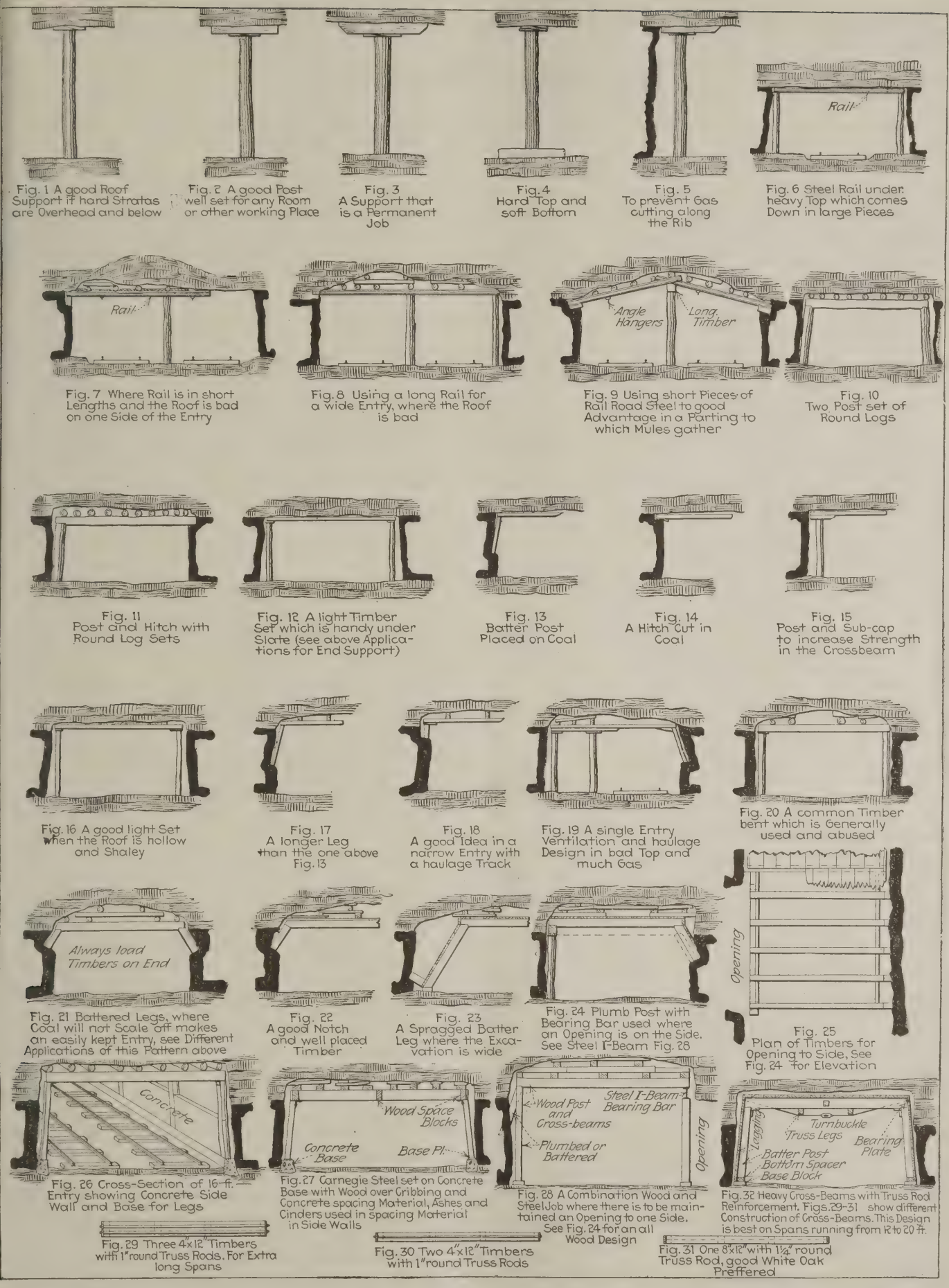


Fig. 1 A good Roof Support if hard Stratas are Overhead and below

Fig. 2 A good Post well set for any Room or other working Place

Fig. 3 A Support that is a Permanent Job

Fig. 4 Hard Top and soft Bottom

Fig. 5 To prevent Gas cutting along the Rib

Fig. 6 Steel Rail under heavy Top which comes Down in large Pieces

Fig. 7 Where Rail is in short Lengths and the Roof is bad on one Side of the Entry

Fig. 8 Using a long Rail for a wide Entry, where the Roof is bad

Fig. 9 Using short Pieces of Rail Road Steel to good Advantage in a Parting to which Mules gather

Fig. 10 Two Post set of Round Logs

Fig. 11 Post and Hitch with Round Log Sets

Fig. 12 A light Timber Set which is handy under Slate (see above Applications for End Support)

Fig. 13 Batter Post Placed on Coal

Fig. 14 A Hitch Cut in Coal

Fig. 15 Post and Sub-cap to increase Strength in the Crossbeam

Fig. 16 A good light Set when the Roof is hollow and Shaley

Fig. 17 A longer Leg than the one above Fig. 13

Fig. 18 A good Idea in a narrow Entry with a haulage Track

Fig. 19 A single Entry Ventilation and haulage Design in bad Top and much Gas

Fig. 20 A common Timber bent which is Generally used and abused

Fig. 21 Battered Legs, where Coal will not Scale off makes an easily kept Entry, see Different Applications of this Pattern above

Fig. 22 A good Notch and well placed Timber

Fig. 23 A Spragged Batter Leg where the Excavation is wide

Fig. 24 Plumb Post with Bearing Bar used where an Opening is on the Side. See Steel I-Beam Fig. 28

Fig. 25 Plan of Timbers for Opening to Side, See Fig. 24 for Elevation

Fig. 26 Cross-Section of 16-ft. Entry showing Concrete Side Wall and Base for Legs

Fig. 27 Carnegie Steel set on Concrete Base with Wood over Cribbing and Concrete spacing Material, Ashes and Cinders used in spacing Material in Side Walls

Fig. 28 A Combination Wood and Steel Job where there is to be maintained an Opening to one Side. See Fig. 24 for an all Wood Design

Fig. 32 Heavy Cross-Beams with Truss Rod Reinforcement. Figs. 29-31 show different Construction of Cross-Beams. This Design is best on Spans running from 12 to 20 ft.

Fig. 29 Three 4"x12" Timbers with 1" round Truss Rods. For Extra long Spans

Fig. 30 Two 4"x12" Timbers with 1" round Truss Rods

Fig. 31 One 8"x12" with 1¼" round Truss Rod, good White Oak Preffered

This Suggestion Sheet on Methods of Timbering Brought Increased Effectiveness on the Part of the Men

Fusibility of Ash from Coals Found in the Interior Province*

By W. A. Selvig, W. C. Ratliff and A. C. Fieldner
Fuels Chemical Laboratory, U. S. Bureau of Mines, Pittsburgh, Penn.

SYNOPSIS — *Coals from the various states in the Interior Province, with the exception of those from Iowa and Michigan, not yet tested, show a great similarity in the fusibility of their ash content. Results obtained in the laboratory may not coincide with those secured in the boiler furnace, but the method of test followed was selected as giving a close approximation to the results that might be expected in the ordinary commercial consumption of the coals tested.*

THE Interior Coal Province, which includes all of the bituminous coal fields near the Great Lakes, in the Mississippi Valley proper, and in Texas, contains a vast amount of coal which is extensively mined and has been an important factor in the development of the great manufacturing centers of this region.

While there is a large amount of analytical data available as to the composition of these coals[1] there has been no general survey of the fusibility of ash from the various coal beds comprising this great coal province.

The fusibility of the ash is of great interest to the consumer of coal, principally in connection with the formation of clinker due to the melting of the ash constituents of the coal when fired under boilers. The Bureau of Mines is therefore making fusibility tests on the well-known American coals, and this paper includes a table giving results for coal from each mine tested in the Interior Province. A previous paper[2] gave a description of the standard gas-furnace method used by the Bureau of Mines in making ash fusibility tests, together with a complete table giving results obtained for the coal from each mine tested in West Virginia.

It is well to bear in mind that fusibility tests as made in the laboratory are not directly comparable to the conditions existing when coal is burned in a furnace. In a laboratory test the impurities remaining as ash are intimately mixed. Obviously, there is no such uniform distribution when the coal is burned in the ordinary manner. Fieldner, Hall and Feild[3] have shown that in a laboratory fusibility test various factors have a great influence on the results obtained. The standard gas-furnace method as used for the tests takes into consideration the different factors influencing the results obtained, with special reference to the atmosphere surrounding the ash during the test. With this method the atmosphere in which the ash is heated is readily controlled by burning an excess of gas, under which condition a reducing atmosphere is obtained. This reduces the iron in the ash to the ferrous state and gives the lowest temperature at which clinkering may result.

This is of special importance in testing ash from coals of the Interior Province, as they contain a relatively large amount of iron in the form of pyrite. Consequently, higher softening temperatures may be expected in tests using oxidizing atmospheres by which the iron would be oxidized to ferric oxide, or in tests using strongly reducing atmospheres by which the iron would be largely reduced to the metallic state. In both of these conditions a more refractory and viscous slag is formed than would result if the atmosphere were such as to reduce the iron in the ash to the ferrous state, which gives the most fusible condition.

Analyses of clinkers from boiler furnaces indicated that the conditions were such as to form clinkers in which the iron is present principally in the ferrous state, consequently the values obtained in the laboratory tests are in this respect comparable to the actual fuel-bed conditions, and give the lowest temperatures at which the intimately mixed ash will soften with the formation of clinker.

Interpretation of Fusibility Table

The states comprising the Interior Coal Province are arranged according to the coal region in which they belong; the eastern region (Illinois, Indiana and western Kentucky); the western region (Kansas, Missouri, Oklahoma and Arkansas); and the southwestern region (Texas). Michigan and Iowa, which are included in the Interior Province, are not represented in the table as no mine samples of coals from these states were available when the tests were made. Under each state the tabulation is alphabetical according to bed, county, town and mine.

The samples represented are practically all standard mine samples collected by representatives of the Bureau of Mines, the U. S. Geological Survey, or by the various state geological surveys, according to the methods used by the Bureau of Mines.[4] A small number of car samples which were considered representative of the output of the various mines were also included.

The number of samples from each mine, the lowest, highest and average softening temperatures in deg. F.,

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[1]Lord, N. W., and others: Analyses of Coals in the United States, with Descriptions of Mine and Field Samples Collected Between July 1, 1904, and June 30, 1910; Bull. 22, Bureau of Mines, 1913, 1200 pp. (In two parts.)
Fieldner, A. C., and others: Analyses of Mine and Car Samples Collected in the Fiscal Years 1911 to 1913; Bull. 85, Bureau of Mines, 1914, 444 pp.
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Parr, S. W.: Chemical Study of Illinois Coals; Illinois State Geological Survey, Coal Mining Investigations; Bull. 3, 1916, 86 pp.

[2]Selvig, Walter A: Fusibility of Coal Ash from West Virginia Coals; *Coal Age*, Vol. 15, No. 1, 1919, pp. 12-16.

[3]Fieldner, A. C., Hall, A. E. and Feild, A. L.: The Fusibility of Coal Ash and the Determination of the softening Temperature; Bull. 129, Bureau of Mines, 1918, 146 pp.

[4]Holmes, J. A.: The Sampling of Coal in the Mine; Technical Paper 1, Bureau of Mines, 1911, 18 pp.

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM THE COALS OF THE INTERIOR PROVINCE

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
EASTERN REGION—ILLINOIS								
No. 1 Bed								
County	Town	Mine						
Mercer	Matherville	Alden No. 7	6	2040	2180	2110	11.74	4.86
No. 2 Bed								
Bureau	Cherry	Cherry No. 2	2	1880	1930	1910	8.97	4.51
Bureau	Marquette	Marquette No. 1	3	1990	2130	2050	8.99	2.75
Grundy	Coal City	Wilmington Star No. 7	1	....	....	1880	6.71	2.96
McLean	Bloomington	Bloomington	5	1960	2030	2000	10.82	3.32
McDonough	Industry	Burdick County Bank	2	2140	2240	2190	7.55	3.26
McDonough	Plymouth	Stoneking	2	1970	2120	2050	6.76	3.68
Average of mines in No. 2 Bed			15	1990	2090	2010	9.97	3.58
No. 5 Bed								
Fulton	Cuba	Big Creek No. 3	2	1890	1960	1930	13.21	3.62
Fulton	St. David	Big Creek No. 2	5	1890	1970	1930	12.87	3.56
Gallatin	Shawneetown	Middle mine of Saline mines	1	....	....	2010	8.55	2.91
Menard	Athens	Wabash No. 2	2	1890	1970	1930	11.47	3.44
Peoria	Bartonville	Collier	3	1900	1970	1950	11.61	3.35
Peoria	Hanna City	Hanna City	4	1910	2030	1950	13.72	3.42
Saline	Harrisburg	O'Gara No. 4	2	2020	2020	2020	7.87	2.92
Saline	Harrisburg	O'Gara No. 9	7	1960	2210	2090	7.94	2.15
Saline	Grayson	Saline County No. 6	1	....	....	2060	10.28	4.14
Average of mines in No. 5 Bed			27	1920	2020	1990	10.84	3.28
No. 6 Bed								
Christian	Pana	Springside	4	1920	2090	2000	11.37	4.58
Franklin	Buckner	No. 2	6	2080	2300	2190	9.35	1.17
Franklin	Bush	Bush No. 2	4	1920	2000	1950	11.26	3.61
Franklin	Christopher	Old Ben No. 11	4	2080	2390	2270	8.68	0.88
Franklin	Christopher	United No. 1	5	2240	2440	2290	9.20	1.03
Franklin	Christopher	Old Ben No. 10	6	2220	2530	2380	9.54	0.84
Franklin	Herrin	Possum Ridge	4	2050	2320	2210	8.39	0.82
Franklin	Orient	Orient	2	2380	2440	2410	8.99	0.93
Franklin	Orient	Orient (car sample, lump over 3 inches)	2	2120	2260	2190	9.73	1.29
Franklin	Royalton	North	6	2170	2650	2420	10.22	0.76
Franklin	Sesser	Sesser No. 1	5	2130	2260	2210	9.30	1.21
Franklin	Sesser	Sesser No. 1 (car sample of 3-in. lump coal)	4	2190	2480	2360	9.84	1.22
Franklin	West Frankfort	Brazil Block No. 18	2	2150	2240	2200	8.42	2.00
Franklin	West Frankfort	Old Ben No. 8	3	2010	2170	2070	7.93	1.45
Franklin	West Frankfort	Old Ben No. 9	4	2030	2150	2080	8.68	1.50
Franklin	West Frankfort	West Frankfort No. 1	5	2140	2520	2260	8.82	1.14
Gallatin	Shawneetown	Strong	1	....	....	2060	9.77	3.15
Macoupin	Gillespie	Superior No. 1	2	2140	2160	2150	11.36	4.59
Macoupin	Gillespie	Superior No. 1 (car sample run-of-mine)	1	....	....	2040	15.11	5.76
Madison	Collinsville	Cantine No. 3	3	1970	2020	1990	10.67	4.01
Montgomery	Panama	Shoal Creek No. 1	6	2010	2170	2060	13.49	4.54
Perry	Duquoin	Paradise	18	2330	2610	2490	11.18	1.00
Perry	Duquoin	Security	4	2050	2130	2090	10.50	1.70
Perry	Pinckneyville	Ritchey No. 1	5	1920	2170	2060	11.46	3.65
St. Clair	O'Fallon	Taylor	2	1960	2030	2000	12.70	5.04
Vermillion	Danville	Schaefer	4	1990	2170	2090	10.19	3.85
Vermillion	Fairmont	Fairmont	6	1950	2150	2050	11.78	2.76
Vermillion	Georgetown	Sharon	5	2070	2160	2100	12.76	2.61
Vermillion	Steelton	Dering No. 4	8	2040	2190	2110	10.53	2.53
Vermillion	Westville	Bunsen (car sample, nut coal)	1	....	....	2180	10.45	1.99
Vermillion	Westville	Bunsen No. 3	1	....	....	1940	11.93	3.74
Vermillion	Westville	Little Vermillion	12	1930	2160	2070	9.84	2.52
Williamson	Herrin	Pond Creek	4	2010	2430	2220	9.43	1.01
Williamson	Herrin	Jeffrey	3	2220	2350	2280	8.26	1.38
Williamson	Herrin	Rend No. 2	5	2230	2390	2300	8.88	1.08
Williamson	Herrin	Weaver No. 2	3	1950	2280	2140	9.74	1.41
Average of mines in No. 6 Bed			160	2080	2280	2160	10.27	2.30
No. 7 Bed								
Vermillion	Danville	Electric	12	1940	2180	2040	9.70	3.31
Williamson	Herrin	C. and H. (car sample, run-of-mine coal)	1	....	....	2060	11.53	2.06
Average of mines in No. 7 Bed			13	1940	2180	2050	10.62	2.69
INDIANA								
No. 3 Bed								
Vermillion	Clinton	Crown Hill No. 3	4	2040	2220	2140	9.92	3.64
Vermillion	Clinton	Dering No. 1	4	1990	2070	2050	9.83	3.86
Vigo	Terre Haute	Vandalia No. 82	3	2030	2100	2080	12.08	5.51
Average of mines in No. 3 Bed			11	2020	2120	2090	10.61	4.34
No. 4 Bed								
Greene	Jasonville	Gilmour No. 7	4	2570	2790	2670	8.43	1.33
Greene	Linton	Vandalia No. 24	3	2370	2710	2500	8.30	1.49
Sullivan	Cass	Vandalia No. 28	3	2300	2420	2350	7.81	1.43
Sullivan	Dugger	Ayrdale	4	2350	2710	2490	8.20	1.42
Sullivan	Dugger	Vandalia No. 10	9	2150	2390	2300	7.01	1.45
Sullivan	Dugger	Vandalia No. 22	3	2030	2340	2170	8.91	2.93
Vermillion	Clinton	Clinton No. 4	4	2250	2320	2280	8.50	1.26
Average of mines in No. 4 Bed			30	2290	2530	2390	8.17	1.62
No. 5 Bed								
Gibson	Fort Branch	Fort Branch	3	2060	2100	2080	9.72	3.83
Gibson	Oakland City	Ayrshire No. 7 (car sample, lump coal)	4	2480	2560	2530	6.40	1.06
Knox	Bicknell	Indian Creek	2	2040	2210	2130	10.28	4.83
Knox	Bruceville	Oliphant Johnson No. 1	6	2030	2130	2070	11.90	3.54
Sullivan	Carlisle	Viola	3	1990	2200	2090	10.29	3.27
Vanderburg	Evansville	Sunnyside	2	2080	2100	2090	10.31	2.97
Vermillion	Blanford	West Clinton No. 1	2	1890	2070	1980	10.49	3.65
Vigo	Terre Haute	Vandalia No. 82	6	1950	2090	2040	10.82	3.45
Warrick	Elberfield	Elberfield	1	....	....	2190	11.83	5.30
Average of mines in No. 5 Bed			29	2070	2180	2130	10.23	3.54
No. 6 Bed								
Sullivan	Dugger	Vandalia No. 17	5	2010	2120	2040	9.91	2.65
Minshall Bed								
Vigo	Coal Bluff	Chicago No. 8	1	....	....	2120	9.60	2.99

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM THE COALS OF THE INTERIOR PROVINCE—Continued

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
WESTERN KENTUCKY								
No. 6 Bed								
County	Town	Mine						
Union	Sturgis	Crittenden	4	1990	2260	2130	8.81	2.97
No. 9 Bed								
Daviess	Owensboro	Fulkerson	2	2030	2080	2060	12.18	4.31
Daviess	Owensboro	George Rudy	3	2060	2190	2100	10.76	3.63
Henderson	Baskett	No. 1	3	2020	2100	2050	11.53	3.14
Henderson	Robards	Panama	2	1990	2070	2030	11.41	4.12
Hopkins	Earlington	Arnold No. 9	8	1980	2310	2090	9.96	3.78
Hopkins	St. Charles	Carbondale No. 1	6	1910	2190	2020	9.05	3.59
Hopkins	St. Charles	Fox Run	8	1930	2170	2030	10.03	3.43
McLean	Island	O'Neil	4	1980	2170	2090	10.62	3.48
Muhlenburg	Bevier	Lam	5	1870	2030	1950	9.83	3.98
Muhlenburg	Central City	Central	3	1970	2230	2090	8.34	2.87
Muhlenburg	Cleaton	Bevier	2	1930	1960	1950	10.41	3.05
Muhlenburg	Graham	Skibo	2	1970	2030	2000	10.20	3.76
Ohio	McHenry	McHenry	1	....	....	2120	9.51	2.91
Ohio	Rockport	Crown	5	2000	2120	2070	10.79	3.70
Union	Dekoven	Curlew	1	....	....	2000	9.69	3.63
Union	Dekoven	Ohio Valley	6	1990	2070	2020	12.32	3.76
Union	Sturgis	West Kentucky No. 8	5	1920	2050	1980	11.62	4.19
Union	Sturgis	West Kentucky No. 9	4	1980	2000	1990	10.62	4.03
Webster	Providence	Providence No. 3	6	1870	2100	1990	10.55	4.17
Webster	Sebree	Sebree	2	1810	2020	1920	11.09	3.86
Average of mines in No. 9 Bed			78	1960	2110	2030	10.53	3.67
No. 10 Bed								
Union	Dekoven	Banks	1	....	....	1970	12.56	4.19
Union	Dekoven	Syres	1	....	....	2010	11.42	4.17
Average of mines in No. 10 Bed			2	....	....	1990	11.99	4.18
No. 11 Bed								
Hopkins	Madisonville	Reinecke	9	1960	2310	2070	7.95	4.00
Hopkins	Nortonville	Norton No. 1	6	1950	2130	2040	7.46	3.77
Union	Morganfield	Morganfield	4	1840	2230	2020	11.06	4.46
Union	Spring Grove	Buchanan	1	....	....	1990	9.99	4.02
Union	Uniontown	River Rail	5	1880	2050	1970	10.33	3.96
Webster	Providence	Shamrock	9	1880	2110	1970	9.77	4.24
Webster	Wheatcroft	West Kentucky No. 4	5	2020	2390	2160	10.45	4.14
Average of mines in No. 11 Bed			39	1920	2200	2030	9.57	4.08
No. 12 Bed								
Henderson	Corydon	Corydon	4	1860	2030	1970	12.72	3.39
Henderson	Smith Mills	Smith Mills	4	1990	2140	2070	9.41	2.03
Webster	Clay	West Kentucky No. 7	9	2080	2720	2410	8.47	1.49
Average of mines in No. 12 Bed			17	1980	2300	2150	10.20	2.30
Miscellaneous Beds								
Butler	Morgantown	Gilliam (Country Bank, bed not classified)	2	2020	2180	2100	8.33	3.71
Christian	Empire	Empire (Empire Bed)	3	1880	1960	1920	5.10	2.31
Crittenden	Sullivan	Barnaby (Bed not named, Bell?)	1	....	....	2160	8.05	3.59
Crittenden	Sullivan	Newcome (Bed not named)	1	....	....	2220	7.11	3.59
Hopkins	Nebo	Nebo (No. 14 Bed)	6	1900	2380	2070	9.17	3.02
Hopkins	Dawson Springs	Workman (Dawson Bed)	4	2000	2250	2100	5.49	3.11
WESTERN REGION—KANSAS								
Bevier Bed								
Leavenworth	Lansing	Penitentiary	3	1970	2070	2030	14.08	4.47
Leavenworth	Leavenworth	Home Riverside No. 1	3	1810	2020	1920	15.58	4.95
Average of mines in Bevier Bed			6	1890	2050	1980	14.83	4.71
Cherokee Bed								
Cherokee	....	Mayer No. 9	4	1900	2000	1950	8.72	3.30
Crawford	Edison	Wear No. 21	1	....	....	2090	12.65	5.04
Crawford	Pittsburgh	Central (Strip Pit)	3	2170	2390	2280	6.89	1.19
Average of mines in Cherokee Bed			8	2040	2200	2110	9.42	3.18
Leavenworth Bed								
Leavenworth	Leavenworth	Home Riverside No. 3	3	1860	2120	2020	18.26	5.46
Weir-Pittsburgh Bed								
Crawford	Fuller	Sheridan No. 2	3	1950	2110	2050	9.56	5.23
Crawford	Franklin	Western No. 16	1	....	....	1970	12.67	5.63
Crawford	Yale	Western No. 13	3	2000	2040	2020	12.81	5.08
Average of mines in Weir-Pittsburgh Bed			7	1980	2080	2010	11.68	5.31
Miscellaneous								
Crawford	Pittsburgh	Patton (Bed unnamed, upper bed)	1	....	....	1920	13.56	3.45
MISSOURI								
Bevier Bed								
Adair	Connellsville	Manufacturers No. 1	3	1870	2100	1980	14.96	4.10
Adair	Kirksville	Rocky Ford No. 1	2	1980	2030	2010	16.11	4.35
Adair	Kirksville	Star No. 1	2	1940	1950	1950	15.44	6.13
Adair	Novinger	Great Northern No. 21	3	1920	1980	1960	11.97	4.17
Adair	Novinger	Rombauer No. 3	3	1870	1950	1910	13.96	3.56
Boone	Columbia	Davis & Watson No. 1	3	1900	1950	1930	11.51	4.57
Boone	Columbia	Prather No. 1	3	1930	1970	1950	14.79	5.55
Caldwell	Hamilton	Caldwell No. 1	1	....	....	1930	16.44	6.65
Callaway	Fulton	Fulton Firebrick No. 1	3	1980	2000	1990	11.74	4.42
Johnson	Sutherland	Sutherland No. 1	2	1890	2060	1980	9.07	4.44
Macon	Bevier	Central No. 61	3	1940	2090	2030	11.27	3.83
Macon	Bevier	Northwestern No. 9	3	1920	1990	1950	11.12	4.05
Randolph	Huntsville	Carson No. 1	3	1960	1980	1970	11.67	6.11
Randolph	Huntsville	Northern Central No. 2	3	1960	1990	1970	9.95	4.46
Randolph	Ryder	Jones No. 1	3	1830	1910	1880	16.01	5.20
Sullivan	Milan	Milan No. 1	2	1850	1960	1910	19.49	6.85
Average of mines in Bevier Bed			42	1920	1990	1960	13.47	4.90
Bowen Bed								
Henry	Windsor	Bowen No. 4	3	1920	1960	1940	13.18	4.61

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM THE COALS OF THE INTERIOR PROVINCE—Continued

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
WESTERN REGION—MISSOURI—Continued								
Gainsville Bed								
County	Town	Mine						
Harrison	Cainsville	Cainsville	3	1940	2030	1980	12.71	5.78
Cherokee Bed								
Barton	Pittsburg, Kansas	Stephenson	3	2020	2260	2150	7.51	1.97
Jordan Bed								
Henry	Clinton	Pharis No. 1	3	1970	2160	2090	12.20	2.86
Henry	Clinton	Sheldon & Holt No. 1	3	1980	2010	1990	12.88	5.99
Henry	Deepwater	Dickey No. 1	3	1990	2040	2020	11.22	4.01
Henry	Deepwater	Hurst No. 1	3	1940	1970	1950	14.65	4.81
Average of mines in Jordan Bed			12	1970	2050	2010	12.74	4.42
Lexington Bed								
Adair	Stahl	Consolidated Stahl No. 1	2	1950	1960	1960	14.62	4.62
Clay	Missouri City	Missouri City No. 1	2	1980	2030	2010	14.78	3.50
Harrison	Melbourne	Trenton No. 1	3	1950	1990	1970	7.84	3.52
Lafayette	Corder	Black Diamond	3	1960	1980	1970	13.00	5.13
Lafayette	Corder	Wilson	3	1950	1980	1970	13.25	3.94
Lafayette	Higginsville	Farmers No. 1	3	2000	2120	2040	19.02	3.76
Lafayette	Lexington	Graddy	3	1930	2070	1990	15.00	3.90
Lafayette	Napoleon	Independence	3	1990	1990	1990	16.59	3.71
Lafayette	Wellington	Labor Exchange, Branch 305	3	1990	2070	2040	11.54	3.51
Putnam	Mendota	Mendota No. 2	3	1900	1940	1930	12.05	5.05
Putnam	Unionville	Anderson	2	2030	2100	2070	13.84	3.76
Ray	Richmond	Ray County No. 2	3	1930	2140	2040	15.84	4.49
Ray	Richmond	Ray County No. 50	3	1990	2030	2010	13.39	4.49
Ray	Vibbard	Vibbard No. 1	3	1990	2220	2070	7.91	3.14
Average of mines in Lexington Bed			39	1970	2040	2000	13.48	4.04
Lower Rich Hill Bed								
Bates	New Home	New Home No. 1	3	1890	1900	1900	16.04	5.59
Bates	Rich Hill	Fleming Pit No. 1	3	1950	2000	1980	13.70	5.46
Bates	Rich Hill	Ritchie Pit No. 1	2	1920	1970	1950	16.43	5.24
Average of mines in Lower Rich Hill Bed			8	1920	1960	1940	15.39	5.43
Lower Weir-Pittsburg Bed								
Barton	Mindenmines	Pullen No. 1	3	1920	1980	1960	9.51	3.72
Barton	Mindenmines	Pullen No. 17	3	1900	1940	1920	12.14	5.17
Average of mines in Lower Weir-Pittsburg Bed			6	1910	1960	1940	10.78	4.45
Mulberry Bed								
Bates	Amsterdam	Amsterdam No. 1	3	1940	1980	1960	16.19	4.30
Bates	Hume	Holland No. 1	2	1940	2070	2010	12.96	2.05
Average of mines in Mulberry Bed			5	1940	2030	1990	14.58	3.18
Mulky Bed								
Audrain	Martinsburg	Martinsburg No. 1	1	....	....	1940	11.66	5.77
Audrain	Vandalia	Standard	3	1890	1970	1920	13.68	5.41
Macon	Macon	Home	2	1950	2100	1980	10.53	4.66
Randolph	Renick	Orris No. 1	3	1870	1930	1910	9.23	5.14
Average of mines in Mulky Bed			9	1900	2000	1940	11.28	5.25
Rich Hill Bed								
Vernon	Panama	Jones No. 1	3	1930	1990	1970	15.47	6.12
Tebo Bed								
Adair	Kirksville	Star	2	1990	2010	2000	11.07	5.91
Grundy	Trenton	Trenton No. 3	3	2140	2320	2260	13.64	3.61
Henry	Calhoun	Parks No. 1	3	1920	2010	1970	12.87	4.01
Henry	Clinton	Lane No. 1	3	1950	2080	2000	14.50	4.28
Henry	Lewis	Pigg No. 1	3	1960	2010	1980	14.24	4.54
Linn	Brookfield	Crandall No. 1	3	1950	2160	2040	9.51	4.97
Linn	Brookfield	Walker No. 1	3	1930	2200	2040	8.82	5.12
Linn	Marceline	Landreth No. 1	3	1960	2040	2000	8.49	4.86
Average of mines in Tebo Bed			23	1980	2100	2040	11.64	4.66
Waverly Bed								
Lafayette	Waverly	Buckhorn	2	2010	2030	2020	17.43	8.29
OKLAHOMA								
Dawson Bed								
Rogers	Collinsville	New State Strip Pit	1	....	....	1860	8.73	4.09
Tulsa	Dawson	Southwestern No. 1	1	....	....	1920	9.36	3.62
Tulsa	Tulsa	Hickory No. 2	1	....	....	1970	8.75	4.01
Average of mines in Dawson Bed			3	....	....	1920	8.95	3.91
Henryetta Bed								
Okmulgee	Henryetta	Creek	1	....	....	1960	9.34	1.59
Okmulgee	Henryetta	Victoria	1	....	....	2000	6.72	1.59
Average of mines in Henryetta Bed			2	....	....	1980	8.03	1.59
Lehigh Coal Bed								
Coal	Lehigh	Folsom Morris No. 5	5	1950	2230	2120	12.89	4.56
Coal	Lehigh	Folsom Morris No. 8	5	1970	2240	2150	12.20	4.19
Coal	Phillips	Folsom Morris No. 6	5	2110	2240	2190	9.30	3.76
Average of mines in Lehigh Coal Bed			15	2010	2240	2150	11.46	4.17
Lower Hartshorne Bed								
Latimer	Adamson	Adamson No. 6	2	1920	1990	1960	3.21	1.38
Latimer	Gowen	Rock Island No. 40	7	1910	2070	2030	6.86	1.46
Le Flore	Hughes	Turkey Creek No. 2	1	....	....	2050	6.46	0.89
Le Flore	Williams	Williams No. 1	5	1870	2020	1970	8.85	1.02
Pittsburg	Adamson	Eclipse No. 1	2	2030	2060	2050	4.16	1.42
Pittsburg	Haileyville	Blue Creek No. 7	2	2000	2060	2030	6.02	2.31
Pittsburg	Hartshorne	Rock Island No. 8	2	1990	2030	2010	5.79	1.84
Pittsburg	Pocahontas	Pocahontas No. 1	1	....	....	2030	5.12	0.81
Pittsburg	Ridgeway	Rock Island No. 10	5	1980	2120	2050	7.77	1.70
Average of mines in Lower Hartshorne Bed			27	1960	2050	2020	6.03	1.43

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM THE COALS OF THE INTERIOR PROVINCE—Continued

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
WESTERN REGION—OKLAHOMA—Continued								
McAlester Bed								
County	Town	Mine						
Coal	Lehigh	Lehigh No. 8	1	....	....	2160	11.66	3.92
Pittsburg	Alderson	Rock Island No. 5	10	2030	2290	2190	4.92	0.71
Pittsburg	Alderson	Rock Island No. 38	8	1950	2160	2090	5.28	0.56
Pittsburg	Craig	Bolen-Darnall No. 4	2	2200	2290	2250	5.39	0.87
Pittsburg	McAlester	Busby No. 5	6	2190	2270	2230	5.40	0.58
Pittsburg	Pittsburg	McAlester Edwards No. 1	1	....	....	2180	8.97	3.38
Average of mines in McAlester Bed			28	2090	2250	2180	6.94	1.67
McCurtain Bed								
Haskell	McCurtain	San Bois No. 2	6	1990	2220	2110	6.92	0.84
Panama Bed								
Haskell	McCurtain	Blue Ridge No. 4	2	2130	2250	2190	6.13	1.01
Haskell	McCurtain	Blue Ridge No. 5	2	2100	2140	2120	7.49	0.91
Average of mines in Panama Bed			4	2120	2200	2160	6.81	1.46
Stigler Bed								
Haskell	Stigler	Turner Strip Pit	1	....	....	1940	4.00	0.64
Haskell	Stigler	Strip Pit	1	....	....	2050	4.69	0.71
Haskell	Stigler	Strip Pit	1	....	....	2090	2.62	0.65
Haskell	Tamaha	Old Slope	1	....	....	1920	8.09	3.60
Haskell	Tamaha	Strip Pit	1	....	....	2250	6.25	3.95
Average of mines in Stigler Bed			5	....	....	2050	5.13	1.91
Upper Hartshorne Bed								
Latimer	Wilburton	Degnan-McConnell No. 5	4	2020	2340	2190	5.16	0.93
Pittsburg	Buck	Buck No. 22	1	....	....	2200	4.78	1.68
Pittsburg	Haileyville	Hailey No. 2	2	2090	2130	2110	8.50	1.86
Average of mines in Upper Hartshorne Bed			7	2060	2240	2170	6.15	1.51
Miscellaneous Beds								
Craig	Bluejacket	Coates	1	....	....	2160	10.61	6.34
Craig	Estella	Boot Strip Pit	1	....	....	2050	10.68	6.39
Craig	Vinita	Heldebrand Strip Pit	1	....	....	2110	10.51	6.83
Craig	Welch	Mills Strip Pit	1	....	....	2040	12.33	6.06
Haskell	Whitefield	Ligon Strip Pit	1	....	....	2000	2.62	1.44
Le Flore	Bokoshe	Slope No. 3	2	2230	2300	2270	5.12	0.78
Pushmataha	Jumbo	Jumbo	5	2200	2510	2310	6.71	1.63
Rogers	Catale	Catale No. 1	1	....	....	2160	10.25	5.40
Rogers	Claremore	McNutt	1	....	....	2230	5.10	0.89
Sequoyah	Hanson	Bremeretal Strip Pit	1	....	....	2170	5.76	1.82
Wagoner	Broken Arrow	Arkansas Valley Strip Pit	1	....	....	1960	7.25	2.75
Wagoner	Redbird	Kirk Strip Pit	1	....	....	2080	14.21	6.79
ARKANSAS								
Denning Bed								
Franklin	Denning	Denning No. 2	3	2180	2230	2200	7.38	2.45
Hartshorne Bed								
Sebastian	Hackett	Branner No. 2	2	2310	2340	2330	17.30	1.59
Sebastian	Hartford	Central No. 4	1	....	....	2090	11.27	1.15
Sebastian	Hartford	Central No. 10	1	....	....	2000	10.07	0.82
Sebastian	Huntington	Central No. 6	4	2060	2120	2090	9.60	2.01
Sebastian	Jenny Lind	Jenny Lind No. 17	1	....	....	2110	9.70	1.42
Average of mines in Hartshorne Bed			9	2190	2230	2120	11.59	1.40
Paris Bed								
Logan	Paris	Grand No. 1	3	2130	2160	2140	10.12	3.28
Shinn Basin Bed								
Pope	Russelville	Bernice	1	....	....	2180	10.36	2.23
Miscellaneous Beds								
Washington	West Fork	Country Bank (bed unnamed)	1	....	....	2150	10.30	2.00
Washington	Fayetteville	Country Bank (bed unnamed)	2	2020	2020	2020	10.73	3.41
SOUTHWESTERN REGION								
TEXAS								
Santo Tomas								
Webb	Dolores	Dolores	1	....	....	2590	19.89	2.17
Webb	Laredo	Santo Tomas	1	....	....	2570	18.52	1.78
Average of mines in Santo Tomas Bed			2	....	....	2580	19.21	1.98

and the per cent. ash and sulphur in the dry coal are tabulated for each mine tested. Average values for each mine were computed from the individual samples, and from these values averages representing each bed were obtained. It is evident that the greater the number of mines sampled the more representative are the average values for the beds. This should be kept in mind as in some instances the average values given for the beds represent only a few mines and are then not truly representative of the coal bed.

The point taken as the softening temperature is that at which the ash, when molded into solid triangular pyramids $\frac{3}{4}$ in. high and $\frac{1}{4}$ in. wide at the side of the base, and mounted in a vertical position, has fused down to a spherical lump. Points at which the tips of the cones first fuse, and at which the ash has become very fluid, are also taken and serve mainly as an indication of the viscosity of the melting ash; however, these values are not tabulated in the table.

In general the softening temperature of coal ash from the various coal fields of the United States ranges from 1900 to 3100 deg. F. For convenience in discussion, the order of fusibility of ash may be expressed by subdividing this range of softening temperature into three groups as follows: Class 1, refractory ashes, softening above 2600 deg. F.; class 2, ashes of medium fusibility, softening between 2200 and 2600 deg. F.; class 3, easily fusible ashes, softening below 2200 deg. F.

The softening temperature of the ash from the

Interior Province coals is uniformly low. With the exception of the Santo Tomas bed in Texas and the No. 4 bed in Indiana, all the average fusibility values of the various beds are found in class 3 (1900 to 2200 deg. F.). There is no such variation among the beds as was found in the coals of West Virginia,[5] where all three classes of fusibility are well represented. It is interesting to note that the class 3 beds of West Virginia which show low softening temperatures comparable to the Interior Province coals are those in the Monongahela, Conemaugh and Allegheny series, these coals being the uppermost coals of West Virginia and geologically the youngest. Most of the class 1 and 2 coals occur in the lower and older beds of the Pittsville series.

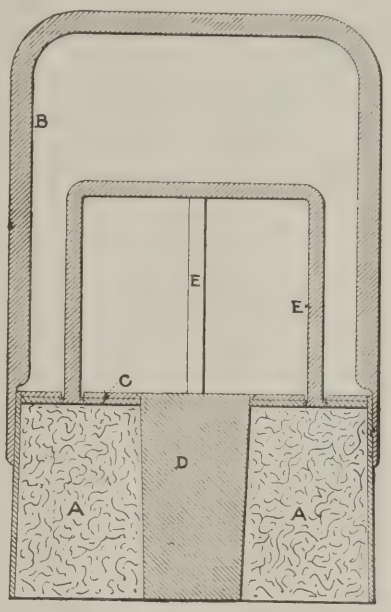
The uniformly low softening temperature of the ash from the Interior Province coal is unquestionably due to the quite general distribution of pyrite, calcite and frequently gypsum in the coal beds of this region. The percentage of iron and lime in the ash is usually quite high. In general it might be said that individual mines producing lower sulphur coal than the average sulphur values given for the bed in which they occur also gave higher fusibility of ash than that indicated by the average value for the bed.

As may be expected, samples from the same mine will give ash varying in fusibility due to the difference in the composition of the ash-forming constituents included in the sample. This variation of fusibility of samples of coal from the same mine in the Interior Province is not large, averaging only 140 deg. F. in the mines represented in the table. Only in a few instances does the difference between the lowest and highest softening temperatures of a number of samples collected from the same mine exceed 300 deg. F. The majority of mines gave samples coming within the average difference of 140 deg. F. between the lowest and highest values.

Novel Coal Cake Developed and Used at the Western Front in France

Under the title of "Homemade Fuel," a process for the utilization of anthracite dust was described in the Sept. 5, 1918, issue of *Coal Age*. This was a wartime suggestion. In the Oct. 18, 1918, issue of the *Colliery Guardian* there is described a similar method developed and used in the actual theater of war on the Western front. Considerable interest attaches to this latter scheme as it has in view the utilization of anthracite and other coal dust; the coal cake (called the Ablain coal cake) is made in a simple mold by hand, the particulars of which were furnished by Col. R. Standen. This coal cake is composed of a mixture of coal dust and either clay or chalk, compressed into perforated cylindrical cakes, measuring about 3½ x 2 in., or 2½ x 1¾ in. For some months past these cakes have been in use by a portion of the British armies in France. The material used was obtained from adjacent coal mines and was mixed in the proportion of two-thirds coal dust to one-third binder. Satisfactory results have also been obtained with four-fifths ground Welsh steam coal and one-fifth of either of the binders mentioned. Charcoal powder has also been used, a mixture of three-fifths charcoal to two-fifths binder being employed.

The mold used in this process is illustrated in the diagram. It consists of a cast-iron shell with the rigid handle *B* and the movable ejecting plate *C*, the latter being operated by the handle *E*. The central tapered core *D* is attached to the mold and makes the perforation in the coal cake; this core also helps to compress the mixture in the mold. To prepare the mixture for



MOLD USED FOR MAKING COAL BLOCKS

the mold, the coal dust is mixed with the binder and sufficient water is added to make a stiff mass; this mixture is then spread out to the desired thickness. The mold is pressed into the prepared layer; when the mold is withdrawn the compressed cake is ejected by means of the handle *E*. This device is primarily intended for domestic users who have a surplus of coal dust which they are unable ordinarily to utilize. It is for use on a small scale and during times of scarcity of fuel, or when coal is high in price. It might offer suggestions to those living near accumulations of coal dust.

California Coal That Is Rich in Oil

For many years lignite mined near Ione, Calif., has been used as fuel, though it contains a large quantity of moisture and therefore does not burn very well. Recently, however, on account of its resemblance to some oil shales that are apparently similar to cannel coals, this lignite has been tested by the United States Geological Survey, Department of the Interior, to determine whether it would not yield oil on destructive distillation. The results of the tests show that the best of the lignite, when destructively distilled, will yield 62 gal. of oil to the ton and, as a byproduct, at least 18 lb. of ammonium sulphate, which is a valuable fertilizer. This lignite is remarkably "fat." Although it contains 46 per cent. of moisture, analysis made by the Bureau of Mines shows that it contains also 31 per cent. of volatile matter and 16 per cent. of fixed carbon. The ash amounts to only 7 per cent., and the heating value is 6060 B.t.u. Although the bed containing this lignite does not appear to underlie a large territory, it is doubtless destined to receive attention sooner or later as a possible source of oil and gasoline.

[5]Selvig, W. A.: Fusibility of Coal Ash from West Virginia coals; *Coal Age*, Vol. 15, No. 1, 1919, pp. 12-16.

Lubrication of Air Compressors

By H. V. Conrad
Secretary, Compressed Air Society, New York

SYNOPSIS — *The oil for lubricating air-compressor cylinders should have a body of such weight as will separate the parts that have relative motion. It should carbonize but little if at all. Asphaltic base oils give a fluffy carbon, while a hard and adherent carbon is formed by those of paraffin base. Oils of high flash point are likely to produce carbon deposits. The author discusses rate of feed and carbon-cutting methods and concludes with some remarks on steam-engine lubrication.*

THE cylinders of air compressors can only be said to be satisfactorily lubricated when friction is reduced to a minimum and when the carbonization of the oil is eliminated as far as possible. If friction is to be avoided to a proper degree it will be necessary to choose an oil having sufficient body to sustain the weight of the moving parts and so form a seal between the rings of the piston and the walls of the cylinder. But the oil must not be so viscous as to absorb power needlessly.

The oil used in air cylinders apparently is always subject to a certain carbonization. It is well, however, to state just why that carbonization should be reduced to the lowest limits possible. The reasons are as follows: The deposits of carbon resulting from the carbonization of the oil accumulate on the cylinder valves, on the cylinder passages, in the pipes, and eventually in the air receiver.

In the early stages of their formation they are sticky, but they become hard and flinty later. These carbon accumulations cause sticking or incomplete closing of the valves which, in consequence, fail to act properly. This is probably the chief objection to the carbonization of the oil used in the cylinder.

The formation of excessive carbon deposits is likely to be due to any one or more of the following causes:

1. The ill-advised use of an oil, such as a steam-cylinder oil, which easily decomposes in the heat of the air cylinder.

2. The use of oils of too great a viscosity—commonly referred to as "too heavy oils." These do not atomize readily and therefore remain too long upon the hot cylinder walls, thus baking down to sticky carbon deposits.

3. The use of too much oil, which has the same effect as the use of too heavy an oil as far as the carbonization is concerned.

4. The failure to provide a proper screen over the air intake of the compressor, thus allowing free entrance of dust.

Not only does carbonization cause a sticking of valves and a choking of air passages, but it menaces the equipment with possibilities of fire. Carbon particles torn loose from such deposits may become incandescent from causes against which the manufacturers of the compressor cannot provide. If these incandescent carbon particles happen to come in contact with "oil-vapor" given off by the lubricating oil, a fire may possibly be started the menace of which would be small or large, depending upon how much carbon had been allowed to accumulate in the compressor and in the piping leading to the receiver. If these parts are kept properly cleansed at all times there should be no danger. Oil vapor is given off from a lubricating oil at a certain temperature called its "flash point," just as steam rises from water at a certain temperature.

To a large extent the lubricant for an air cylinder should be selected with reference to the cylinder temperature it must withstand. Knowing the air pressures the temperatures in the cylinder at the end of the compressor stroke may be ascertained with fair accuracy, as shown in Table I both for single-stage and two-stage (or compound) compression, the free air being assumed to enter the cylinder at 60 deg. Fahrenheit.

TABLE I. CYLINDER TEMPERATURES AT END OF PISTON STROKE

Air Compressed to a Gage Pressure, Lb.	Final Temperature, Single Stage, F.°	Final Temperature, Two Stage, F.°
10	145	....
20	207	....
30	255	....
40	302	....
50	339	188
60	375	203
70	405	214
80	432	224
90	459	234
100	485	243
110	507	250
120	529	257
130	550	265
140	570	272
150	589	279
200	672	309
250	749	331

The temperatures given in Table I will not always occur in actual practice, for the water jackets of the cylinders and radiation from the surfaces will tend to lower the temperature at the higher pressures. At a pressure of 50 lb. and lower, the heat is quite likely to be greater than that given if the compressor is run at a high speed and is not water-jacketed.

Relation of Flash Point to Cylinder Temperature

The natural inference of the reader, after noting the temperatures in Table I, is that he must select an air-cylinder oil of a flash point just above the maximum temperature commonly encountered within the air cylinder. As a matter of fact, this is not so.

The air-cylinder temperatures are useful because they aid us in selecting an oil which will resist breaking down into carbon when used in the lubrication of the cylinder. Such temperatures cannot be used as indicating the highest allowable flash point for a lubricant safe to use in the air cylinders.

In general, for average conditions, the oil should be a pure mineral oil of medium body and of the highest quality. It should not be compounded with fixed oils, such as those of animal or vegetable origin. It should, moreover, be carefully filtered in the final process of manufacture. Still a range of composition is nevertheless permissible in lubricants used for the lubrication of air compressors.

A distinction must be made between oils having a paraffin base and those having an asphalt base. Some

lubricant manufacturers claim that one class of oil is as desirable as another for the lubrication of the cylinders of compressors provided that both of them in the process of manufacture have been properly filtered so as to remove all carbon-forming elements. If, however, any carbon should be formed by the asphaltic base oils it will be of a light or fluffy nature, whereas that formed by oils having a paraffin base will be adhesive, hard and flinty.

To aid the operator in specifying what qualities should be possessed by a lubricant for average duty in air cylinders, Table II is given. I would suggest that

TABLE II PHYSICAL TESTS OF PARAFFIN-BASE OILS

	Minimum	Average	Maximum
Gravity, Bé.	28 to 32 deg.	25 to 30 deg.	25 to 27 deg.
Flash point, open cup	375 to 400 deg. F.	400 to 425 deg. F.	425 to 500 deg. F.
Fire	425 to 450 deg. F.	450 to 475 deg. F.	475 to 575 deg. F.
Viscosity (Saybolt) at 100 deg. F.	120 to 180 sec.	230 to 315 sec.	to 1500 sec.
Color	Yellowish	Reddish	Dark red to green
Congealing point (pour test deg. F.)	20 to 25 deg. F.	30 deg. F.	35 to 45 deg. F.

those oils which have ranges such as are described under the column marked "Minimum" should be used for light duty where low pressures and temperatures will be encountered. Any paraffin-base lubricant intended for use in "standard air compressors" should be within the ranges set forth under the column marked "Average." The following types of machines are classified as "standard air compressors":

1. Low-pressure machines compressing air to 100 lb. or less. These may be either small-sized single-stage units or larger-sized compound machines.

2. High-pressure machines which are constructed with the proper number of stages, so that no excessive temperatures are ever reached.

In other words, the lubricant which can find its appropriate place in the column marked "Average" (Table II) is always recommended unless a compressor manufacturer specifies in his literature that an oil of high flash point should be used to meet conditions peculiar to his machines. It is thus obvious that it is never necessary that a lubricant should possess a flash point as high as 500 deg. unless abnormal conditions of high temperature prevail. Oils of so high a flash point have an unusual tendency to produce the carbon deposits that we are so anxious to avoid.

The asphaltic-base lubricating oils are considered separately for the reason that the lower limit of gravity

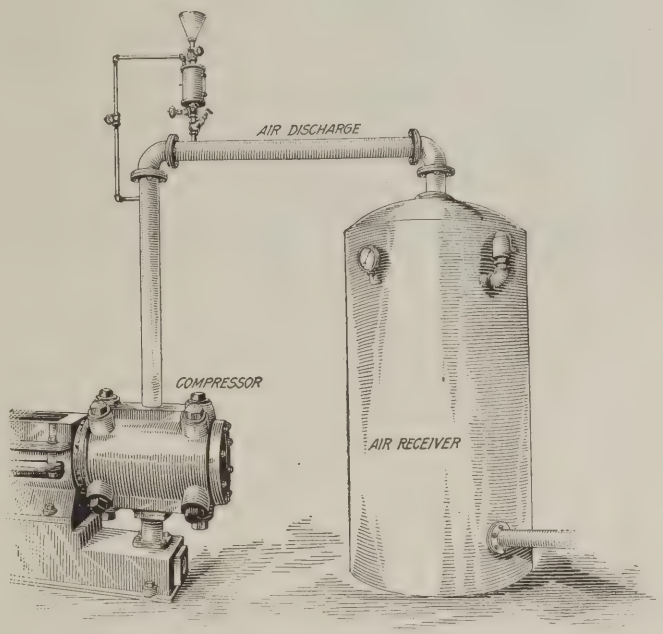
TABLE III. PHYSICAL TESTS OF ASPHALTIC-BASE OILS

	Minimum	Average	Maximum
Gravity, Bé.	20 to 22 deg.	19.8 to 21 deg.	19.5 to 20.5 deg.
Flash point, open cup	305 to 325 deg. F.	315 to 335 deg. F.	330 to 375 deg. F.
Fire	360 to 380 deg. F.	370 to 400 deg. F.	385 to 440 deg. F.
Viscosity (Saybolt) at 100 deg. F.	175 to 225 sec.	275 to 325 sec.	475 to 750 sec.
Color	Pale yellow	Pale yellow	Pale yellow
Congealing point (pour test, deg.)	0 deg. F.	—0 deg. F.	—0 deg. F.

stated in Table II—namely, 25 deg. Bé.—eliminates this entire group from consideration, which is not the intention of this article. As a guide for the selection of suitable oil, Table III is given. In general, the recommendations of Tables II and III cover the situation as well as possible. Special cases will, of course, require investigation and special consideration before recommendations are made.

The quantity of lubricating oil to feed to the air cylinders of compressors cannot be stated in exact terms. This is because of the varying viscosity of different oils, the heat of compression and the size of the cylinder. It may be stated in general, however, that, after the cylinders have acquired smooth and polished surfaces, the quantity should be reduced to the lowest limit, to avoid the possibility of the accumulation of carbon and sooty deposits. The basis of quantity given in Table IV is recommended, subject to modifications.

It should be carefully noted that the results in the last column of Table IV are based on the assumption that, under average conditions of temperature and with the usual range of oil viscosities, a pint of oil will



ARRANGEMENT FOR FEEDING SOAP SUDS INTO AIR DISCHARGE TO CUT CARBON DEPOSITS

average about 16,000 drops. The figures are offered merely as a rough guide. Every individual must exercise his own judgment in modifying them wherever his working conditions are unusual.

A leading authority on compressor engineering contributes the following: "The best way to determine the proper amount of lubrication is to take out the valves from time to time and examine the cylinder. All parts should feel oily. If they feel dry, the lubricators should be adjusted to feed a little more oil, whereas if oil lies in the cylinder or its parts, the quantity fed by the lubricators should be reduced. By thus examining the machine a few times the proper amount of any particular lubricant under the conditions of operation can be determined. It is better to use this method of determining the number of drops needed than to adopt, without experiment, any number of drops prescribed by authority for any given oil and conditions. This is a better way to finally determine the quantity of oil required than by adopting, without this experimenting, any predetermined number of drops."

The best of lubricating oils will cause the deposit of enough carbon in the compressor system to necessitate periodical cleansing. For the removal of carbon, the machine operator should confine his efforts to the use of soapsuds. A good cleansing solution is made of 1 part soft soap to 15 parts water. About once a week the suds should, for a few hours, be fed into the cyl-

TABLE IV. QUANTITY OF AIR-CYLINDER LUBRICANT REQUIRED PER 10-HOUR DAY

Diam. of Cylinder, Inch	Size of Cylinder, Inch	Displacement per Minute, Cu.Ft.	Piston Speed, Ft. per Min.	Sq.Ft. of Cylinder Wall Swept by Piston	Drops Oil per Minute	Drops Oil per 10 Hours	Sq.Ft. Oil per Drop	Number Pints Oil Required per 10 Hours
8	8x 8	120	344	718	1	600	718	0.0375
12	12x12	320	408	1230	2	1200	613	0.0750
18	18x18	880	496	2340	4	2400	585	0.1500
24	24x24	1730	550	3450	6	3600	575	0.2250
30	30x30	2940	600	4700	8	4800	590	0.3000
36	36x36	4550	644	6070	10	6000	607	0.3750
42	42x42	6700	696	7600	12	7200	633	0.4500

Figures of last column are based upon an estimated 16,000 drops per pint of oil at 75 deg. F.

inders in place of oil, either by means of a hand pump or through the regular lubricator.

The suds should be fed about ten times as rapidly as oil. The cleanliness of the air valves when inspected, as they should be periodically, will indicate whether greater or lesser applications of the soapsuds should be made. After using soapsuds, open the drain cock of the air receiver (and of the intercooler in the case of compound machines) to draw off any accumulated liquid. Before shutting down the machine, oil should be used for at least a half hour so as to prevent the rusting of the cylinder and its fittings. Never use kerosene, gasoline or lighter oils in an air cylinder for any purpose whatever, because of their volatile nature in the presence of heat.

It often happens that oil, carbon and other foreign matters are deposited in the lines through which the air is discharged and also in the air receiver. A practical method of cleaning these is shown in the illustration, where a receptacle made of 6-in. pipe is shown set on top of the discharge pipe. The diagram shows plainly the construction and what the different parts represent.

If, while the compressor is running, a mixture of 1 lb. of lye and 18 lb. of water is passed into the discharge line at the rate of 60 or 70 drops per minute, this will eat out all the carbon which has accumulated on the surface of the pipe and in the receiver; and if the blow-off valve on the receiver is open, all this foreign matter will be discharged therefrom. This cleansing solution can be used every month or two, the frequency of its application depending on the amount of carbon that may be deposited in the receiver.

Steam cylinders should be furnished with about four times as much oil as air cylinders, because the oil in the former case is constantly being washed away by the steam. Of course, conditions vary and make the ratio somewhat variable.

A pint of steam-cylinder oil will furnish from 5000 to 8000 drops, the number depending on the viscosity of the oil. Taking an average of about 6500 drops and assuming that four times as much oil is needed as for air cylinders of the same size working at the same piston speeds as given in Table III, the quantities of oil which should be fed to steam cylinders are given in Table V. The figures are approximate only, and will vary with the steam conditions, the kind of oil used and its method of introduction into the steam; also with the boiler compound carried by the steam into the cylinder. When the operator of an air compressor succeeds in obtaining lubricating oils that are giving satisfactory results, he should be cautious about making a change to other grades, particularly if cheapening the cost is advocated by purchasing or selling agents.

TABLE V. NEEDED OIL FOR STEAM-CYLINDER LUBRICATION

Number of Drops Needed per Minute	Size of Cylinder, in In.	Number Pints Oil Needed per 10 Hours
4	8x 8	0.4
8	12x12	0.75
16	18x18	1.5
24	24x24	2.25
32	30x30	3.0
40	36x36	3.75
48	42x42	4.5

But if a change is decided on, the performance of the new lubricants should be most carefully checked up before damage can occur to the rubbing surfaces of the compressors, and care should be taken to see that no increased amount of deposit collects on the inside walls of the air receiver.

The quickest way to solve the problem as to the use or rejection of any new air-cylinder lubricant safely and satisfactorily is to submit the matter to the local experts of any reputable lubricating company and to be governed by their recommendations. This advice should, however, be based on the considerations mentioned in the foregoing statement.

Use of Electric Power in the Mining of Anthracite Coal

One of the big anthracite companies, committed to an electrical policy, is systematically distributing the various power costs of operation at its plants. Much interesting information is thus obtained for comparison with former steam costs for the same duty. In this connection a paper read before the American Institute of Electrical Engineers by J. B. Crane is most timely. In this paper, Mr. Crane states a certain anthracite mine had meters installed for the different services for one year and the following average figures were obtained:

Operation	Kw.-Hr. per Gross Ton of Coal Produced
Haulage	1.73
Ventilation	1.62
Drainage	1.30
Lighting (including charging station)	0.12
Hoisting	1.02
Air compressor	2.11
Breaker	4.75
Total	12.65

The mine produced 558,394 tons of coal for the year in question and was doubtless selected as a plant presenting average conditions of cost of producing coal. If we assume 12 kw.-hr. per ton of coal produced, then there would have been required in 1917 (with a total anthracite tonnage of 89,720,982), if all the coal had been produced electrically, 1,076,652,000 kw.-hr. As a matter of fact 215,000,000 kw.-hr. were actually used in 1917 in electrically operated anthracite mines from central station and mine plants. Thus 861,652,000 kw.-hr. is the balance which would have been necessary to produce the remainder of the anthracite electrically.

In the mining and preparation of anthracite, reports have shown for years that some 10 tons of coal are required for power purposes for every 90 tons sent to market. Therefore in 1917, to produce the 89,720,982 tons of coal, 10 per cent., or 8,972,098 tons, were burned under boilers. If we can produce 1 kw.-hr. from 2½ lb. of small anthracite in large power stations, then 961,665 tons of coal would supply the 861,652,000 kw.-hr. noted in the preceding paragraph. Thus a saving of 8,010,335 tons would be effected, and this amount of coal would be released for sale.



FIG. 1. FRONT VIEW OF THE MAIN BUILDING OF THE PITTSBURGH STATION OF THE BUREAU OF MINES

The New Pittsburgh Station of the Bureau of Mines—I

By George W. Harris
Editorial Staff, *Coal Age*

THREE quarters of a million employees labor in and around the coal mines of this country, the hazardous nature of their labor demanding that they be safeguarded by every reasonable precaution. This necessity was long recognized, but it took a series of terrible mine explosions with attendant harrowing circumstances to emphasize the need of positive action.

The history of coal mining in America furnishes a striking illustration of the permanent benefit that may be brought about by disaster. The great loss of life following the explosion in an anthracite mine at Avondale, Penn., on Sept. 6, 1869, aroused public sentiment in that commonwealth to such an extent that legislative action begun at that time finally gave the state a set of mining laws and a system of inspection that brought great relief to both operator and miner.

England, France, Belgium and Germany all have established bureaus in their respective countries that are attaining most satisfactory results. Especially in France and Belgium was it necessary to surround the miner with every safeguard, as here are notably deep mines and gaseous coal seams; yet the death rate among the miners of these countries was far below that of our own country, in which an average of 3½ men per 1000 employed were killed in mines in 1908.

The Bureau of Mines was organized by its first director—the late Dr. J. A. Holmes—who also planned the new building that is the present home of the Pittsburgh station. It is particularly appropriate that the field headquarters of the Bureau should be located in Pittsburgh, the center of the greatest coal and coke and iron and steel section of the country. The new Pittsburgh station building is located in the Schenley Farms district, in the technical and educational atmosphere of the city. The property of the Carnegie Institute of Technology abuts on the south and east; the extensive building that houses the library and other benefactions of Andrew Carnegie lies to the west; on the crest of a not distant hill, a little to the north of west, is the University of Pittsburgh and the Mellon Institute.

The Pittsburgh station building is shown in perspective in Figs. 1 and 2, and the plans of the various floors are given in Figs. 3, 4, 5 and 6. The architecture is severely plain and businesslike, with an ornamental doorway at the main entrance on the north elevation (see Fig. 1). The main station building somewhat resembles the letter H, consisting of a longitudinal central building and two transverse wings, as may be seen in the illustrations. This building has only recently been taken over by the Bureau, accessory plant has not completely emerged from the construction period and the laboratory work is being reorganized and systematized; war work that has been carried on at the station is being wound up and preparations are being made to carry out the plans considered when the building was authorized.

The nature of much of the work done at the Pittsburgh station demands that the building containing the laboratories and workshops be substantial and of fireproof construction; furthermore, valuable records and results of years of research, also the samples stored

here, all dictate that there be a practical elimination of the fire risk. The building was therefore built with this in view. Imitation granite forms the side walls to the first floor, above which is reinforced concrete faced with buff brick; the floors are tile and concrete overlaid by hardwood in the offices and some of the laboratories; the partitions are of gypsum block. The main building corridors have floors of stained cement and marble mosaic. A slate roof caps the structure.

The dimensions of the Pittsburgh building suggest roominess. The central part of the station measures 59 x 240 ft., and each of the east and west wings is 46 ft. wide and 211 ft. long. The central portion and east wing were laid out for special allotment of rooms for certain work to be done; the west wing was made with rooms communicating, which permits of their being used as a suite or individually. The central portion of the building is mainly given over to administrative officials and affairs; the east wing is distinctly the chemical section and contains the various laboratories and offices; the west wing is appropriated largely by the mechanical department, the entire basement eventually constituting a mechanical laboratory that is open to the level of the second floor. Over this latter laboratory are smaller laboratories and the offices of the mechanical and electrical sections.

Some authority has stated that a chemical laboratory should include pipes with a building constructed around them. The significance of this comment is evident to the initiated and should be plain to anyone when it is known that a modern laboratory service often includes hot and cold water, compressed air, vacuum and natural and artificial gas, also electrical current. In connection with the Pittsburgh station laboratory considerable thought was given to the service problem. All main service pipes and electrical wires come into the basement of the building in a tunnel which continues under the basement corridor; from here the pipes pass through a vertical shaft up to the first and second floors. Under the first and second floor corridors are concrete passages connecting with the pipe shaft, and service mains extending the length of the building are run through these secondary passages. Special provision is made for branch pipe lines; 2 x 12-in. joists are in position under the wooden floor at right angles to the corridors, and branch pipes and wires are readily carried from main lines between these joists, up through the floor to the laboratory tables or benches. Drains from the benches and sinks are carried to vertical risers of acid-resisting fiber pipe leading down to a terra cotta drain in the basement tunnel.



FIG. 2. GENERAL VIEW OF BUREAU OF MINES BUILDINGS, LOOKING NORTH

The efficient and thorough ventilation of a laboratory, especially the hoods, is most important. This feature of the station chemical laboratory has been most satisfactorily worked out and was put to a severe test recently. In the war-work investigations of gas masks and respirators, some powerful poison gases were used; and their complete and direct removal from that part of the building where they were used was most imperative. The ventilating system of the laboratories of the entire wing includes four vertical flues equally distributed along the length of the building and connecting with all hoods by galvanized-iron air ducts painted inside with an acid-proof preparation. These vertical flues

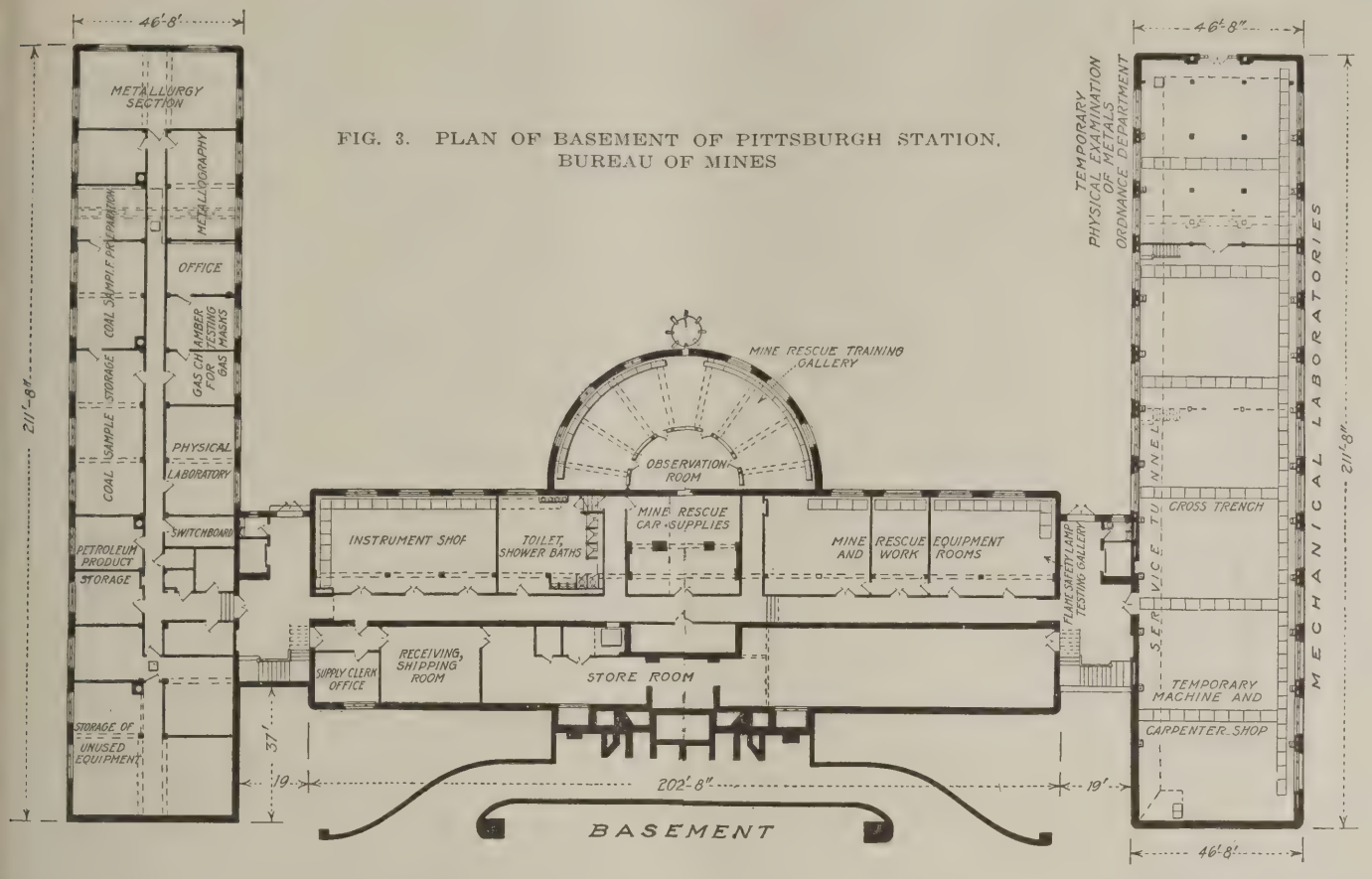


FIG. 3. PLAN OF BASEMENT OF PITTSBURGH STATION, BUREAU OF MINES

Basement of New Pittsburgh Station Is Largely Given Over to Storage Space, While First Floor Houses the Administrative Offices and an Up-to-date Auditorium

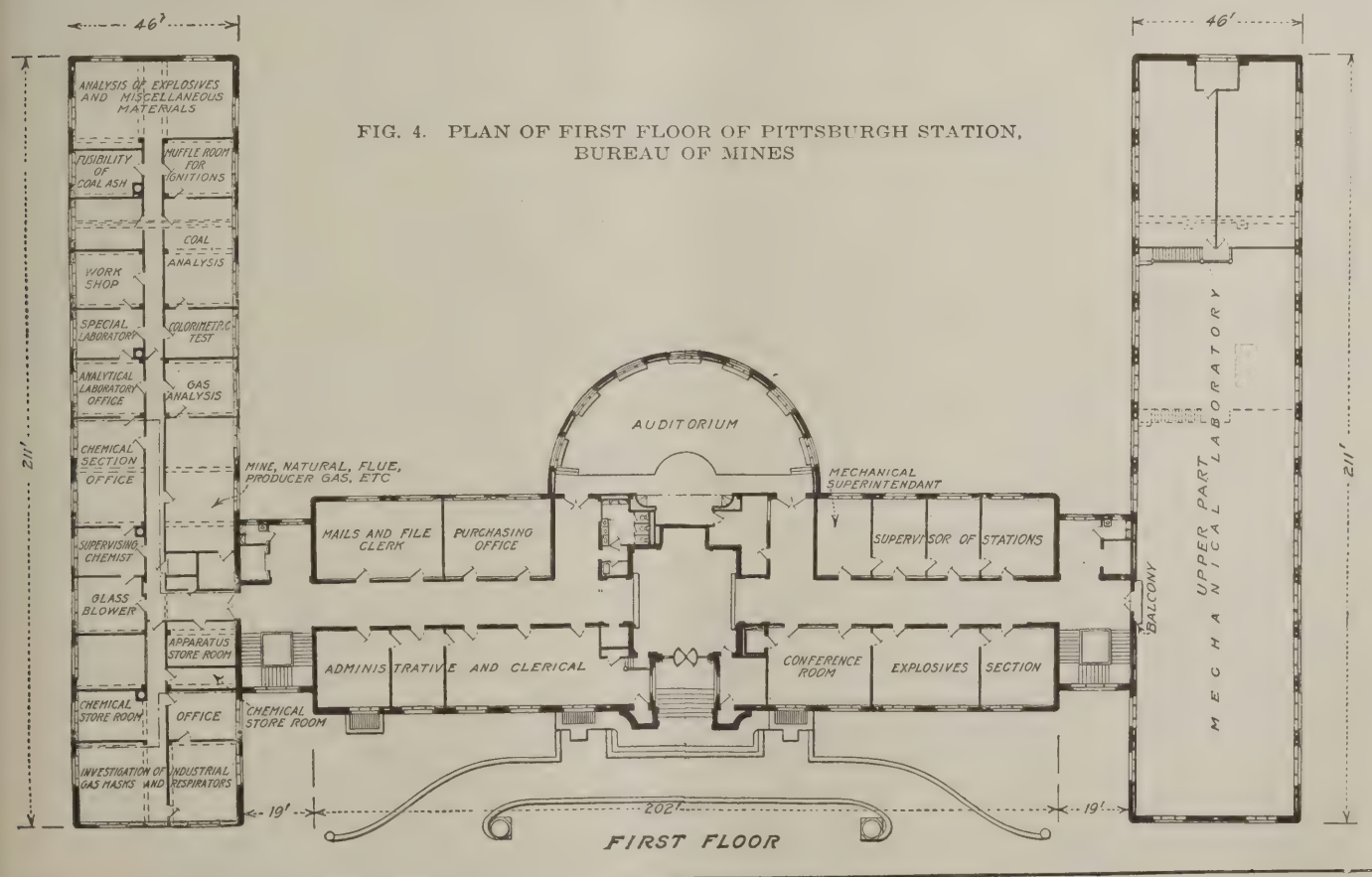


FIG. 4. PLAN OF FIRST FLOOR OF PITTSBURGH STATION, BUREAU OF MINES

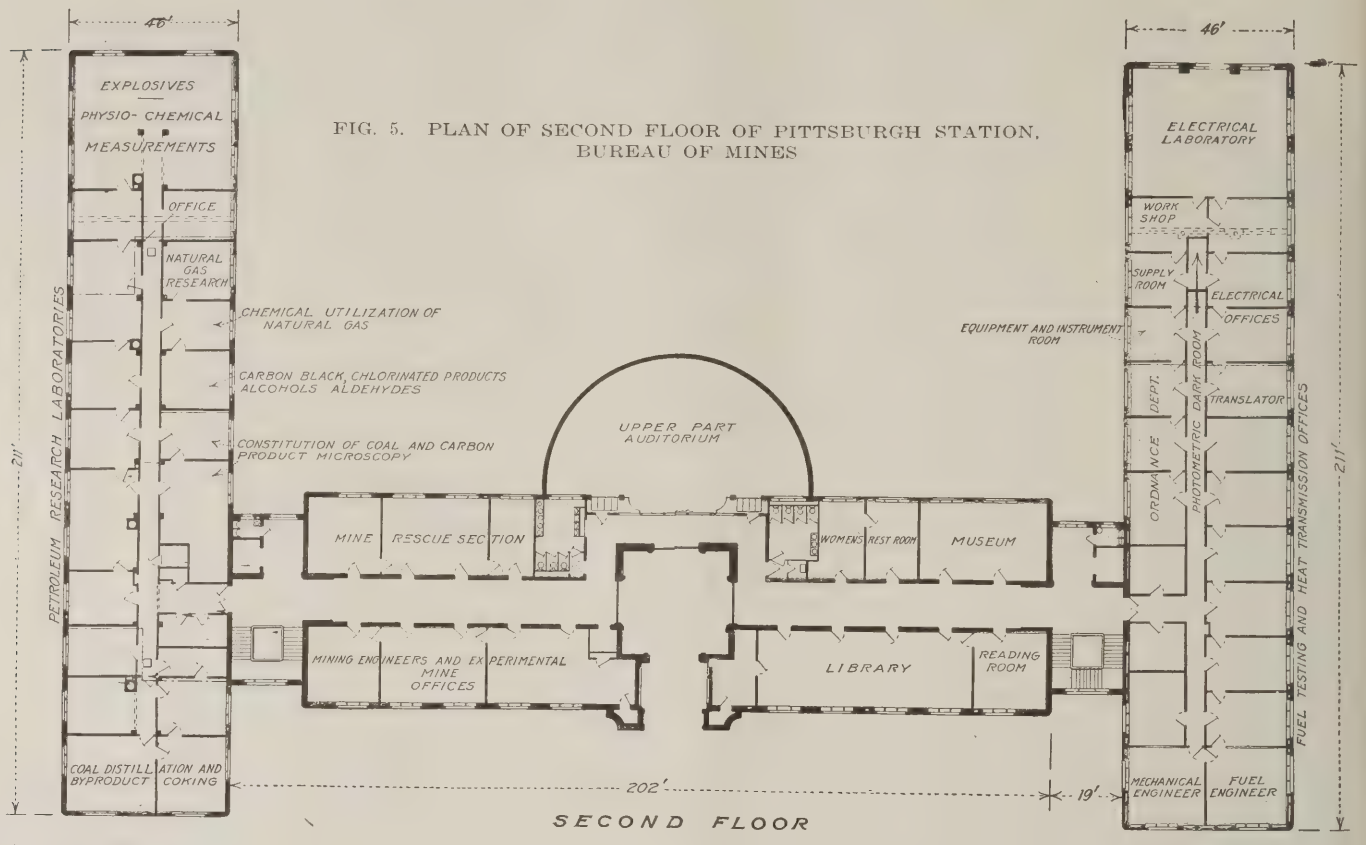


FIG. 5. PLAN OF SECOND FLOOR OF PITTSBURGH STATION, BUREAU OF MINES

On Second Floor of New Pittsburgh Station Are Located the Petroleum and Electrical Laboratories, the Third Floor Containing the Drafting and Computing Rooms

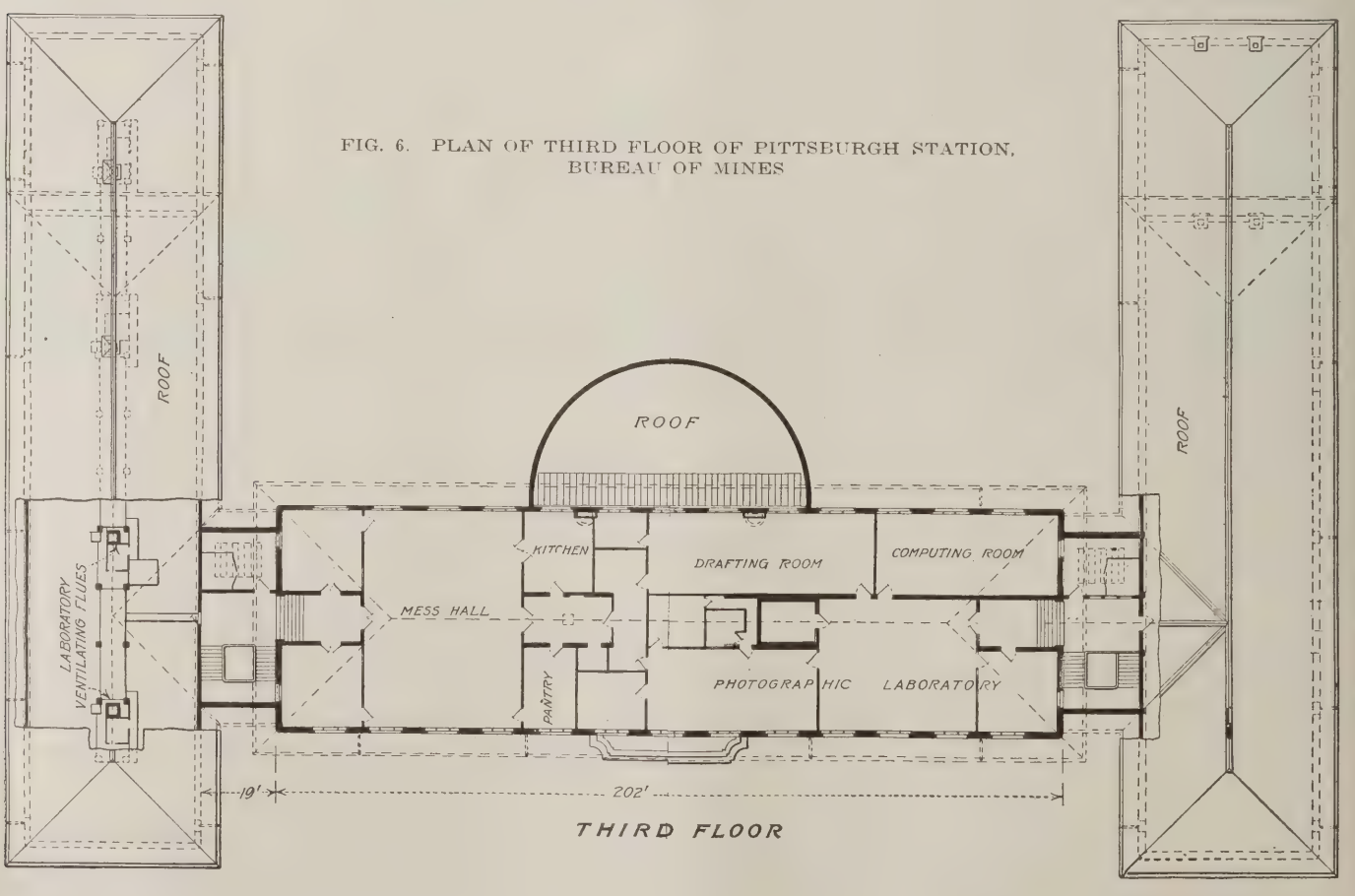


FIG. 6. PLAN OF THIRD FLOOR OF PITTSBURGH STATION, BUREAU OF MINES

extend to the loft over the chemical wing; here fans exhaust the fumes from the laboratory and force them out of the building through four vents in the roof.

The basement of the chemical (or east) wing is largely given up to storage of unused equipment, petroleum products and coal samples. A great number of coal samples have been taken from seams in mines throughout the country, and all these have been carefully preserved, making a valuable collection. In time they cannot be used for B.t.u. determinations, but for some purposes such as ash-fusing tests they answer the same purpose as freshly gathered samples. Coal samples are prepared in the basement, and gas masks are tested in a special gas chamber fitted up for the purpose. The disposition of other space is indicated on the plans.

On the first floor of the center building are the offices of the administrative and clerical forces. In the bay is an auditorium capable of seating 228 persons; it is at the service of the mining and scientific public at any time, upon application. The stage is equipped for lantern slide, moving picture and demonstration work of various kinds. The conference room on this floor is also available for small gatherings of scientific or technical men. The appointments of the room are in keeping with the purposes for which it was designed. The accompanying floor plans clearly note the uses to which the space on the second and third floors is put.

The mechanical laboratory takes up the whole floor space in the basement of the west wing. It is one large open room and of a height equal to the basement and first floor rooms in the center building and east wing. This laboratory is equipped for all kinds of mechanical work or testing. The floor is cement. On one side of the room provision will be made for a run of over 200 ft. in length on which rope tests and experiments can be made. On the other side of this laboratory is a service tunnel just below the floor level; connecting with the tunnel and at right angles to it are six cross trenches; the latter are 2 ft. deep and 3 ft. wide. The tunnel and trenches carry the service pipes and wires, which thus are distributed convenient for use at any part of the laboratory. At present the north end of the mechanical laboratory is used as a temporary machine and carpenter shop; the south end is now occupied by the ordnance department, which is conducting physical examinations of metals. The plan of the second floor of the west wing is self-explanatory as to disposition of space.

An important feature of the Pittsburgh station is the power plant that occupies the low building in the immediate foreground (see Fig. 2). The steam-generating end of this plant is a temporary arrangement. Two Babcock & Wilcox boilers are set independently with Sewell-type baffling; they are fired with Playford, type B, chain-grate, mechanical stokers that are 6 ft. wide and 10 ft. long. Another boiler—a 208-hp. Parker—is being erected, and this unit will be fired with an Illinois, chain-grate, mechanical stoker, 5 ft. wide and 10 ft. long. Pittsburgh seam screenings are fired under the boilers.

A feed-water heating system is used, the temperature of the city water being raised to about 210 deg. F. and then pumped into the boilers. The water is slightly hard and a Permutit water purifier system has been installed. Eventually the steam-generating plant will be in an addition to this building, on the ground level. This new arrangement will permit of satisfactory mechanical handling of coal and ashes. At present this work is done partly by hand; the coal is shoveled by hand from a railroad car into a skip that runs up the inclined track (see Fig. 2) and dumps it into a bin. Further handwork is necessary in the boiler room to fill the stoker hoppers at the grates. This expensive work will be done away with in time.

Electric current is generated in the center room of the power plant, first floor, by three 18 x 24-in. single Nordberg engines direct-connected to three-phase, 60-cycle, 440-volt, 200-k.v.a., revolving-field, General Electric alternators.

For ordinary service in the laboratories, 110- or 220-volt direct current is furnished by a 50-kw. Crocker-Wheeler motor-generator set—a synchronous motor in control and a 110- and a 220-volt direct-current generator being mounted on either side; all this apparatus is mounted on a common base. For direct-current circuit-breaker and switch tests, a direct current of 220 volts is supplied by a De Laval turbo-generator set; the turbine driving two 220-volt, 110-kw., direct-current generators.

In the east end of the power building is the fuels laboratory. Tests will be made here soon on house-heating boilers, to determine the heating value of coal in terms of wood. This problem is of practical interest outside of army circles. Under the first floor of the power building are pipe and wire galleries and also rooms for apparatus accessory to the machinery and steam plant above, such as a pressure oil-circulating system and so on. The main building of the Pittsburgh station is heated by exhaust steam from the engines in the power building; and the steam mains go from one building to the other through a tunnel.

The building shown in Figs. 1 and 2 is the first of a group; others are contemplated, and construction is at present proceeding during suitable weather on additions to the plant. A gallery for testing large explosion-proof apparatus is being completed near the end of the chemical wing of the station; the structural steel frame of the gallery building is shown in Fig. 2. Adjacent to the gallery is to be a garage—the materials for the building are on the ground. The garage will house automobiles, mine rescue trucks and passenger cars for jitney service between Pittsburgh and the Bruceton experiment stations; this building will include a tire and repair shop. Plans are being completed for an explosives magazine designed to hold quantities of explosives temporarily stored here awaiting chemical analysis and tests.

By referring to Fig. 2 it is evident that the Bureau of Mines building faces one of the fine residential sections of Pittsburgh. When the idea was suggested that this building be erected in the Schenley Farms district of the city, considerable opposition developed on the part of those owning homes here. To the average Pittsburgher the thought of a mines building going up in their midst would be somewhat alarming. However, little difficulty was finally experienced in acquiring a fine site for the station, which bids fair to considerably enhance the prestige of the educational and technical reputation of the Iron City.

(*To be continued*)

Governor Sproul Withdraws His Criticisms of the Anthracite Industry

On Mar. 13 Governor Sproul of Pennsylvania, much perturbed at the increased cost of anthracite, asked the Attorney-General to tell him what powers he had to inquire into the cost of anthracite. On Aug. 4 the governor, having assured himself that the price increase was justified, much to the credit of his reputation as an honest and fearless public servant, made the statement given below.

SINCE the announcement of the proposed raise in the price of domestic sizes of anthracite coal at the mines, last month, I have given a great deal of time to the making of a businesslike personal investigation of the anthracite situation. In this I have received every coöperation from the operators and from others interested in the question. I have made the investigation personally as a business man and as a state official rather than by utilizing the more ponderous implement of a legislative committee, because I was convinced that it was essential, in view of the commercial interests involved, that decision should be given promptly.

Had Access to Engineers' Reports

In my inquiry I have had access to the reports made by the engineers and experts employed by the United States Fuel Administration. These reports are very complete and their determinations are recent and up to date. I have also had the sworn figures of the producing corporations, both the railroad operators and the independents, before me and have had the benefit of the advice and experience of some of those who assisted the Federal Fuel Administrator in his determinations.

H. A. Garfield, the United States Fuel Administrator, when he relinquished active control over coal prices on Feb. 1 of this year, made a statement in which he said among other things:

"Had the Fuel Administration's active control over maximum prices on anthracite coal been continued the cost examination above referred to shows that it would have been necessary, on the basis of the present wage scale, to raise these maximum prices possibly as much as 50c. per ton above those last fixed by the Government, in order to prevent financial embarrassment and perhaps the closing of companies producing a substantial percentage of the necessary anthracite output. Such a curtailment of production would eventually result in the demand exceeding the supply to such an extent as to increase the prices much higher than they would be if that supply was continued."

I am convinced that Dr. Garfield's judgment in this matter was correct and that the action of the producers in announcing a gradual increase of 10c. a ton for five months, beginning May 1, is justified, considering all of the conditions confronting the trade. We are all anxious that the present wage in the anthracite regions be maintained, as this industry in one way or another affords employment and sustenance to almost one-tenth of our industrial population in Pennsylvania. It is also a fact to be thoroughly considered that only about one-eighth of the anthracite coal mined in Pennsylvania is consumed in this state, the balance going outside of the limits of the state. The Federal Fuel Administration's experts showed that the cost of mining and preparing anthracite coal has increased 52 per cent., while the price at the mines has increased only 30.5 per cent.

Willing to Coöperate

Several of the larger independent operators and some of the so-called railroad interests were willing to defer the beginning of the increase until July 1, instead of May 1, had I so requested. I feared to insist upon this, however, as it would have meant a derangement in the trade throughout the entire anthracite-using section and would undoubtedly have worked hardship upon operators and the throwing of many people out of work by preventing early buying of anthracite and its storage in cellars for next winter's use.

There has been a marked falling off in the production of coal during February and March, many mines being on short time and others closed. It would be dangerous, therefore, to delay the settlement of the question longer for the usual mining operations during the spring and summer would be reduced and a shortage in coal and consequently higher prices would result next winter. My feeling is that everyone who can do so should lay in coal now.

There are other elements entering into the cost of anthracite coal at the homes of our people which need some sort of regulation and control. There are great inequalities in the railroad rates as planned by the Federal Railroad Administration, and, of course, a considerable part of the increase in the price of coal has been due to these increased rates for carrying domestic coal to the user. For instance, the freight rate to Reading is $1.90, although the haul from the Schuylkill region is but little over fifty miles, while the same rate prevails to Philadelphia, nearly sixty miles further. If our railroad situation is ever unscrambled and the state ever again has authority over its interstate business an investigation must be made to iron out these inequalities and give the people their rights in the matter.

Distribution Charge High

The charges for distribution, which were fixed at a very high figure during the extraordinarily severe winter of 1917-1918, when heavy snows and the worst weather in a generation made the handling of coal extremely difficult, still remain in force in most places, although in some cities of the state reductions of as much as 50c. per ton have been made in the delivery charges. The dealers have their troubles, too, in increased expenses for labor and materials, but it would seem that there is generally room for reductions in the distribution charges which will at least make up and perhaps exceed the increase which is necessary at the mines.

It would seem that there should be some continuing authority over the fuel situation to prevent runaway

markets, extortion and to maintain the trade on an equitable basis, fair to labor, producer, dealer and consumer.

It would also seem that our larger communities might very well be given the right to establish coal markets for supplying their own citizens. Well conducted public fuel markets would likely be able to save the citizens of our larger communities as much as a dollar a ton upon domestic fuel coal.

[It may be said for the retail dealers that their prices were probably kept up in anticipation of a heavy snowfall which would make such prices as they were charging wholly inadequate during the long period in which the snow might be expected to encumber the streets. No one knew till spring was well on its way that the weather would be mild.—EDITOR.]

Instrument for Locating Entombed Miners

The geophone, a listening instrument invented by the French during the war to detect enemy sapping and underground mining operations, and for the location of enemy artillery, is now being used by the Bureau of Mines as a possible aid in locating miners who have been entombed after a disaster. This instrument was further developed by United States engineers and is now used by the bureau according to plans drawn by these engineers. Alan Leighton, of the bureau, has charge of investigations being conducted with the geophone by the department with which he is connected.

The instrument, though small, is essentially a seismograph, since it works on the same principle as the ponderous apparatus with which earthquake tremors are recorded. It consists of an iron ring about 3½ in. in diameter; within the center of this ring is suspended a lead disk which is fastened by a single bolt through two mica disks, one forming the top and the other the bottom cover of the ring. Outside of each mica disk is a brass cap piece fastened with bolts to the iron ring and serving also to hold the mica disks in place. The top brass cap has an opening in its center to which is fixed a rubber tube leading to a stethoscopic earpiece.

The geophone is simply an air-tight box in which is suspended a lead weight between two mica disks. In operation, if the instrument is placed on the ground and anyone pounds or digs in the vicinity, then energy is transmitted as wave motion to the earth and these earth waves shake the geophone case. The lead weight, on account of its mass and because of its being suspended between the mica disks, remains comparatively motionless. Thus relative motion is produced between the instrument case and the lead weight, with resulting compression and rarefaction of the air in the instrument. This rarefaction and compression is carried to the ear drum by the rubber tube and stethoscopic ear piece. It is customary to use two instruments, one for each ear.

When the two instruments are used, it has been found that the sound is apparently louder from the instrument nearer the source of the sound. It is evident then that by moving the instruments around, a point can be found where the sound will be of the same apparent intensity in both ears. The direction of the sound is then on a perpendicular to the line connecting the centers of the two instruments either in front of or behind the observer. Further observation will show which side. Direction of sound is quite accurately determined in this way. The sound is not actually louder in one ear than in the other, but the ear is capable of distinguishing the difference in time at which the sound arrives in the two instruments.

The Bureau of Mines engineers have done considerable experimenting with the geophone, determining the distance that different mining machines could be heard through clay, shale, coal and strata overlying coal beds. Measurements were also made of the energy required to be given to various tools that blows might be heard through definite distances of rock and coal. The shock waves resulting from the discharge of explosives were also investigated. To give some idea of the sensitiveness of the instrument, it may be said that pounding with a pick on bituminous coal has been detected a distance of 900 ft. and the direction determined; pounding with a sledge has been heard as far as 1150 ft. These measurements were made in the Pittsburgh coal seam, which is somewhat harder than most other bituminous coal beds. One interesting feature of the instrument is that the sound as transmitted to the ear is characteristic of the instrument producing the sound.

It is thought that the geophone possibly will be of great value to mine rescue crews who may enter mines for exploration, and to locate miners who may have been entombed after a disaster. The distance at which sounds can be heard depends greatly on the character of the coal upon which a man is pounding; intervening rooms and entries seem to have surprisingly little effect in interrupting sound or in confusing the determination of direction. On the other hand, any wind blowing outside the mine greatly interferes with the successful operation of the instrument on the surface. Futhermore, dust tends to dampen the transmission of sound; and since mine tracks often either rest on such material or are surfaced with it, sounds are not usually transmitted well by rails. The same is true of pipe lines which are buried in mine dust; however, when pipes are supported on ties or fastened to props, pounding on them can be heard great distances. Miners are well aware of this and frequently signal to the surface by hammering on pipe lines up shafts and slopes.

After the bureau has completed its investigations, a course of instruction in the use of the geophone will be developed and recommendations will be made as to the best procedure for rescuers to follow when using the instrument, and also what entombed miners should do to assist toward their rescue.

Wasted Fuel in Factories

In most factories the ashes and waste from boiler and other furnaces carrying a variable amount of usable fuel is either taken to a common dump or is carted away without any attempt at recovery of the useful portion, even sifting not often being done. In this way a loss of fuel occurs, and it would seem that decided improvement could be effected in the treatment of both factory and domestic fuel wastes.

Probably a combination of dry and wet separation would give the best results, the material being graded and to some extent separated dry by means of screws, as in a coal washery, and afterward separated in wet jigging or other machines so far as the heavy waste is concerned. Metals and other material passing over, say a 2-in. mesh screen might well be hand sorted. Fine stuff below that passing a ¼-in. mesh screen could be left untreated. The result of treating the grades between ¼-in. and 2-in. would be fuel and waste.



Railroad Fuel Policy Still Subject of Much Acrimonious Debate

Little progress has been made during the past week in the controversy over the purchasing policy of the Railroad Administration. The matter has been the subject of bitter discussions. Officialdom is divided, and there is a diversity of opinion among coal operators and steel makers. Director General Hines apparently is of the opinion that the low-cost mines can produce all of the coal that is needed at this time and is opposed to adjusting prices so as to permit other properties to operate. His view apparently is that the low-cost operations will absorb such labor as may be released from higher-cost properties, to say nothing of the increased employment which would be made possible if coal and steel costs were reduced.

The National Coal Association has not replied to Director General Hines' last statement alleging selfish motives on the part of the coal operators. It is the intention not to dignify it with a reply.

Investigation Bureau of Fuel Administration Will Cease Work on May 1

The Bureau of Investigation of the Fuel Administration will close out its work May 1. Any cases which may be pending on that date will be turned over to the legal division. When the Bureau began its work, there were 1800 jobbers of coal in the country. This number increased to 4800, largely as the result of the licensing system and the 15c. a ton addition to the price.

Of that large number in the jobbing business, all but eighty have reported according to the regulations. An analysis of those eighty, however, shows that there were no intentional violations of the regulations. Most of the number is made up of those who expected to do a jobbing business but through failure to obtain coal did not actually handle any tonnage.

More than 30 per cent. of the workmen in coal mines, it is believed, are non-resident aliens. This means that a large amount of work will fall to coal operators under the new revenue law, in which they are charged with the duties of withholding income tax at the source.

The Government, on Apr. 9, filed its brief in the Supreme Court of the United States in the case of the United States vs. the Lehigh Coal and Navigation Co. The case, which has been in the courts since 1915, revolves around an alleged payment of rebates by the Central Railroad Co. of New Jersey to the coal company.

Some Interesting Comparisons in Prices of Basic Commodities

How far the cost of living, for individuals and industries, has gone down or is likely to go down is again brought to the fore by the announcement of a price readjustment for the steel industry. The new schedule of steel prices is interesting, not only for its actual figures, but for the results obtained from a comparison with prices ruling in January, 1914, before a world war became the main price factor.

Such a comparison indicates that even under the new schedule steel prices show a tremendous increase, surpassing the advance in America's other great basic commodity, coal, whether anthracite or bituminous.

Here are figures for iron and steel, showing the percentage of increase in the present revised prices over those prevailing in January, 1914, the latter being taken from *The Iron Age*:

Commodity	January, 1914	March, 1919	Increase, per Cent.
Basic iron, gross ton	$12.50	$25.75	106.00
*Black sheets, No. 28	1.87	4.35	132.62
Galvanized sheets, No. 28	2.87	5.70	91.63
Steel bars	1.20	2.35	90.58
Tin plate, base box	3.32	7.00	110.84
*Tank plates	1.20	2.65	120.83
*Nails	1.54	3.25	111.03
Wire rods, gross ton	25.50	52.00	103.92
Billets, 4-in	20.13	38.50	91.26

Two additional comparisons are here given, the 1914 figures being from records of steel concerns in Philadelphia:

*Shapes	1.20	2.45	104.16
*Light rails, gross ton	22.00	54.88	158.54

* Products so marked enter largely into anthracite mining.

As against this, anthracite, all sizes, averaged much less, comparing January, 1914, against March, 1919. The three standard domestic sizes—egg, stove and nut—illustrate this. White ash egg coal cost $3.75 at the mine in January, 1914, and $5.85 in March, 1919, an advance of 56 per cent.; white ash stove, then $4 at the mine, is now $6.10, an advance of 52.50 per cent.; white ash nut, the most popular size of all, which then cost $4.15 at the mine, is now $6.20, a gain of but 49.39 per cent. in a five-year war period.

The percentage of increase, taking all hard coal, including steam sizes, would be much less than the figures shown above. The United States Government, through the Bureau of Labor Statistics, Department of Labor, in the March issue of the *Monthly Labor Review*, gives the advance in all Pennsylvania white ash coal since 1913 as 44 per cent.

Bituminous coal, on the average, has likewise advanced but 44 per cent. over 1913 figures, though of course certain grades advanced beyond that percentage; but coke was not so moderate. Connellsville furnace coke, sold for $1.85 in January, 1914, while it was

quoted at $4 for the week beginning Mar. 24, 1919, a gain of 116.2 per cent.

Not only has coal been beaten out by steel, even using the present steel prices and ignoring the still higher quotations during the last two years or more, but food keeps mounting. Bradstreet's index number, based on the wholesale prices of 31 foodstuffs, was $4.74 for the week ended Mar. 27, 1919, a gain of 9.7 per cent. over the corresponding week last year, and comparing with $4.62 Feb. 27, 1919.

Below are comparisons of food and cotton prices, just before the world war began and as of Mar. 27, 1919. The former figures are from Government reports, and the latter from Bradstreet's:

Commodity	July, 1914	Mar. 27, 1919	Increase, per Cent.
Steers, live	$9.219	$18.70	102.8
Hogs, live	8.769	19.38	121.0
Flour, standard pat	4.594	11.95	160.1
Butter, extra creamery	.27	.5925	119.4
Granulated sugar	.042	.0905	115.4
Cotton, mid. upland	.131	.2830	116.0

Will Put Price Stabilization Program Up to President Wilson

Overshadowing all other matters in official interest during the past week has been the controversy between the Railroad Administration and the Industrial Board of the Department of Commerce over the matter of price stabilization. The discussions have been followed closely by all industries, as the concentration of buying power in the unified administration of all railroads has brought many industries face to face with a most serious situation.

While the whole controversy has been waged around steel rails, it was really the coal operators who brought the question to a head. They declined to enter into any agreement with the Industrial Board until absolute assurance could be given that the Railroad Administration would be a party to the agreement. A number of statements have been issued in the matter, but the one by George N. Peek, the chairman of the Industrial Board, is regarded here as being of unusual interest since it clearly outlines the issues in which so many industries are vitally interested. Mr. Peek's statement, slightly abridged, is as follows:

The Industrial Board was formed to carry out a perfectly defined industrial policy to which the Government, represented by the President, the cabinet and the director general, was fully committed. There is no ambiguity either in the record or in the minds of the people of the United States as to just what that policy is—it is to avoid industrial stagnation pending a return from war to peace prices, to start the wheels of industry, to give employment to labor, to reduce the cost of living, to insure prosperity. Neither is there any ambiguity as to the methods to be employed in accomplishing this end. A scientific study of costs of production is to be made. Upon these studies of costs, prices of basic commodities are to be determined which shall be as low as cost of production will permit, which shall squeeze out all speculative or opportunist profit and upon which industry can commence operations without fear of any considerable drop in the market. This policy and this method are viewed by our people as the first constructive, comprehensive and direct attempt to reduce the cost of living.

To the complete success of this plan, however, there was one absolute essential, that the governmental departments should express the confidence of the Government in the execution of this most important policy. Especially is this true in respect of steel rails, in the buying of which the Government, through its control of the railroads, consumes a very large percentage of the output.

Considering the first of the Director General's reasons for refusing to accept the steel prices—that the Industrial Board has no right to impose a price on the Railroad Administration—the technical prerogative of the Railroad Administration must be and always has been cheerfully conceded by the Industrial Board. But presuming the Government to have been committed to this important industrial policy the board feels that the Railroad Administration is under a powerful, if not a compelling, obligation, either to have the governmental policy abandoned by the same source that announced it and to assume full responsibility for the inevitable effect of such a step, or to support the policy, or to demonstrate that the Industrial Board has failed in its function and that the prices announced by the board are not fair.

This brings us to the second of the Director General's reasons for his grave action—that "in his opinion" the prices are "too high." The significance of this expression cannot be overlooked.

A representative of the Railroad Administration is a member and a part of the board. Contrary to Mr. Hines' impression, this representative did not maintain that the prices of steel generally were "too high." He finally dissented only on the price of rails. That is not, however, the circumstances of greatest significance, which is that, throughout the discussion, from its earliest word to this latest pronouncement, the figures representing the costs of production were constantly available to the Railroad Administration's representative, and the basis upon which conclusions have been reached has been repeatedly represented to the advisors of the Director General and to Mr. Hines himself. Never have those figures been contested, never have additional or contradictory data been presented, never has the argument of the Railroad Administration been addressed to those figures nor to the conclusions drawn from them by the board.

In fairness to the Railroad Administration it must be admitted that, by using the full effect of its power of monopolistic buying it might secure a price on rails somewhat lower than that announced by the Industrial Board. The figures stand to prove, however, beyond all question, that such a price would be lower than production costs of any but one or two of the most highly organized, powerful, and lowest cost producers. For example, the pre-war price of rails was $30. The increase over pre-war costs of production, for the United States Steel Corporation, in direct labor alone, excluding labor in transportation, is reported by that corporation to be $19.48 per ton. The price approved by the Industrial Board on rails was $47, or $2.48 less than the increase of cost of labor alone would account for.

The inevitable result of the use of the enormous buying power of the Railroad Administration to reduce any price would be to create a situation which would have to met in one of the following ways: (a) Increasing of the prices to the public, (b) throwing all railroad business into a monopoly of powerful producers, (c) reducing wages.

In the opinion of the majority of disinterested men all of these results are highly undesirable and are, of themselves, gravely inimical to industry and to the public welfare. These results alone are, however, of an importance relatively incomparable to the vastly greater harm in the frustration of the industrial policy of the Government and the forced return to the period of commercial and industrial stagnation.

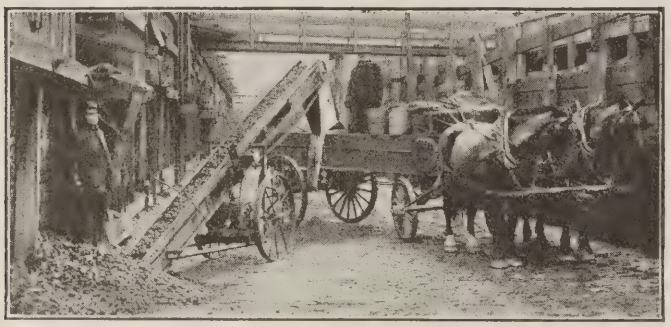
Doubtless the Director General is within his rights in insisting upon his technical prerogative to determine prices for himself, to exercise an arbitrary discretion in making that determination, and to use all the powerful means within his control to obtain the lowest possible prices on iron, steel and coal for railroad consumption. The board insists, however, that in the exercise of that right the Director General must assume full responsibility for all the results of the course he has chosen.

It is not the opinion of the board that governmental organization is such that important policies can be so lightly frustrated. The Railroad Administration's refusal to accept the steel prices puts a temporary check on the work of the board, but before abandoning the vital industrial policy which it represents, the board will see that the whole controversy is submitted to the President for final decision.

New Apparatus and Equipment

Portable Scoop Conveyor Does More Work with Less Manpower

The new type of portable belt conveyor manufactured by the Portable Machinery Co., Inc., of Passaic, N. J., is an improvement over previous designs. The machine is operated either by electric motor or gasoline engine and is known as a scoop conveyor, because the conveying belt receives its material from a scoop that can be forced under or completely buried in the material to



EFFICIENT CONVEYOR FOR HANDLING LOOSE MATERIALS

be conveyed. It will handle coal at the rate of 1 to 1½ tons per minute, depending upon its size.

The object sought is to provide a portable machine than can readily and easily be handled by one man for the purpose of loading and unloading, stacking and reclaiming loose materials such as coal, coke, ashes, crushed stone, sand and gravel.

This conveyor has a wide range of application. In the accompanying illustration it is shown handling coal from a pocket to a wagon at a big saving in labor. It will also handle sacks, packages, boxes and various manufactured products. One man with this conveyor, it is claimed, will handle without difficulty loose materials with greater speed than 6 to 12 men without it.

It is highly important under present-day operating conditions to keep trucks moving, save demurrage charges and cut the cost of shoveling. A number of well-known coal concerns are already employing from one to six of these conveyors.

Motor-Driven Shovels and Dragline Equipment for Mine Work

As a means to economy where electric power is available, electrically driven shovels or draglines are used for stripping overburden, mining coal, excavating, dredging, reloading coal and coke, and similar work.

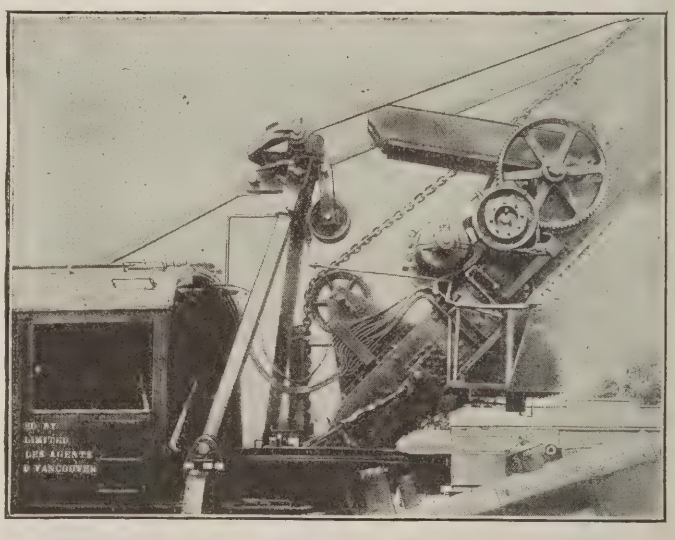
The advantages arising from the use of the electrically driven shovel and dragline are as follows: Lower operating cost, especially when fuels are scarce, expensive or hard to transport; a smaller number of operatives are required; there is no water to supply line to freeze; no boiler or boiler troubles; no standby losses; no smoke; no sparks; no objectionable noises; and more material can be handled.

A complete line of shovel and dragline equipment that meets the especially severe service encountered in such work has been designed by the Westinghouse Electric and Manufacturing Co. Simplicity is one feature of the apparatus tending to give it reliability in operation without skilled and frequent attention.

Both alternating- and direct-current equipments can be furnished. In general, the location of the shovels make alternating-current equipment preferable, because this current can be transformed economically. With the use of alternating-current motors the necessity of converting alternating to direct current is eliminated.

Such motors are of the wound-rotor type capable of exerting powerful effort at the instant needed in the cycle of operation. Each motor is mounted on a heavy frame with a strong shaft and amply large well-supported bearings of the oil-ring type. The rotating part is of small diameter and consequently has a low flywheel effect, which permits rapid starts, stops and reversals. The motors have few wearing parts and require little attention except for an occasional oiling.

The controllers are simple and compact, and are so designed and arranged that the operator can, by manipulating his master switches, cause the shovel to respond to his every wish with facility. By means of

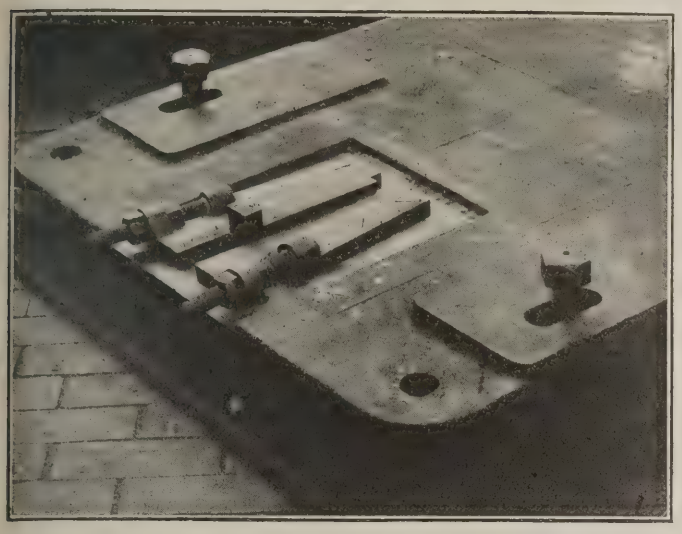


ELECTRICALLY OPERATED SHOVEL REDUCES LABOR COSTS

the protective features of the controllers the shovel or dragline can be operated at its maximum rate without injury to attendants or equipment, and without loss of time. Due to the ease and simplicity of control and the savings in power cost, through the use of the motor-driven shovel and dragline equipment, not only can more material be handled, but this at a lower cost per cubic yard. The standard equipment of the shovel and dragline consists of wound-rotor motors, magnetic contactors, master controller and transformer.

Adjustable Motor Anchorage

For the purpose of adjusting motors of 20 hp. and over upon their bedplates the Adjustable Anchorage Co., of Detroit, Mich., has recently placed upon the market the adjustable anchorage here illustrated. The device is simple, reliable and positive. It is particularly advantageous for motors equipped with magnetic clutches, although it is useful on motor driving belts. Heretofore



ADJUSTABLE ANCHORAGE FOR MOTORS

motors have not infrequently been dowelled in place. Any change in location of a motor so positioned is difficult, slow, and often entails injury or destruction to the concrete foundation. With this new device slight changes in the position of the motor may be readily and quickly effected, the only tool necessary being a suitable wrench.

Experiments on a New Pump to Withstand Acidulous Mine Water

Because of the exacting and adverse conditions under which mine pumps are operated, engineers and mining men are manifesting considerable interest in the outcome of certain experiments now being conducted by the Midwest Engine Co., of Indianapolis, Ind., on a pump of new design which is constructed from more resistant metal than is at present employed in mine pump-making.

The new pump will be of the duplex, double-acting, power-driven plunger type, unusually rugged in construction and driven by helical instead of spur gearing. It is designed theoretically to withstand the most severe duty imposed by gritty and acidulous mine water

Builders have long attempted to overcome the rapid deterioration in pumps arising from mine conditions. In the anthracite region especially an unusual amount of sulphuric acid is encountered in the mine water. Under these circumstances the life of the average mine pump is at best short.

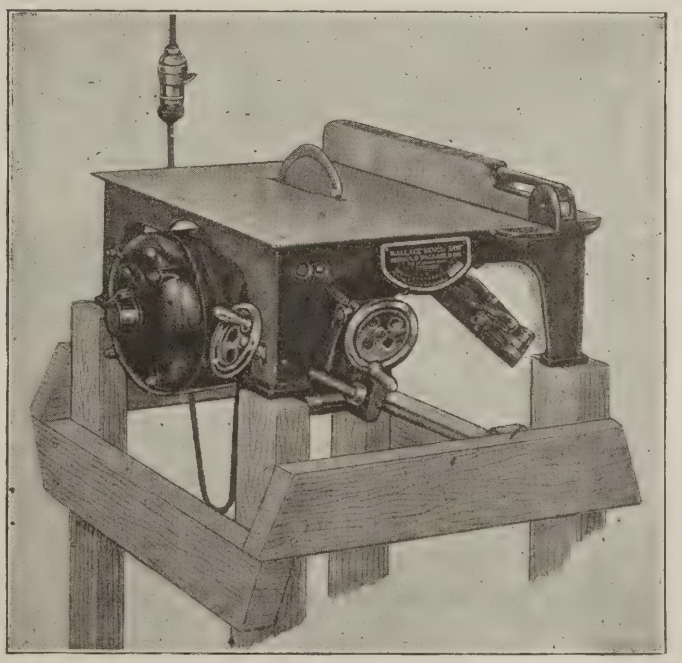
In view of this condition the experiments referred to are being conducted to develop a metal of such a composition as to withstand deterioration due to acidulous water. Already a cast iron has been developed that shows a tensile strength as great as that of steel.

With this new pump the designers expect to provide a construction that will stand up against the abrasive effect of gritty and acidulous water and to secure vastly longer pump service than has been the rule with power models.

Handy Portable Saw for Mine Use

A light, portable and relatively cheap circular saw that can be connected to an ordinary lamp circuit, and which should prove a valuable asset in the mine carpenter's shop, is shown in the illustration. The saw is operated by a ½-hp. General Electric motor fitted with ball bearings, and is capable of readily handling any wood up to 2 in. in thickness. In addition, it can be used for grooving lumber of any thickness. This saw should effect a considerable saving on routine work such as the irregular cuts necessary in some of the material going into mine cars and other construction.

A novel feature of the saw is the arrangement for tilting it, together with the motor, at any angle which it may be desired to cut. The saw differs in this respect from most others of this type, which usually tilt the table itself, allowing the saw to remain stationary. One of the chief advantages of this arrangement is that it facilitates cutting long pieces that would have a tendency to slide off the table when this is not horizontal. The exact angle of the cut may be readily fixed



SAW WITH PROTECTING GUARD IN POSITION

by turning the small handwheel. Once set there is no danger of the angle becoming deranged.

In cutting grooves, the saw can also be raised or lowered to cut any depth up to 2 in. This is regulated by a small handwheel like that used for controlling the angle of cut.

The saw shown has the shutter saw guard in position. As the material moves in to the saw, this is slowly moved back by an ingenious device, thus protecting the operator's hands. The device also eliminates the catching of the tail end of the stock in the back of the saw. The tool is manufactured by J. D. Wallace & Co., 1401 W. Jackson Boulevard, Chicago, Ill.

EDITORIALS

Prospect of High and Higher Prices

A CARTOON does not create ideas. It merely expresses the ideas after they have once been formed. It cannot create a point of view, it can only recall and strengthen it. As a hyposulphite of soda solution is only able to make permanent a photographic impression already made, so a cartoon can only serve to permanently fix in the brain a thought already outlined therein.

Likewise, when labor is represented in a cartoon as defending high prices, one is disposed to wonder what is intended. Surely, it will be said, labor is always most querulously objecting to an increase in price. Yet it is the laboring man who is the defender of the high prices he deplores. It is his higher wages that causes prices to be so high. He gets from 80 to 90 per cent. of the product of his toil as wages. Much of the other 10 or 20 per cent. is payment for the use of past construction of labor. So the price of the labor is a very large part, sometimes the whole price of the article produced. High prices inevitably result from high labor costs. They cannot be divorced.



LABOR to CAPITAL: They will have to down me, too, brother, before they take away what is tied up in this poke.

NEARLY 90 PER CENT. OF ALL COMMODITY COSTS ARE FOR LABOR, AND HIGH PRICES CAN NOT COME DOWN UNLESS LABOR CONSENTS

Similarly, labor and capital are so usually considered to be enemies that when they are, in a cartoon, joined as friends we must have them shaking hands as people just introduced or embracing one another as if suddenly convinced of a newfound fraternal relation. All of which is a sign that our thoughts are so contrary to the truth that symbols fail, for symbols cannot be intelligible where the thoughts symbolized are lacking in our brains. So, to use our simile, it is necessary to expose a new plate to which the fixative solution may perhaps be successfully applied later. We must do our arguing first and look for the cartoon to tell the story pointedly later. It is needless to emphasize that the cost of labor will remain up, for the unions will not let it come down. Whoever would reduce prices must take up his battle with labor.

Business men in general know that their own prices are on a bedrock except insofar as they threaten even to rise still higher as the outcome of a strike. They, themselves, refuse to sell at any other than the price they have set, for that price is such that only by obtaining it can they make both ends meet. Yet they are ready to believe that all other men are different from themselves. They expect every moment that the man from whom they buy will divide his prices almost in two and get back to a pre-war basis. They forget that their own prices are, and must continue to be, as greatly inflated as his—till the price of labor goes down, a time that will never arrive.

Even the interest-on-investment account is more or less based on labor, though the interest now charged may even be double that formerly provided. A factory built and equipped ten years ago cost less that would another of like character built today. But as the old factory competes with the new one, its value is bound to increase, and its owner can charge an apparent profit, for indeed it is only apparent. It may be shown that it is for the public advantage for him to do so, nor is it an unethical act so to do.

Let us take up in order the contentions for this argument. With higher prices for construction, building will not become active till higher book profits on completed buildings or, what is the same, higher rents become general. That may be readily conceded. The public wants more building, and what increases the amount of building helps the public.

As for the ethics of higher charges, it may well be shown that the old building was erected by the dollars of, say, 1909, and the rent and profit is collected in the depreciated dollars of 1919. If a building cost $100,000 in 1909, 10 per cent. for interest, repairs and depreciation would amount to $10,000. Today the receipts on the investment would be paid not in real dollars, but in 60c. dollars, which would not bring the owners as much goods or make as much repairs or replace as much of the building as in 1909. The return would be equivalent to $6000 in the currency of the year of construction.

On the whole then, labor, past or present, is the cause of almost all elements of cost and therefore the base of all price. The element of past labor has not yet got in its finished work. In a short while, however, it will do so everywhere as will be shown by a general increase in rents. When it does complete its mysterious work there will be a further rise in costs of all articles, but the increase in cost due to the raise in wages of the body of workmen to whom the war has brought a salary not adequate to the demands of a new cost of living will be a still more important factor. Perhaps, also, further wage increases, unjustly granted to bulldozing unions who want all for their little group of workingmen, will be an even greater cause of an ever-increased cost of everything.

When the governors and mayors met recently they elected to discuss the shortcomings of the national government and of business, whereas little has been more disturbing than the action of the governors and mayors themselves; and they had plenty of room for searchings of heart and purpose. More municipal and state construction, it would seem, went on during the war than is going on now, though everybody agreed that such work hampered hostilities. But the governors and the mayors utterly failed to see their obligations and avoided the issue. The public wants the business men to accept all the risks of resumption, and the members of the conference are unwilling to urge upon the people the commencement of any construction work for which they do not make a spontaneous demand.

Adequate Ventilation and Big Tonnage

ONLY by good ventilation can men put out an adequate tonnage. The air should be so readily cleared that the miner is able to return to his place within ten minutes after he has fired his shot. However, it is hard to make the average operator realize this; he has been so accustomed to see the miner wait on the entry for the clearing of the air. We have all seen that worthy many a time, with his coat thrown, like the sheepskin of Hercules, over his shoulders watching the slowly eddying currents taking the air out of the working place or viewing them with disgust when they actually turned around and carried the smoke back to the scene of his operations.

The miner also seems unable to comprehend that he is entitled to such ventilation, so long has he done without it and so adaptably has he trained himself to fill in the interim by taking a piece from his pail and visiting his neighbor's place and so ready is he to go home when his afternoon shots are fired. In some poorly ventilated mines a man is almost suffocated if he stays an hour after the round of evening shots, and as a result each man races with his fellow to be the first to fire.

With our tonnage system good ventilation, if there is any, must be provided by the operator and cashed in by the employee, so the air supply rarely gets up to the level of the law and often falls below it. The metal-mine operator is not waiting for the law. He is going ahead of it, for running his mines by the day, he cashes in on the improvement in production resulting from his expenditures. In less than three years certain metal mines in the Southwest increased their production per man 150 per cent. Whereas, before the improvements, the men mined about 2.8 tons per shift, after the changes were made they mined about 7 tons. The cost of mining dropped from $1.63 to about 82c. per ton.

Of course, there were many causes of variation in product and cost, some of which worked doubtless in the opposite direction to the tendencies shown; but nevertheless the credit for the improvement has been largely and rightly, laid to better ventilation. Undoubtedly these mines were warm and disinclination to work in humid and warm air had as much to do with the improvement as the ability afforded the mucker of making a speedy return to work after shooting. But to show that work was being hampered by the lack of air, it may be said that 110 million cubic feet of compressed air were used before the improvements and barely 80 million after them. The air was evidently being used to clear the places of smoke. The best way to prevent this waste of compressed air where compressed air is supplied is to afford a better means of allaying the nuisance arising from bad air. This loss at any rate, where it is encountered, is a loss to the operator and not to the employee; and insofar as good ventilation will prevent it the successful meeting of the difficulty will prove profitable to the operator.

It is estimated that at least $500,000,000 in interest and dividends will be due yearly to the United States from foreign debtors. Unless our widely heralded goodwill and warm friendship for European countries is mere talk, we should not expect these foreign nations to pay their debts to us in cash here. Even if such a plan were feasible it would lose for us, not only our leading position, but also deprive us eventually of our foreign trade. Consequently, if we are not to be paid in gold over here, we must use the foreign money we are to get over there to make foreign reinvestments. America can no longer live in isolated fashion. We must improve and run foreign factories, build foreign railroads, send agents to buy goods direct at production points and establish banks throughout the world so as to keep the American dollar at full value.

Our National Honor Engaged

THIS country made good in its war. Germany had sneered at us "money-grubbing Yankees." She had proclaimed we would not fight; that we could not fight. Having seen raised the army she said couldn't be raised, she declared it never could be transported overseas. It was transported overseas. Men of that army broke the famous Hindenburg line, and went through the Argonne, which had been considered impregnable.

More than that, the whole country stood behind its fighters. We shifted the entire industrial system of the land to war purposes. By the labor of those men who were not considered essential to the country's military purpose and the devoted efforts of loyal women, we heaped up a tremendous supply of munitions and war materials which, quite as much as the valor of our men, contributed to the early ending of the war. We bought issue after issue of Liberty Bonds, so that the Government might have money for its war purposes, oversubscribing every loan so that there might be no mistake, either here or in Germany, about our deadly earnestness in the great cause.

We have a right to a great pride in our soldiers and a great satisfaction that we backed them so loyally. But pride in what has been won must not blind us to the fact that there remains a further task. That is the paying up of the war's bills. Our victorious soldiers are returning. They have done their work. We shall not have completed ours until the Victory Liberty Loan, which is to settle the debts, has been subscribed.

Our national honor is engaged in this, just as it was in the military phase of the war. The United States, a leader in the great task of helping the world to peace, prosperity and freedom, must not be a debtor at home. It is an obligation resting on each of us to see to it that this final undertaking of the war is accomplished. We cannot—must not—quit until the success of the Victory Liberty Loan may be ranked with the success of our fighting men.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Sanity seems to be reasserting itself in the mine workers' ranks. Steady work will probably remove most of the fads which have misled even the best of them. The very leaders who have called loudly for changes will cease their clamor in the face of a steady demand for coal. The anthracite districts are already working more steadily and in a short while the bituminous region will also show the tonic effect of steady work.

The operators sympathize with the men who have been harried to work hard and then have been told that they have mined so much coal that they must lie idle till the fuel they labored so hard to produce is entirely exhausted. The mine owners also realize that closing mines is a form of eviction, an act of efficiency and of prudence, perhaps, but one not without its painful sides. They know that permitting the miners to work while the day men are idle reduces the hours and pay of the day men. But prices are low and conditions are difficult. The companies cannot run steadily if people will not buy, and they can't get out coal economically and pay their way if they hire men more hours than the work to be performed demands.

Steady demand will correct all the difficulties, and the market should try and provide it. Above all the Government should do its utmost to relieve the situation. It should not, as has the Railroad Administration, try to lock out the mines and so make it compulsory that a lower wage be paid mine workers and a lower price be charged for coal. The mine workers are surely entitled to their present pay and should not yield to the Railroad Administration in its apparent determination to seek from the coal industry the money whereby to pay its own men the increases in wages just granted.

Only Fair Price Will Secure Fair Wage

Governor Sproul's action in sustaining the anthracite operators in their contemplated readjustment of prices May 1, when a 10-cent increase per ton per month is to become effective for five months, is warmly praised by Thomas Kennedy, president of the United Mine Workers of the Seventh District.

"The statement of Governor Sproul," he said, "shows a broad and intelligent understanding of the anthracite situation. I am more than pleased when he says we are all anxious that the present wage scale in the anthracite region be maintained. That coming from the chief executive of the state will, in my opinion, silence those who had hoped to reduce wages and will do much to stabilize the anthracite trade."

Anthracite Labor Makes New Rules

Circulars warning all miners to refrain from cutting or loading coal on idle days will be sent to all locals in the three anthracite districts immediately. This action has been decided upon by the tri-district officials. Only necessary repair work about the mines will be permitted on days when the mines are not being operated.

The board favors a 70 per cent. compensation pay, starting the second day after the injury, instead of the 50 per cent. now allowed.

The board is arranging for a tri-district convention to be held in September to frame the new demands of the miners, which are to be presented to the operators at the expiration of the present scale, which expires Apr. 1, 1920.

West Virginia Celebrates Eight-Hour Day

The celebration of the second anniversary of the establishment of an eight-hour day for the miners of West Virginia was observed at Rivesville, W. Va., on Apr. 1 and was featured by an address by President F. C. Keeney of District 17, in which he attacked Bolshevism in all its aspects. He said in part:

"I sent out a circular letter some weeks ago, which I desire to explain at this time. The United Mine Workers of America have done more for the miners than any other organization ever can hope to and it objects to the radical policies of the Industrial Workers of the World and other similar institutions, the success of which would bring about the destruction of the union.

"The rules of the United Mine Workers stand for the expulsion of members who cherish such ideas as Bolshevism and if the local does not have spine enough to expel them I will go there and expel them myself. Much evil is cloaked in Bolshevism. Perhaps you don't understand Bolshevism. Neither do I, but I am opposed to supporting any such radical movements."

The opening part of Mr. Keeney's address dealt with the history of the eight-hour day. It was started in 1898 in Illinois, where the miners had to submit to a cut in wages in order to establish it. The idea, President Keeley stated, was one of years' standing, having been advocated by John Synie, of Pottsville, Penn., fifty years ago—shortly after the Civil War. His own followers persecuted him, although he was an ardent believer in the rights of the working man and a "real labor leader," as Mr. Keeney put it. He recalled how Synie went to Indianapolis from Pottsville, Penn., on foot to attend conventions, which, in all, probably represented only 2000 or 3000 miners.

Forty-eight years afterward on the same spot—Pottsville, Penn.—John P. White, international president of the United Mine Workers of America, inaugurated the eight-hour day.

The eight-hour day did not make its appearance in the State of West Virginia until Apr. 1, 1917, when Mr. Keeney inaugurated it after a tenure of office of only a few months. Last year the Kanawha Coal Operators' Association with operations in the southern part of the state sanctioned the day and upon the letting down of the non-union bars in the Fairmont field it was celebrated there this year. The eight-hour day leaves the foreigner with two more hours in which to acquire a knowledge of our language and laws. He should not fail to take advantage of this opportunity. Nor is he the only one who should use this larger waking rest period with profit. Even American workmen should seek in it an opportunity to add to the training already received in the public schools.

Should Binder Figure in Coal Thickness?

It may require the services of an expert to settle a dispute between the miners and operators of the Elkins field as to when "coal" is coal or when "coal" is not coal, the controversy having arisen in connection with an agreement covering the mining of coal in the Pittsburgh bed.

The agreement calls for the mining of coal in that vein of 5 ft. or more in height or thickness. The question has now arisen whether the "binder" is included in that measurement. Miners insist that under the agreement it should be included. The operators take the position that it includes only 5 ft. of actual coal and excludes the binder. While no agreement has so far been reached at the one conference so far held, it is felt that it will be possible to reach an agreement when the parties to the controversy meet a second time.

Coal-Mine Labor the World Around

On Apr. 1, Frank S. Hayes, the president of the United Mine Workers, stated that he and Robert H. Harlin, of Seattle, would go to Paris to urge upon President Wilson personally the need and desire of the mine workers for the development of the export coal business of the United States. The leaders expect to visit Mr. Smillie, in Great Britain, and to see other British labor leaders, who will perhaps, convince them that the British are seeking the same end and that the natural ambitions of the Allies —no, that is not the correct word—"Associates"—are conflicting.

The W. J. Rainey Coke Co., in the Connellsville region, as related in the issue of Apr. 3, has had a strike because of its determination no longer to give free powder to miners. The mines have resumed operation. The product of the ovens of this company used to go in part to the Pittsburgh Steel Co. That corporation has acquired the W. Harry Brown properties; and the ovens formerly belonging to that operator, which were shut down, are now being put to use again. It is natural to wonder if the W. J. Rainey operation will be as active as in the past, now that this rearrangement of ownership has been effected.

The Ohio mine workers have been protesting through President Hayes, of their union, against the discrimination in purchasing exercised by the railroads. Director Hines has replied that the matter is left to the determination of the various railroads, which buy in accord with their needs.

Limit to Working Less and Doing More

In Alabama, President J. R. Kennamer, of District No. 20, has declared in favor of the six-hour day for mine workers on the ground that the air is impure and cannot be endured for a full eight hours. It is regrettable, if that is the case, though it may be true in some of the smaller operations. There is surely no need for it, and in up-to-date mines the air is unusually fresh and invigorating, far more bracing and life-preserving in summer than the stuffy climate of the oversoil.

Mr. Kennamer alleges that it has been proved that more has been achieved in the mines in eight hours of work than can be accomplished in ten. Everyone awaits his proof, but perhaps it was true in Alabama where the change in the duration of the day was concurrent with the war excitement. Under such circumstances the larger working efficiency might well be ascribed to the enthusiasm resulting from the war rather than to the working of an economic law.

It is surely permissible to ask him to "quote chapter and verse" for his statement. True, Paul F. Brissenden, of the Bureau of Labor, did in 1917 try to show that shorter hours had increased production in the anthracite region, but his figures did not prove it as was shown editorially in the issue of *Coal Age* of Sept. 8 of that year. His figures showed just the reverse.

But if the figures showed just what Brissenden said they did, there is no reason to suppose that, taking them as a basis, a man would do more in six hours than in eight; or, for that matter, in four hours than in six or in two hours than in four. To carry the reduction to the limits of absurdity, we might declare that if he didn't do any work at all he would achieve more than if he worked for two hours every day. Kennamer is the "devil's advocate" when he thus talks to his Alabama audiences. He means well, doubtless, but the effect is equally mischievous whether his purpose is well or ill.

Want Short Day if Competition Permits

From Lethbridge, British Columbia, comes a perfectly sane statement on the six-hour day from President Christopher: "Regarding the six-hour proposition: We are still in favor of this, but how many of us really believe that it is possible to bring this about in this district while the other coal fields competing with this district in the same markets are working from eight to ten hours a day? It is at present a matter of competition in the markets, and no one, no matter how desirous of bringing about a six-hour day, can gainsay the fact."

This, however, is not enough. Competition is not the main cause for a failure to reduce the hours of work. Canada can reduce laboring hours as well as the United States when the mine workers of the United States so determine and the public is willing. But neither ought to reduce hours till they are about to be reduced in other industries, and until the mine workers and others are willing to sustain the inevitable loss that the shorter day entails they should remember that shorter hours mean less product; that is, less goods created and less goods to divide. The wage could be made the same for the shorter working period, but that would do no good, for six hours' work can give but six hours' product, and there then will be but six hours' product to divide. If we fail to bake our cake it is sure we shall never eat it.

At Thurber, Tex., all the coal-mine operators of the Texas & Pacific Coal and Oil Co., numbering about 300, went on strike the week before last, remaining out for several days pending a settlement of their grievance which arose over the wage contract. The matter was finally settled through the efforts of the officials of the miners' union.

British Workmen Accept Sankey Wage Plan

British mine workers seem to have been satisfied with the Sankey decision. They are disposed to believe that it concedes almost all they could possibly hope for. Even the Welsh mine workers voted 6 to 1 in its favor when the question of accepting or rejecting it was submitted to their vote on Apr. 11. No mine workers in Great Britain are more disposed to make large demands than the men in the South Wales field. Now that even they are satisfied the matter is disposed of for a while till a period of agitation has managed to create a new discontent with the award. The mine leaders must yearly give an account of their stewardship. Larger pay, shorter hours, democratic control of industry, nationalization or something must be sought, otherwise the mine workers will think their leaders remiss.

In Germany many strikes have recently occurred. On Mar. 29, 30,000 men were on strike in the mines around Essen, thirty shafts being closed down. In Witten and Dortmund, and indeed elsewhere, the trouble seems to have a Sparticide origin, the demands made including one for the withdrawal of Government troops. An increase in wage of 25 per cent. was asked, also additional bonuses and the six-hour day.

A meeting of delegates of the revolutionary mine workers representing 195 mines voted at a meeting in Essen that they would strike on Apr. 1 and discontinue work till their demands were fully granted. The men wanted all political prisoners released, the disarmament of the police in the mining districts, and payment by the Nation for every day the men had been on strike. They sent a message to the governing council at Budapest containing brotherly greetings and declaring that they were inspired by the victory of their Hungarian comrades over "the accursed class." They promised that they would fight with their Hungarian and Russian brothers with all their means to compel the establishment of a Socialist Soviet government.

All German Miners Seek Changed Conditions

The mine workers mentioned are classified usually as of the Ruhr Valley. When they struck, the revolutionary mine workers of Central Germany and Silesia declared themselves as sympathetic and made demands on their own behalf, declaring that if these demands were not granted by Apr. 9 they would cease even emergency work. Thus the mines would be flooded. They condemned all those who had joined the army in response to Herr Noske's appeal. At that time, Apr. 6, there were 345,000 men on strike, and 215 mines were thus thrown idle.

The revolutionists were using intimidation to compel every one to enter their ranks. A Council of Nine, thoroughly unrepresentative of the miners, has been formed. It consists solely of Sparticides and communists. The revolutionists declare that they will allow none other than this *ex parte* committee to represent the mine workers in handling matters with the government.

At the same date the men at Dortmund were reported going back to work. Nevertheless the strike was growing larger hour by hour and it was steadily embracing more occupations. Since then conditions have been becoming increasingly chaotic.

To Have More Money



All we need in order to have more money is more printing presses. But what we need is not more money but more goods; and how will we get goods unless we work for them?

There was a King named Midas who, the Fable says, turned everything he touched to gold. He nearly starved to death. The unions may so arrange it that every way a workingman may look he will see wages, but if he doesn't work and if other men don't work, he will starve to death like Midas.

We can't let "George do it." We must all work a reasonable length of time each day or there will be nothing else but wages; and it is a fact wages never have and never will make good eating. What we need to worry about is not how to get more money, but how to make more goods.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Certification and Safety

Letter No. 2—I was deeply impressed with the able remarks of James Touhey, *Coal Age*, Feb. 20, p. 374, in which he criticises the attitude of the members who attended a recent meeting of the Coal Mining Institute of America, at Pittsburgh, Penn., when one of the questions discussed was "Has the law permitting the employment of uncertified officials in coal mines been detrimental to the efficient and safe operation of the mines?"

Mr. Touhey states that what appeals to him, in this connection, is the fact that "an intelligent body of men meeting to discuss questions of vital interest to their calling should not arrive at some definite conclusion." He admits that the holding of a certificate is not a guarantee of the competency of the man. The same was also admitted by those who took part in the discussion of this question, at the Pittsburgh meeting, it being claimed that the certificate was merely "an index" of the man's competency.

While I deem it unwise to criticise the actions of examining boards and other intelligent bodies, such as I have witnessed at Owens College, Manchester, and Watson's College, Edinborough, especially when one holds, as I do, mine foremen's certificates granted me, both in Great Britain and in the United States; yet, to my mind, there is a great lack of efficiency in the examining boards in both countries, in respect to the practical experience that should be required of men authorized to examine candidates and grant certificates of competency for mine foremanship.

EXPERIENCE REQUIRED OF MINE FOREMEN

The Coal-Mines Regulation Act of Great Britain and the Bituminous Mine Law of Pennsylvania each require that the candidate for a mine foreman's certificate shall have had five years' practical experience in mines. In my judgment, this is where the root of the trouble lies. The man with five years' experience is hardly competent to take charge of a coal mine. He should have at least nine years of practice in the general routine of work underground. This should include besides the mining of coal with pick and by machinery, methods of timbering, pumping, drainage, tracklaying, mule driving and a knowledge of and acquaintance with electric installations.

The nine years' experience, in such general work as I have just named, should include five years' experience in shotfiring and firebossing. He should have, moreover, a thorough knowledge of and acquaintance with the mining laws of the state, before I would consider him a fit candidate for the office.

The work of mining coal is a perilous undertaking, and the man in charge should be possessed of the cream of knowledge, in respect to both the theory and the practice of coal mining. To my mind, there is no question relating to coal mining that is as important as that of the certification of mine foremen.

The statement to which I have referred that, "a certificate of competency is merely an index to a man's ability to act as foreman of a mine," makes it appear that the Board of Examiners who grant such certificates are mere indexes themselves. If this is true, it is high time, in this 20th century, that the coal industry of this country should be represented by boards of examiners who are able to issue certificates of competency that are something more than indexes to a man's ability.

I fully agree with the mine inspector, who, speaking at the Pittsburgh meeting, is reported, *Coal Age*, Dec. 12, p. 1081, to have remarked that "the operator who allows an uncertificated man in an authoritative position in his mine is a criminal." Let me say that the men who make and those who sign the laws that make this condition possible are likewise criminal.

In closing, allow me to appeal to the mine inspectors of the different states who read *Coal Age*, to take part in this discussion, which is intended to show the relation of the uncertification of mine officials to safety in our mines. State mine inspectors are the intelligent heads, generally, of the state boards of examiners. It is to be regretted that so many state mine inspectors are willing to discuss these questions only when they are no longer in office. This appears to me a mystery.

Springfield, Ill. JAMES N. RODDIE.

Engine-Plane Haulage

Letter No. 3—The proposition presented in the inquiry, *Coal Age*, Feb. 6, p. 293, is an interesting one. It appears that engine-plane haulage had been in use on the 400-ft. incline, which is said to have a grade of 25 per cent. At the foot of this incline, the road leads into the mine and has a uniform grade of 1½ per cent., for a distance of 1000 ft., to the side track where the trips are made up to be hauled to the surface.

Three car trips, weighing $3 \times 5000 = 15{,}000$ lb. were hauled up the incline from the mine entrance to the tipple. It is stated that each empty car weighs 1500 lb., while the weight of a loaded car is 5000 lb., making the weight of coal hauled in each car $5000 - 1500 = 3500$ lb. It is now desired to continue this engine-plane haul to the side track 1000 ft. back in the mine.

The fall of the 400-ft. incline is $400 \times 0.25 = 100$ ft., while the fall of the mine road, in 1000 ft., is $1000 \times 0.015 = 15$ ft., which makes the total fall from the tipple to the side track 115 ft. Now, if it was practicable to build a uniform grade from the tipple to the side track, the total length of such grade would be 1400 ft., and its inclination $(115 \times 100) \div 1400 =$ say 8 per cent., which would make a good engine-plane haulage.

But, assuming that it is not practicable to build a uniform grade, I will estimate on an average speed of hauling of, say 8 mi. per hour, for the empty trip running into the mine, and 10 mi. per hour, for the returning trip when on the mine road, and 3 mi. per

hour on the incline. I will allow 2 min., at each end, for changing ropes and starting the trips.

A speed of 8 mi. per hour is $(8 \times 5280) \div 60 = 704$ ft. per min., which makes the time required for the empty trip to run into the mine, $1400 \div 704 =$ say 2 min., and adding 2 min. more for changing ropes and starting the trip gives a total of 4 min. for the empty trip. Likewise, a speed of 10 mi. per hour is 880 ft. per min, and a speed of 8 mi. per hour, 264 ft. per min. The total time for the loaded trip, then, including the 2 min. for changing ropes and starting, is $(1000 \div 880) + (400 \div 264) + 2 =$ say 5 minutes.

On this basis, the time of making one round trip is 9 min., or, allowing for some delay, we will say 10 min. per round trip. Then, hauling 8 hours a day, the number of trips is $(8 \times 60) \div 10 = 48$ trips; and, for an output of 500 tons per day, the weight of coal hauled per trip is $500 \div 48 =$ say $10\frac{1}{2}$ tons. But, since each car has a capacity of 3500 lb., the number of cars that would have to be hauled in each trip is $(10.5 \times 2000) \div 3500 = 6$ cars.

The question at once arises as to whether the cars in use are strong enough and whether the drawbars will stand the pull of a 6-car trip on a 25 per cent. incline. If the car is too weak for this pull, it may be possible to haul two 3-car trips on the incline, while one 6-car trip is hauled on the mine road.

Calculating the Horsepower Required

In regard to the horsepower of the engine required for this haulage, I would not care to estimate on a higher speed than 10 mi. per hour on the mine road and 3 mi. per hour on the incline. The greatest load on the engine will occur when the trip is at the foot of the incline and has started up the grade. Assuming a 6-car trip weighing $6 \times 5000 = 30{,}000$ lb., and adding 300 lb. for the weight of the rope on the incline, the total weight hauled is 30,300 pounds.

Estimating the grade on the pitch distance, the sine of a 25 per cent. grade is 0.25 and the cosine 0.968. Then, taking the track resistance as 20 lb. per ton, the load on the engine when the trip is near the foot of the incline is

$$L = 30{,}300\left(0.25 + \frac{0.968}{100}\right) = 7868\ lb.$$

Then, allowing an efficiency of the engine of, say 80 per cent., the required horsepower when hauling at a speed of 264 ft. per min. is

$$H = \frac{7868 \times 264}{0.80 \times 33{,}000} = say\ 80\ hp.$$

When a loaded trip is starting from the side track in the mine the horsepower exerted by the engine must be calculated for a speed of 880 ft. per min., and a total load, including the weight of 1400 ft. of rope, or say 31,050 lb. In this case, the sine of the grade angle is 0.015 and the cosine 0.999. The load on the rope is then

$$L = 31{,}050\left(0.015 + \frac{0.999}{100}\right) = say\ 500\ lb.$$

The horsepower developed when hauling this load at a speed of 880 ft. per min. is

$$H = \frac{500 \times 880}{0.80 \times 33{,}000} = 16\tfrac{2}{3}\ hp.$$

This calculation may enable us to make some modification, in respect to time allowances and speed, that would reduce the required horsepower on the incline. However, it is always wise to have a good margin of engine power to offset any unforeseen delays or occurrences that are liable to happen in mine haulage. The size or dimensions of the engine required will depend on the steam pressure available.

W. H. Luxton.

Linton, Ind.

Drawing Pillars in Machine Mining

Letter No. 13—Referring to the letter of D. F. M., *Coal Age*, Feb. 27, p. 415, regarding the drawing of pillars with machines, I was glad to see that he made clear, in that letter, how these pillars should be attacked, namely, on the side opposite to the falls. I have, myself, had considerable experience in cutting pillars with a Sullivan CE7 machine; and, also, with a Goodman shortwall machine. To attack the pillars on the side nearest the falls, as indicated in a previous letter, would surely result in a considerable loss of pillar coal and run the risk of losing a machine.

As D. F. M. has shown, the plan he describes can be adapted either to the retreating or the advancing method of mining, and rooms can be driven off one or both entries of a pair of headings. However, in order to keep the straight rib and the track next to it, on the opposite side of the pillar from the falls, it is necessary to always widen out the rooms in the direction in which the new rooms are being turned, or the direction in which the work is proceeding.

For example, in the retreating system, the headings are driven to the line or boundary and the first rooms are started at the inby end. In that case the rooms should all be widened out toward the main heading, leaving the straight rib and track on the side of the room toward the boundary.

Manner of Widening Rooms Explained in Detail

Assuming the butt headings are driven to the left of the main headings and explaining more in detail, rooms driven off the first left entry when retreating must be widened to the left, while those driven off the second left entry must be widened to the right. This will always keep the track on the opposite side of the pillar from the falls and enable the machines to work on that side when cutting out the pillar.

On the other hand, in the advancing system of mining, the first rooms are started a short distance from the mouth of the cross-entries and widened out inby, as shown by the plan given by D. F. M., in his letter, page 415, to which I have referred. In this case, rooms driven off the first left entry must be widened out to the right, while those driven off the second left entry are widened to the left.

Again, if the butt entries are driven to the right, as shown in the figure on page 145, the rooms driven off the first right entry must be widened to the left, and those driven off the second right entry must be widened to the right. In each and all of these cases, the straight rib and track must be kept on the opposite side of the pillar from the falls to enable the pillars to be attacked with safety on that side.

Undoubtedly, the retreating plan would give better results, in respect to the complete recovery of the coal, and there would be less liability to squeeze. But, if the roof is not too strong and will break within a reasonable space after the pillar and standing timber have been removed, it will be more economical to adopt the advancing system.

In the case cited in this inquiry, let me suggest that the rooms should not be driven more than 20 ft. wide, nor have a greater depth than 250 ft., especially if wooden rails are used in the rooms, as it will be difficult to get men to push cars a greater distance than this over wood rails. The pillars should be not less than 16 or 18 ft. thick between the rooms.

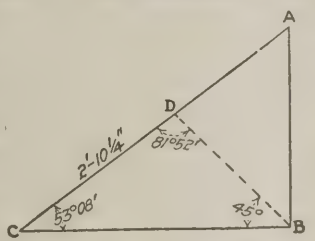
All entries should be driven on 60-ft. centers and protected by 40-ft. room stumps. Track should be laid on one side of the room, and three good posts should be set for each 6-ft. cut made in the room. In drawing back the ribs, the three cuts the machine makes can easily be loaded without having to lay a switch in the crosscut.

DANIEL F. SMITH.

Wellsburg, W. Va.

Turning Rooms Without Sights

Letter No. 1—Kindly permit me to refer to the idea presented by Ostel Bullock in *Coal Age*, Feb. 13, p. 306, and to say that his suggestion of a device for turning rooms at a right angle with the entry, before the permanent sights are set up, is a good one, and can be used to good advantage when turning rooms off a straight piece of entry, but cannot be employed as well where the entry is crooked.



THE RIGHT TRIANGLE

I want to draw attention, however, to an evident error in his statement that the same method can be employed when the rooms are to be driven at an angle of 45 deg. with the entry. In that case, Mr. Bullock says, "It is only necessary to sight from the same point on the entry to a point at the center of the 5-ft. string.

The device Mr. Bullock suggests consists of three small rings connected together by three strings whose lengths are 3, 4 and 5 ft., respectively, as indicated in the accompanying figure. As he has stated, this device forms a right angle at the intersection of the 3-ft. and 4-ft. strings. But, a line drawn from that intersection to the center of the 5-ft. string will not make an angle of 45 deg. with the 4-ft. string, which is in line with the entry.

Referring to the figure, let *ABC* represent the device, right-angled at *B*, and draw *BD* making the angle *CBD* equal to 45 deg. Evidently, sin *BCD* = 4 ÷ 5 = 0.8; and the angle *BCD* is 53° 08′. Then, the angle *BDC* is 180° — (45° + 53° 08′) = 81° 52′.

Then, since the ratio of the sides of any triangle is equal to the ratio of the sines of the opposite angle, we have,

$$\frac{CD}{CB} = \frac{CD}{4} = \frac{\sin 45^\circ}{\sin 81^\circ 52'} = \frac{0.70711}{0.99} = 0.714$$

Therefore, $CD = 4 \times 0.714 = 2.86$ ft.; or 2 ft. 10¼ in. Hence, *BD* is the sight line for rooms turned at an angle of 45 deg. with the center line of the entry; and the point *D* is, therefore, 4¼ in. beyond the center of the 5-ft. string.

E. P. HUMPHREY.

Upper Lehigh, Penn.

Letter No. 2—On reading a recent issue of *Coal Age* (Feb. 13) my attention was attracted to a short article by Ostel Bullock (p. 306), describing a method that can be employed where it is desired to turn rooms at an angle of 90 deg. with the entry, without first setting up sights.

The device Mr. Bullock describes, being three rings joined by strings 3, 4 and 5 ft., respectively, will certainly give him a right angle. However, he makes a serious mistake when he says a 45 deg. line drawn through the right angle would bisect the 5-ft. string.

In order to obtain a 45 deg. angle the right angle must be bisected and the bisecting line will not strike the center of the 5-ft. string. A line drawn from the right angle to the center of that string would divide the right angle into two angles of about 53 and 37 deg., respectively, instead of bisecting that angle.

Let me suggest, also, if a mine foreman should attempt to bisect the right angle by drawing a line on the roof of the entry to indicate the direction of the 45 deg. room, he could as well draw a line perpendicular to the center line of the entry to indicate the direction of a room driven square with that entry.

JOHN WALLS, SR.

Porter, Ala.

Payment for Yardage and Deadwork

Letter No. 1—Every coal mine has its difficulties and these vary with the conditions existing in the seam and adjacent strata. Mining the coal, in some seams, is accompanied with no end of expense, while comparatively little or no expense attaches to the same undertaking in other seams, beyond the paying for yardage in driving the entries and turning rooms.

Referring to the case presented by G. Stern, *Coal Age*, Mar. 6, p. 464, where the thickness of the coal is said to vary from 3½ to 4 ft., the seam being overlaid with from 4 to 10 in. of slate, above which is 6 or 8 in. more of coal, let me say that the mining of this coal without incurring a burdensome expense will require care and watchfulness.

I may assume that there is a total thickness of, say 52 in. of coal on the average, which with about 8 in. of slate parting makes the entire thickness of the seam 60 in. This seam has, therefore, (8 × 100) ÷ 60 = 13⅓ per cent. of refuse, which will give no end of trouble, unless some means are adopted to keep the coal clean and avoid the loading of refuse. This will require strict regulations in regard to cleaning the coal at the working face.

MISCHIEF OF A FEW CARELESS LOADERS

Every practical mining man knows that, in working a seam of coal of this character, it will take but a few working places sending out impurities with the coal to lower the quality of the output of the mine and injure its market value. On the other hand, if the coal must be cleaned after reaching the surface, this will add to the cost of production, besides restricting the output of the mine.

Compare, for a moment, the working of such a seam as is here mentioned with that of a good seam of coal of the same thickness but containing no refuse that must be separated from the market product. It is evident that the miners working such a seam have a great advantage over their fellows employed in the seam first mentioned. Let a miner have a few inches of refuse to handle and be given to understand that it must not be loaded with the coal, it is clear he will then be entitled to some compensation for handling this dirt that brings him no revenue.

As an illustration, let us assume that the weight of coal is 80 lb. per cu.ft., or 2000 ÷ 80 = 25 cu.ft. per ton of coal in place. Now, suppose a miner is driving an entry 10 ft. wide in a 5-ft. seam. The cubic contents of this seam for each yard driven is 5 × 10 × 3 = 150 cu.ft., and the weight of the coal, per yard, is 150 ÷ 25 = 6 tons. Assuming 13⅓ per cent. of refuse, as previously calculated, the loss in coal when driving such a place would be 0.13⅓ × 6 = 0.8 ton. If the price of mining is 90c. per ton, this would mean a loss of 90 × 0.8 = 72c.

Calculating this loss, per inch of thickness of slate, having assumed an average thickness of 8 in., gives 72 ÷ 8 = 9c. of loss for each inch of thickness of slate in the parting. This estimate is based on the driving of a 10-ft. entry in a 5-ft. seam, for each inch of thickness of refuse in the seam, the price of mining being 90c. per ton of coal loaded.

It appears to me that this would be a fair compensation to be paid the miner for his deadwork in handling the refuse in such a seam. If the width of the entry is increased to 12 ft., the payment for deadwork would be increased in the ratio 12: 10, or 1.2 times. The payment for yardage in such an entry would then be 1.2 × 9 = 10.8c. per in. of thickness of refuse parting. On the other hand, if the width of the entry is but 8 ft., the payment would be 0.8 × 9 = 7.2c. per in. of refuse, for each yard of entry driven.

In coal mining, as in other industries, there are always some honest fellows who plug along when working under difficulties such as these. They make no claim for extra pay, until the work becomes really burdensome. However, when you analyze the situation and consider the conditions that exist in the seam, nothing can be fairer than to establish a price based on such conditions. Then, as the deadwork increases, and the thickness of the refuse parting grows greater, inch by inch, the price paid compensates fairly for the extra labor performed by the miner. Where such an agreement is made with a man working such a place, little trouble is experienced as he is generally satisfied.

Edwardsville, Penn. LEWIS R. THOMAS.

Firebosses as State Officials

Letter No. 2—Referring to the statement made by Fred Turner, *Coal Age*, Jan. 30, p. 245, regarding the attitude of some firebosses toward the state mining law, and their responsibilities for the safety of the men employed in the mine, it appears to me that any fireboss who fails to comply with the state law, or is willing to do things that he knows are unsafe should have his papers taken from him.

Mr. Turner states that he knows of firebosses who would do anything they are told, without regard to whether the acts are lawful or dangerous to the men working in the mine. Speaking of the fireboss, he says, "His refusal to obey the orders of his foreman would result sooner or later in his discharge." While that may be true, it is no excuse for a fireboss doing anything contrary to the state law, or permitting practices that he knows are dangerous.

A fireboss that has the ambition to do his work well and conscientiously will act the same whether he is employed by his company or the state. Safety is his first consideration, and he will let nothing else control his actions. Suppose, for a moment, there is an entry where firedamp has collected. If the mine foreman told a fireboss to go and touch a match to the gas, do you suppose he would obey such an order? Then, why assume that firebosses are afraid to refuse to comply with any order that they know is unsafe or contrary to the requirements of the mining law. What firebosses need is a little backbone, which will give them all that is coming to them.

Having worked for a great many mine foremen, as fireboss and assistant foreman, I can say with truth that I have never yet seen the foreman who has asked me to do anything that would endanger the lives of those at work in the mine. The advice of these foremen has always been to "go safe." It is my belief that few operators, if any, would stand for a foreman in their employ, ordering or asking a fireboss to do anything that would be unsafe or contrary to law. A fireboss receiving an order of that kind from his foreman should appeal at once to the superintendent or manager. By so doing, he would prove his efficiency and value.

Speaking of efficiency in a fireboss, let me say that it is not alone his compliance with the law and keeping the mine safe; but his efficiency will depend also on his ability to handle successfully the men in his charge, and look after other matters in his section. By observing where timber, ties and rails need to be removed from places that are abandoned, and taking note of other things, in his efforts to coöperate with the foreman, a fireboss will prove his value in the daily operation of the mine. Firebosses would derive much benefit from meeting together and talking over matters pertaining to their work in the mine. By so doing, they would get better results and be more efficient.

Chambersville, Penn. JOHN BUGGY.

Belting for Anthracite Breakers

Letter No. 1—A short time ago, I remember there appeared in *Coal Age* (Feb. 27, p. 419), an inquiry by a mechanical engineer who asks for an estimate on the quantity of belting required in the operation of an up-to-date anthracite breaker, on the basis of tonnage of coal handled in the breaker.

Having recently designed such a breaker located in this city and which is 80 per cent. complete, it gives me pleasure to offer the following, in respect to the quantity of belting and rope drives employed:

Two rope drives, requiring 160 ft. of rope;
Eight rubber-belt drives, requiring 415 ft. belting;
Three jig drives, requiring 75 ft. belting.

This plant is designed to prepare and ship to market about 500 tons of coal per day.

FRANK B. DAVENPORT,
Mining and Mechanical Engineer.
Wilkes-Barre, Penn.

Living Conditions at Mines

Letter No. 2—One who has spent all his life, as I have, in and around coal-mining towns, cannot fail to read with deep interest the excellent letter, regarding the effect of living conditions on the successful operation of coal mines, by A. A. Allen, *Coal Age*, Feb. 13, p. 331. The reading of that letter inclines me to add a word or two from my own experience that may he helpful, and I hope to see the subject discussed thoroughly, as it is an interesting one to all who have the welfare of miners at heart.

Being a miner myself, there are two things that I have always noted are a characteristic of this class of workers; and I believe other mining men will bear me out in what I am going to say. When the average miner *works* he works hard, under almost any kind of conditions. When he *plays* he plays hard, which is proved by the fact that our best baseball, football and basketball teams come from mining towns. Now, one can readily judge that men having these characteristics must be provided with surroundings that will appeal to their tastes and assist their development.

My observation and experience compels me to conclude that, in the large majority of our mining towns, coal miners are required to live under the most meager conditions, their lot being worse in this respect than that of any other class of industrial workers. My belief is that it causes the present unsettled condition of miners. They move from one place to another, looking for better conditions in which to live and rear their families, but too often their search is vain.

Conditions Underground Good, But No Living Accommodations in the Place

Only recently, I was called to look over a proposition where a foreman was wanted. I found conditions in the mine the very best, but the living conditions in the town were unbelievable, in one or two respects. In reply to my inquiry as to where I could find a temporary boarding place, the superintendent loked half ashamed and said, "I don't think there is a place in town where an English-speaking man would care to stay."

The roads in the town were poor, there were no churches, no places for amusement or recreation, and one can judge of the sort of schools that would be found there. To move to such a place, a good miner would have no desire. The class of men employed there were largely given to drink and carousing Sundays and other days when they were not working.

Contrast these conditions with those existing in a mining town where the roads are good, and where there are good schools and churches and comfortable houses are provided for the men. The town is kept in a sanitary condition. The miners are not unsettled and restless, but are a satisfied lot, as one observes them. While there may be one or more saloons in the place, there is not the hard drinking and carousing that characterizes the towns to which I have just referred. A miner may go to a saloon, get a drink and stroll out to see the boys play ball or some other game but after that, he returns home none the worse for his manner of spending the few hours he has above ground.

Labor, Booze and Living Conditions

The statement has been made that to abolish booze would solve the labor troubles. In a sense this may be true, as too many men drink hard and forget to report for duty if, indeed, they are in fit condition to work. Now, I am not speaking a word in favor of booze, as I am a strict temperance man, myself. Let me say, however, that I am convinced that the only way to better labor conditions in coal-mining is to improve the living conditions at the mines. Provide good schools and churches, good roads and comfortable houses with yards and gardens, and see to it that there are places of amusement and recreation. Last but not least, make the town sanitary and a fit living place where a man can safely bring up his family.

At the mine, a good warm wash house should be provided where the tired miner can wash himself and change his clothes before going home. If these conditions prevail at a mine, there need be little fear that miners will become restless. Under proper management, the conditions I have just cited can be made self-supporting, and it goes without saying that they would secure and hold a better class of miners, which would mean an increased production of coal because of fewer idle days when men fail to report for work.

Johnstown, Penn. Optimist.

Efficiency in Firebossing

Letter No. 11.—Having been a fireboss myself for a considerable time, I always try to sympathize with the fellow who is unfortunate enough to hold that position. I regard it as the most responsible position in a coal mine, and one that should only be given to men whose ability and courage cannot be questioned, inasmuch as the safety of all the men working in the mine is dependent on the fireboss.

The fireboss' task begins when he leaves his bed in the early morning and prepares to enter the mine. On reaching the head of the shaft or slope, he must assemble all his thinking powers for action. In the performance of his work, his ear must ever be alert to catch the sound of a crack or break in the roof or the timbers supporting it. His watchful eye must be able to detect the presence of even a small percentage of gas, by observing its first appearance on the flame of his safety lamp, which is the only light he is permitted to carry when making his examination of the mine.

What the Mine Foreman Expects of the Fireboss Beside His Regular Duties

In addition to the duties that pertain particularly to his office as fireboss, he is expected, by the mine foreman, to make mental note of the number of loaded and empty cars standing in the working places and to be able to describe the condition of each place in his section, in respect to its condition and need of timber or tracking, and report these and other things that may require immediate attention.

On his return to the shaft or slope bottom, his report having been entered in the fireboss book, he must next attend to the miners who are now entering the mine, and notify any who are working in places that he has found to be unsafe, not to go into their places. A little later, he must return to the working face and see that miner 289, or miner 683, has taken down that loose piece of bad top, before proceeding to load any coal, after which he must assist the bratticeman in removing gas from a pitch heading. The fireboss, in answer to the inquiries of the foreman, is supposed to know why John Popolaski, or Salvatore Angelo, are not at work in their places.

These and many other numerous tasks fall to the lot of the busy and efficient fireboss. When he at last starts back to the foot of the shaft, ready to return home, it is only to meet the foreman, who wants to know "Why in h—, is there no more coal coming out?" Yes, the fireboss, if he is a good conscientous fellow, has a happy life of it whenever the foreman so determines.

West Pittston, Penn. Richard Bowen.

[The discussion of "Efficiency in Firebossing" will close with Letter 15, now on hand.—Editor.]

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

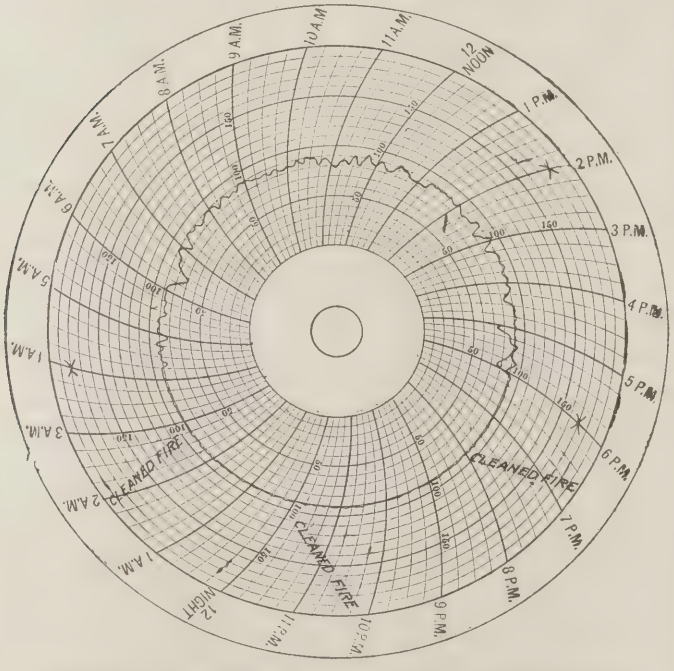
A Remarkable Pressure Chart

I am sending the inclosed Bristol's recording-pressure chart, which represents a 24-hour run at the power plant of the Miami Valley Hospital of this place, and wish to ask for the opinion of *Coal Age* and its readers regarding the chart. It will be observed that the first dayman is in charge doing a 10-hour shift extending from 4 a.m. to 2 p.m.; the second dayman works a 4-hour shift from 2 p.m. to 6 p.m. and is followed by the nightman who works another 10-hour shift, from 6 p.m. to 4 a.m.

The point to which I wish to draw particular attention is the fact that the nightman saved 30 per cent. of coal on his run and, as indicated on the chart, cleaned the fire three times, in his 10-hour shift. He states that the boiler popped off three times in the same shift. The furnaces are fired by hand and equipped with shaker grates. The chart shows the pressures recorded during each shift and speaks for itself, no further comments being needed. I shall be glad to learn the opinions of experienced engineers and firemen who have used this form of pressure chart.

W. F. HARRY, Chief Engineer,
Dayton, Ohio. Miami Valley Hospital.

The remarkable feature of this chart, which is accurately shown in the accompanying figure, is the uniform pressure line recorded during the nightman's shift. Taken in connection with his statement that the boiler popped off three times during that shift, and the further fact indicated on the chart that the fires were cleaned three times in the same period, one feels justified in assuming that the showing on the chart is not a correct representation of the pressure in the boiler, during the night shift.



BRISTOL PRESSURE CHART OF A POWER PLANT

If the boiler popped at all at this pressure, it would have kept on popping if the chart is a correct showing. The only conclusion is that the gage was spiked by the nightman, with the probable intention of producing such a uniform chart, believing that this would reflect credit on him as showing constant attendance on his duties as fireman. In the absence of exact information, it may be assumed that the plant was carrying a fairly uniform load during the day shifts, and the slight irregularity of the pressure line during those shifts is no more than what might be expected especially in a hand-fired plant. Referring to the statement that the nightman saved 30 per cent. of coal on his run, the meaning is somewhat obscure. It is only natural to suppose that there would be a considerable less coal used to run the plant during the night than during the day, and the 30 per cent. saving claimed for the night shift has no particular significance.

From the appearance of the chart, it can be said with some degree of certainty that the dayman who came on at 4 a.m., cleaned fires two hours later, at 6 o'clock, causing a well-defined drop in pressure for a half-hour period. From that time, the chart does not show, by any undue pressure drop, that the fires were cleaned again during the day.

We feel safe in assuming that the night man coming on at 6 p.m. probably did clean fires two hours later, as marked on the chart. We can see no reason, however, why it would be necessary to clean the same fire four hours later, midnight, and again at 3 p.m. The three cleanings marked on the night run would seem to refer to three separate fires. We shall be glad to receive the opinions of our practical readers.

Three Common Safety Lamps

Please explain in *Coal Age* the important differences between the Davy, Clanny and Wolf safety lamps.

Johnstown, Penn. ASST. FOREMAN.

The chimney of the common Davy lamp consists entirely of wire gauze, while in the Clanny and Wolf lamps the flame is surrounded by a glass cylinder surmounted by a wire gauze. The Davy lamp is often provided with a metal shield, which partially encircles the gauze chimney and protects the flame from strong drafts. The Clanny and Wolf lamps may or may not be provided with a steel bonnet. The bonnet of a Wolf lamp is corrugated and has tangential openings that afford a less resistance to the burnt air and gas issuing from the top of the lamp. While the Davy and Clanny lamps burn lard, cottonseed or sperm oil, the Wolf lamp is designed to burn a volatile oil, as naphtha or naphtha benzine. The oil vessel is filled with absorbent cotton, in order to lessen the danger arising from the use of the volatile oil. The Wolf lamp is also provided with an igniter to relight the flame when extinguished.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Alabama Firebosses' Examination Birmingham, Jan. 20-23, 1919

(Selected Questions)

Ques.—Give the names, chemical symbols and composition of the different gases met with in coal mines.

Ans.—The common mine gases are the following: Methane or marsh gas (CH_4), consisting of one atom of carbon combined with four atoms of hydrogen; carbon dioxide (CO_2), consisting of one atom of carbon combined with two atoms of oxygen; carbon monoxide (CO), consisting of one atom of carbon combined with one atom of oxygen; hydrogen sulphide or sulphureted hydrogen (H_2S), consisting of two atoms of hydrogen combined with one atom of sulphur. In addition to these common mine gases may be mentioned the heavy hydrocarbon gases, olefiant gas (C_2H_4), consisting of two atoms of carbon combined with four atoms of hydrogen, and ethane (C_2H_6), consisting of two atoms of carbon combined with six atoms of hydrogen. Methane or marsh gas is a light hydrocarbon and is sometimes called "light carbureted hydrogen." Though not mine gases, properly speaking, there may be mentioned in this connection the oxygen (O_2) and the nitrogen (N_2) of the atmosphere. Under certain conditions, there may also be present in the mine small quantities of hydrogen (H_2).

Ques.—Are there any conditions under which the flame will pass through the gauze of a safety lamp? Explain fully.

Ans.—If the gauze of the lamp becomes heated to low redness in the dark, it is extremely unsafe and flame is liable to pass through the mesh. Also, if the



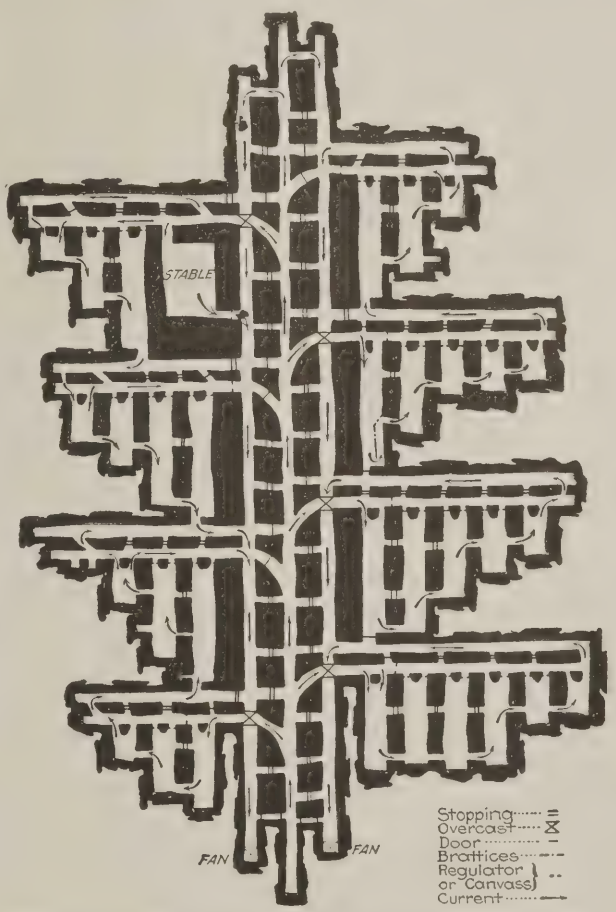
FLAME PASSES TROUGH WIRE GAUGE WHEN HEATED

gauze is dirty, or the lamp is exposed to a strong air current or blast of air, or the lamp falls, or if the gauze is defective or has been injured in any way the lamp is unsafe and liable to pass flame through its gauze, especially if handled by an incompetent person.

As shown in the accompanying figure, when the gauze has become sufficiently heated, its cooling effect is destroyed and the flame passes through the mesh, because the wires no longer absorb the heat from the tiny streams of gas and air passing through the gauze and the flame continues to burn instead of being extinguished, as is the case when the wires are cool and able to absorb the heat from the burning gas.

Ques.—How many cubic feet of air must be mixed with 1 cu.ft. of firedamp to render it harmless?

Ans.—Assuming the firedamp is a mixture of pure methane and air, in the most explosive proportions, or contains 9.46 per cent. of gas, 1 cu.ft. of the firedamp will contain 0.0946 cu.ft. of gas. But, taking the lower inflammable limit of the mixture as reached when it



SHOWING PROPER VENTILATION OF MINE PLAN

contains 2.5 per cent. of gas, the volume of air and gas will then be $0.0946 \div 0.025 = 3.784$ cu.ft. Now, subtracting the original cubic foot of firedamp from this volume gives 2.784 cu.ft. of air to be added to bring the mixture to the lower inflammable limit. For safety, it would be well to add 3 cu.ft. of air to provide a good margin.

NOTE—Candidates in the firebosses' examination, as well as in the first- and second-class examinations, were required to ventilate the map shown in the accompanying figure. The circulation shown in the figure, of course, did not appear in the original map given to the candidates, but has been carefully indicated here in order to show the proper manner of ventilating the mine.—EDITOR.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Canary Islands Lost Bunker Coal Trade During 1917

The inhabited islands of the Canary Archipelago (Teneriffe, Grand Canary, Palma, Lanzarote, Fuerteventura and Hierro) have experienced great economic and financial depression during 1917 as a result of the war. The withdrawal of all but Spanish vessels from Canary Island ports closed down the bunker-coal trade abruptly. This trade, which in 1914 was valued at $10,000,000, ceased in January, 1917. No collier entered these ports during the year except small coastwise steamers carrying 300 to 400 tons of low-grade Spanish dust coal. In 1917 there were no imports of American coal, which in 1916 showed a landed value of $167,840. The total imports of bunker coal in the Canary Islands in 1916 amounted to 110,270 metric tons, valued at $573,102. In 1917 the tonnage dropped off to 42,000 metric tons, valued at $281,450.

Germany to Retain Saar Valley

According to recent reports from Paris, the Saar Valley problem has been solved by an economic agreement that will give France certain concessions in the coal supply of that region but which will not militate against German sovereignty. It will be recalled that the French Government has been insisting for some time that the Saar Valley, with its rich coal deposits, be given over to her, basing her contention on the fact that the Germans destroyed the coal mines in the Lens region of France.

All French plans to dominate the Saar Valley and to obtain the entire coal output of the region until the Lens mines were again in operation met with stubborn resistance. The disposition of this question has possibly been the most bitterly fought of all the issues before the peace conference.

Foreign Trade Opportunity

An American consular officer reports that a man in Sweden wishes to secure an agency for the sale of the best quality steam coal. Those who are interested may obtain the name and address by addressing the Bureau of Foreign and Domestic Commerce, or any of its branches, and referring to Opportunity Number 29009. Correspondence with the Swedish agent may be in English.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lambert's Point				
Mar. 31	Amer. S.S. Cotopaxi	Vera Cruz, Mexico	3,118	600
Apr. 1	Amer. S.S. Hawaiian	Rio de Janeiro, Brazil	7,425	1,395
Apr. 2	Amer. S.S. Lake Gormannia	Barbados, B. W. I.	3,008	648
Apr. 2	Ital. S.S. Labor	Gibraltar for orders (Italy)	5,679	1,006
Sewalls Point				
Mar. 31	Amer. S.S. Lake Agomak	Barbados, B. W. I.	3,040	513
Apr. 1	Br. S.S. Cuthbert	Manaos, Brazil via N. Y.	1,023	850
Apr. 4	Amer. S.S. Andra	Mejillones, Chile	2,427	540
Newport News				
Mar. 29	Br. S.S. Baranga	Auckland, N. Z.	4,989	2,010
Mar. 31	Amer. S.S. Lake Ontario	Chanaral, Chile	1,000	557
Mar. 31	Amer. S.S. Lake Ontario	Huasco, Chile	1,370	....
Apr. 1	Nor. S.S. Ottar	Port of Spain, Trinidad	1,952	365
Apr. 1	Nor. S.S. Roar	Port of Spain, Trinidad	1,167	365
....	Nor. S.S. Roar	Grenada, B. W. I.	400	....
Apr. 3	Swed. S.S. Meta	Havana, Cuba	2,145	138
Apr. 3	Dan. S.S. Erik II	Nuevitas, Cuba	2,523	209
Apr. 3	Swed. S.S. Hermes	Kingston, Jamaica	2,153	242

HAMPTON ROADS COAL DUMPINGS, MARCH, 1919

	Gross Tons
Norfolk & Western R.R.	412,842
Virginian R.R.	197,367
Chesapeake & Ohio R.R.	234,058
Total	844,267

Foreign Freight Rates

W. W. Battle & Co.'s coal trade freight report under date of Apr. 17:

During the past week we chartered a number of sailing vessels to carry coals to South American ports, and have a few additional sailing vessels open for this business; but steamers for these destinations are difficult to obtain. We also chartered a number of steamers to carry coals to West Indian ports, and have additional tonnage offered at the Chartering Committee's rates.

We would quote the Chartering Committee's rates as follows:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge. Rio, $19.50 net, 1000 tons dis.; Santos, $19.50 net, 1000 tons dis., or $21 net, 600 tons dis.; Buenos Aires, $18.50 net, 600 tons dis.; Montevideo, $19.50 net, 750 tons dis.; Pernambuco, $18.50 net, 500 tons dis. To Nitrate Range, $16.50 gross prepaid.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Rio Grande do Sul, $21.50 net, 400 tons dis.; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. To Nitrate Range, $16.50 gross prepaid.

American Ambassador Edwin V. Morgan reports from Rio de Janeiro, Brazil, under date of March 27, that an executive decree has been signed withdrawing from foreign vessels the privilege granted by decree 12734, of Dec. 5, 1917, to engage in Brazilian intercoastwise trade.

Coal and Coke Exported from New York in February

Only in the quantity of coke exported from the Port of New York during February of 1919 is there shown an increase as compared with the same month in the two previous years. As compared with February in 1917 and 1918, the tonnage of anthracite and bituminous exported from this port shows a decrease, which may be due in most part to the mild winter and the consequent small consumption. The tabulation below gives tonnage and value:

	Anthracite						Bituminous						Coke					
	1917		1918		1919		1917		1918		1919		1917		1918		1919	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Argentina	1,074	$8,592	....	....	....	....	1,437	$5,892	....	....	2,017	$13,485	....	....	....	....	....	....
Barbados	....	....	....	....	40	$606	....	....	....	....	....	....	....	....	....	....	....	....
Bermuda	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bolivia	....	....	....	....	....	....	2	12	....	....	....	....	738	$5,899	..	....	....	....
Brazil	....	....	....	....	....	....	....	....	....	....	300	2,100	29	573	..	....	190	$1,582
British West Africa	20	240	....	....	....	....	....	....	....	....	....	....	....	....	..	....	....	....
British West Indies	25	199	....	....	50	753	....	....	....	....	....	....	....	....	..	....	....	....
Canada	2,970	17,154	945	$6,177	223	1,840	....	....	....	....	....	....	....	....	..	....	....	....
Chile	....	....	....	....	....	....	....	....	....	....	....	....	75	500	..	....	....	....
Costa Rica	30	435	....	....	....	....	....	....	....	....	....	....	....	....	..	....	27	915
Cuba	10	88	45	328	....	....	50	225	1,776	$16,808	....	....	5	43	19	$553	....	....
Colombia	....	....	....	....	....	....	....	....	....	....	....	....	2	40	..	....	....	....
D. West Indies	....	....	....	....	....	....	....	....	....	....	469	3,142	....	....	..	....	....	....
France	3	36	....	....	....	....	....	....	....	....	....	....	....	....	..	....	1,311	18,396
F. West Indies	....	....	....	....	....	....	....	....	....	....	....	....	89	1,892	..	....	2	65
Guatemala	2	14	....	....	....	....	....	....	....	....	....	....	....	....	..	....	....	....
Haiti	51	715	....	....	....	....	....	....	....	....	....	....	....	....	..	....	....	....
Italy	....	....	....	....	....	....	....	....	....	....	500	5,000	....	....	..	....	....	....
Mexico	105	1,234	....	....	....	....	242	847	....	....	....	....	....	....	..	....	....	....
Newfoundland	....	....	144	1,349	....	....	....	....	....	....	....	....	....	....	..	....	....	....
Norway	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	....	....	....
Panama	....	....	....	....	....	....	....	....	....	....	....	....	35	233	..	....	....	....
Peru	98	1,123	....	....	....	....	....	....	....	....	....	....	100	805	..	....	....	....
San Domingo	468	4,018	50	323	....	....	....	....	....	....	75	1,154	15	239	..	....	36	1,060
Salvador	....	....	....	....	....	....	....	....	381	2,540	....	....	4	77	..	....	....	....
Turkey in Asia	....	....	....	....	101	1,285	....	....	....	....	....	....	....	....	25	700	....	....
Turkey in Europe	....	....	....	....	201	1,706	....	....	....	....	200	1,700	....	....	..	....	....	....
Venezuela	125	1,514	....	....	....	....	....	....	....	....	....	....	119	1,082	..	....	20	590
Total	4,981	$35,362	1,184	$8,177	615	$6,190	1,731	$6,976	2,157	$19,348	3,561	$26,581	1,211	$11,383	44	$1,253	1,586	$22,608

COAL AND COKE NEWS

EDITED BY ..... MOSS

Harrisburg, Penn.

Considerable interest has been aroused by the offer of the Susquehanna Collieries Co., owner of two collieries at Lykens and Williamstown, Dauphin County, to sell its holdings to any responsible purchaser. It has advertised to this effect in the Dauphin County papers, but no buyer has appeared to date.

The offer was prompted by the fact that advisers engaged by the Dauphin County commissioners as coal-land experts have appraised the value of the Susquehanna's Dauphin County holdings at $87,000,000. The company is willing to dispose of the whole tract, with improvements, for $1,400,000, of which $400,000 represents the improvements. This is considerably less than 2 per cent. of the appraised value, yet nobody has so far appeared anxious to take a profit of about $85,000,000 by putting up $1,400,000. It would seem to be the impression of possible investors that the property is not worth what the county's advisers say it is.

According to mining men, the problems presented in this particular property make it the hardest mining job in the anthracite region. One of the mines hoisted 13¾ tons of water for every ton of coal hoisted in 1918, while at the other mine the ratio was 22¾ tons of water for every ton of coal. One mine used 22 per cent. of its output for boiler fuel, while the other used 40 per cent. A hearing on the appeal from the new valuation will be held by the Dauphin County commissioners Apr. 17.

With the basic purpose in mind of allowing anthracite coal to be taxed without having it declared unconstitutional by the courts, Senator A. L. Davis, of Lackawanna, in the Senate on Apr. 9 introduced a joint resolution proposing an amendment to article nine of the constitution. The amendment follows:

"Section 16—For the purpose of taxation, subjects of the same nature may be classified according to their physical character or their general use and all subjects of taxation may be classified for the purpose of laying graded or progressive taxes."

This amendment will have to be passed by this legislature and the one two years hence, and then submitted to the people, before it becomes a law.

Senator Davis states that the real purpose in introducing the amendment was so that anthracite coal could be taxed without the courts declaring this method of taxation unconstitutional. There are on the statute books of the state two measures, the Roney bill and the Dawson bill, calling for a tax on anthracite. These measures were passed and signed at the 1915 and 1917 sessions for the purpose of assisting in remedying the mine-cave situation in the anthracite region.

Uniontown, Penn.

Not since 1907 have conditions in the Connellsville bituminous region been at such low ebb as at present. The entire region is now operating upon a basis of 44 per cent., with 50 coke plants and three times as many coal plants entirely out of operation and all others operating upon a greatly restricted basis.

The action of Director General Hines in refusing to accept the Peek-Gary steel price schedule has served to cloud the immediate future of the coke industry with more uncertainty than existed before the conferences were started. The first effect of the present controversy has been to cause a drop of from $4.50 to $4.25 in the average price of coke, which was quickly followed by another retrenchment period on the part of the operators. A week ago there was a consensus of opinion that rock bottom in curtailment had been reached. Now nobody will venture a prediction on how much lower it will go.

Four dollars seems to be the lowest figure at which operators can sell any considerable tonnage of coke. Demands of buyers for a lower price has resulted in suspension of operations at a number of plants. For odd lots of coke, however, the price has gone as low as $3.75, ovens, and in one instance an operator accepted that price on a contract for a limited period because mining conditions forced him to continue operations, even at a loss. Prompt furnace coke is selling from $4 to $4.50, but the range for contracts runs the line from $4.50 to $6 with most of the tonnage delivered around $5.

Output of the Alicia plants recently sold by W. Harry Brown is now being delivered to the Monessen plant of the Pittsburgh Steel Co. The Rostraver dock has been put back into commission after having been rebuilt following its destruction by fire last summer.

Charleston, W. Va.

Coal production in West Virginia during the first few days of April had not regained its stride, even though statistics covering March shipments showed that there had been an increase in the output during that month as compared with February production. In other words, insofar as it was possible to tell, the output was just about at the point it had reached during the early part of March. In certain districts the idle mines were more numerous than they had been in the previous fortnight, and in no district was there any increase insofar as it was possible to estimate.

Taking the state as a whole, the output was not much over 40 per cent. of the total full-time capacity of the mines. Even such business as there was came from consumers who were simply keeping their stocks from running too low and could not be attributed to any additional consumption of coal. On a rough estimate, shipments from West Virginia fields in March exceeded those in February by from 5 to 10 per cent. During the week ending Apr. 5 railroad fuel shipments were somewhat curtailed. Tidewater shipments to all points except Hampton roads were fairly large. On Apr. 1, when the coal year opened, much coal tonnage was not yet under contract, that being especially true as to lake shipments and as to coal for shipment to the West in general.

Improvement marked the course of events in the Fairmont region during the first five days of April. Despite such improvement, however, there was no decrease in the number of idle mines. The improvement was applicable to western as well as to eastern consignments. Production in the Fairmont field was less than half of normal.

At the outset of April New River operators were still being somewhat hampered in their attempt to make eastern shipments by the existence of several embargoes on coal, although the Navy continues to use a large quantity of fuel from New River mines. Much of the tonnage usually going to tidewater is already under contract for the coming year. It will require an increase in western business to simulate production to any appreciable extent in the New River field. Pocahontas production was diminished somewhat through market conditions.

The condition of the western market was reflected to some extent in the Logan Mining District, where there was a slight decline in production during the week.

Insofar as it was possible to tell production hardly held its own in the Kanawha region during the first five days of April. Further gains will not be made until the opening of the lake trade season, and until that time most of the miners will not average over two days a week. There was some encouragement in the fact that March shipments exceeded February shipments by about 10 per cent. Much coal from the district is still not under contract.

Victoria, B. C.

When the British Columbia Legislature prorogued a few days ago the Lieutenant Governor withheld his assent to the Settlers' Rights Act of 1919, which would have given the old settlers, or their dependents, with homes in the Esquimalt & Nanaimo Railway Belt on Vancouver Island a further opportunity to make application for the coal rights in connection with their property. The issue now is straight cut between the jurisdiction of the Dominion and the Province, and the stake to those directly interested in title to a large section of coal-bearing lands of the Island.

On the question of jurisdiction the Province maintains that it has absolute power with respect to the administration of matters pertaining to civil and property rights, within which classification comes the proprietorship of the coal referred to. Just what position the Dominion government takes it is not so easy to define, but that it is responsible for the Lieutenant Governor's action in refusing to give his assent to the enactment of the Legislature there is no doubt. It may be that its argument is that title to surface and under-surface rights in these Island lands passed from the Province to the Dominion, and from the latter to the Esquimalt & Nanaimo Railway Co., in 1884; that the Esquimalt & Nanaimo Railway Co. since has sold the under-surface rights to the Canadian Collieries (D), Ltd., and that the latter, having raised a considerable sum on this security, should be protected, if only in justice to the bondholders.

It is to be noted that, because of the action taken by the Dominion Government, the Province finds itself in the position of being forced to defend its right to the sole administration of "property and civil rights" within its domain. These rights are part and parcel of the "Terms of Union" and it is considered most serious, apart altogether from the rights of the Canadian Collieries or of the settlers affected, that the Federal Government should so interfere with Provincial legislation of this character. It is very probable, therefore, that both because it believes the settlers have a good case and have been unjustly treated and because the powers granted the Provinces under Confederation must be upheld that British Columbia will not allow the matter to drop where it now stands.

PENNSYLVANIA

Anthracite

Hazleton—The sixteen collieries of the Lehigh Valley Coal Co. in this district have resumed full-time operation. A number of independent operations that had been working only three days a week will also go to a full-time schedule. The resumption of activity is attributed to the action of Governor Sproul sustaining the prospective increase in the price of anthracite.

Freeland — Indications that the Sandy Run mine of the Kemmerer Coal Co. is to be idle for some time have been given by the action of the officials in ordering the men to remove the mules from the mines. The animals are being sent to pasture on ground owned by the company in Carbon County.

Pottsville—Members of the City Council have gone after the Pennsylvania Railroad Co. for persisting to burn soft coal in its engines in that town. An ordinance has been passed providing a fine from $10 to $100 for every day's continuance of the smoke nuisance. Pottsville officials argue that the railroad company should not attempt to burn bituminous coal in an anthracite mining center.

Hazleton—Though miners of the Lehigh coal field are working on reduced time because there is no market for coal, a famine exists in Hazleton and people can not get enough fuel. They let their stocks dwindle, thinking the mild winter weather indicated an early spring. As a result they were caught unawares when the temperature dropped during the week. The mines are operated only two and three days a week, and coal dealers find they can not catch up with orders.

Bituminous

Greensburg—Fire recently destroyed one of the buildings at the No. 2 plant of the Alexandria Coal & Coke Co., located near New Alexandria, with loss estimated at about $10,000.

Charleroi—The Union Coal & Coke company, which operates all of the mines in the Pigeon Creek valley with but one exception, has moved its general offices from Monongahela to Farmers and Miners Bank Building of Bentleyville. The company purchased the Kuhn interests in several thousand acres of coal lands in Scenery Hill and it is reported will develop that tract in the near future.

WEST VIRGINIA

Monon—An improvement in market conditions has enabled the Monongahela Coal Co. operating at this place to start its mines going once again. More than 100 miners are employed at the plant.

Switchback—The Pocahontas Fuel Co. is considering plans for the construction of a large new coal tipple at its local properties, to provide for increased capacity.

Affinity—The Pemberton Coal Co. has recently commenced the construction of a new power plant and machine shop at its local plant, to be used to facilitate operations. It is understood that a new recreation hall and the construction of a number of miners' residences are also contemplated.

Fairmont—The purchase price paid for a one-half interest in the North Fairmont Coal Co. by Robert Talbott, who acquired such an interest in the concern from Seymour McIntire, W. D. Reed and M. A. Joliff, is said to be $150,000. The company has its operation in the Fairmont field, its property being between Fairmont and Morgantown.

Bluefield—M. H. Pedigo, Bluefield, and William H. Leckie, Welch, have recently completed negotiations for the purchase of extensive coal properties located on Pigeon Creek, in McDowell County, comprising a total of 1500 acres, and are understood to be arranging plans for the installation of the necessary mining machinery for extensive development.

Nitro—Plans are under consideration by the Fryland Coal Co. for the installation of new equipment and mining machinery, etc., for the development of two new coal mines located in the vicinity of Nitro. It is understood that in connection with this work the company is planning for the construction of a number of miners' residences for its employees. C. G. Howland is president. The entire work is estimated to cost approximately $50,000.

Fairmont—Another phase in the development of the plans of the Domestic Coke Corporation, of this city, engaged is completing a $3,000,000 byproduct plant, is the awarding of a contract for the construction of two miles of railroad from the site of the plant to the Baltimore & Ohio R. R., such work together with the rights of way necessary to cost about $125,000. This is one of the companies in which capitalists identified with the Monongahela Valley Traction Co. are also interested. At the present rate of progress executives of the company are confident that the new plant will be completed early next spring.

Omar—The tonnage of the Main Island Creek Coal Co. will be appreciably increased upon the completion within the next 30 days of the Logan Southern R. R. from Omar to Sterrett, a distance of ten miles, the Main Island company having changed the name of Crane to Sterrett when many improvements were started there with a view to making it one of the large plants of the company. The holdings include a large acreage of coal of excellent quality which it is proposed to mine on an extensive scale. There has been a large influx of miners since improvements were initiated, and when the new road permits the shipment of even more coal Sterrett will become one of the most important shipping points in the Logan field.

INDIANA

Jasonville—The supply house and blacksmith shop at the Green Valley mine has been burned with loss of $2000, covered by insurance.

ILLINOIS

Nilwood—The Union Fuel Co. has purchased the mine of the Nilwood Mining Co. for $350,000.

Marion—The Peabody Coal Co. is installing at its No. 3 mine at Marion a large crusher which was made by the Link-Belt Co., of Chicago. The crusher has a capacity of 2500 tons per day and will produce a product of 1½-in. cubes of coal.

Du Quoin—Drilling has been started on the Wabash, Chester & Western R. R., ten miles west of here, on 7000 acres of land which have been leased by Crawford & Hagler. It is reported that results of the drilling indicate that a large mine will be sunk near the location soon.

Du Quoin—At a recent election among the miners of the Ninth Subdistrict, which embraces all of Franklin County, the proposition to continue the payment of $750 death fund was defeated. The per capita assessment on the miners was unusually heavy during the recent influenza epidemic, and in addition to this a number of deaths resulted from the Royalton mine explosion last year. The treasurer of this subdistrict, which is the largest subdistrict in the State of Illinois, during the epidemic period paid out $22,500 in claims, with additional claims for $68,000 pending adjustment.

KENTUCKY

Whitesburg—The Wells Coal Co. has recently completed negotiations for the acquirement of the plants of the Salt Lick Coal Co. and the Black Diamond-Elkhorn Coal Co., located in the vicinity of Right Ford of Beaver Creek. It is understood that plans are now being arranged for extensive development operations. The company has also leased additional coal properties in this section, which will also be developed.

ARKANSAS

Clarksville—The King & Johnson Mining Co., of Montana, is understood to have completed arrangements for extensive improvements and extensions in its local coal-mining properties. The plans include the erection of a new coal tipple, electrically operated, with the installation of electric motors and auxiliary apparatus, and the construction of a five-mile railroad branch. The work will involve an expenditure of approximately $150,000.

OKLAHOMA

Tulsa—The B. B. Coal Co. has opened a mine on its holdings just east of Tulsa. This company owns 125 acres underlaid with a vein of coal several feet in thickness and at such shallow depth to permit of profitable working.

Tulsa—Charles Page, oil magnate of this place, has purchased 1000 acres of proven coal lands southwest of here which he will soon begin developing. Mr. Page will build a line of railroad into the heart of this tract to handle the coal mined.

Dawson—Cosden & Co., oil producers, have purchased extensive coal lands at Dawson, four miles east of Tulsa, and will begin taking coal from new mines that will be opened there during the summer. Cosden & Co. own and operate at Tulsa an oil refinery said to be the largest in the world. Since the supply of natural gas in the Oklahoma fields is proving inadequate and is insufficient to operate the refinery, Cosden & Co. are looking elsewhere for fuel. It is the plan to take coal from the recently acquired coal lands for operating the Tulsa refinery.

KANSAS

Pittsburg—Daylight saving to economize on the use of fuel has worked the other way in the Kansas coal fields, so far. Twenty-six coal mines in this district were idle last week because the men would not go to work earlier, and the companies persisted in following the Government time change. An agreement has been reached, however, whereby the men will resume their work on the new time schedule pending a rearrangment of car schedules by the railroads.

NEW MEXICO

Oscura—The Consumers Coal Co. is being organized at El Paso, Tex., by M. D. Gaylord, an experienced coal operator, for the purpose of developing four sections of coal lands in the vicinity of Oscura. The company plans to bring the daily output of the property to 500 tons. The El Paso & Southwestern Ry. runs through the property, which is 128 miles from El Paso.

Foreign News

Victoria, B. C.—Consumers of coal here have now to pay $10.25 a ton and, if they buy it in half-ton lots, at the rate of $10.50 a ton. Shortly before the war the price in this and neighboring cities was $6.50 a ton, which furnishes a good illustration of the remarkable advance which has taken place within a comparatively brief period. The dealers' only explanation is that, as domestic coal has been selling at a lower figure than bunker coal, and as for some reason the sale of bunker coal has fallen off, the mine operators have been obliged to bring the price of domestic coal near the mark of that being sold at the bunkers in order to pay the miners the present high wage scale. They could not explain how it happens that bunker sales have declined, although venturing the suggestion that fuel oil now is being used by many more vessels than in the past.

Toronto, Ont.—The annual meeting of the Canadian Associated Coal Dealers was held here on Apr. 3. The situation was fully discussed, the general consensus of opinion being that there was still a possible danger of temporary shortage in case of a sudden rush of orders, but that this would be averted if consumers would order supplies early. Some advance in prices was regarded as certain. The following officers were elected: T. A .Harrison, Toronto, president; J. M. Daly, London, vice president; B. A. Caspell, Toronto, secretary-treasurer; M. F. Craig, Gueiph; J. A. Maclean, Wingham; J. F. Foulds, Campbellford; G. M. Baker, Lindsay; Edward Browne, Port Hope; G. A. Stanley, Lucan, and G. F. Rogers, St. Catharines, directors. Resolutions were adopted that the Railway Commissioners be requested to give consideration to the inconveniences suffered by coal dealers and attempt to adjust their grievances in a definite period; that the government be urged to continue the office of Fuel Controller in the interests of the public, and that the dealers watch carefully for impurities in coal and demand compensation from shippers, and that the government fix the amount of impurities possible.

Nanaimo, B. C.—There has been litigation during the past few weeks over title to the coal fields of Vancouver Island controlled by the Nanoose Collieries, Ltd., suit being brought against the company by A. F. Eastman, manager of the Marble Bay mines, Texada Island, for an accounting and for an order restraining further work on the property. His claim was that in 1906 he had entered into an agreement with the then owner of a portion of the property now under development to provide money for opening up the coal measures supposed to be there in return for a half interest. Work started on this basis, a small seam was struck not far from the surface, and then a disagreement arose with the result that operations were suspended. Mr. Jack subsequently died. His executors, according to Mr. Eastman, declared that the estate would sell its interest for $60,000, whereupon Mr. Eastman et al arranged to dispose of the entire holdings to Alvo von Alvensleben, the German financier and propagandist, of whom considerable has been heard both in Canada and the United Stated of late years, for $125,000. This, however, was not accepted by the executors, and Alvensleben bought the Jingle Pot mine, near Nanaimo, B. C. Finally the property was sold out to the Nanoose Collieries, Ltd. The reply to Mr. Eastman on behalf of the company was that his arrangement with Mr. Jack was to the effect that he should have one-half of the returns of coal produced during the active operation of the partnership. The court upheld the company and the action was dismissed.

Personals

W. C. Gartley, formerly with the H. C. Frick Coke Co., at Maxwell, Penn., has accepted a position as superintendent with the Maple Glen Coal works at Shoring, Penn.

J. A. Bier has resigned as superintendent of the Williams Run Coal Co. and Anita Coal Mining Co., Punxsutawney, Penn., and is now connected with the Hurlburt Grease and Oil Co.

Joseph Maize, of Wendel, Westmoreland County, Pennsylvania, has resigned his position as superintendent of Edna Nos. 1 and 2 mines of the United Coal Corporation, effective Apr. 16.

B. H. Armstrong recently assumed the duties of superintendent for the Citizens' Coal Mining Co., of Lincoln, Ill., succeeding **William D. Obcamp**, who was formerly superintendent of the Lincoln mine.

Robert Whitehead, well known in southern Illinois coal-trade circles, has joined the sales force of the New Kentucky Coal Co., 1700 Fisher Building, Chicago, of which H. L. Keiflein recently became vice president and manager.

Henry Blackledge, formerly with the Pittsburgh Coal Co., in Washington County, has been appointed superintendent of Mines Nos. 88, 89 and 90 of the Consolidation Coal Co., with headquarters at Wyatt, W. Va. He succeeds **W. E. Lakin**, resigned.

A. T. Pace has been reappointed as traveling auditor for the United Mine Workers of America in the 12th district, by President Frank J. Hayes, of Indianapolis, Ind. His territory is in southern Illinois and includes Williamson, Franklin, Saline, White and Gallatin Counties.

J. D. Mooney, recently discharged from the Army after having served overseas as a captain with the 309th Ammunition Train, 84th Division, is now with the General Motors Corporation, New York. Mr. Mooney was manager of the Hyatt Roller Bearing Co.'s industrial division prior to joining the army in 1917.

R. W. Belcher, who has been identified with civil service work, has been elected secretary of the War Service Executive Committee of the Chamber of Commerce of the United States to take up the work inaugurated by W. H. Manss at the great reconstruction conference of American business, held at Atlantic City last September.

T. L. Cole, formerly assistant in the sales department of the New York Coal Co., Columbus, Ohio, has resigned to take a position with the Kendall Coal Co. **C. C. Everhart,** who was the Detroit representative of the New York Coal Co., has resigned his position, being succeeded by **John F. Nuebacher,** formerly with the Semet Solvay Co. C. C. Everhart has gone into the jobbing business in Detroit.

James D. Monie has resigned as chief clerk of the New York office of the Tidewater Coal Exchange and on Apr. 15 became New York sales manager of the Johnstown Coal and Coke Co. Mr. Monie has been with the Tidewater Coal Exchange since its organization. The office of the Johnstown Coal and Coke Co. will be removed from the Park Row Building to the Maritime Exchange Building, 80 Broad Street.

W. H. Ashlers has been made assistant secretary and treasurer of the Rackett Brook Coal Co., Carbondale, Penn., and **Edward B. Burr** has been appointed general superintendent of operations. The former takes a newly created position and the latter the place of **E. H. Leaning,** who has had charge of operations for the past three years. Mr. Leaning is still identified with the Nay Aug Coal Co. and will probably devote his entire time to the operations of that company.

Obituary

William Clayton, pioneer operator and one of the first to sink a mine in the Standard field of Illinois, died recently at his home in Collinsville. He sank two mines near Collinsville 35 years ago and afterward sold them to the Consolidated Coal Co., of St. Louis.

Harvey Miller, 40 years of age, a prominent coal and lumber man of eastern Kentucky, recently died at his home near Whitesburg, Ky., of influenza. Mr. Miller held title to several fine coal properties and had a number of hardwood tracts, operating several mills.

D. E. Adams, a leading coal merchant of Winnipeg, Man., and a pioneer of the business in Western Canada, died on Apr. 3 at Pasadena, Cal., where he had been spending the winter on account of ill health. He came to Winnipeg from Toronto in 1882 and entered the coal business as representative of the North West Fuel Co., of St. Paul, Minn., which was the only concern engaged in the Winnipeg trade at that time. It afterward sold out to the Dominion Coal Co., of which Mr. Adams was manager from 1885 to 1895. He was also connected with the company that was the first to mine Souris Valley coal. In 1904 he became secretary and selling agent of the Tabor Coal Mining Co., which afterward sold out to St. Paul and Minneapolis capitalists who organized the Canada West Coal and Coke Co. Mr. Adams' business was transferred to a joint stock company under the style of the D. E. Adams Coal Co., Ltd. Mr. Adams took a prominent part in the business and social life of Winnipeg and was a Free Mason. He leaves a widow, one son and two daughters.

Coming Meetings

Illinois Mining Institute will hold its annual meeting May 22, 23 and 24. Secretary, Martin Bolt, Springfield, Ill.

National Coal Association will meet May 21, 22 and 23, at Congress Hotel, Chicago, Ill. Secretary, J. D. A. Morrow, Washington, D. C.

Illinois and Wisconsin Retail Coal Dealers' Association will meet at Hotel Nelson, Rockford, Ill., June 4 and 5. Secretary, I. L. Runyan, Chicago, Ill.

International Railway Fuel Association will hold its annual meeting May 19-22 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

Retail Coal Dealers' Association of Texas will hold its annual meeting on May 19 and 20 at Fort Worth, Texas. Secretary, C. R. Goldman, Dallas, Texas.

Indiana Retail Coal Merchants' Association will hold its annual spring meeting Apr. 23 and 24 at Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind., subject to ratification of executive committee. Secretary, J. W. Paul, Pittsburgh, Penn.

American Manufacturers' Export Association will tender a luncheon at 12:30 p.m., to all its members who may be in attendance at the National Foreign Trade Convention in Chicago, Apr. 25 to 26, at the Congress Hotel.

Kentucky Mining Institute after having skipped two years, one on account of the war and the other due to the influenza epidemic, expects to hold its annual meeting this year. While the date and place of meeting have not definitely been set, it will probably be held on May 30 and 31 at Lexington, Ky. Secretary, C. W. Strickland, Huntington, W. Va.

Publications Received

Boiler Water Treatment. Department of the Interior, Bureau of Mines. Technical Paper 218. Unillustrated, 8 pp., 5¾ x 9⅛ inches.

Annual Report on the Mines, 1918. Province of Nova Scotia, Department of Public Works and Mines. Unillustrated, 76 pp., 6⅝ x 9½ inches.

Eighth Biennial Report of the State Engineer to the Governor of North Dakota for the Biennial Period Ending June 30, 1918. Public Document No. 26. Unillustrated. 174 pp., 6 x 9 inches.

Geology of the Lost Creek Coal Field, Morgan County, Utah. By Frank R. Clark. Department of the Interior, United States Geological Survey. Bulletin 691-L. Illustrated, pp. 311-322, 6 x 9 inches.

A Summary of Mining in the State of Washington. By Arthur Homer Fischer. Bulletin No. 4. Engineering Experiment Station, University of Washington. Unillustrated, pp. 124, 6 x 9 inches.

Method of Least Squares Applied to Estimating Errors in Coal Analysis. By J. D. Davis and J. G. Fairchild. Department of the Interior, Bureau of Mines. Technical Paper 171. Illustrated, pp. 36, 6 x 9 inches.

Combustion Experiments with North Dakota Lignite. By Henry Kreisinger, C. E. Augustine and W. C. Harpster. Department of Interior, Bureau of Mines. Technical Paper 207. Illustrated; 41 pp.; 6 x 9 inches.

Notes on the Geology of the Murchison District. By J. Henderson, Mining Geologist, Geological Survey Department. Pp. 108 to 112 inclusive of the New Zealand Journal of Science and Technology, March, 1918. Unillustrated, 6¼ x 9¾ inches.

Notes on the Geology of the Waikato Valley near Maungatautari. By J. Henderson, D. Sc., Mining Geologist, Geological Survey Department. Pp. 56 to 60 inclusive of the New Zealand Journal of Science and Technology, January, 1918. Unillustrated, 6¼ x 9¾ inches.

The Geology of the Te Kuiti District, with Special Reference to Coal Prospects. By J. Henderson, D. Sc., Mining Geologist, Geological Survey Department. Pp. 112 to 115 inclusive of the New Zealand Journal of Science and Technology, March, 1918. Unillustrated, 6¼ x 9¾ inches.

Notes on the Geology and Mineral Occurrences of the Wakamarina Valley. By J. Henderson, D. Sc., Mining Geologist, Geological Survey Department. Pp. 11 to 15 inclusive of the New Zealand Journal of Science and Technology, January, 1918. Unillustrated, 6¼ x 9¾ inches.

A Preliminary Report on the Mining Districts of Idaho. By Thomas Varley, Clarence A. Wright, Edgar K. Soper and Douglas C. Livingston. (In coöperation with the University of Idaho.) Department of the Interior, Bureau of Mines. Bulletin 166. Illustrated, 103 pp., 5¾ x 9⅛ inches.

Trade Catalogs

Locomotive Coaling Plants. Roberts & Schaefer Co., Chicago, Ill. Bulletin No. 34. Pp. 68, 9 x 11½ in., illustrated. Typical coal handling plants designed and built by the company.

Boiler Logic. Heine Safety Boiler Co., St. Louis, Mo. Catalog. Pp. 86, 6 x 9 in., illustrated. A treatise on steam boilers, accompanied by a supplement in color of a Heine boiler set over an underfeed stoker.

Use and Abuse of Electric Headlights on Mining Locomotives. Ohio Brass Co., Mansfield, Ohio. Pp. 15, 8 x 10½ in., illustrated. Reprint of a paper read by K. W. Mackall before the Coal Mining Institute of America.

Modern Types of Flory Mine Hoists. S. Flory Manufacturing Co., Bangor, Penn. Catalog 26. Pp. 6¼ x 9 in., illustrated. Taken bodily from the company's general catalog and covers a general line of mining hoists.

Type "C" Roller Bearings. American Roller Bearing Co., Pittsburgh, Penn. Bulletin No. 1004. Pp. 8, 6¾ x 10 in., illustrated. These roller bearings are recommended for use under conditions of medium loads at medium speeds.

Fairmont Coal Augers. Fairmont Mining Machinery Co., Fairmont, W. Va. Bulletin No. 15. Pp. 4, 6 x 9 in., illustrated. Describes a power auger for use in coal 5 ft. thick and over. Emphasis is placed on flexibility and easy portability.

Sullivan "WB-3" Air Compressors.—Sullivan Machinery Co., Chicago, Ill. Bulletin 75-E. Pp. 12, 6x9 in., illustrated. Compressors for general mining, quarrying or contracting work, and to operate coal machines, drills, pumps and pneumatic tools.

"Sergeant" Ticket Cancelling Box. Ingersoll-Rand Co., New York, N. Y. Form No. 9010. Pp. 4, 6 x 9 in., illustrated. Used at ball grounds, moving picture theaters, etc., where great quantities of tickets must be disposed of without the possibility of their ever being used again.

Recent Coal and Coke Patents

Mine Apparatus. A. Bucey, Bowerstown, Ohio, 1,294,868. Feb. 18, 1919. Filed May 14, 1918. Serial No. 234,462.

Steel Framing for Mine Shafts. O. D. McClure, Ishpeming, Mich., 1,294,814. Feb. 18, 1919. Serial No. 128,418.

Sifter Grate. G. G. Bole, Union City, Mich., 1,293,677. Feb. 11, 1919. Filed June 6, 1918. Serial No. 238,543.

Ash Sifter. S. Heath, Philadelphia, Penn., 1,294,262. Feb. 11, 1919. Filed Dec. 13, 1918. Serial No. 266,605.

Ash Cart Cover. S. Rochlis, Philadelphia, Penn., 1,294,708. Feb. 18, 1919. Filed Aug. 23, 1917. Serial No. 187,770.

Breast Car for Mines. R. Christiansen, Black Diamond, Wash., 1,294,619. Feb. 18, 1919. Filed Aug. 17, 1918. Serial No. 250,394.

Coal Pile. A. C. Johnston, assignor to Link-Belt Co., Chicago, Ill., 1,256,569. Feb. 25, 1919. Filed Dec. 14, 1918. Serial No 138,184.

Registering Device for Automatic Stokers. H. J. Peterson, Minneapolis, Minn., 1,294,700. Feb. 18, 1919. Filed May 7, 1918. Serial No. 233,010.

Coal Loading Machine Gathering Mechanism. J. F. Joy, N. Belle Vernon, Penn., 1,295,173. Feb. 25, 1919. Filed May 9, 1918. Serial No. 233,477.

Boiler Furnace. W. J. Manhire, assignor to Combustion Specialty Co., Kansas City, Mo., 1,293,845. Feb. 11, 1919. Filed June 1, 1917. Serial No. 172,826.

Coal Reducing Apparatus. H. Adams, assignor to Adams Mining Machinery Corporation, New London, Conn., 1,293,656. Feb. 11, 1919. Filed Sept. 20, 1915. Serial No. 51,563.

Pneumatic System for Cleaning Coal. L. B. Yeiser, assignor to Glauber Brass Manufacturing Co., Cleveland, Ohio, 1,295,250. Feb. 25, 1919. Filed Aug. 16, 1917. Serial No. 186,468.

Process and Apparatus for Reducing Coal. H. Adams, assignor to Adams Mining Machinery Corporation, New London, Conn., 1,293,654. Feb. 11, 1919. Filed Aug. 24, 1915. Serial No. 47,064.

Industrial News

Middletown, Ohio—Papers have been filed increasing the capital of the Solar Coal Co. from $100,000 to $200,000.

Dover, Ohio—The Macksburg Coal Co. has been chartered with a capital of $100,000 by L. R. Page, Joseph Jenkins, W. H. Scheu, John Rees and Charles A. Graber.

Wheeling, W. Va.—The Echo Coal Co. has recently filed notice of an increase in its capital from $50,000 to $150,000, to provide for general business expansion.

Ashland, Ky.—The Lackey Mining Co. has filed notice with the Secretary of State of an increase in its capitalization from $12,000 to $50,000, to provide for expansion.

Moundsville, W. Va.—Plans are under consideration by the Mound City Coal Co. for the immediate rebuilding of its tipple recently destroyed by fire, with loss of about $10,000.

Johnstown, Penn.—The Sheesley Coal Co. has filed articles of incorporation with a capital of $50,000 to operate in the Johnstown section. J. D. Sheesley is the principal incorporator.

El Paso, Tex.—The Hines Lumber and Coal Co. has filed notice with the Secretary of State of an increase in its capitalization from $20,000 to $100,000, to provide for general business expansion.

Whitesburg, Ky.—Fess Whitaker and associates have completed negotiations for the leasing of extensive coal properties in the Whitesburg section, and are arranging plans for early development.

Cleveland, Ohio—The Guernsey Land, Timber and Coal Co. has been chartered with a capital of $100,000 by Mark A. Copeland, F. B. Evarts, James F. Walsh, K. Droege and O. E. Schulte.

Whitwell, Tenn.—The Whitwell Coal Co. has filed notice with the Secretary of State of an increase in its capital stock from $50,000 to $100,000. The increase will be used, it is understood, for general business expansion.

Zanesville, Ohio—Papers have been filed with the secretary of state increasing the capital of the Kehota Coal Co. from $1,000,000 to $2,000,000. The increase will be used in the expansion of the operations in this neighborhood.

Marion, Ky.—The Lagrange Mining Co. has been incorporated with a capital of $30,000 to engage in the development of coal properties in the Marion section. J. L. Lane, A. S. Furtwangler and W. A. Barton are the incorporators.

Charleston, W. Va.—The Nelson Coal and Oil Co. has filed articles of incorporation with a capital of $150,000 to operate in the Charleston district. C. W. Morton, Charles E. Krebs and E. M. Johnson are the principal incorporators.

Whitesburg, Ky.—The Southeast Coal Co., Seco and LeViers, Ky., is understood to be considering plans for the installation of new coal-mining machinery for the development of coal properties in the Thornton Creek section, near Whitesburg.

Harriman, Tenn.—The Harriman Coal & Land Co. has been incorporated with a capital of $40,000 to engage in coal-mining operations in the vicinity of Harriman. Brown Crinkley, L. O. Scott and G. W. Chandler are the principal incorporators.

East Burnstadt, Ky.—The Furnie Coal Co. has been incorporated with a capital of $10,000 to engage in the development of coal properties in the vicinity of East Burnstadt. T. S. Lanier, Sr., Richard Gentry and C. W. Nelch are the principal incorporators.

Columbus, Ohio—The Central West Coal and Lumber Co., of Columbus, has increased its authorized capital from $100,000 to $250,000, in order to acquire additional mining property in the Hocking Valley and Pomeroy Bend fields. J. S. McVey is president.

Whitesburg, Ky.—The Wells-Elkhorn Coal Co., recently incorporated by A. M. Kelly, J. S. Fitzgerald and L. S. Wilson, has filed notice with the Secretary of State of an increase in its capitalization from $75,000 to $300,000 to provide for general business expansion.

Little Rock, Ark.—The North Spadra Coal Co. has filed articles of incorporation with a capital of $25,000 to engage in general coal-mining operations in the Little Rock district. W. R. Eustice is president, L. Werner is vice president and P. D. McKinnon is secretary-treasurer.

Chicago, Ill.—The Chicago Pneumatic Tool Co. has moved its Milwaukee office from Room 1305, Majestic Building, to Room 1418 in the same building, where more convenient quarters necessitated by the growing business of the company in this district have been obtained.

New York, N. Y.—The A. P. Green Fire Brick Co., of Mexico, Mo., has opened an eastern district sales office in New York City at 30 Church St. Howard C. Thayer, formerly field mechanical engineer for the J. G. White Engineering Corporation at U. S. Nitrate Plant No. 2, is in charge.

Buffalo, N. Y.—Weston & Dodson, coal miners and shippers at Bethlehem, Penn., will locate a branch office here under the management of H. J. Welch, formerly with the Philadelphia & Reading Coal and Iron Co. here. Better control of the firm's Canadian trade is the principal object.

Buffalo, N. Y.—The Penn Canadian Fuel Co. has been organized with principal office in Toronto. B. M. Bremner, of that city, will be managing director. Members of the Weaver Coal Co., of Buffalo, are largely interested in the new organization. A general rail and water coal business will be done.

Columbus, Ohio—The Ohio Board of Administration will soon place contracts for approximately 20,000 tons of Hocking mine-run to be used at the various institutions of the state for the remainder of the fiscal year up to July 1. The H. W. Jenkins Coal Co. was the low bidder at $1.75 at the mines.

Charleston, W. Va.—J. M. Magee and other business men of Pittsburgh have organized the Allegheny Western Mining Co. with an authorized capital of $100,000 to engage in the mining business. The incorporators are J. M. Magee, A. G. Wells, A. B. Coleman, W. St. Clair Childs and Simon Patterson, all of Pittsburgh.

Webster Springs, W. Va.—The Webster Smokeless Coal Co. has filed articles of incorporation with a capital of $150,000 to engage in the development of coal properties in the Webster Springs district. L. C. Anderson, Welch, W. Va.; J. E. Anderson, Cowen, W. Va.; and E. H. Morton, Webster Springs, are the incorporators.

Zanesville, Ohio—The authorized capital of the Kehota Mining Co. has been increased from $1,000,000 to $2,000,000. The concern has developed several large stripping operations and holds other lands to be developed later. The sales end of the business is carried on by the Pittsburgh & Bessemer Coal Co., of Columbus.

Buffalo, N. Y.—The Peabody Coal Co., of Chicago, has taken offices in the Marine Bank Building and placed them in charge of H. P. McCue, for some time located in Pittsburgh as the assistant fuel controller of Canada. The plan is to concentrate the Canadian trade in the one office, both with Pennsylvania and western mines.

Huntington, W. Va.—Huntington citizens are planning for the development of coal lands near Pikesville, in Pike County, Kentucky, and have organized the Pike Coal Co. with an authorized capital of $10,000. The incorporators of the new company are G. W. Pyle, B. N. Pyle, H. C. Simpson, J. F. Vass, E. I. Hofmier, all of Huntington.

New York, N. Y.—During the year ended Dec. 31, 1918, the New York, New Haven & Hartford R. R. carried over its lines 4,030,863 tons of anthracite coal, an increase of 784,520 tons over the previous year; 5,707,299 tons of bituminous, an increase of 1,130,693 tons over the previous year, and 218,057 tons of coke, an increase of 64,525 tons over the previous year.

Gadsden, Ala.—The Blount Mountain Coal and Iron Co. has been incorporated with a capital of $2,000,000 by Chicago interests. It is understood that plans are now in process of formation for the development of a tract comprising approximately 30,000 acres of coal and iron properties in the vicinity of Gadsden. J. J. Burns is president; F. W. Rehbock, vice-president, and A. Fink, secretary-treasurer, all of Chicago, Ill.

Birmingham, Ala.—It is reported that the properties of the Warrior-Pratt Coal Co., at Porter, in the western part of Jefferson County, have been leased to the Sheffield Company, with furnaces located at Sheffield, Ala., and large ore mines in the Russellville district. The company also has beehive coke ovens in Walker County not far distant from the leased properties, which will be available for coking the output of the mines.

Columbus, Ohio—City Purchasing Agent Guthke opened bids Apr. 7 for approximately 7000 tons of nut, pea and slack for the garbage and refuse plants, the municipal light plant and the waterworks department. The Maynard Coal Co. bid $1.53 for Pomeroy Bend coal, guaranteeing 12,200 B.t.u. and taking a discount or premium as the case may be. The contract was awarded to the Maynard Coal Co. The Fletcher-Williams Coal Co. bid $1.44 for Hocking nut, pea and slack.

Louisville, Ky.—A license ordinance recently introduced before the City Council, and which would have taxed all coal brokers, retailers, salesmen, etc., the retailers paying on the basis of volume done per year, was killed in the city council last week, a substitute ordinance being introduced which left the coal men out. This ordinance was framed for the purpose of raising revenue sufficient to meet the loss that will result in city revenue from national prohibition.

Buffalo, N. Y.—The Buffalo office of the Century Coal and Coke Co., of Montreal, announces the consolidation of that company with four Canadian companies—the Quebec Coal and Dock Co., the Toronto Coal and Dock Co., the Port Colborne Coal and Dock Co. and the Northern Dock and Coal Co., of Sault Ste. Marie, Ont.—with capital of $2,500,000, under the name of the Century Coal Co., Ltd. The principal office will be in Montreal as formerly. The leading organizers were Fred McCourt, Dr. W. L. McDougald and Harry F. Butler, of the Century company.

New York, N. Y.—The Railway and Power Equipment Co., Woolworth Building, New York, is planning increased scope of operation. With this in mind it has been incorporated in Delaware with a capital stock of $5,000,000, $3,000,000 common, $2,000,000 7 per cent. cumulative preferred. In addition to the interests of Charles F. Johnson, who has been carrying on the business for about 20 years, it has taken in other interests. Its new work is planned to include engineering and equipment work in any way connected with power, railroads, industrial establishments and contracting in all parts of the world.

St. Louis, Mo.—Because of the unusual heavy coal-shipping conditions which have developed on the Illinois Central R. R. between southern Illinois coal fields and St. Louis, that company has constructed a four-mile double-track extension on this division between Belleville and Wilderman. It is estimated that at least 90 per cent. of southern Illinois coal which is billed to St. Louis is routed over this division.

An organization has been perfected in Franklin County to be known as the Franklin County Mine Examiners' Safety First Association, the object of which is to better mining conditions and urge safety first measures in mining. Resolutions dealing with mining methods were drafted and will be presented to the State Department of Mines and Minerals.

Chicago, Ill.—The American Steam Conveyor Corporation announces the appointment of Charles H. Florandin, formerly of the National Electric and Welding Co., New York, as general manager of its eastern territory with headquarters at the New York office, 110 West 40th St. Mr. Florandin, who assumes charge of his new duties May 1, was born in France and received his technical education at the famous Lycee de Marseilles. He is an engineer by profession and upon coming to the United States did important work with the Brooklyn City Railway Co. in the early days when the road was being electrified. After five years' service with this company, he joined the C & C Electric Co., New York, where he held a responsible position with them for many years.

New York, N. Y.—The Railway and Power Equipment Co., Woolworth Building, New York, has received an inquiry from Belgium for $200,000 worth of machine tools, including lathes, planers, shapers, turning and boring machines, slotters, radial drills, steam hammers, shears, punches and shears, machinery for manufacturing springs, four 16-ton traveling cranes. It also has the following inquiries: 120,000 tons new steel rails for a French colony; five tons of portable track for France; electric power and lighting machinery for Japan; slotters, hammers, presses, cranes, locomotives, for Bombay, India; railway, mining, sugar plantation and factory equipment for Panama; air compressors for Chile; derricks and electrical machinery for Hong Kong, China; contractors' supplies, machinery and equipment for France; machine tools and hammers for England; railroad equipment for Spain; machinery and tools for Antofagasta, South America; a large quantity of electric motors for Bombay, India; machinery and tools for Brazil; railway equipment and machinery for Argentina; three new steam locomotives for Japan; forty pairs of steel car trucks for electric railways for Italy.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Slight Improvement in Bituminous—Production Still Dropping—Better Buying Demand Looked For—Anthracite Situation Is Decidedly Better—Small Sizes Scarce and Prices Being Maintained at Former Levels

ALL things considered, the bituminous coal market shows an improvement over the previous week. Conditions are far from satisfactory, however, the general lack of interest on the part of buyers being still in evidence. The soft-coal mines continue to work on a restricted basis, and the output from the respective operations is merely sufficient to meet the orders on hand. During the week ended Apr. 5 the bituminous mines of the country produced 7,005,000 net tons of coal, which is 455,000 net tons below the production for the week ended Mar. 29 and 2,280,000 net tons below the output for the week of Apr. 6, 1918.

Little progress has been made during the past week in the railroad fuel controversy. It has been announced that the railroad employees are to receive another increase in wages. As practically all the roads are short of funds, this added financial burden will undoubtedly lead to a substantial increase in freight rates. The coal industry is anticipating a stronger market from now on, as many consumers will purchase their coal before the proposed advances go into effect. Quite an active demand is evident for the higher grades of soft coal and prices are being maintained at or near the former Government maximums.

There is a decidedly encouraging improvement in the anthracite situation. Demand has become stronger, and all branches of the industry appear to be busier than they have been for some time. Shipments of anthracite to New England have become stronger as the result of a reduction in waterborne freight rates. Pea coal and the smaller sizes are in much better demand. All of these coals are tightening, and quotations that were being shaded are nearly back to normal.

The output of anthracite during the week ended Apr. 5 is estimated at 1,272,000 net tons, approximately 160,000 net tons below the output recorded during the week preceding and 600,000 net tons lower than the production of the week of Apr. 6, 1918.

WEEKLY COAL PRODUCTION

The observance of Apr. 1 as a miners' holiday tended still further to reduce production of bituminous coal during the week ended Apr. 5, the output being estimated at 7,005,000 net tons. This production is 455,000 net tons below the output the week of Mar. 29 and 2,280,000 net tons below the production for the week of Apr. 6, 1918. The daily average production during the week ended Apr. 5 is estimated at 1,167,000 net tons as compared with 1,382,000 net tons for the calendar year to date, and 1,763,000 net tons for the same period of last year. Estimates for the calendar year to date place the output at 113,329,000 net tons as compared with 144,591,000 net tons for the period Jan. 1 to Apr. 6, 1918.

Production of anthracite in the United States during the week ended Apr. 5 is estimated at 1,272,000 net tons, and is approximately 160,000 net tons below the output recorded during the week preceding. Compared with the corresponding week of last year the current weekly output falls approximately 600,000 tons. The total production of anthracite for the period Jan. 1 to Apr. 5 is estimated at 18,943,000 net tons, as compared with 25,563,000 net tons during the same period of 1918. The daily average for this calendar year to date is 231,000 net tons and falls 81,000 net tons below the daily average of last year, estimated at 312,000 net tons.

The carriers' reports for the week ended Apr. 5 show a decrease in loading in all fields with the exception of western Pennsylvania and the southern West Virginia fields. Decreases which occurred in other fields, with the exception of Ohio and the district including Illinois, Indiana and western Kentucky, were slight, while the decreases in the two fields mentioned were large.

Shipment of bituminous coal from the tidewater harbors to all points during the week ended Apr. 5 is estimated at 470,729 net tons, and while in excess of the tonnage moved during the week ended Mar. 29, estimated at 402,126 net tons, falls considerably behind the movement during the corresponding week of 1918, when the tonnage equaled 698,930 net tons. Improvement in the current week's shipments over the week preceding occurred at all harbors—New York making the greatest gain.

Shipments to New England by tidewater during the week ended Apr. 5 are estimated at 120,162 net tons as compared with 89,166 net tons during the week of Mar. 29. The current week's shipments, however, fall approximately 110,000 net tons below that for the week of Apr. 6, 1918, estimated at 229,278 net tons. Shipments to New England by rail during the current week were not reported.

The production of beehive coke in the United States during the week ended Apr. 5 is estimated at 369,807 net tons as compared with 362,283 net tons during the week preceding and 568,651 net tons during the corresponding week of 1918. During the current week considerable increase occurred in Colorado, Oklahoma and New Mexico compared with the week ended Mar. 29, and is approximately the same as produced in these states during the week ended Apr. 6, 1918. In all other states production was considerably lower than that reported during the corresponding week of last year. The daily average per working day during the week ended Apr. 5 is estimated at 61,635 net tons, as against 77,392 net tons, daily average for the year to date, and 93,547 net tons for the same period for 1918. The total production for the period Jan. 1 to Apr. 6 for this year is estimated at 6,346,135 net tons, and falls approximately one and one-quarter million net tons below the output of last year.

BUSINESS OPINIONS

The Iron Age—The price-fixing wrangle at Washington has halted business in iron and steel. While ostensibly some development from the repeated conferences between the heads of the Industrial Board and the Railroad Administration is awaited, the belief is widespread that confidence in cooperative price maintenance has been shattered. Pig-iron output was 3,090,243 gross tons in March, or 99,685 tons a day, against 2,940,168 tons in February, or 105,006 tons a day. Furnaces active on April 1 were capable of producing 93,165 tons a day, against 101,475 tons a day as the rated capacity active on March 1. Since Dec. 1, 94 furnaces have been blown out.

American Wool and Cotton Reporter—Government auctions and the prospects of the domestic clip are prominent features in the Boston wool market. There is also considerable interest in the London sales. It is expected that at the auctions this week prices will be stronger than ever before. News of the good prices paid at the London sales for wools have had a very strengthening effect on the wool trade in this country. A little more inquiry has been in evidence in the cotton market during the week under review, but actual business with the mills has not increased materially.

Bradstreet's—Ordinary distributive trade stimulated by spring influences, perfect winter wheat crop conditions, extraordinary prices present and prospective for farm produce, past excellent industrial and agricultural earnings and the return of hundreds of thousands of soldiers to private life with money in their pockets, shows further expansion, despite inclement weather and bad roads in some sections, buying from wholesalers for fall is rather more confident and while there are evidences of conservatism due to price reduction talk the reductions so far made are not up to expectations. As for some time past consumptive demand seems to single out lines which have been under the ban of war necessity.

Dry Goods Economist—The call for merchandise is perhaps more insistent in connection with goods whereof the production period is close to that of consumption, such as women's, misses' and children's wear, dress accessories, fancy goods, notions, etc. Nevertheless, in all of the piece goods lines there are evidences of an increased willingness to operate on the part of buyers, due, no doubt, to the reductions in price which have taken place. Raw materials also continue high, cotton in particular having advanced 200 points during the last two weeks. At Government auctions the better grades of wool have brought prices well above the Government's minimum figure.

Marshall Field & Co.—Current wholesale distribution of dry goods is nearly up to the large volume of the corresponding week of 1918. Retail business continues excellent and a great many more merchants were in the market. Road sales for immediate delivery were larger, compared with the same period last year. Orders for fall delivery are being placed in excellent volume, which indicates that merchants now have confidence in the stability of prices named for fall merchandise. Collections were normal.

Atlantic Seaboard

BOSTON

Shippers still short of orders for April and May. Only scattering sales. Higher grades firm all-rail. Railroad fuel still a storm center. A depressing factor in prices of higher volatiles. Light production and conservative selling characteristic of central Pennsylvania. Hampton Roads tonnage very light. Shipping Board rates reduced. Delivered prices named. Large buyers tempering the market. Flirting with oil. Anthracite shipments slow starting. Sundry difficulties. Demand increasing. Retail deliveries show marked improvement.

Bituminous—The market here continues without material change. There is the same dullness and the same general lack of interest on the part of buyers that has been usual for the past six weeks. Through the lack of orders for spot shipment most of the operators are getting out about 50 per cent. of the usual tonnage, and there is little chance that New England will be the means of boosting this any for some weeks to come. There is a good deal of talk in trade circles about the interruptions that are likely to take place in mining and transportation in the fall and winter, but the mild season we have just gone through and the high water that has helped out so many manufacturers have only served to postpone the time for anything like active buying in this territory. All sections are being carefully combed for orders, but reports agree that for May as well as April there will be only a light business.

A few mill buyers are placing orders for limited tonnages for delivery over a period of five or six months, but in the aggregate the volume is small and is not particularly significant. Aside from the few contracts that continue to be made on specialties, there are only scattering sales. There is more faith in the market than was the case a month ago; there is also less disposition to buy the lower-priced medium grades. There is more and more insistence on coals of recognized value and in another two months it is quite likely these will be well sold up.

Prices on the quality coals are being firmly maintained, especially all-rail, and few concessions are heard. This is the wiser course on the part of selling agents, for not infrequently it happens that the higher price will sell coal when other conditions are not so favorable. The weak spot is in the Fairmont district where the railroads seem to be having pretty much their own way. It is only natural that coals in that region will be the last to react to any improved demand, especially in this territory where consumers are so well stocked that for a long time to come their interest will be only in the low-volatile grades from other districts.

Proposals have been submitted the past week to the New Haven road, and on the 17th inst. bids will be received on locomotive fuel for the Boston & Maine. The latter is not as accessible to the Fairmont district as the New Haven, and for that reason is not likely to buy on quite so low a range of prices. A small block of high volatile from central Pennsylvania was rumored to have been bought by the Boston & Maine for April-May delivery at a price very close to $2 per net at the mines. Practically every house in the trade has been invited to submit prices for deliveries over any period to Apr. 1, 1920, although no purchase is likely to be made of any save operators, so great is the pressure from Washington to buy only at first-hand. So long as low prices are quoted on railroad fuel there is not likely to be any marked improvement in buying sentiment.

Many of the larger buyers have been accustomed to wait the results of railroad buying, although it is by no means clear this present season whether railroad purchases will be a sufficient guide. One-third of the bituminous that comes here is of course used by the railroads, and a determined effort is being made to arrange for a large portion of their tonnage to come by the all-rail route. Undoubtedly the railroads will have their way, and once their requirements are arranged for there will be some effect on the volume of commercial coal that it is sought also to bring to this market through all-rail channels. Today the Railroad Administration is certainly a depressing factor: it remains to be seen what will be the effect of purchases it is now proposed to make. The trade is following the controversy with much interest, but the opinion seems to be that price-fixing is now out of the question.

So long, however, as operators in Central Pennsylvania adhere to their policy of light production and conservative selling there are likely to be few weak spots among the coals that most steam-users want to buy. On some of the medium coals there are still prices down to $2.60@2.75 for spot shipment, but there are no sales of any consequence. What market there is seems to show a pronounced tendency toward the higher grades.

Hampton Roads tonnage is also very light. In one day recently there were only five bottoms entered at the piers to load, and practically every agency has heavy accumulations at all the terminals. The export business seems mostly a mirage, unless and until suitable ships are forthcoming at rates that will enable American coals to compete. Aside from the few contracts that shippers have been able to make this season there is little doing on Pocahontas and New River in New England. The Shipping Board has now reduced rates another 50c. on steamers under its operation, making the new rate from Hampton Roads to Boston $2, or $1.75 to Providence. Outside barges are also on a $2 basis, although there have been rumors of a rate as low as $1.75, Norfolk to Boston. Even on this latter rate the smokeless coals are likely to be confined pretty closely to an area within a score of miles or so of the tidewater distributing point.

Certain of the rehandling factors here have made a tentative price of $7.90 per gross ton f.o.b. cars Boston for inland delivery through the year to April next. This makes the cost at Lowell, Mass., for instance, very close to $9, or nearly $1.50 per ton more than high-grade Pennsylvania coals at $3.10 per net ton at the mines. It is doubtful whether the large textiles will make any very comprehensive purchases on the basis referred to. Purchasing agents are tempering the market, and it is still too early to get a line on their probable procedure. Too often have they seen Hampton Roads prices drop between April and July to get much interested in buying at this stage. Then, too, there are several who want to know more about fuel oil. There is every prospect that very large preparations will soon be apparent for handling oil at various points on tidewater.

Bituminous prices at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net ton, as designated:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.80@3.35
Philadelphia, gross tons	4.20@4.90	5.00@5.40
New York, gross tons	4.50@5.25	5.35@5.80
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.65

Georges Creek is quoted at $3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at $4.69@5.14 f.o.b. Norfolk and Newport News, Va., for spot coal. Alongside Boston the present gross ton range would be $7.15@$8.10.

Season prices have been made at $7.90 on cars Boston, for inland delivery.

Anthracite—Somewhat contrary to trade expectation anthracite shipments both all-rail and by water have started very slowly. The mines are now on a full-time basis, but not yet have domestic sizes reached the piers in customary spring volume. Certain sizes are in short supply and the Railroad Administration has further hampered movement by changing instructions as to the type of cars furnished. Port Reading loading is still insisted upon for Philadelphia & Reading railway barges notwithstanding all the delays and hindrances that are plain even to the casual observer. A few barges are loading at Philadelphia, these having come out of the repair yard, and there the customary service is given including the proper screening of the coal. The independent operators are finding it hard to interest retail dealers in their output, for many of the latter have memories of service received in 1917 and 1919.

It is clear, however, that the demand is increasing. Every week that passes without usual spring loadings is just so much handicap on shipments later on. The publicity given to conditions in the anthracite region is causing a much better request from householders, and notwithstanding the present scale of retail prices the dealers in most towns have all the business they can swing with their present stocks and the rate that shipments are now coming forward.

NEW YORK

Anthracite situation shows improvement and dealers look for a brisk spring and summer. Demand is better and consumers show a desire to place orders for immediate delivery. Shipments from local docks delayed by marine strike. Some operators sold up until June 1. More inquiries for bituminous and prospects are encouraging.

Anthracite—Business at this Tidewater market shows a betterment, while reports from inland territory indicate that trade is picking up. There has been an improvement in local conditions which is encouraging. Demand has become stronger and dealers look for an active market as soon as the marine strike is settled. In the meantime all branches of the industry appear to be busier than they were a couple of weeks back. Consumers are placing their orders with the retailers and the latter, if they have the coal in their yards, are making immediate deliveries. This means additional orders for the wholesale dealer.

The reports from the coal fields show that the operators are looking ahead, as orders have been given in many instances for steadier operation of the mines. Some mine owners have orders ahead to keep them busy for a month, while it is claimed some of the smaller operators have sufficient orders for all sizes to keep their plants going full speed until June 1.

Stocks at the loading piers in this harbor show a steady increase and coal is moving freely notwithstanding the harbor tie-up. Some of the large companies have no difficulty in taking care of their customers, either on water deliveries or by rail.

Canadian dealers are sending many orders and additional inquiries to the local trade, with requests for hurry shipments. Similar indications of an active demand come from the west, where it is said consumers are not taking any chances of being found without sufficient anthracite to see them through next winter. The consensus of opinion among the trade is that for the next several months the industry will be active in all branches.

The improvement in the line trade has been decidedly noticeable. Wholesalers have many orders on their books calling for early delivery. Shipments to New England and to points along Long Island Sound have become stronger because of the reduction in water freight rates by some concerns.

Retail dealers report a much heavier receipt of orders from consumers than has been the rule for the past few weeks, but they attribute a great deal of the rush to the fear of consumers that because of the marine strike it would be wise for them to place their orders now rather than wait until later in the season, when because of the demand all over the country there might be a shortage of coal. It also indicates a desire on the part of the consumers to save the May 1 advance.

Pea coal and the smaller sizes are in much better shape than they were a week ago. All of these coals are tightening and quotations which were being shaded are nearly back to normal.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	5.85	7.70
Stove	6.10	7.95
Chestnut	6.20	8.05
Pea	4.80	6.55
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—There has been an improvement in buying here but deliveries have been slow on account of the labor trouble in the harbor. Buyers are in a better frame of mind regarding prices and stocks are considerably reduced. The strike which is now in its seventh week has taken just that many weeks' supply of coal from the local market and consequently bins are nearly bare.

Indications point to a busy market as soon as there is a settlement between the private boat owners and their workers. At present all proposals are off and both sides say they are in the fight to a finish. In the meantime users of coal are running short and it is possible that some of the industries in the Metropolitan district that depend entirely upon receiving their coal supply by water may have to curtail operations or haul the coal from nearby railroad sidings.

Wholesale dealers are pleased by the increase in the number of inquiries being received. Buyers, while interested as usual in the quotations, appear to be just as much if not more interested in the quality of coal to be shipped.

Embargoes on individual shippers have kept stocks at the docks well within the necessary limits, which has enabled all shippers to keep sufficient coal on hand to take care of the necessary requirements of their customers. At the docks on Apr. 9 there were 5170 cars of bituminous standing as compared with 4730 cars a week previous, while the number of cars enroute was 2978 as against 3280 on Apr. 2.

The mines are being operating on about a half-time basis but this seems sufficient to take care of immediate wants. So far there has not been a tendency to stock up but shippers expect that consumers will soon come into the market for larger and more frequent deliveries

The fuel supply for the railroads and the price question continue to agitate the trade. Producers fail to see any reason why the railroads should not purchase their supply of coal at the same price as is charged the industrial or any other consumer.

Quotations for coal for spot delivery or on contract show several changes from those of last week, and are as follows:

	Spot	Contract
South Forks	$2.90 to $3.25	$2.95 to $3.50
Cambria County (good grades)	2.80 to 3.10	2.95 to 3.25
Clearfield County (good grades)	2.65 to 2.95	2.80 to 2.95
Reynoldsville	2.65 to 2.85	2.85 to 2.95
Quemahoning	2.75 to 2.95	2.95 to 3.10
Somerset County (best grades)	2.75 to 2.95	2.95 to 3.10
Somerset County (poorer grades)	2.25 to 2.50	2.50 to 2.75
Western Maryland	2.25 to 2.75	2.50 to 2.75
Fairmont	2.10 to 2.35	2.35 to 2.50
Latrobe	2.10 to 2.25	2.25 to 2.40
Greensburg	2.35 to 2.40	2.35 to 2.60
Westmoreland ¾-in.	2.60 to 2.75	2.65 to 2.75
Westmoreland run-of-mine	2.40 to 2.65	2.40 to 2.65

PHILADELPHIA

Anthracite trade improved. Mines on full working time. Dealers buying heavily. Retailers using advertising methods. Spring business fair, with public in no hurry to buy. Some suggestions of labor trouble. Summer outlook not promising. Stove and nut in good demand, but pea difficult to move. Retail cash plan fails. Bituminous quiet. Good coals in demand. Railroads buying little fuel pending price discussion. Some commercial contracting.

Anthracite—The improvement in market conditions is probably best shown by the change in the working schedules at the collieries. A few weeks ago the big companies were working three days a week and storing some of the production at that. Now they are planning for six full working days a week for the entire month, or at least until some impression can be made on the mass of business that has accumulated so rapidly. Of course, the sudden and changed conditions came about through the announcement on the last day of last week that the Governor of Pennsylvania had been convinced that the operators were justified in the plan of advancing prices 10c. per ton for five months commencing May 1.

Undoubtedly the dealers are buying more coal than they are selling, and it may be that the present rush of business is not as substantial as appears now. Many retailers report receiving only a fair number of orders and that they call for a smaller tonnage than in former years. They claim their customers are evidently basing their supposed requirements on the past winter's consumption, which in all cases was far below normal.

A number of shippers report having about sold their output of egg, stove and chestnut for the month of April, and there is no doubt of it. It is also quite possible that the dealers will be busier in May than during the present month. Talking with several of the largest operators we learn that the prospects, at least up to the middle of June, are good. We are unable, however, to find any in the trade who predict anything but a very dull summer.

Even the smaller operators, those with high-class coal especially, are apparently taking a more optimistic view of market conditions and several have ceased to actively canvass the trade for orders for shipment of family sizes this month. Pea, though, is troublesome to all and will continue to be so until some change is made in the price. Stove and chestnut at a cost of $1.50 and $1.60 are the more economical household sizes, and the public knows it and is accordingly passing pea by.

The large companies are holding firmly to their $4.80 price and storing heavy tonnages of this size. We hear of several of the smaller operators cutting the price on pea, yet without making substantial sales. Pea coal was never bought heavily in the market during the spring months, even when prices were much lower, and it will be interesting to watch developments, for we cannot see now how six days' production can be cared for. The dealers generally realize that something must be done by the operators later in the season to move this size and are buying sparingly, as they believe they may be able later to stock up on this size at a more favorable price. Locally stove coal has the call just now, and while few need business for egg and nut, it is stove that is in the shortest supply in the yards.

The steam trade is being well taken care of now. With the collieries working the entire week the big companies are beginning to receive sufficient buckwheat and rice to meet the current demand, which up to the past week was somewhat short and necessitated taking coal out of storage. One other result of this increased production has naturally been a still further accumulation of barley coal, which is now going into the storage yards in greater volume than ever.

Many of the larger companies are still working on their contracts for steam coal and while many of them have been signed, they have a great number still outstanding. The consumers are in no hurry whatever to sign, as with buckwheat at a price of $3.40 many of them are considering the advisability of turning to bituminous coal, which can now be had on contract terms quite favorable.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.80	Buckwheat	$3.40	$4.45
Egg	5.85	7.70	Rice	2.75	3.65
Stove	6.10	7.95	Boiler	2.50	3.50
Nut	6.20	8.05	Barley	2.25	3.15
Pea	4.80	6.40			

Bituminous—There is no change of any moment in the soft coal trade. All mines are working on a restricted basis, just turning out sufficient coal to meet the orders in hand. The only real demand is for the better coals. The call for these grades still continues actively from New England territory.

Producers receive numerous inquiries from consumers asking in regard to contracts, but in proportion to the amount of business closed it would appear that the consumer is merely "shopping around" in an endeavor to find out the state of the price market. In the cases of contracts that have been closed very few of the buyers are taking the amount of coal asked for in the contracts, as the state of industry in this district is as yet far from satisfactory, although the greatest optimism is expressed that a few months will see a general resumption in all lines.

Prices remain firm and it is only in occasional instances that one hears of any recession. The following table gives a fairly accurate idea of the price situation:

Georges Creek Big Vein	$3.00 @ $3.10
South Fork Miller Vein	2.95 @ 3.10
Clearfield (ordinary)	2.70 @ 2.90
Somerset (ordinary)	2.60 @ 2.80
Fairmont lump (ordinary)	2.40 @ 2.50
Fairmont mine-run	2.20 @ 2.35
Fairmont slack	2.10 @ 2.25

BALTIMORE

Bituminous market remains spotty, with contract making light and offerings in open purchasing considerably off the general contracting price. Gas coals particularly weak. Anthracite men busy and spring orders heavy.

Bituminous—Soft coal is spotty and the tendency is toward weakness. The local market has little to offer in the shape of encouragement for immediate trading. The future holds out great promise, however, and the faith of the coal men in a coming business revival and for a big export when more bottoms are available remains unshattered. While quotations on good coals awheel continue on a mine basis of from 30 to 70 cents off the old Government maximum rates in many cases, there is strong adherence to these prices when quoting on contract. Operators of mines where the better grades of coal are produced refuse to consider any large volume of future business at less than the old maximums, and already some of the mine owners are asking for more.

Gas coals are particularly weak, due to the fact that many war industries that had used the fuel are now out of the market. At times these coals can be bought below the $2 mark, mine basis. Reports from western Maryland and West Virginia operations are to the effect that the daily output is running only to about 40 to 50 per cent. of capacity, and that the tendency is to concentrate on mines producing better grades of coal. The Georges Creek and Upper Potomac regions, in which railroad fuel orders have in the past amounted to 2,000,000 tons annually, are just now barely running.

Anthracite—Hard coal dealers are enjoying a period of happiness. The cut of 40 cents a ton in the winter schedule and of 25 cents additional for ten-day cash payments, has spurred the public to order their coal. Many dealers are rushed, and there is a belief that a large volume of orders will go on the books during April and May. The local outlook—should there be no further freight-rate increase—is that the present retail price list will be maintained until July 1, despite the plan to advance wholesale prices 10 cents a month dating from May 1. In July the retail price will probably be advanced 25 cents a ton to cover advances, and it may be that this price will be the ruling price for next fall and winter. Such a schedule would bring coal to 15 cents per ton cheaper than last winter. The city of Baltimore has asked for bids on 11,000 tons of anthracite, the bids to be opened Apr. 23. Little contracting is reported.

Lake Markets

PITTSBURGH

Operations slightly under 50 per cent. Pittsburgh market holds relatively well. High-grade byproduct and gas coals firm.

Coal-mining operations in the entire Pittsburgh district are showing an average of a trifle under 50 per cent., which is an improvement over operations at some earlier times in the year. The market is hardly as strong as it was a week or a fortnight ago, but it has softened very little. Considering the general unsettlement in the coal trade of the country, and the warm controversy at Washington over prices for railroad fuel and the manner in which purchases should be made, the Pittsburgh coal market is really showing a remarkable degree of strength. This is the more noteworthy by reason of the fact that there is by no means complete coöperation between the producers. For instance, some prominent independent operators openly state that they do not intend to be guided, in their sales policy, by what the leading interest desires or states to be its own policy, while some operators, particularly in the Panhandle district, have freely cut prices to the extent necessary to secure the volume of business they desired.

With all this, the Pittsburgh market maintains a moderately even keel, while as to high-grade coking and gas coal it is absolutely firm at $2.35 for mine-run. Operators admit that these prices may possibly yield in time, but the important fact is that even up to this time they have not yielded. The railroads have not bought a great deal of coal in the Pittsburgh district, and on what they have bought they have paid what should be considered high prices in view of reports from Washington as to the low prices at which coal has been picked up by the Railroad Administration. For Panhandle steam coal, for instance, the Pennsylvania lines are understood to have paid $2.15. There is no regularly quotable market on domestic coal, as transactions are light, and besides this there is a wide range in the quality of coal desired by different retail dealers, some preferring to handle high-grade gas coal while others take decidedly indifferent steam coal, analysis being practically no consideration.

Some leading operators, particularly those with the better grades of coal, are desirous that the old fashion of quoting "Pittsburgh coal" at one price only should be absolutely discarded, and that prices should be quoted according to quality and character. The high-grade coking and gas coals, it is pointed out, ought to be conserved for their proper uses and should command a higher price than ordinary steam coal, while even in steam coal there is quite a range of quality.

We quote the market as follows: Good grade byproduct coal, mine-run, $2.35; high-grade gas coal, mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in.; $2.60@2.70; slack, $2.25@2.35; steam coal, slack, $2@2.10; mine-run, $2@2.35, all net ton at mine, Pittsburgh district. Some high sulphur Connellsville coal has been sold at low prices, but that is altogether outside the district.

TORONTO

Coal business continues generally dull. Consumers ordering from hand to mouth. Toronto dealers organize. Office of fuel controller likely to be continued.

The demand for coal both for domestic and industrial uses continues light, from causes previously indicated, and dealers are doing very little business. The situation has been unchanged for some weeks, orders being merely for temporary requirements as a rule. The public has so far shown little disposition to follow the advice of the Fuel Controller and place their orders early, apparently hoping that prices may fall in spite of assurances to the contrary. With the object of promoting friendly relations, avoiding misunderstandings among the trade and keeping in touch with conditions, the local dealers have organized as the Toronto Coal Dealers' Association with Frank Rogers as president; Charles McGill, vice president; and James Hardy, secretary-treasurer. It is considered altogether probable that in view of the petition of the Canadian Associated Coal Dealers to that effect the Government will continue the office of Fuel Controller for another year.

Quotations for short tons are as follows:

Retail:	
Anthracite egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	8.25
Slack	7.25
Domestic lump	10.00
Cannel	13.00
Wholesale f.o.b. cars at destination:	
Three-quarter lump	6.25
Slack	5.25

BUFFALO

Still waiting for a stir. Slight improvement here and there. Government uncertainty does harm. Anthracite to be short again.

Bituminous—The trade goes on much the same. Jobbers get some orders, but as a rule the consumer reports that he has a month's supply or more. When that is gone there must be more buying, so the trade waits for that. It is a long delay, but it may be made so speedily if the car supply should run short. So the jobbers try to make the most of the situation. They find some improvement, but as a rule the situation does not change. It is likely to be midsummer before trade is good. In fact we may be well satisfied if it comes then.

Much uneasiness is shown over the railroad complications. Sales to the roads are few and payment is uncertain. No very satisfactory trade is possible till the roads are in better shape. While the people here do not say the roads should go back to the old management, the idea is that a firmer basis would be reached if something of the sort were ordered. The emergency is past, and if the plan of handling cars as one body were continued the Government control might go. Then an adjustment on a paying basis could be made. It will never happen now.

Bituminous mining is slow. Some mines are running only about two days a week and none can be said to be really active. This increases the cost of the coal and satisfies nobody. For all that, the mining capacity increases slowly, in the face of such poor prospects.

The firm condition of prices continues. That seems to be the last hope of the trade. If price cutting is increased much the situation will become serious. Some reductions are made, but the coal generally is not good. Quotations remain on the basis of $4.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump; $4.20 for same mine run or slack; $5.65 for smithing and smokeless; $5.60 to $6.10 for cannel; all per net ton, f.o.b. Buffalo.

Anthracite—The demand increases and the supply falls off. Shippers are saying that a shortage next winter is certain. Consumers will not buy fast enough to keep the mines in full operation, and when the fall rush sets in they cannot be run fast enough to meet the demand. It is time that consumers realized this, but only a few do. Already some of the lake shippers are turning all their receipts to the rail and will load no more vessels till navigation opens. The prospect of no sailing till late this month continues.

The prices of anthracite to the Buffalo market remain as follows through April:

	F.o.b. Cars Gross Ton	At Curb Net Ton
Grate	$8.55	$10.25
Egg	8.45	10.20
Stove	8.70	10.10
Chestnut	8.80	10.50
Pea	7.00	9.05
Buckwheat	5.70	7.75

CINCINNATI

Conditions quiet, and no great demand expected in immediate future. Prices being maintained.

The general condition of the coal trade in Cincinnati remains extremely quiet, with the possible exception of the fair demand for steam grades. While the more optimistic dealers describe the market conditions as fair, the majority of them qualify the statement by saying that it is fair, considering all the adverse factors affecting the demand at present, by which they mean the general let-up in industrial pursuits and the early opening of spring, which naturally affects the demand for fuel. Then, too, there is the fact that large quantities of coal were laid in by consumers in the expectation of a severe winter, which failed to materialize, thus leaving coal bins and cellars well stocked. There is every likelihood that this condition will have a serious effect on the demand for domestic grades for the remainder of the spring and summer at least, and that the sales in this branch will be far below normal during the coming season. Prices remain firm, although small producers, in some cases, have taken orders below the market, presumably in order to maintain their organizations.

CLEVELAND

Demand for No. 8 coal for the lake trade is coming out surprisingly strong, and operations in eastern Ohio are rapidly being speeded up. No. 8 ¾-in. lump for lake shipment is holding firm at $2.35 and $2.40 f.o.b. mine, about 25 and 20c. under last year's price, while northern Ohio offerings are as low as $1.90.

Bituminous—Operators in the No. 6 and the No. 8 districts of eastern and southern Ohio evidently are cleaning up their accumulations, for offers of low-grade coal this week have been the most numerous in a long while. Some blocks have been offered at as low as $1.90, and it is believed $1.80 could be done, in a pinch. This is the lowest the bituminous market has sagged since the armistice. High-grade No. 8 ¾-in. lump seems to be plentiful at around $2.20, and some retail dealers claim to have offers of this grade at $2.15 and $2.10. Outside of the block of lake coal that went at $2.35, no more No. 8 ¾-in. lump for the head of the lakes is reported closed. Most No. 8 operators are believed to be holding out for $2.40, though on a large percentage of the early shipments the price is being left for adjustment later.

Operators appear to be completely at sea in regard to railroad buying. That the Railroad Administration will drive a bargain shortly, or rather attempt to drive one, is the general belief. Return of the railroads to their corporate owners is looked for around July 1, and it is assumed that inasmuch as they must be turned back in worse shape physically than they were in when taken over, Railroad Administration officials will seek to offset this partially by low-price contracts for coal and steel rails. Ohio operators are largely dependent upon the railroad fuel business, but appear determined to hold out against a deep cut. A reduction of 20c. in contract railroad fuel is one prediction, and it is the only one hazarded here.

Larger steam-coal users still are flirting with proposals but have not yet done any worth-while buying. Another 30 days, however, will see some fair-sized tonnages contracted for, it is believed. Stock piles are wearing down, and industrial buyers appear only to be awaiting action by the Railroad Administration in order to satisfy themselves as to price. Domestic demand for bituminous, and for anthracite and Pocahontas as well, has faded to virtually nothing. This is to be expected at this time of the year.

Lake Trade—Demand for No. 8 coal for lake shipment has exceeded the hopes of even the most optimistic, and preparations are under way at a number of mines to get on to full-time as soon as possible. By Apr. 20 fully 500,000 tons will have gone over Lake Erie car dumpers, it now appears. Few cargoes, if any, however, will be unloaded at the head of the lakes before May 1. In some quarters there is speculation whether fuel coal put down on the docks last summer will be marked down in price in order to move it. Lake carriers that held winter grain cargoes are being freely moved at Lake Erie ports in order to take on coal cargoes. Insurance rates on coal for the 1919 season have been fixed at 7½c. per 100 tons—the same rate as last season.

Prices of coal, per net ton delivered in Cleveland, are:

Anthracite:	
Egg	$10.85 @ 10.95
Chestnut	11.00 @ 11.15
Grate	10.90 @ 11.05
Stove	10.90 @ 11.05
Pocahontas:	
Lump	7.50
Mine-run	7.20
Domestic Bituminous:	
West Virginia splint	7.05 @ 7.15
No. 8 Pittsburgh	6.10 @ 6.30
Massillon lump	6.90 @ 7.05
Steam coal:	
No. 6 slack	4.40 @ 4.50
No. 8 slack	4.70 @ 4.85
Youghiogheny	4.90 @ 5.05
No. 6 mine-run	4.40 @ 4.50
No. 8 mine-run	4.70 @ 4.85
No. 8, ¾-in	5.35 @ 5.50

DETROIT

With buyers indifferent and sales small in volume, the Detroit market is sluggish.

Bituminous—Complaints are still coming from jobbers and wholesalers that the Detroit market is apparently devoid of a buying demand and that all attempts to arouse interest among customers seem to be without result. In view of the attitude of the buyers and the greatly diminished production of the mines, which is a sequence of similar curtailment of business in other markets, jobbers say that matters are seemingly shaping themselves for development of a serious deficiency in bituminous supply before the end of the year.

Unusually large supplies of bituminous in the reserves of manufacturing plants and the storage yards of the retailers constitute the obstacle which the jobbers encounter in their efforts to sell coal. The manufacturing plants are not burning as much coal as under normal conditions. Their reserves contain accumulations of low-grade coal, and jobbers say there seems to be an unwillingness to place further orders until the stock of inferior quality has been consumed. Among the retailers there is an easing off in domestic demand that causes hesitation in buying, particularly as many of the retailers' stocks not only include much low-grade coal but an undesirably large proportion of small coal, such as slack and mine-run.

Quotations on domestic lump, according to the jobbers, are being made at the Fuel Administration prices, though it is admitted that offerings of mine-run and slack have been made on a basis of $1 a ton or more below the figures named by the Government. In negotiations relating to contracts, the Government prices are quoted.

Anthracite—Even the prospect of an advance in price of anthracite on May 1 appears ineffective to stimulate a broad demand from householders. Orders are largely for small quantities sufficient to fill out stocks until warm weather. Retail dealers are striving to encourage early buying. The supply of prepared sizes seems sufficient for the present needs of buyers.

Lake Trade—Vessel owners and shippers of coal by lake routes show no eagerness to get the movement under way. The mines are sending coal to lake loading docks in fair volume and carriers are being loaded, but few or none of these cargoes will be delivered before the last week in April.

COLUMBUS

The Ohio coal trade continues quiet. Contracting is still held in abeyance to wait for price adjustment. Railroads are in the market for a considerable tonnage. Lake trade will be late in opening.

The coal trade in Ohio continues to show little activity in most directions. Because of the lateness of the season the domestic trade is quiet. Steam business is held up because of uncertainty of quotations and there is little prospect of an early opening of the lake trade. Taking it all in all, the industry is marking time and producers as well as shippers are not anxious to go ahead under present unsettled conditions.

The contract situation remains unchanged. Because of the unsettled price for railroad fuel coupled with the uncertainty of the future, purchasers are not inclined to contract for any large tonnage.

As a result comparatively few contracts have been renewed and there are only few that are close to closing. Some of the agreements leave the price blank to be fixed when quotations are settled. Some lake contracts have been made in the same manner. But when it comes to getting down to signing at a certain figure, many difficulties are encountered. It is true that there are quite a few inquiries received and that some quotations are made, but the main volume of business is held up. There is considerable spot coal to be had at less than Government prices and consequently no one is anxious to contract.

The screenings situation is unchanged. Owing to lack of demand there is no market for screenings and an oversupply is reported from every mining field. This is curtailing the production of lump to a large extent.

The lake trade is not showing much signs of opening. There is a belief that it will not open much before May 15, if at that time. Vessel rates and contracts for lake tonnage are still held up because of uncertainty as to price. Reports show that a considerable tonnage is carried over at the head of the lakes and that there is no desire to hurry matters.

Production is rather low in most of the producing areas of the state. Railroad consumption is not large and factories are not getting back to normal business very fast. Consequently, little increase is anticipated in the near future.

LOUISVILLE

Domestic slightly more draggy, but steam grades in better demand. Inquiries coming freely, and a good deal of contract making being done on steam. Prices firm and stronger.

Domestic grades are somewhat draggier than they have been, if such a thing is possible and the retailer is not doing much business. However, the jobbers and producers are managing to keep fairly busy even without any great rush for domestic, as mine-run for steam use is coming better all the time, and the demand for nut and slack should reach a point shortly where it will be a question of disposing of the resulting lump, instead of a question of disposing of the screenings as has been the case for some months.

Inquiries are coming in freely, and operators are now quoting prices on mine-run and nut and slack for annual delivery, although no one is willing to quote much domestic business. It is felt that unless stocking is taken up by the retailer and domestic consumer that the demand for domestic sizes this fall will exceed the supply, resulting in a market higher than a "cat's back." Prices are quoted on domestic for April, May and June delivery, but beyond that period the average producer or jobber will not take chances.

Mines in eastern Kentucky are reported to be operating on a basis of about 65 per cent., with the western Kentucky mines doing a little better than 50 per cent. of full time.

Coal prices are firmer than they have been, although there is some cheap spot coal being heard of at frequent intervals. Good eastern Kentucky egg and lump is selling in many instances at 25c. a ton over other quotations, this being especially true in some sections of the Harlan, Straight Creek and Jellico districts. As closely as can be ascertained, prices for the state, short ton, including brokerage fee to be deducted if sold through jobber, are as follows:

	Eastern Kentucky	Western Kentucky
Block and egg	$2.85@$3.00	$2.60
Run-of-mine	2.20@ 2.50	2.35
Nut and slack	2.00@ 2.10	2.05

Western Kentucky is doing little price cutting, and while stories are heard relative to nut and slack selling at $1.75 to $1.85, investigation generally proves that there was an error somewhere, or that it was some spot coal that had to be disposed of to escape demurrage. Some eastern Kentucky mine-run is selling as low as $1.90, it is reported, but going out and finding it at that price is something else again.

Inquiries are coming in nicely from the southern railroads, the Southern, Seaboard, Louisville & Nashville, Big Four and any number of Georgia and Alabama roads asking prices. Operators and jobbers are sticking mighty close to former maximum Fuel Administration prices in quotations, and there is no prospect whatever for a wholesale cut in prices this spring.

Several producers and jobbers report that business after May 1 will be all that can be desired, and that today business is better than it was last year. Domestic is a problem, but steam should move. Lake inquiry is opening nicely.

BIRMINGHAM

Domestic coal being readily taken, but steam consumers are manifesting little interest in the market, only caring for current needs. Mines operating on a three- and four-day schedule.

There is a decidedly good tone to the domestic coal market in this district, and distributing agencies report that all the available coal of the best grades in being taken readily, and many dealers are signing contracts for their year's supply. Prepared sizes of the lower grades are also coming into favor, and there is a satisfactory demand for the medium-grade coals. Quotations are as follows per net ton mines:

Big Seam lump	$2.90
Carbon Hill lump and nut	3.15
Corona lump and nut	3.40
Montevallo lump	5.00
Cahaba and Black Creek lump and nut	3.85@4.50

Steam buying is confined to small orders, consumers buying in the spot market not taking more than current requirements. Very little contracting is being done as yet. Inquiries are being received by local sales agencies which give promise of resulting in some large export orders being booked in the near future. The last named Government schedules are still ruling on steam coal, which are as follows per net ton mines:

	Mine-run	Prepared	Screenings
Big Seam	$2.45	$2.75	$2.40
Cahaba and Black Creek	3.45	3.75	3.10
Pratt and Corona	2.85	3.05	2.45

Mines in the Birmingham district, aside from one or two producing high-grade domestic coal and some employing convict labor, are working on a schedule of three and four days per week.

Coke

CONNELLSVILLE

Price level unchanged. Open pig-iron market. Continued decrease in coke production.

The coke market is certainly no stronger as to prices, but it is hardly weaker to any material extent. Possibly the market had already got down as low as it could go, with present costs and with the disposition of operators to curtail production if they cannot get their prices. One difficulty is that blast furnaces are going out so rapidly that it is difficult for coke production to decrease fast enough to maintain the pace. Each week seems to show a slight increase in the rate at which furnaces go out of blast. Whatever may be the outcome of the present uncertainty as to how steel prices are to be made in future, whether the Industrial Board will continue its efforts and whether the Railroad Administration will formally indorse reduced prices if made, the pig-iron trade has already established what it is going to do. It is going to have an open market for pig-iron, prices being allowed to go where they will and furnaces going out of blast whenever they cannot sell their output at a profit. The blast furnaces are used to that sort of thing, having always had an open market prior to the war-time price control, while the steel industry has nearly always had a controlled market. Coke operators are in sympathy with this blast furnace policy, and quite naturally, since an open market developed for coke a few days before Government control came off, while pig-iron remained as a controlled market.

The majority of adjustment contracts were settled for April shipments of furnace coke at $4.25, operators having readily yielded from their original demand of $4.50. Odd lots of furnace coke may readily be picked up at $3.75, involving standard grades, off grades not being salable at all except as fuel. Many producers of standard foundry coke are holding at $5.25, while two or three still quote $6 and one has actually sold a few carloads at $7, to consumers unwilling to change brands. Ordinary foundry coke can be picked up at $4.50, which seems to be the absolute minimum. The market is thus quotable as follows: Furnace, $3.75@4.25; foundry, $4.50@6, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Apr. 5 at 172,350 tons, a decrease of 13,310 tons. Production has continually and sharply decreased, as the Connellsville region experiences a greater decrease in demand than the total decrease in coke consumption, because the byproduct ovens have decreased but little.

Buffalo—It is still impossible to sell fine fuel coke in this market and the commercial grades are as dull as ever. Until the furnaces in this district buy ore for the season's use the coke movement will be light. Furnaces are not running at all strong, though they would have started before this but for the hitch in the iron trade. Connellsville shippers quote 72-hour foundry coke at $7 to $7.25, 48-hour furnace at $6.60 and off grades at $6.10. Vessel owners are getting uneasy, but do not dare to start till ore is offered.

Middle Western

GENERAL REVIEW

Certain amount of buying activity leads to slight improvement in Middle West producing districts. Railroad fuel controversy comes in for much criticism. Increased buying anticipated.

A curious situation has developed; operators and jobbers alike are experiencing the same thing—namely, plenty of orders on Monday and Tuesday, and not an order on Wednesday. Exactly what is to account for this is hard to determine, but the consensus of opinion has it that stock piles are running low, and consequently there is a certain amount of buying. Another opinion is that certain interests are feeling uneasy over the labor situation, and are preparing against the eventual disturbance to the market by buying a three to four weeks' supply.

Taking all things into consideration, the market shows an improvement over previous weeks, although conditions are very far from satisfactory. This small improvement is felt by operators in all the coal-producing districts of the Middle West. The district most benefited, as usual, was southern Illinois, but both the Springfield district and northern Illinois report better markets. The Indiana fields have had a little better running time, especially some of the mines on the Vandalia that have secured railroad orders.

There is considerable, in fact much more than considerable, criticism in these parts against Mr. Redfield and his confreres in the railroad fuel question. It will be remembered that Redfield was connected with the "Eastland" disaster, which took place in the Chicago River some years ago, and that this connection of Mr. Redfield's did anything but add to his reputation. It is felt here that the railroad fuel question has become too serious to leave to politicians, and should be decided by a committee who are familar with at least the basic principles of railroading and coal operating.

On Friday, Apr. 11, the papers all published the news that the railroad employees are to receive another raise in their salaries. Inasmuch as practically all of the roads are hard up for funds, this additional burden added to their shoulders will eventually, and perhaps very shortly, result in a substantial increase in rates. The operators and jobbers are anticipating a stronger coal market from now on, as many people will come into the market to purchase coal before the proposed advances go into effect.

CHICAGO

Pocahontas coal in great demand. Steam situation better. Prices holding up well.

Everything points, at this writing, to a complete reinstatement of high-grade eastern coal in this city. It was reported that one dealer on the North Side sold 500 tons of southern Illinois lump, bought last year, at a loss of approximately $1 per ton, in order to make room in his bins for the eastern coal his trade demanded. Pocahontas coal is in great demand, and it is said that the prepared sizes of this fuel are selling at from $3.50 to $3.75 per ton, f.o.b. mines. This coal takes a rate of $2.60 to Chicago, making Pocahontas, on the whole, a pretty expensive fuel. The public are not taking at all well to the increased cost of anthracite fuel, and, as a direct result, there

has been a good market on coke, and on certain high-grade bituminous coals, which can be used as substitutes for hard coal.

The steam situation appears a trifle better, as there is more demand than last week. Prices, considering everything, are remaining remarkably firm, as but few cuts have been reported, and these, as usual, on inferior grades.

Prices per ton are as follows:

ILLINOIS

Southern Illinois	F.o.b. Mines	Rate to Chicago
Franklin, Saline and Williamson Counties, etc.		
Prepared sizes	$2.55@$2.75	$1.55
Mine-run	2.35@ 2.50	1.55
Screenings	1.85@ 2.20	1.55
Central Illinois		
Springfield District		
Prepared sizes	$2.55@$2.75	$1.32
Mine-run	2.35	1.32
Screenings	2.05	1.32
Northern Illinois		
Prepared sizes	$3.25	$1.24
Mine-run	3.00	1.24
Screenings	2.75	1.24

INDIANA

Clinton 4th Vein District		
Prepared sizes	$2.65@$2.75	$1.27
Mine-run	2.35@ 2.45	1.27
Screenings	2.05@ 2.25	1.27
Knox County Field		
Prepared sizes	$2.65@$2.75	$1.37
Mine-run	2.35@ 2.45	1.37
Screenings	2.05@ 2.25	1.37

MILWAUKEE

Market continues inordinately slow, with little prospect of interesting consumers in supplies for the future. Higher anthracite predicted.

There is absolutely no interest in coal in this part of the country at present, as far as consumers are concerned, and the prospect is that there will be little or no early ordering of fuel supplies by householders. Dealers, however, are naturally concerned as to the future of prices, but they are completely befogged and disinclined to make predictions. It is being advanced that a raise of $1.50 per ton on hard coal is among the possibilities, because of increased mining rates and higher freight charges. The customary advance of 10c. per ton from May to September will combine in the lifting process. On the other hand, it seems to be conceded that bituminous coal will be slightly lower, but no reasons are given for this conclusion except the large stocks on the docks.

Prices for coal and coke of all grades continue unchanged, as follows:

Domestic

Anthracite—	Short Ton
Egg	$12.20
Stove	12.40
Nut	12.50
Pea	11.00
Buckwheat	10.60
Bituminous—	
Pocahontas mine-run	$8.15
Hocking, screened	7.90
Youghiogheny, screened	7.90
Pittsburgh, No. 8, screened	7.90
West Virginia, screened	8.40
Splint, screened	8.40
Kentucky, screened	8.40
Illinois, screened	7.25
Coke—	
Solvay, large sizes	$11.50
Solvay, small sizes	10.25
Smithing	8.40

Steam—

Youghiogheny, Hocking and Pittsburgh	
No. 8, screened	$7.18
No. 8, pile run	6.93
No. 8 screenings	6.68
West Virginia, Kentucky and splint	
Screened	7.68
Pile run	7.43
Screenings	7.18
Illinois and Indiana, screened	6.50
Pile run	6.25
Screenings	6.00
Smithing	7.68

ST. LOUIS

No demand for either steam or domestic. Some little movement of coal to country points, but in a general way the situation is about as quiet as it can be, with little prospect of anything better immediately.

The general spring storage of domestic has not yet started, but there are indications that this will get under way the coming month in pretty fair shape. Little smokeless has come and there is no demand. The demand for smokeless in this territory does not look good for the coming season. As far as Arkansas is concerned, that seems to be even farther away than the smokeless, and it is likely there will be no Arkansas used at all. The price of Arkansas anthracite almost equals the price of Pennsylvania anthracite, and Pennsylvania will always be preferred.

The coke situation is not encouraging. The price is right, but the early buying movement is not under way to the extent that it has made any inroads on the mountainous supply of coke on hand.

In the Standard district some mines are getting one or two days a week on commercial and steam business. There is a slight movement of this coal to the Chicago market, and the railroads are taking some, but in a general way the field is as near shut down as it could possibly be in normal times.

The low prices that prevailed in the Standard field are practically a thing of the past, for from now on the operator must get producing cost or put up an indemnity bond to the mine workers to assure them of their wages. That is practically the ultimatum that has been sent out by Frank Farrington, president of the Mine Workers of Illinois.

In the Mt. Olive district conditions are somewhat better with a greater portion of the tonnage moving north. Prices are being pretty well maintained. This is the only district in southern Illinois that is maintaining the former Government prices.

In the Carterville field of Williamson and Franklin Counties, and also in the Duquoin field, there has been a gradual easing up of orders for domestic sizes, and steam sizes are now in the ascendant. If the demand for domestic sizes continues to ease up it will be only a short time until screenings and the smaller sizes of nut will almost be at a premium. The northern market, however, promises to absorb a good tonnage of early storage coal from this district. If this is the case, the situation will be much easier. Some mines are getting four to five days a week. Others are only getting one or two and some are idle. The railroad tonnage out of this field is light right now, but indications are that this will continue to grow as time goes on.

The prevailing circular at the present time f.o.b. the mines is:

Williamson and Franklin County Association:	Mt. Olive and Staunton		Standard
Lump, egg and nut	$2.75	....	..
Washed Nos. 1 and 2 nut	2.85	....	....
Independent:			
Lump, egg and nut	2.55	2.55 Lump and egg	2.25
Washed Nos. 1 and 2 nut	2.85	.... 2x3 nut	2.00
Mine-run	2.35	2.20	2.00
Screenings	2.20	2.05	1.75
3-in. lump	....	2.30	....
2-in. lump	....	....	2.15
2x6 egg	....	....	2.10

Williamson-Franklin rate to St. Louis is $1.07½; other rates $0.92½.

General Statistics

ANTHRACITE SHIPMENTS FOR MARCH, 1919

The shipments of anthracite for the month of March, as reported to the Anthracite Bureau of Information, amounted to 3,938,908 tons, which exceeded the short month of February, when the shipments were 3,871,932 tons, by only 66,996 tons, or less than 2 per cent.

As compared with March, 1918, when the shipments amounted to 7,276,777 tons, the shipments in March this year showed a decrease of 3,337,869 tons, of 46 per cent. This almost unprecedently low record for March shipments of anthracite was unquestionably due to the holding off of consumers and dealers in making purchases, because of the anticipation of a possible reduction in price on April 1.

The statement issued by the Governor of Pennsylvania Apr. 4 has done much to correct this impression and a decided improvement has already been evinced in business for April, with indications that the demand and shipments will continue to improve during the next few months. The public seems to have taken notice of the warning issued by the United States Fuel Administration that unless consumers and dealers lay in their supplies during the summer months there is serious danger of a shortage of domestic coal next winter.

The shipments by companies were as follows:

	March, 1919	March, 1918	Coal Year, 1918–19	Coal Year, 1917–18
P. & R. Ry	667,229	1,339,051	14,007,057	14,798,496
L. V. R.R.	622,746	1,355,933	13,209,114	14,221,783
C. R.R. of N. J.	309,994	623,611	6,238,053	6,872,635
D. L. & W. R.R.	658,694	1,155,587	10,892,222	12,528,523
D. & H. Co.	671,829	861,253	8,834,560	8,754,115
Penna. R.R.	338,977	519,806	5,094,789	5,643,501
Erie R.R.	451,572	864,968	8,039,908	8,840,579
N. Y. O & W. Ry.	88,116	199,680	1,837,467	2,065,236
L. & N. E. R.R.	129,751	356,888	3,514,587	4,027,499
Total	3,938,908	7,276,777	71,667,757	77,752,315

Coal and Coke Securities

New York Stock Exchange Closing Quotations Apr. 14, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	..
Burns Brothers, Com	(BB)	164	165
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	..
Central Coal & Coke, Pfd	(CK)	63	..
Colorado Fuel & Iron, Com	(CF)	42	43
Colorado Fuel & Iron, Pfd	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	..
Elk Horn Coal, Com	(EH)	27	27½
Elk Horn Coal, Pfd	(EH)	..	47
Island Creek Coal, Com	(ICR)	39	..
Island Creek Coal, Pfd	(ICR)	75	..
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	..
New Central Coal of West Va	(NCC)	5	..
Pittsburgh Coal, Com	(PC)	49	49½
Pittsburgh Coal, Pfd	(PC)	86	87
Pond Creek Coal	(PD)	13	15½
Viginia Iron, Coal & Coke	(VK)	55	58

* Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	....
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	....
Colorado Fuel & Iron, Gen. 5s, 1943	89½	90
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74⅜	74⅞
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	88	88¼
Lehigh Valley Coal, 1st Gtd. 5s, 1933	96	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79¼	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	83½	84⅜
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	86¾	87¼
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	82⅞
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	91	92
Utah Fuel, 1st Sinking Fund 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	85¾



'YE BREAK FAITH WITH THEM WHO DIE
HEY WILL NOT SLEEP,
HO POPPIES GROW IN FLANDERS FIELDS

ement to Coal Age, April 24, 1919.

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COAL AGE

Volume 15 New York, April 24, 1919 Number 17

Meeting the Situation

By Floyd W. Parsons

THERE can be no reversion to the standards of industry prevailing before the war, and few people desire that there should be. The so-called common people—those entirely apart from the capitalistic class—are going to get an increasing share of the good things of life. The chief matter of concern is that the changes which are to bring about these new and desirable results shall proceed in orderly fashion along sound economic lines. Our progress toward a new day must be through evolution and not by revolution.

Our minority class of reactionaries might as well try to stem the ocean's tides as to block the coming of a new era. Aside from the cause of justice, they fail to note that unionism has increased to a point where it only has to become political and fuse with the Socialists to hold the balance of power. It is not the workmen but the employers today who are lingering on the shore of doubt. They are mentally unprepared to meet the changing point of view of their employees. They must be educated out of the belief that industry will some day return to the old basis of "hiring and firing." They will have to learn that the manager of a concern is not the exclusive boss.

The one sure way to feed anarchy is to depress wages without regard to the cost of living. Give us a protracted period of unemployment and state Socialism will come in a hurry. There is but one safe road ahead, and that is the highway of full-time production and satisfactory working relations. Never in our history has it been so necessary for the Government to undertake great national projects, and never has Washington been slower in starting. The Nation is waiting for a stimulus, but Uncle Sam refuses to administer the potion.

The solution of the labor problem is not a thing by itself, but a question of complex nature. The war taught us that money alone will not hold men—companies that paid the highest wages in 1918 had unusually high labor turnovers. The largest turnover in the country was in a steel plant that paid high wages, in addition to giving large bonuses. The second largest turnover recorded was in a shipbuilding yard where record wages were in force.

It was also discovered that "speeding up" does not permanently help production nor hold men. The offers of large rewards resulted in spurts that were always short-lived. Reactions followed with a regularity that was convincing. The managements found that the steady worker is eventually the most valuable. The ideal conditions prevailed in shops where "pride in work" was considered more important than employment "methods." The best records of continuous individual production were in plants where employer and employee worked together, and where there was no suspicion on the part of the workmen that the owner was getting undue profits. It was in such plants that the labor turnover made a highly creditable showing.

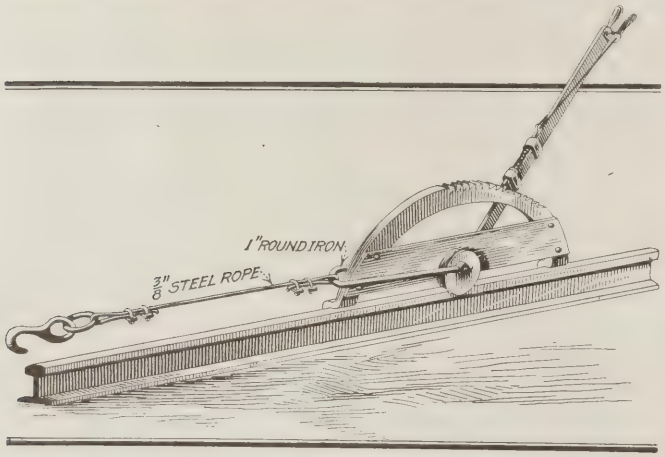
If the war has taught nothing more than that money is not a universal cure-all for labor troubles, it has done some real good. Labor demands a recognized position, and corporations have got to give way to the yearning of their men for a place in industry equal in dignity to that of the employer. Wages may be used as an excuse, but the real fight of labor is a struggle to obtain a recognized position in society.

Let us no longer damn all unionism because a few of its representatives are demagogues. Every movement, no matter how laudable, is likely to occasionally get off the right track. What is required is patience and forbearance, with a complete understanding by capital that unions are results, not causes. We will have peace and plenty instead of boiling discontent when there is a healthy understanding between the parties to industry. The man must not be made to feel that he is the assistant to a machine. He must be permitted in some way to share in the fruits of good work. He must be made to feel that he can wear a white collar without being an object of curiosity to the balance of society.

IDEAS AND SUGGESTIONS

Device for Holding Cars Until They May Be Attached to the Cable

Considerable trouble was experienced at the mouth of a certain mine with the landing of trips and in attaching the trip to the plane rope, especially on snowy and rainy days. Before the little device here shown was devised sprags were used; and when the rails got wet



DEVICE FACILITATES THE HANDLING OF TRIPS

and the cars would slide, sand was necessary in order to prevent them going down the hill. To take out sprags on sand took up too much time. The device finally employed is shown in the accompanying illustration. The grade at the landing is 3 per cent. against the loads, 15 cars to the trip, 4 tons to the car. The cars are steel and weigh 3200 lb. each.

Fiber Rope Little Weakened by Frost

A recent note states that "Frozen Rope Causes Accidents" and that the rope is made brittle by freezing (*Coal Age,* Vol 15, p. 563), adding that the rope is weak. The following quotation from the *Engineering News-Record* justifies all these statements but qualifies the last as to the weakness of the rope.

"A recent test indicates that freezing does not, as has been generally believed, greatly lessen the breaking strength of fiber rope. Four specimens were cut from a 3-in. manila rope. All were spliced at both ends with an 8-in. splice. The length between the splices was 6 ft. Two specimens were soaked in water for 45 min., then exposed to an 18 deg. temperature from 5:30 p.m. to 9:30 a.m. Both were stiff with frost when tested. The other two specimens were kept unfrozen. The elongation, at 50 per cent. of the breaking load was 1¾ in., and at 80 per cent., 2 in. It was the same in all specimens. The breaking strains were, for the frozen rope, 10,000 lb. and 10,900 lb., and for the unfrozen rope 11,000 and 11,300 pounds."

This experiment was conducted by Fred A. Jenks, Plymouth Cordage Co., Plymouth, Mass., to answer an inquiry by the editor. Mr. Jenks comments as follows:

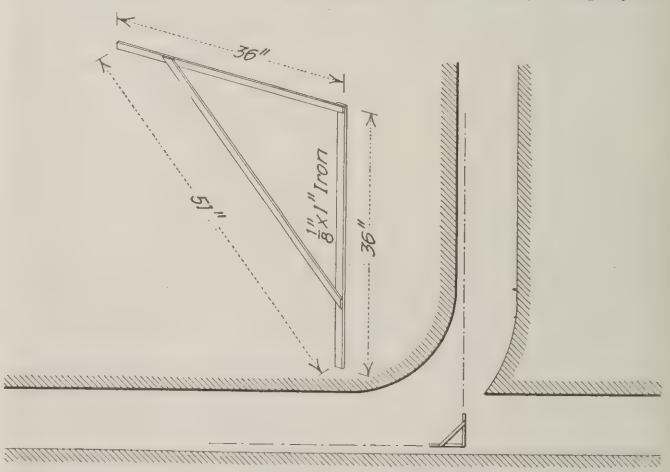
"The results were rather surprising. It was expected that the unfrozen rope would show comparatively a much larger breaking strain. As soon, however, as pull began to be exerted on the frozen rope the frost particles began to break up. After the rope had broken, the portion under stress was absolutely clear of frost, although in the splices, where the strain was on the double, the rope was still somewhat stiff from frost, and the ends of the tucks were completely frozen.

"Between pulling centers there was practically only a damp rope at the time of rupture. The pull had not only broken the frost crystals, but the heat generated by the friction in the strain and breaking of the rope had melted the frost. However, despite the showing made by the tests, everyone who has handled frozen rope knows that it cannot be as easily handled or run as freely over sheaves or used as well over capstans, and that it is much more difficult to secure. These facts alone constitute good reasons for protecting rope from the effects of frost."

Turning Off an Entry Without a Transit

BY GAS INSPECTOR
Worley, Ky.

Many a mining man has been confronted with the problem of no engineer and no instrument, while half a dozen places needed turning off at once to avoid delay and other costly annoyances. The following description covers a method I have followed for many years, one that has proved successful and avoided the delay entailed by waiting for an engineer to arrive. It has proved to be so near correct that no expensive changes had to be made when the transit was finally employed.



METHOD OF USING SQUARE FOR TURNING ENTRIES

This method necessitates the use of a 36-in. square, readily made in the blacksmith shop out of ⅛ in x 1 in. iron, as shown in the diagram.

Sights are taken from the entry back plugs, and by the use of short strings and two plumb bobs the entry line is projected to a point opposite that where it is desired to start advancing, in the new passage. Here

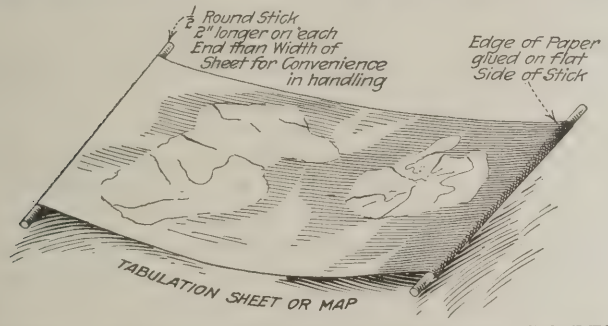
place two knife-point dots on the roof or on a plank, and locate them not over 36 in. apart; then with a chalked string make a straight line from dot to dot; when one arm of the square is placed on this chalk mark a third dot mark at the side and near the end of the other arm gives a right angle. On the second and third dots, or marks, plugs and spads may be placed to direct the new place, be it room or entry.

If the new place is to be an entry, a change can be made in its turning so that it will form an easy curve at the entrance yet still retain the guide of the line established in the manner just described.

Wooden Edge Protector for Maps

By Roy H. Poston

Long maps, blueprints, and charts which require handling soon become frayed or torn unless the edges are protected. Frequently only one copy or set is available, and the destruction or obliteration of it would cause much inconvenience. One method of insuring proper



HOW TO PROTECT THE EDGES OF MAPS AND CHARTS

protection against such possibilities is to glue pieces of half-round wooden stick to the two opposite edges of the print, after the manner shown in the accompanying sketch. This permits the print to be rolled from either end, and thus avoids creases caused by folding, in addition to allowing greater convenience in showing any desired portion of the print.—*Engineering and Mining Journal.*

Why Not Avoid Traverse-Table Troubles?

By R. Dawson Hall

Associate Editor, *Coal Age*

Many traverse-table annoyances are due to the fact that the transit man does not have to traverse his own notes and feels no responsibility in consequence. He could save the officeman a lot of work if he would arrange, as far as possible, that the directions of all courses should lie an even number of degrees off the meridian and that the length of every course should be an even number of feet. Even where some bearings must, in the nature of things, be partly given in both degrees and minutes, and in feet, tenths and hundredths, there is no reason why all the courses should be so contrived. By simplifying the surveys we can save the length of the bearing notes to be entered on mine maps. Such bearings take up not only time in the office but space on the map. They often spoil the appearance and legibility of a mine plot.

The layout of the mine underground can often easily be made a little bit off the true butt and face. In fact the direction of the face is not readily determined. The engineer usually has some face heading running on a known bearing, and he parallels that in another heading when laying out a new mine. It would often be just as easy to make his butt headings run 60 deg. east of north and then half the traversing could be done by mental arithmetic. In any event there is no sense in standardizing on N59°/48′ E or some similar assumption, as likely to be erroneous as it is to be correct.

Much of the time in the office is wasted in trying to reconcile differences in the work of different transitmen or to discover why some one transitman does not arrive twice at the same result. Sometimes the whole series of bearings is corrected to make a survey "close," and new bearings are calculated. This cannot, of course, be entirely avoided, because the mensuration of distances by taping or stadia reading cannot be accurate.

There is no reason, however, why azimuths should not be accurately measured if the transitman will take the necessary care to set his instrument on a steady base, keep his transit in good adjustment, and read azimuthal bearings on the vernier. Mine-property surveys should tie to the minute and should usually close within two feet. They will not necessarily, of course, be correct to that degree as far as distances are concerned. All that a perfect tie shows is a uniformity of error in measurement throughout the length of the line surveyed.

It is a fact, not usually known, that the largest errors in surveying, outside of faulty records, arise not from erratic taping but from mistakes in the mensuration of angles, owing to the shifting of the transit between the fore and rear sights. An indifferent closure means a rerunning of the surveys with a new record of distances and bearings slightly different in azimuth and distance from the first. This makes the calculation in the office slow and burdensome and the record of the survey on the map, a bristle of figures.

Uses for Empty Carbide Cans

By E. P. Humphrey

Upper Lehigh, Penn.

Several uses can be made of the 100-lb. tin carbide containers, instead of throwing them away. They have a small refund value, but when the freight is paid it amounts to practically nothing. One use is to place them in the machine shop so that the machinists can put their turnings and borings into them, one for each kind; and then, when a car of scrap is to be loaded, the filled cans are placed in this car. The blacksmith also should have some for his scrap ends. This practice is not only a great labor saver for the mine or shop operator, but also for the receiver of the car, as it greatly facilitates unloading.

These cans may also find place in the shop, breaker or tipple as receivers for dirty cotton waste and wiping cloths. Some reclaim the cotton waste, and the oil residue is used on gearing. A few cans of this oily waste are handy in the winter time for thawing pipes. A locomotive fire may be easily started with it, saving good waste and oil which the engineer is likely to use in order to secure a quick, sure fire.

Another use lies in substituting the cans as bags for carrying feed to mules in the mines. They can be easily cleaned and dried, and with the screw top are moisture and rat proof. This feature is especially useful in the small mine, where there may be only one mule that is cared for by the driver. The tendency when bags are used as is the ordinary practice is for the feed to get wet and be left out for the rats.

Coal Resources of Western Canada—I

By James White
Assistant to Chairman, Deputy Head, Commission of Conservation, Ottawa, Canada

SYNOPSIS—*British Columbia, Alberta, Saskatchewan and Manitoba together have an actual coal reserve of 412 billion tons and in addition a probable reserve of 781 billion tons. Of the first, 669 million tons in actual reserve is semi-anthracite, the proportion of volatile matter in which is about 12 per cent. The lignites outrange all the other coals, there being 383 billion tons of lignite and sub-bituminous coals in actual reserve. Some of the lignites have nearly 24 per cent. of moisture, of which, however, air drying sometimes largely rids them.*

THE principal fuels of Western Canada[1] are coal, natural gas, petroleum, peat and wood. Electricity, to be generated by water power, will serve, also, as a substitute for fuel. Coal is, of course, much the most important fuel of Western Canada. It ranges in character from the lignite of the prairies to the semi-anthracite of the Rocky Mountains. Many of the following facts are taken from the "Coal Fields and Coal Resources of Canada," by Dr. D. B. Dowling, of the Geological Survey of Canada. Included in these is the statement as to the coal reserves of the provinces that are included in this area. The monograph quoted divides the reserves into two groups.

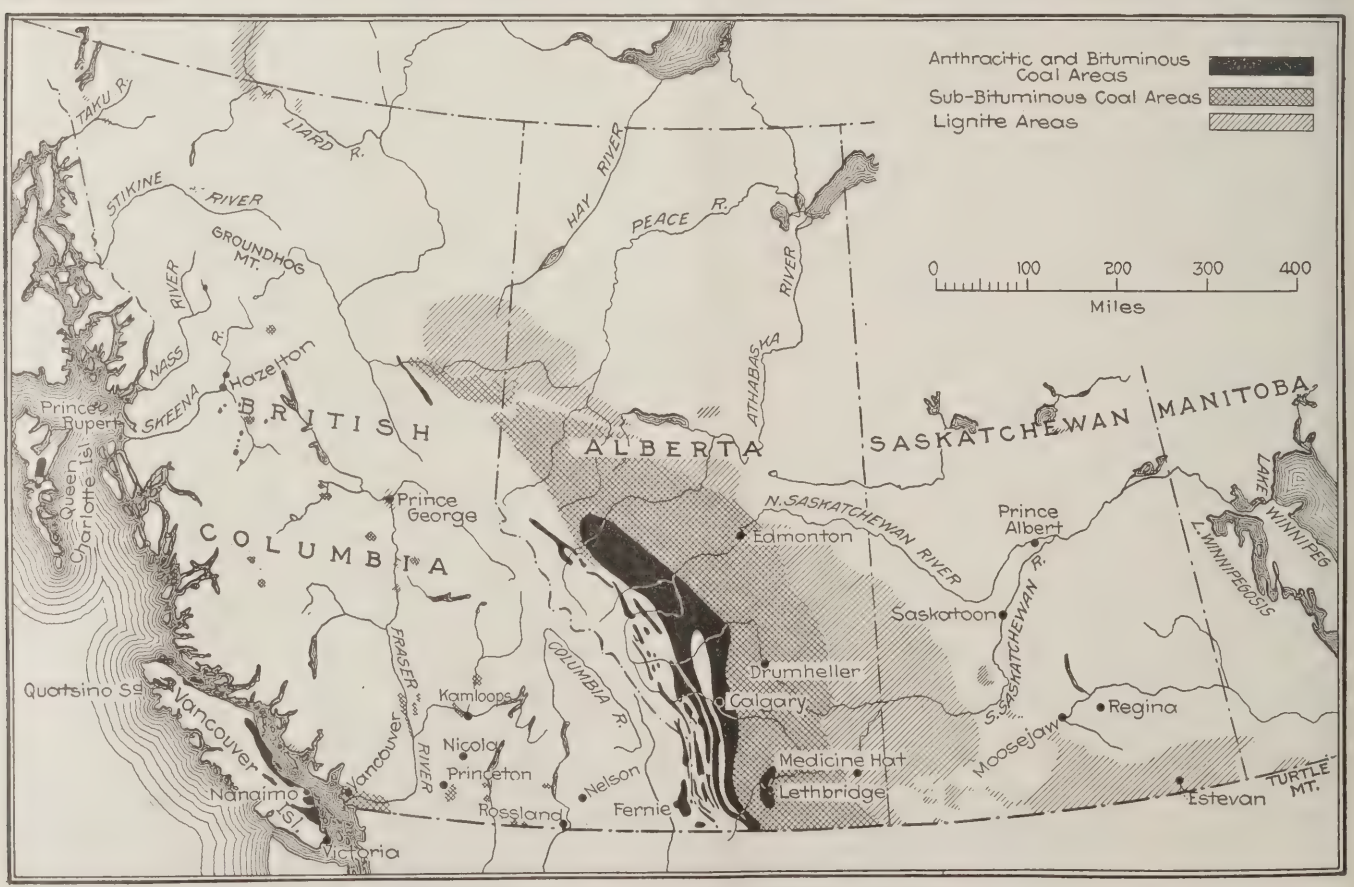
Group I includes all coal found in seams which contain not less than one foot of merchantable coal. However, when any seam occurs more than 4000 ft. below the surface it has been excluded from the calculation. The estimate also includes all the coal in workable submarine areas. This group, Dr. Dowling remarks, includes all the coal of economic value that is contained in seams of workable thickness situated within minable distance of the surface.

Group II includes the coal in seams which contain not less than two feet of merchantable coal wherever such seams occur at depths ranging between 4000 and 6000 ft. Such seams are situated beyond present minable distance of the surface and have not been considered in this paper.

Both groups are subdivided into actual and probable reserves. Actual reserves include coal the amount of which can be calculated with some degree of accuracy, being "based on a knowledge of the actual thickness and extent of the seams." Probable reserves include coal of which "an approximate estimate only" can be made.

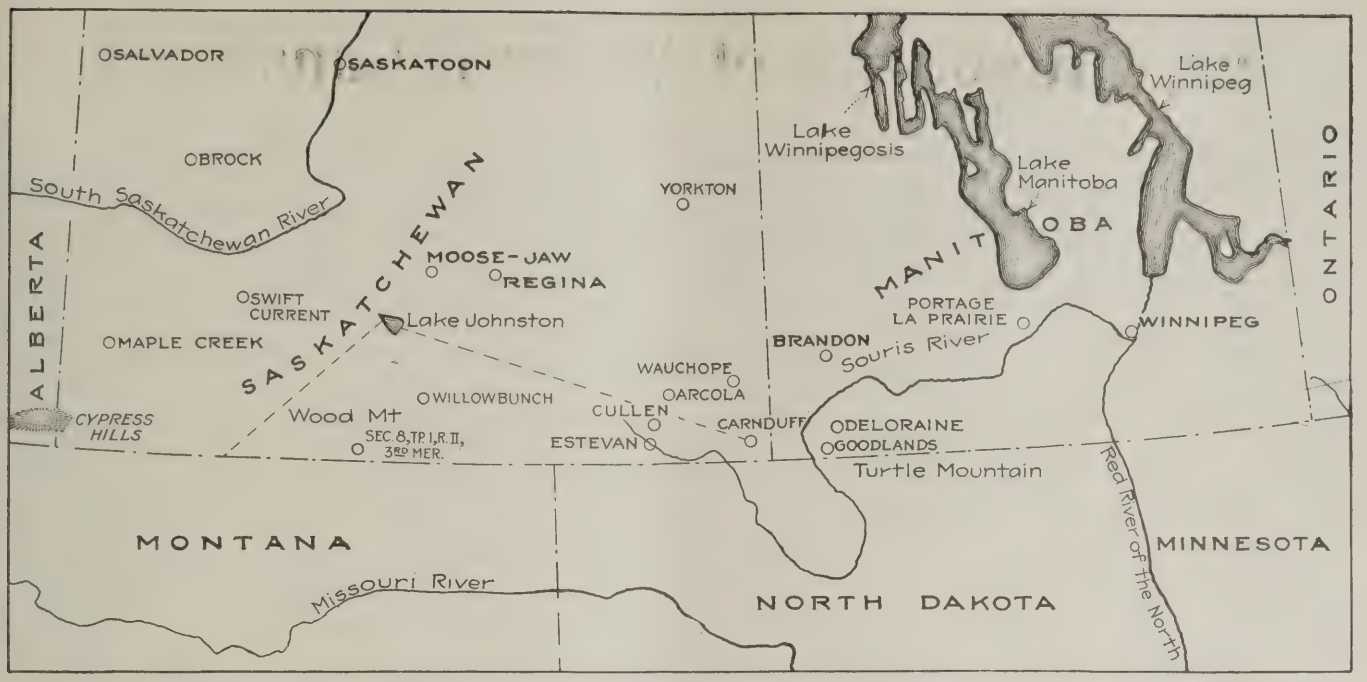
At the present time, to be economically "workable"

[1]For the purposes of this paper Western Canada is taken as including Manitoba, Saskatchewan, Alberta and British Columbia, but not including Yukon or the Northwest Territories. The article is taken from a booklet issued by the Commission of Conservation entitled "Fuels of Western Canada." Everything not relating to coal is eliminated.



DISTRIBUTION OF COAL IN WESTERN CANADA

The areas shown as containing anthracite and bituminous coal include also, in places, sub-bituminous coal and lignite; similarly some of the sub-bituminous areas also contain lignite.



SOUTHERN SASKATCHEWAN AND MANITOBA, SHOWING POINTS MENTIONED IN ARTICLE

a seam must be more than one foot thick, and there is no coal mine in Canada that has a depth approaching 4000 ft., though, in the Crowsnest district, some workings have a "cover" several thousand feet thick. At great depth the greatly increased ventilation required is a matter of expense and difficulty; "creep" and subsidences of strata are unavoidable, and they either crush the coal or render it inaccessible. The capital required for the development of the mine and the current expenditure that its operation demands increases out of all proportion with depth, while the cost of raising water, coal, miners, etc., also advances.

Dr. Dowling's estimate of the coal reserves in Group I is as follows:

TABLE I. ACTUAL COAL RESERVES OF WESTERN CANADA IN MILLIONS OF METRIC TONS [1]

(Calculation based on actual thickness and extent)

	Lignite	Lignitic or Sub-bituminous	Low-Carbon Bituminous	Bituminous and High-Carbon Bituminous	Semi-Anthracite	Total
Saskatchewan	2,412	.....	.....	.....	...	2,412
Alberta	.....	382,500	1,197	2,027	669	386,373[3]
British Columbia	.....	60	118	23,653[2]	...	23,831
Total	2,412	382,560	1,315	25,680	669	412,616[3]

PROBABLE COAL RESERVES OF WESTERN CANADA IN MILLIONS OF METRIC TONS

(Approximate estimate)

	Lignite	Lignitic or Sub-bituminous	Low Carbon Bituminous	Bituminous and High-Carbon Bituminous	Semi-Anthracite	Total
Manitoba	160	.....	.....	.....	...	160
Saskatchewan	57,400	.....	.....	.....	...	57,400
Alberta	26,450	464,821	139,161	43,022[2]	100	673,554
British Columbia	.....	5,136	2,300	42,608[4]	...	50,044
Total	84,010	469,957	141,461	85,630	100	781,158.

[1] Metric ton is equivalent to 2,204.62 lb., practically a long ton. No conversion has been attempted because the figures are not, of course, so absolutely accurate that this course is advisable.
[2] Includes semi-anthracite.
[3] Total after deducting 20 million tons mined in 1911.
[4] Includes 1,800 million tons of cannel.

TOTAL COAL IN WESTERN CANADA (GROUP I)

	Tons	Per Cent.
Manitoba	160,000,000	0.1
Saskatchewan	59,812,000,000	6.1
Alberta	1,059,927,400,000	88.8
British Columbia	73,874,942,000	5.0
Total	1,193,774,342,000	

The classification of coals adopted in this paper is that used in the "Coal Resources of the World," as below:

Anthracite—Fuel ratio,[2] 12 or over; Calorific value, 14,500 to 15,000 B.t.u.; Carbon, 93 to 95 per cent.; Volatile combustible matter, 3 to 5 per cent.

Semi-anthracite—Fuel ratio, 7 to 12; Calorific value, 15,000 to 15,500 B.t.u.; Carbon, 90 to 93 per cent.; Volatile combustible matter, 7 to 12 per cent.

Anthracite and High-carbon Bituminous—Fuel, ratio, 4 to 7; Calorific value, 15,200 to 16,000 B.t.u.; Carbon, 80 to 90 per cent.; Volatile combustible matter, 12 to 15 per cent.; does not readily coke.

Bituminous—Fuel ratio, 1.2 to 7; Calorific value, 14,000 to 16,000 B.t.u.; Carbon, 75 to 90 per cent.; Volatile combustible matter, 12 to 26 per cent.; generally cokes.

Low-carbon Bituminous—Moisture content occasionally reaches 6 per cent.; Volatile matter, up to 35 per cent.; $\frac{\text{Fixed carbon} + \frac{1}{2}\text{ volatile}}{\text{Hygroscopic moisture} + \frac{1}{2}\text{ volatile}} = 2.5$ to 3.3; Calorific value, 12,000 to 14,000 B.t.u.; Carbon, 70 to 80 per cent.; makes porous, tender coke.

Cannel—Yields 30 to 40 per cent. volatile matter on distillation; Calorific value, 12,000 to 16,000 B.t.u.; very porous coke.

Lignite or Sub-bituminous—Generally contains over 6 per cent. of moisture; Moisture, freshly mined, up to 20 per cent.; $\frac{\text{Fixed carbon} + \frac{1}{2}\text{ volatile}}{\text{Hygroscopic moisture} + \frac{1}{2}\text{ volatile}} = 1.8$ to 2.5; Calorific value, 10,000 to 13,000 B.t.u.; Carbon, 60 to 75 per cent.

[2] The fuel ratio is obtained by dividing the percentage of fixed carbon by the percentage of volatile matter.

Lignite—Moisture in commercial output, over 20 per cent.; Calorific value, 7000 to 11,000 B.t.u.; Carbon, 45 to 65 per cent.

MANITOBA

In Manitoba, the Turtle Mountain coal field occupies an area of about 48 square miles. About 1890, an attempt to mine coal was made near Goodlands, but it was unsuccessful, probably because the seams were thin and of poor quality. Coal has also been mined near Deloraine, but only for local use. The insignificance of the production is indicated by the fact that the "Annual Report on the Mineral Production of Canada," published by the Mines Branch, Ottawa, gives no statistics of coal production in Manitoba. The "probable," not "actual," reserves are estimated at 160,000,000 tons of lignite.

Dr. D. B. Dowling states that "the coal horizon does not appear to consist of a series of seams in continuous sheets, but rather of deposits which are limited in extent though repeated over large areas. A thick seam may thus be represented in an adjoining locality by a series of thin seams separated by sheets of sand or clay."

SASKATCHEWAN

In Saskatchewan, two coal-bearing formations are exposed, namely, (1) the Belly formation of the Cretaceous and (2) Tertiary, which is much more important than the Cretaceous, and underlies the Estevan District, Wood Mountain and the Missouri Coteau.[3] The two principal fields are roughly triangular in shape. The latter is bounded on the northeast by a line extending from the vicinity of Carnduff to Johnston lake, on the west by a line thence to the international boundary west of Wood Mountain and on the south by the international boundary. The other field extends from the boundary between Saskatchewan and Alberta to the vicinity of Swift Current and includes the eastern portion of the Cypress Hills.

TABLE II. ANALYSES OF SASKATCHEWAN COALS

District	Moisture Condition*	Loss in Air Drying	Moisture	Volatile Combustible	Fixed Carbon	Ash	B.t.u. per Lb., Gross	Fuel Ratio	Carbon Hydrogen Ratio	Coking Properties	Name of Mine	Authority for Analyses †
Lignite:												
Estevan area...	A.D.	18.4	18.2	32.7	35.4	13.7	7,890	1.10	8.5	Non-coking	Estevan Coal and Brick Co.	Mines Br., B. 24
Estevan area....	A.D.	14.7	18.0	40.2	35.2	6.6	8,770	0.88	8.2	Non-coking	West Dom. Collieries	Mines Br., B. 24
Estevan area...	A.D.	14.0	23.6	31.4	38.6	6.4	.....	1.25	....	Non-coking	Bienfait mine	Mines Br., B. 24
Willowbunch area.....	R.	....	8.5	39.5	35.4	16.6	.....	0.90	....	Non-coking	Waldon mine	Mines Br., B. 24
Wood Mt. area.	R.	....	13.8	38.3	37.3	10.6	.....	0.97	....	Non-coking	Sec. 8, Tp. 1, R. II W. of 3rd Mer.	Mines Br., B. 24

TABLE III. ANALYSES OF ALBERTA COALS

Anthracite:												
Banff, commercial.....	A.D.	0.5	0.5	11.7	75.7	12.1	13,250	6.45	22.0	Non-coking	Bankhead colliery	Mines Br., B. 25
Banff, briquets‡	A.D.	1.8	0.9	17.0	68.0	14.1	12,970	4.00	20.2	Non-coking	Bankhead colliery	Mines Br., B. 25
Bituminous:												
Crowsnest Pass.	A.D.	1.3	0.7	24.9	54.7	19.7	11,640	2.20	16.7	.....	Denison colliery	Mines Br., B. 25
Crowsnest Pass.	A.D.	0.7	0.2	27.6	56.8	15.4	12,370	2.05	16.4	.....	Bellevue Colliery	Mines Br., B. 25
Crowsnest Pass.	A.D.	0.0	1.2	26.0	56.3	16.5	12,330	2.15	14.9	Good coke	Franco-Can. Col.	Mines Br., B. 25
Canmore.....	A.D.	0.0	0.9	14.0	79.7	5.4	14,470	5.70	20.5	Very slight	No. 2 mine, Canmore	Mines Br., B. 25
Brazeau.....	A.D.	1.0	0.9	16.5	70.6	12.0	13,480	4.30	18.7	Poor coke	Brazeau collieries	Mines Br., B. 25
Jasper Park....	A.D.	1.8	0.5	18.8	58.9	21.8	11,790	3.10	17.6	Good coke	Jasper Park collieries	Mines Br., B. 25
Yellowhead Pass	A.D.	1.8	7.5	30.3	54.6	7.6	11,480	1.80	12.9	Non-coking	Pacific Pass colliery	Mines Br., B. 25
Mountain Park.	A.D.	1.4	1.9	30.9	62.9	4.3	14,400	2.05	15.5	Good coke	Mountain Park mine	Mines Br., B. 25
Lignite:												
Pincher Creek...	A.D.	1.2	3.8	28.9	38.7	28.6	9,440	1.35	12.1	.....	Breckenridge & Lund Coal Co.	Mines Br., B. 25
Lethbridge.....	A.D.	0.5	7.9	34.5	47.5	10.1	10,790	1.35	11.3	Non-coking	Galt No. 3 mine	Mines Br., B. 25
Magrath.....	A.D.	0.0	9.6	32.8	47.8	9.8	10,640	1.45	11.9	Non-coking	Chinook Coal Co.	Mines Br., B. 25
Milk River.....	.....	....	5.6	37.8	49.8	6.8	.....	2.81	....	Non-coking	Sec. 2, Tp. 4, R. XIX, W. 4	Geol. Surv., M. 53
Taber.....	A.D.	1.5	11.7	31.8	44.1	12.4	9,750	1.40	10.4	Non-coking	Canada West Co.	Mines Br., B. 25
Bow Island....	.....	....	17.3	30.9	46.3	5.6	9,259	....	....	Non-coking	.....	Pearce.
Medicine Hat..	.....	....	19.9	33.3	41.6	5.2	.....	1.59	....	.....	Stair mine	Geol. Surv., M. 53
Aldersyde.....	A.D.	2.9	10.2	32.7	50.1	7.0	10,660	1.55	11.7	Non-coking	Ellis Bros. No. 1 mine	Mines Br., B. 25
High River.....	.....	....	2.2	34.6	56.4	6.8	.....	3.78	....	.....	Sec. 26, Tp. 19, R. IV, W. 5th	Geol. Surv., M. 53
Drumheller....	A.D.	7.2	8.8	34.6	48.4	8.2	10,350	1.40	11.9	Non-coking	Rosedale mine	Mines Br., B. 25
Big Valley.....	.....	....	12.1	30.0	44.3	8.6	.....	....	....	.....	.....	Pearce.
Brooks.....	.....	....	11.1	38.7	40.9	9.2	.....	1.97	....	.....	Bow river, Horseshoe bend	Geol.Surv. M. 53
Hanna.....	A.D.	4.2	20.8	31.0	42.4	5.8	9,120	1.35	9.4	Non-coking	Wadsworth mine, Hanna	Mines Br., B. 25
Lacombe.....	A.D	7.0	22.7	30.7	38.4	8.2	8,220	1.25	8.6	Non-coking	McCormack mine, Castor	Mines Br., B. 25
Trochu.....	A.D.	2.4	15.3	27.9	48.2	8.6	9,810	1.75	11.2	Non-coking	Halbert mine	Mines Br., B. 25
Three Hills.....	A.D.	0.9	14.3	28.5	48.8	8.4	9,890	1.70	11.0	Non-coking	Wilson mine	Mines Br., B. 25
Carbon.....	.....	....	9.9	34.9	46.6	8.7	.....	2.35	....	.....	Knee Hills creek, R. XXIII	Geol. Surv., M. 53
Battle River....	A.D.	3.1	23.0	28.7	42.3	6.0	8,770	1.45	8.9	Non-coking	Bish mine	Mines Br., B. 25
Camrose.....	....	....	18.3	31.8	44.7	5.1	9,250	....	....	.....	.....	Pearce.
Tofield.....	A.D.	8.7	15.9	34.3	44.2	5.6	9,800	1.30	10.1	Non-coking	Tofield Coal Co.	Mines Br., B. 25
Clover Bar.....	A.D.	9.6	17.6	27.8	46.6	8.0	9,130	1.65	10.2	Non-coking	Clover Bar Coal Co.	Mines Br., B. 25
Edmonton.....	A.D.	5.8	18.2	33.6	38.9	9.3	8,780	1.15	9.0	Non-coking	Strathcona Coal Co.	Mines Br., B. 25
Namao.....	A.D.	4.6	22.1	29.7	43.1	5.1	9,050	1.45	9.2	Non-coking	Comfort Coal Co.	Mines Br., B. 25
Cardiff.....	A.D.	9.6	18.2	31.9	44.6	5.3	9,360	1.40	10.0	Non-coking	Cardiff collieries	Mines Br., B. 25
Wabamun.....	A.D.	2.5	16.8	32.4	45.1	5.7	9,150	1.40	10.8	Non-coking	Security mine, Wabamun	Mines Br., B. 25
Pembina.....	A.D.	6.2	11.5	31.5	46.6	10.4	9,580	1.50	10.8	Non-coking	Pembina mine	Mines Br., B. 25
Peace River....	A.D.	1.6	10.4	32.0	53.8	3.8	11,830	1.70	12.2	Non-coking	Brown's pit, 21-70-10, W. 6	Mines Br., B. 25
	R.	....	1.1	23.0	70.6	5.3	.....	3.05	....	Good coke	Abbott claim, 4-57-7 W. 6	Mines Br., B. 25

* Figures in this column indicate moisture condition. "A.D" indicates that sample analyzed was air-dried: "R" indicates fuel as received.
†"Mines Br., B. 24" or "Mines Br., B. 25" indicates that the analysis was extracted from Bulletin 24, or 25, Mines Branch, Federal Department of Mines. "Geol. Surv. M. 53" indicates that it was obtained from Memoir 53, by D. B. Dowling, Geological Survey of Canada. "Pearce" indicates that the data were obtained from a blue print compiled by William Pearce, Calgary, and are "from various sources believed by the compiler to be reliable."
‡Coal dust briquetted with about 10 per cent. coal tar.

[3] Coteau, a hilly upland adjacent to a river or between two rivers. —Editor.

The Souris Valley is about 120 ft. deep near Estevan and presents peculiarly advantageous conditions for prospecting and for mining the seams that outcrop in its banks and in the tributary gullies and ravines. Though there can be little doubt that enormous areas in Saskatchewan are underlaid by coal seams, the heavy covering of boulder clay conceals their outcrops and, except in occasional rock exposures in the hillsides and stream valleys, their existence can only be determined by boring. At the Estevan mines, most of the coal is produced from the lower measures, the thickness of the mineral at this point being 8 ft. In the western portion of the district, the bed splits up into several small seams; but it is reported that to the northeast it increases to 15 feet.

Lignite has also been reported near Cullen, 16 ft.; Arcola, 14 ft.; Wauchope, 8 ft.; and in a number of localities, particularly in the Wood Mountain and Cypress Hills districts. Coal has been found in borings or natural exposures of rocks of the Belly River formation in the western portion of Saskatchewan, notably at Maple Creek, Brock and Salvador. It carries from 27 to 34 per cent. fixed carbon. Coal carrying 35 per cent. fixed carbon has also been found in the Dakota sandstone (Cretaceous) near lac la Ronge.

It is estimated that, in Saskatchewan, an area of 13,100 square miles is underlaid by coal seams. The "actual" and "probable" reserves of coal aggregate 59,812 million tons, all lignite. The annual production of coal in Saskatchewan during the period 1898-1917 is shown in Table IV.

The output of the mines in the Souris field constitutes 95½ per cent. of the production of the province. The mines at Gladmar and Hart produce about 1½ per cent., the remainder of the output coming from mines that produce less than 1000 tons each per annum.

Alberta

As indicated in Table I the "actual" and "probable" reserves of coal in Alberta are estimated as aggregating 1,059,927 million tons, and constitute 87 per cent. of the coal in Canada. The coal horizons in Alberta are: (1) Edmonton formation, with which may be associated the Paskapoo beds. (2) Belly River formation. (3) Kootenay formation. Coal is found in the Tertiary rocks, but most of the seams are too thin to mine.

Of the total area, 24,779 square miles, occupied by the Edmonton and Paskapoo beds, 22,475 square miles is assumed to be underlaid by coal. The "actual" and "probable" reserves in these beds aggregate 789,600 million tons of lignitic or sub-bituminous coal and 11,358 million tons of low-carbon bituminous. Of the reserves in the Edmonton formation, 98.6 per cent. is lignite or sub-bituminous and 1.4 per cent. is low-carbon bituminous.

TABLE IV. ANNUAL COAL PRODUCTION IN SASKATCHEWAN, 1898–1917

	Tons	Value		Tons	Value
1898	25,000	$37,500	1908	150,556	$253,790
1899	25,000	37,500	1909	192,125	296,339
1900	40,500	60,750	1910	181,156	293,923
1901	45,000	72,000	1911	206,779	347,248
1902	70,400	112,640	1912	225,342	368,135
1903	116,703	169,618	1913	212,897	358,192
1904	124,885	187,021	1914	232,299	374,245
1905	107,596	152,334	1915	240,107	365,246
1906	108,398	164,146	1916	281,300	441,836
1907	151,232	252,437	1917	355,445	662,451

TABLE V. COAL PRODUCTION OF ALBERTA IN THE PERIOD 1898–1917*

	Tons	Value		Tons	Value
1898	315,088	$787,720	1908	1,685,661	$4,127,311
1899	309,600	774,000	1909	1,994,741	4,838,109
1900	311,450	778,625	1910	2,894,469	7,065,736
1901	340,275	850,687	1911	1,511,036	3,979,264
1902	402,819	960,601	1912	3,240,577	8,113,525
1903	495,893	1,117,541	1913	4,014,755	10,418,941
1904	661,732	1,404,524	1914	3,683,015	9,350,392
1905	931,917	1,993,915	1915	3,360,818	8,283,079
1906	1,246,360	2,614,762	1916	4,559,054	11,386,577
1907	1,591,579	3,836,286	1917	4,736,368	14,155,685

* "The Production of Coal and Coke in Canada, During the Calendar Year 1916," p. 29. By John McLeish, Mines Branch, Department of Mines, Ottawa.

The Edmonton formation forms a wide trough lying approximately parallel to the Rockies and extending from the international boundary to about latitude 55° 30′. The central portion of the trough is occupied by Tertiary sandstones.

The "Big" coal seam, which is 25 ft. thick where



ALBERTA, WITH LEADING COAL CENTERS

it outcrops on the North Saskatchewan, consists of two 10-ft. seams near the Grand Trunk Pacific crossing of the Pembina River. It is 10 ft. thick on the Red Deer River near Alix, but decreases to about 5 ft. south of the Bow River.

Another persistent coal horizon is found 500 to 600 ft. below the "Big" seam. At Calgary, where it has been found in a borehole 1800 ft. below the surface, it is 13 ft. thick; near Drumheller it is 6 ft. 10 in. thick; on Battle River it has a thickness of 4 ft. At Edmonton, there are two seams of good domestic coal, each about 6 ft. thick.

The Belly River formation occupies a considerable area in the southeastern portion of the province. The most important seams in this formation are exposed at Lethbridge. At this point, the main seam is 5 ft.

6 in. thick. The probable reserves in the Belly River are: Lignite, 29 per cent.; lignitic or sub-bituminous, 10.5 per cent.; low-carbon bituminous, 60.5 per cent.

The discovery of a 4-ft. and a 7-ft. seam at Maple Creek, at depths of 197 and 292 ft. respectively, indicates that this formation contains workable seams as far east as southern Saskatchewan.

What is assumed to be the "upper" seam has been found at Tofield, at a depth of 1050 ft., and at Edmonton, at a depth of 1400 ft., where it is 6 ft. thick. At Calgary, a 5-ft. seam found at 2562 ft., a 7-ft. seam at 2656 ft. and a 4-ft. seam at 2875 ft. are believed to be in the Belly River formation.

The Kootenay formation is exposed in and near the Rocky Mountains. As a result of the great uplift of the Rockies, the upper measures were denuded and only remnants of the lowest division of the Cretaceous—the Kootenay—survived. These remnants are usually found occupying valleys between the mountain ranges, the mountains having served as a protecting agency. At the same time, the crumpling and folding of the strata during the uplift of the mountains have given us a coal that, in places, is semi-anthracite or is anthracitic. It is estimated that, of the "actual" and "probable" reserves, 1.7 per cent. is semi-anthracite and 98.3 per cent. is high-carbon bituminous or bituminous. The coal in the Kootenay formation is the highest grade found in the Prairie Provinces.

TABLE VI. PRODUCTION OF COAL IN ALBERTA, 1917, BY DISTRICTS

District	Production, Short Tons	Per Cent. of Total
Anthracite:		
Banff	108,225	2.3
Bituminous:		
Crowsnest Pass	1,188,456	25.1
Canmore	196,947	4.2
Brazeau	266,823	5.6
Jasper Park	248,733	5.2
Yellowhead Pass	159,182	3.4
Mountain Park	139,164	2.9
Total bituminous	2,199,305	46.4
Lignite:		
Pincher Creek	4,652	0.1
Lethbridge	614,017	13.0
Magrath	936	...
Milk River	8,047	0.2
Taber	157,373	3.3
Bow Island	6,043	0.1
Medicine Hat	13,975	0.3
Aldersyde	7,076	0.2
High River	1,126	...
Drumheller	631,767	13.3
Big Valley	26,753	0.6
Brooks	9,233	0.2
Hanna	25,670	0.5
Lacombe	16,097	0.3
Trochu	15,023	0.3
Three Hills	22,457	0.5
Carbon	4,301	0.1
Battle River	9,862	0.2
Camrose	56,625	1.2
Tofield	68,806	1.5
Clover Bar	256,208	5.4
Edmonton	121,080	2.6
Namao	18,195	0.4
Cardiff	237,861	5.0
Wabamun	13,534	0.3
Pembina	81,911	1.7
Peace River	210	...
Total lignite	2,428,838	51.3
Total production	4,736,368	....

In Alberta, the three principal seams in the Coleman area have a thickness of 16 ft., 10 ft., and 8 ft. respectively. In the Blairmore area there are seams 10, 17, 3½, 3½, 17 and 6 ft. thick respectively. A seam 20 ft. thick has been reported in the Moose Mountain area. In the Banff area, the coal varies from anthracite to bituminous. In the southeastern portion of the field there is a total thickness of coal of from 41 to 86 ft. At Bankhead, the workings have cut seams 3 ft., 7 ft. (in thin bands), 8 ft., 19 ft. (in two benches), 13 ft. (in three benches) and 6 ft. thick respectively.

In the Bighorn basin, seams aggregating about 60 ft. of workable coal have been found. Seams of 21 ft., 7½ ft. and 4½ ft. are being mined at Mountain Park. Coal is also found in the Kootenay formation at numerous other points in the Rockies and in the foothills. On the Muskeg River, seams 11½ ft., 25 ft. and 7 ft. thick respectively, have been found.

The Chief Inspector of Coal Mines for Alberta states that in 1916 the total sales in Canada of coal produced in Alberta were 4,227,164 tons; that 2,956,205 tons were sold for consumption in Alberta, 1,021,656 tons in Saskatchewan, 98,629 tons in Manitoba, 89,582 tons in British Columbia and 61,092 in the United States.

The total coal production of Alberta, in 1917, was 4,736,368 tons. Of this production, 2,428,838 tons, or 51.3 per cent., was lignite; 2,199,305 tons, or 46.4 per cent., was bituminous; 108,225 tons, or 2.3 per cent., was semi-anthracite.

(To be concluded)

Coal and Oil in Rhode Island

By Kirby Thomas
New York City

A full-fledged oil drilling rig, installed on Connanicutt Island, Narragansett Bay, Rhode Island, is a sight that might well surprise the oil expert and the engineer, yet the fact exists and the conditions of its being are interesting. The American Oil Co., of Boston, successor to several companies formed in recent years to fathom the geological mysteries of the smallest state in the union, erected in 1918 a rig on the eastern shore of the island and drilled to a depth of 2000 ft. for oil. In the previous year, a subsidiary interest, using a Star rig, drilled to 1300 ft., in the same locality.

In both cases the results were negative as to oil, although some interesting data as to the extent and character of the graphitic shale of the area were brought to light. The geological formation drilled is a southerly extension of the coal-bearing horizon in which to the north, at Portsmouth, several years ago the Whitney interests of Boston undertook an ambitious, but ill-fated, operation in coal.

On Connanicutt Island the graphitic shales appear to correspond to the coal measures at Portsmouth; and the drilling, while disclosing no coal measures, confirmed this relation in a general way. The drills were sunk to the underlying basal sandstone and probably through the geological measures which correspond to those in which the Portsmouth coal is found. The strata on the island dip to the west about 45 deg. and appear to be duplicated by a fold or fault between the east and west shores.

This local structure furnished the assumption for a syncline on which the oil experts based their hopes. The strata were all found to be highly metamorphosed.

This oil exploration has had the result of settling the question of whether or not the Portsmouth coal measures would be found in that direction. It is only a few years ago that a company was formed to develop coal on the island on this same property. The American Oil Co. is now planning to develop and operate the graphite deposits and has apparently given up expectations of finding oil.

The New Pittsburgh Station of the Bureau of Mines—II

By George W. Harris
Editorial Staff, "Coal Age"

OPPORTUNITY for research is offered to an unusual degree in all phases of mining and allied fields in this comparatively new bureau, which has attracted many enthusiastic experts and specialists. Their services are directed largely to the working out of special technical problems. While the war lasted the work of the Pittsburgh station was entirely devoted to the demands that were made upon it for assistance on problems connected with war work, but plans are now completed for a return to a peace basis. The organization is being strengthened by a larger personnel, including many of those formerly connected with the Pittsburgh station.

In reviewing the work of the Bureau of Mines during the past two years especial attention should be called to Director Van H. Manning, who on account of rare vision was quite prepared to assist in war work. He saw that sooner or later we would get into the war, and also how it would be possible to merge into war activities—especially gas work. When the time came, the Bureau simply took it up without asking for the assistance of anyone. The slogan was—Is this going to help win the war? If that test could not be met satisfactorily, then the force was put on something that would be of assistance in winning.

G. A. Burrell was placed in charge of war gas investigation; until the war broke out he had charge of gas investigations in the Bureau's laboratory, and was a leading expert in gas work. Various men of the Bureau assisted Mr. Burrell, among whom were A. C. Fieldner, supervising chemist, on testing absorbents for gas masks and the masks themselves; J. W. Paul, chief coal mining engineer (in the early part of the work), on design and tests of gas masks and training of army officers in the use of masks; D. J. Parker, mine safety engineer, in charge of mine rescue work; W. E. Gibbs, the inventor of the Gibbs rescue apparatus, on mechanical design; H. H. Clark, electrical engineer, with his assistants, devoted his time to gas masks and other appliances used in warfare. On the physiological side, Yandell Henderson, a consulting physiologist of the Bureau and the Yale School of Medicine, was called in to organize in his specialty; he was associated with D. J. Parker on matters pertaining to breathing apparatus.



VAN H. MANNING
Director of Bureau of Mines

All the chemical work in connection with the designing and making of the first lot of gas masks, in the early part of the war, was done in Pittsburgh, as was also the testing. The whole problem grew so that the undertaking had to be established in a separate station. Accordingly the American University site in Washington was used, and new buildings were put up in which to carry on the work. The Bureau force was moved down there in September, 1917, and was added to from other sources; when taken over by the War Department in July, 1918, some 1500 men were included and incorporated in the Research Division of Chemical Warfare Service. On the facing page is shown the latest type United States Army Tissot mask, which is pronounced superior to the mouthpiece type largely used in the war and copied from the English model. The United States Army mask is more comfortable to wear, has a larger angle of vision and men are able to fight better with it on than with that of any other make.



D. A. LYON
Supervisor of Stations

Considerable prominence might to advantage be given to the gas mask illustrated, as it is one of the types which will be used in the industries. Furthermore, the Bureau of Mines not only took an active part in its development but expects to follow up the matter in connection with its future usefulness. Therefore a brief description of the mask would be fitting. It consists essentially of a facepiece of rubber backed up with fabric; it carries two eyepieces and a connection for a flexible rubber tubing to a canister of absorbents. The canister is supported in a knapsack slung from the neck. This canister contains a mixture of 60 per cent. charcoal and 40 per cent. soda lime, by volume; there is an inlet valve in the bottom and an exhalation valve on a small metal casting attached to the facepiece. The wearer of this mask breathes through the canister, which filters out poison gases and gives him pure air. This mask is limited as to efficiency to 1 per cent. and less of concentrations of gases; in the case of higher percentages, some of the gases pass through the absorbents. Also, the standard filling in the canister being an alkali is intended to neutralize the acid which is the base of many of the poison gases used in the war. This mask will not replace the rescue breathing apparatus used in mines, around blast furnaces, gas producers or illuminating gas plants. It should not be used in places where oxygen is scarce.

A. C. Fieldner, the authority for the gas mask information, also states that the Bureau of Mines is interested in the problem of a suitable absorbent for carbon monoxide and expects, in the not far distant future, that a suitable canister filling for carbon monoxide will become available. It has its legitimate field, but great caution is necessary in its use. In general no mask should be used in gas unless an expert has first looked into the matter. The Bureau of Mines

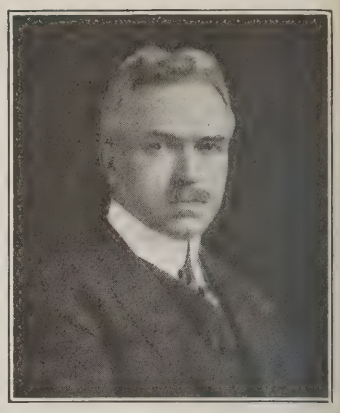
expects to advise in such cases when requested and will approve any mask submitted by manufacturers which will do the work claimed for it. This is similar to the investigations and tests which are now conducted in the case of explosives, lamps and motors. Permissible masks should meet with popular approval.

The explosives laboratory at the Pittsburgh station did a great deal of research work on new military explosives—also on the substitution of other materials which could be used in the manufacture of industrial explosives to satisfy heavy demands. Of course, much of this work done on military explosives will apply to mining; and this same principle will hold true as regards gas mask work also.

The public does not tire of hearing about the war history of our institutions and industrial plants. This should be especially true in regard to the activities of the Bureau of Mines during this trying period. Among the stations of the Bureau the one at Urbana, Ill., was chiefly occupied in the problem of recovery of sulphur from coal brasses (iron pyrites) for use in the manufacture of sulphuric acid. Coal operators would certainly welcome a permanent and satisfactory solution of the problem of the utilization of sulphur found in coal beds. Also here was solved the problem of the utilization of the coals of the middle west for gas manufacture; formerly it was considered that eastern coals were essential for this purpose.

In the State of Washington, fuel oils were shut off as the war absorbed this product, and accordingly a study was made of this situation to show how to utilize the coals of that immediate section to take the place of oil fuel.

It is of interest to know just how each of these stations functions and fits in with the general plan of the Bureau of Mines—each attempts to serve the district in which it is located. The Pittsburgh station is the most important one of the Bureau by reason of its size and the appropriation made for it. By reason of its facilities and staff it can serve the other stations in various ways, such as reference, computing, photographic and analytical work; the smaller stations can undertake much of this work only in a limited way on account of their smaller appropriations. Furthermore, there is a limited demand for such work at any one of the other stations. An endeavor is made to coördinate the work of all so as to prevent any useless duplication and to insure the use of plant and equipment to the fullest extent. In commenting on the field of labor of the Bureau of Mines, emphasis has been placed more or less on the research work of this institution. However, D. A. Lyon, the supervisor of stations, states that the Bureau of Mines is not merely a big research body—that it does the work within its scope. This action is definitely established by an act of Congress—either the prevention of loss of life or the saving of waste. In discussing this point with Mr. Lyon, he stated that if there is any doubt as to the propriety of going ahead in any matter, it is generally easy, if the broad act establishing the Bureau is considered, to determine whether or not a given problem falls within the scope of the work as planned when the Bureau was authorized.



O. P. HOOD
Chief Mechanical Engineer of the Bureau

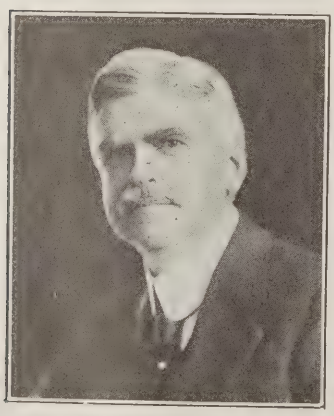


HOW TISSOT MASK IS ADJUSTED

As the Bureau developed it was evident that a field station should be planned so as to be able to coöperate with the commercial establishments and institutions around it. Thus at the Pittsburgh station the idea would be to build up research in coal mining in all its ramifications; those matters naturally claiming attention here would be safety or accident prevention, mining methods, the minimizing of waste, permissible explosives and ventilation problems, among others. But possibly the biggest problem of all is the utilization of coal. Naturally the mining companies encourage the buying of coal—it is the consumer who has in mind its saving; the whole nation is interested in saving fuel and in its most efficient utilization in every industry. But after all the major premise is the life and health of the miner and the prevention of the waste of resources.

The Pittsburgh station is a big institution devoting much of its energy to matters connected with coal and coal mining. It is right and proper that it should do so, as 50 per cent. of our investments are in connection with fuel. The next single item as to investment is iron, representing 24 per cent.; all other metals are a little more than 25 per cent. The Bureau has tried to proportion the work of the stations to the money invested and to meet the needs of all the industries. In a coal sense many of the fuel problems of Pittsburgh are those of the coal fields of the whole country.

Environment has great weight. Dr. Holmes' original idea was to have one big station in the East and another in the West, and other stations distributed over the country, as an act of Congress provides. It is most desirable to have a Bureau station rub elbows with an industry in each particular instance. In the event



GEORGE S. RICE
Chief Mining Engineer of the Bureau

of a laboratory far removed from a practice to be investigated, it would be one thing to read about it and quite another matter to sense the problem by actual contact with the industry. It might be said here that it is not only to save fuel that the Bureau attacks the problems of an industry, but also to discover means of cheapening a process as well.

Professional ethics are strictly observed by the Bureau in its relations with consulting engineers and chemists. This matter is one it has to contend with, and the Bureau observes the rule of not encroaching on the field of the engineer in private practice in a competitive sense. This idea is kept uppermost even if it results in no action being taken toward the solution of problems which distinctly fall within the scope of the Bureau's work. Also if the problem is of a purely limited and local nature, possibly concerning a single individual, then this party is advised to have the matter attended to by his own engineer. But if a problem is one that has not been solved, and it is of a sufficiently broad scope, then the Bureau is glad to undertake its solution.

The new Pittsburgh station of the Bureau of Mines was to be essentially a laboratory for the investigation of coal and iron problems and the practical application of its findings to these industries. Nevertheless, it also was to be in the nature of a clearing house for the other stations throughout the country. It seems to be developing along these broad lines.

(*To be continued*)

Coal and Coke Operations of the United States Steel Corporation

The United States Steel Corporation mined 25,393,155 tons of coal for use in the manufacture of coke, and 6,354,980 tons for steam, gas and all other purposes in 1918, a total of 31,748,135 tons of coal. The annual report for this company for the fiscal year ended Dec. 31, 1918 was made public on Mar. 31. This report also shows that during last year 9,962,403 tons of coke were manufactured in beehive ovens and 7,795,233 tons in the byproduct type, a total of 17,757,636 tons as compared with 17,461,675 tons the previous year.

The total amount expended by the corporation and its subsidiary companies during the year 1918 for safety work was $1,110,064; $998,800 was spent in a similar way in 1917. Compared with results in 1917, the fatal and other serious accidents per 1000 employees showed a decrease of 7.64 per cent.; compared with 1906 there was a decrease of 46.1 per cent. The total amount disbursed by all the corporation companies during 1918 in connection with work accidents was $3,336,459. Of this sum 87 per cent. was paid directly to the injured employees or their families, or in taking care of them. These payments were made either under the corporation's voluntary accident relief plan or under the provisions of the Workmen's Compensation Laws of the several states in which the subsidiary companies are operating.

During 1918 the Steel Corporation acquired the following territory: In Pennsylvania, 117 acres of coking coal and 37 acres of surface were purchased in the Connellsville district; in the Pittsburgh district (Greene County), 14,207 acres of steam coal were bought; in Vermillion county, Illinois, 584 acres of coal land were acquired; 200 acres of coal and 104 acres of surface were purchased in the Black Mountain district of Kentucky. Additional mining and shipping equipment was provided for the Palmer, Dilworth, Maxwell, Gates, Leckrone, Ralph and Ronco mines in the Connellsville district. In the Pocahantas field, West Virginia, 130 tenements were completed, also 169 other houses and a clubhouse; street and sanitary improvements were made at various works.

The number of employees on the coal and coke properties of the corporation during 1918 was 28,378, as compared with 26,189 in 1917. The average salary or wage per employee per day, including general administrative and selling force, was $5.38 in 1918; it was $4.16 in 1917. Employees, to the number of 34,407, or about one-eighth of the total average number of employees in all departments of the corporation, entered the active military and naval service of the United States during the war.

In what is known as the northern coal and coke property, the corporation has 219,205 acres of coking coal, 115,362 acres of steam coal and 80,059 acres of surface. Here there are 71 coke plants, eight of which are equipped with apparatus for the recovery and rectification of benzol; 21,796 beehive and 2558 byproduct ovens are included in this district.

In the corporation's southern coal and coke property there are 190,696 acres of mineral and surface lands; this includes 139,329 acres of mineral only and 13,823 acres of surface only. There are located on developed sections of this property nine coal-mining plants comprising twenty operating mines, producing coal both for shipment and for manufacture into coke. In connection with these coal-mining operations there are ten coal-washing plants and seven coking plants, the latter comprising a total of 2974 beehive coke ovens. At Fairfield, Ala., there is located a byproduct coke works consisting of 280 ovens, with 154 additional ovens under construction to be ready in part by July, 1919. A benzol recovery plant is connected with this byproduct plant.

In the Pennsylvania Connellsville coke region the corporation's subsidiary companies own water-supply plants, consisting of 13 reservoirs and six pumping stations with a distributing system of pipe lines aggregating about 92 miles in length. These plants have a daily capacity of 18,000,000 gal., furnishing water for use in manufacturing coke and, in addition, supplying water to three municipalities.

Nitrogen Decreases with Carbonization

Nitrogen in coal is of uncertain occurrence. In the analyses contained in Bulletin 22 of the Bureau of Mines, the highest content of nitrogen in what is commonly, even though erroneously, called pure coal substance (casting out certain obvious errors in tabulation) is 2.65 per cent. The coal containing this percentage comes from Carbonado, Pierce County, Washington. It is a bituminous coal having 29 per cent. of volatile matter and about 5 per cent. of moisture. The same ash- moisture- and sulphur-free analysis of an extremely anthracitic coal at Portsmouth, R. I., ran only 0.12 per cent. In general the more complete the carbonization the smaller the nitrogen content, but there are several exceptions to this extremely rough rule. It is probably true of any one type of coal that the nitrogen content of so-called pure coal substance decreases with carbonization.

Research and Progress in Byproduct Coking in Great Britain—IV*

By John B. C. Kershaw
Colwyn Bay, Wales

SYNOPSIS—*Coals are usually crushed and mixed before coking, as certain advantages are secured thereby. The proper proportion in which coals of varying quality should be blended has been heretofore the subject of experiment, but it would appear that these data might now be determined in the laboratory. A new byproduct coking plant is briefly described. The moisture content of coal as charged to the oven exerts a potent influence on the amount and quality of byproducts obtained. This influence is particularly strong on the quantity of ammonium sulphate secured.*

THE economic and other advantages of using mixtures of coking and non-coking coals in byproduct ovens have long been recognized in America, and all up-to-date coking plants in the United States are now equipped with coal-crushing and mixing machinery, in order that the various kinds of coal it is desired to employ may be crushed to uniform size and mixed in the proper proportions. This method of improving the yield of coke is also now in use to a considerable extent in England, especially in those districts where non-coking coals high in nitrogen content are mined. In these cases the increased yield of ammonium sulphate obtained more than covers the cost of the crushing, grading and mixing of the coking and non-coking coals.

The method of selecting the coals that will give the best results and deciding what proportion to use in the mixture has been developed along purely empirical lines both in England and America. It is therefore of distinct interest and gain to the byproduct coke industry to find two French chemists, Charpy and Godchot, asserting in a recent contribution to *Comptes Rendus* that it is quite possible by laboratory trials to determine what coals are the best for the purpose, and in what proportions they should be mixed in order to give the hardest coke, under practical conditions.

These two authors, in an earlier contribution to the same journal, described a laboratory method of examining the physical and chemical properties of coke and showed that different varieties of coal, when coked, require different thermal treatment in order to obtain the best results.

In the more recent investigation they have applied the same methods of laboratory examination to mixtures of lean and rich coals, in order to determine whether in this case, also, laboratory methods can be employed to determine the best proportions for coking purposes. Using a temperature of 700 deg. C. (1292 deg. F.) (which was found by preliminary trials to give the best carbonization), and different proportions of "de Brassac" and Durham coals, the results given in Table I were obtained.

The rapid variation in the figures for the resistance of the coke given in the table shows how important it is to make a preliminary study of the best thermal conditions and proper proportions when carbonizing mixed coals. The percentage of "volatile matter" in the two coals used or in the mixture when made (which is sometimes relied upon) is no guide to the quality or hardness of the coke produced.

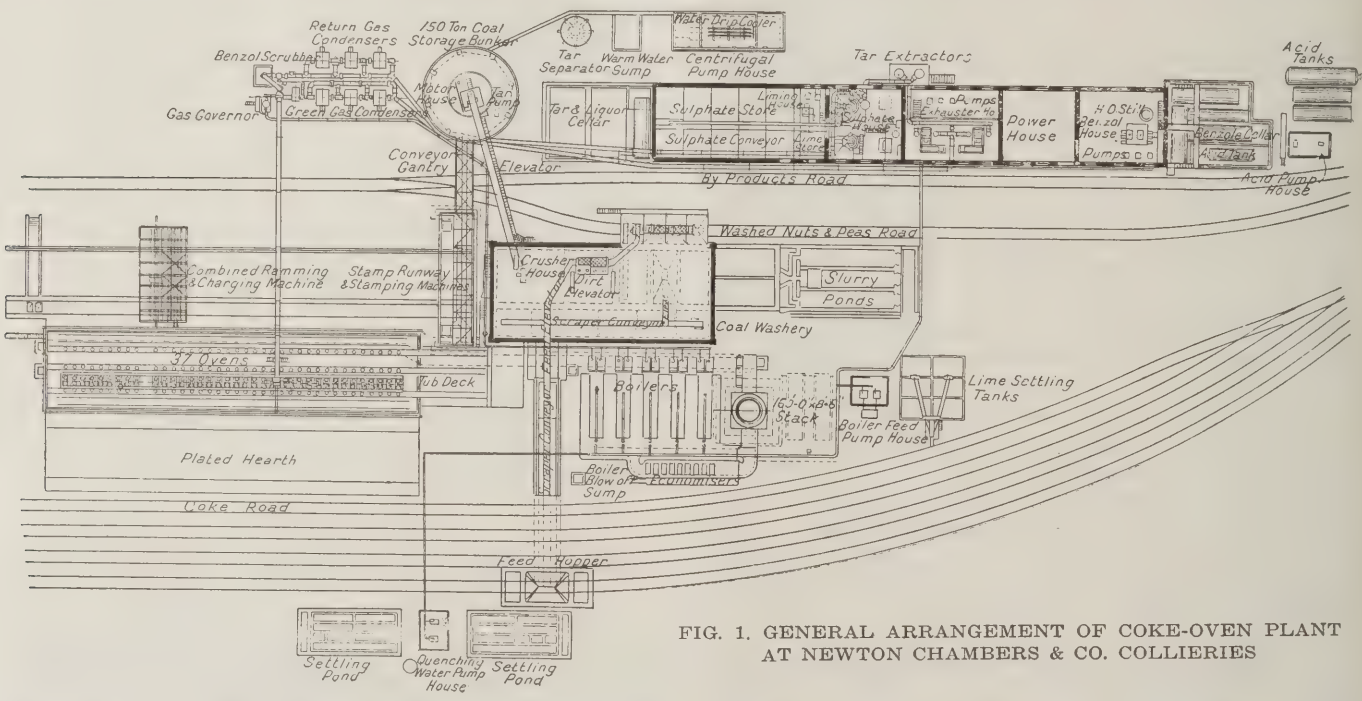


FIG. 1. GENERAL ARRANGEMENT OF COKE-OVEN PLANT AT NEWTON CHAMBERS & CO. COLLIERIES

*The third article of this series was published in *Coal Age*, Nov. 21, 1918.

As an example of this, the best hardness test obtained in the series quoted above corresponded to an average volatile test of 19.60 per cent. Another mixture of Durham and Cardiff coal, however, has given a maximum hardness test for the coke of 1000 lb. per sq.in. with proportions representing only 16 per cent. of volatile matter in the mixture; and when this content was raised to 19 per cent. the coke lost all cohesive properties, and its resistance to crushing fell to zero.

Charpy and Godchot have also investigated the effect of using resins and tar as substitutes for volatile matter, in order to improve the coking properties of

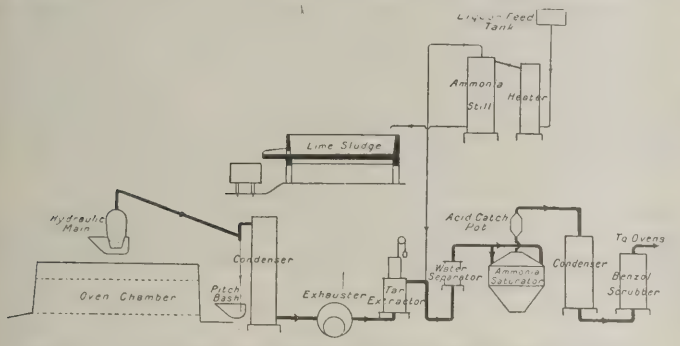


FIG. 2. LAYOUT OF BYPRODUCT RECOVERY PLANT

lean coals. They have found that in both cases remarkable increases in the hardness of the coke can be attained when the correct proportion of the volatile bituminous matter has been ascertained by laboratory trials.

For example, the de Brassac coal referred to above, containing only 11 per cent. of volatile matter, when carbonized with sufficient resinous matter to raise the percentage of volatile in the mixture to 14 per cent., showed a gradually increasing hardness. When the volatile matter reached 28.8 per cent., the hardness test showed 1842 lb. per sq.in. Similar results were obtained by using tar in the carbonizing apparatus.

Finally, Charpy and Godchot investigated the effects of carrying out the carbonization of highly bituminous coals in two stages, the Durham coal used for these tests containing 28.1 per cent. of volatile matter. The first heating was carried out at 450 deg. C. (842 deg. F.) and covered various periods of time. The carbonization was then completed at 700 deg. C. (1292 deg. F.). The results obtained are given in Table II.

The results in Table II prove that a coal which in the natural state is quite useless for producing hard coke, by means of a preliminary heating at 450 deg. C. can be converted into one which will yield a coke of normal quality and hardness.

The importance, therefore, of carrying out preliminary trials with various coals and mixtures, in order to ascertain the best conditions and proportions for carbonization, is emphasized by these tests. The authors claim thus to have indicated a simple and easy method for this purpose. The full text of this valuable

TABLE I. TESTS WITH "DE BRASSAC" AND DURHAM COALS

Test No.	British Durham Coal, with 24 per Cent. Volatile, Parts per 100 in Mixture	French "de Brassac" Coal, with 11 per Cent. Volatile, Parts per 100 in Mixture	Resistance to Crushing of the Coke, in Lb. per Sq.In.
1	20	80	0
2	25	75	292
3	44	56	640
4	51	49	1140
5	56	44	0

TABLE II. CARBONIZATION TESTS OF DURHAM COAL

Preliminary Distillation at 450 Deg. C. Duration, Minutes	Per Cent. Volatile in Residue	Quality and Hardness of Coke Obtained After Final Carbonization at 700 Deg. C.
0	28.1	Coke porous and very friable
30	23.5	Coke porous and very friable
60	22.2	Coke porous and very friable
90	21.4	Coke porous and very friable
105	20.0	Coke hard; mean of 3 tests 583 lb. per sq.in.
120	18.1	Coke hard; mean of 3 tests 1387 lb. per sq.in.
150	16.6	Coke hard; mean of 3 tests 356 lb. per sq.in.
165	14.8	Coke powdery

contribution to the scientific side of coking practice will be found in *Comptes Rendus*, 167 (Aug. 26, 1918), pp. 322-324.

Newton Chambers & Co. has erected recently a battery of 37 coke ovens and a byproduct recovery plant in connection with a blast-furnace installation. As this new equipment embodies many of the latest improvements in the Semet-Solvay type of regenerative byproduct coke oven, it appears worthy of a description.

Fig. 1 shows the general arrangement of the coke-oven plant and Fig. 2 that of the recovery plant. Fig. 3 shows sectional elevations of the oven, both longitudinal and transverse.

The slack used is brought from the firm's own colliery by rail and is dumped into an elevator serving a Baum type of coal washery. This washery separates it into nuts, beans, peas and fine coal, the respective sizes and percentages of these grades, obtained from the unwashed slack, being as follows:

Name	Size, In.	Percentage
Nuts	2 to 1¼	15
Beans	1¼ to ¾	10
Peas	¾ to ⅜	10½
Fine	⅜ to 0	57
Dirt		7½

The washed and graded nuts, beans and peas are delivered into separate bunkers and thence discharged into railroad cars and sold, while the fine coal, amounting to 57 per cent. of the total, is passed on to drainers, then to crushers, and finally arrives at the service bunker of the coke-oven battery. This holds 750 tons, or over two days' supply. This bunker is built of

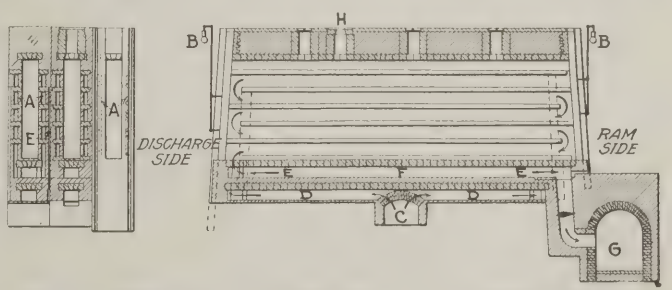


FIG. 3. SECTIONAL ELEVATION OF LATEST TYPE OF SEMET-SOLVAY COKE OVEN

reinforced concrete and is of tank form, with one hoppered outlet.

The washed and disintegrated crushed coal is delivered from this hoppered outlet onto a revolving feed table, from which it is passed by a Robin's belt conveyor to the compression box of the oven-charging machine. This machine is of the combined ramming and charging type and is strongly built, as the ovens are of 12-ton capacity and thus take 50 per cent. larger charges than has been customary hitherto with Semet-Solvay ovens in the United Kingdom. Two stamping machines compress the charge in the box; and by means of an automatic reversing distributor the belt conveyor is

made to deliver its charge over the whole length of the compression box, and thus to promote uniformity in the quality and density of the coke produced.

The ovens are 9 ft. 10 in. high by 36 ft. long, and are of the horizontal flue type, as shown in the sectional elevation, Fig. 3. The air for combustion is preheated to about 300 deg. C. (572 deg. F.) by circulation under the bench of ovens in the flue *C;* and the waste gases from the ovens, with a temperature of 850 to 900 deg. C. (1562 to 1652 deg. F.), are drawn off by the main collecting flue *G* and are used for steam raising, together with the surplus gas from the ovens not required for heating the battery.

The quantity of air supplied to the top burner is greatly in excess of the theoretical quantity required for complete combustion, and this excess is heated in its passage along the flue to a temperature of about 1000 deg. C. (1832 deg. F.) and passes with the burned products into the next flue. Here it provides the free oxygen to burn the gas admitted into the second flue. The excess of air in the burned products from the flue above is such that even in the third and any subsequent burners little additional air is necessary to complete combustion. It is gradually consumed in its second and later traverses, without exceeding in total the theoretical quantity. The burned products make five successive traverses in the heating flues, and as they sweep through the flues, increasing in volume and velocity, combustion is gradually completed, with a minimum of burned products, and with what is claimed to be a very perfect distribution of the heat over the whole surface of the wall.

The gases evolved from the coal in the process of carbonization pass through the outlet in the roof of the oven into the hydraulic main, from which they are drawn, under the influence of an exhauster, through condensers and washing or absorbing apparatus, in which they are deprived of the ammonia, tar and light oils which they contain. Thus dried and purified, the gases are returned by the exhauster to the distributing main *B* to be burned—the main part in the heating flues and the surplus at the boilers.

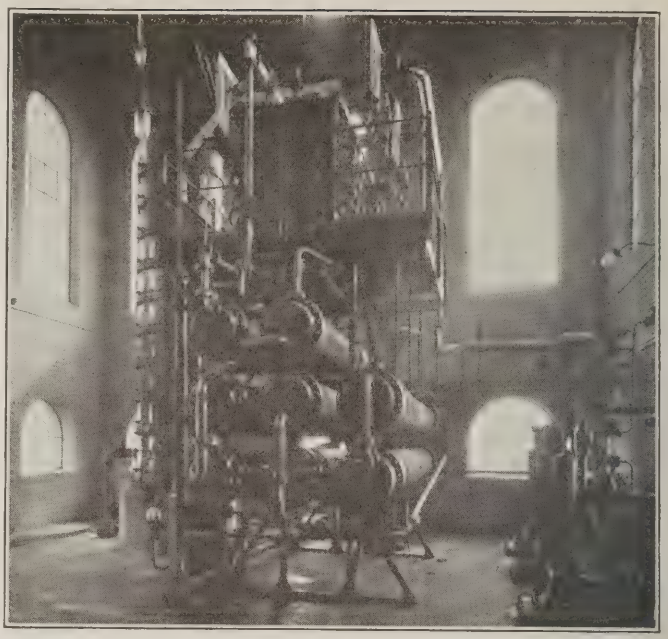


FIG. 4. INTERIOR OF BENZOL RECOVERY PLANT

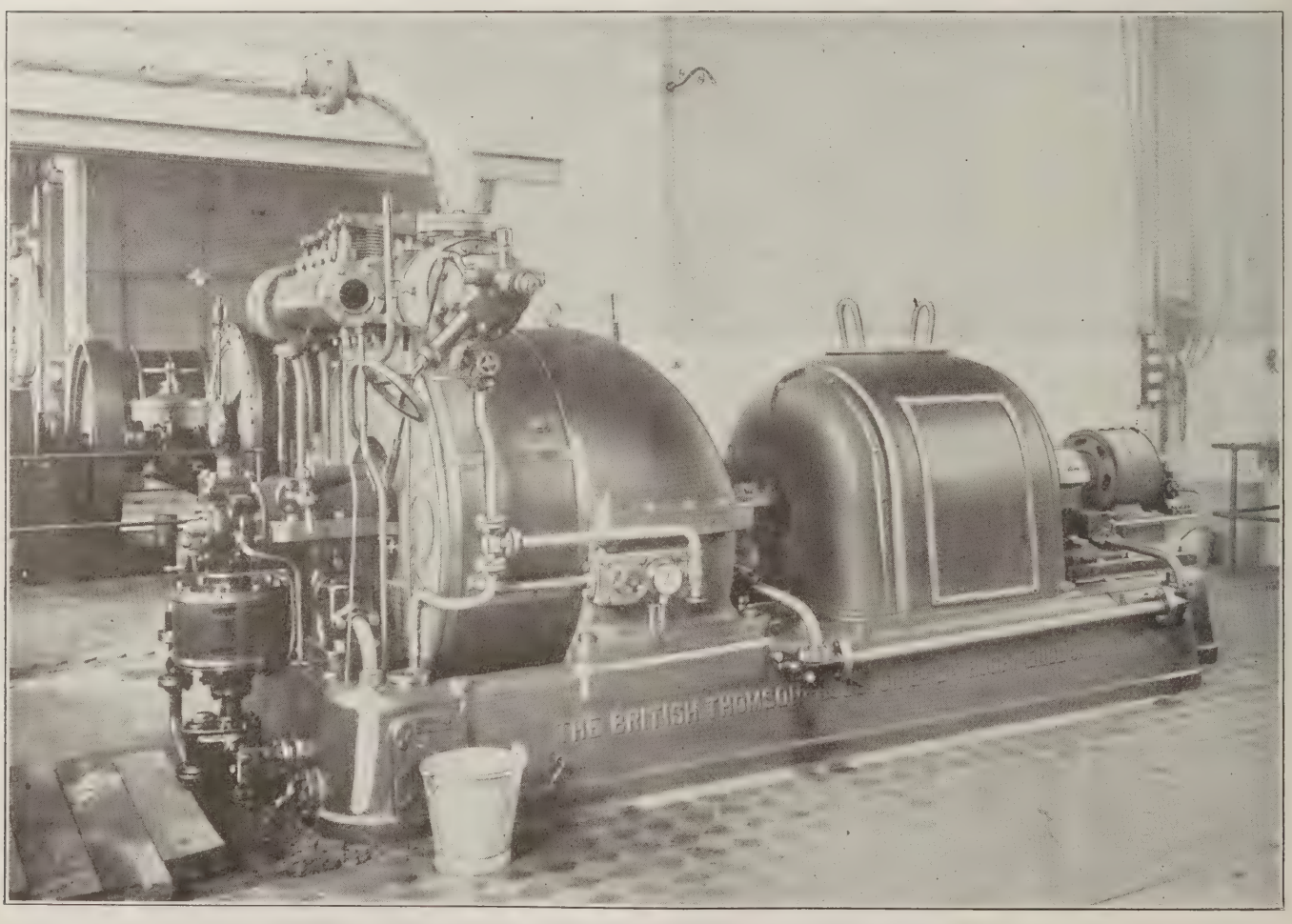


FIG. 5. TURBO-GENERATOR USED AT NEWTON CHAMBERS & CO. PLANT

As regards the capacity of the new plant, it is estimated that as the ovens are of 12 tons capacity and the coking period 34 hours, the output will be 220 tons of coke per day, with corresponding amounts of benzol, ammonium sulphate and other byproducts. The battery of 37 ovens should therefore serve to coke 2200 tons of coal per week (calculated on a dry basis) and the waste gases should raise 26,000 lb. of steam per hour, in the waste-heat utilization portion of the plant. This consists of five double-flued Lancashire boilers equipped with brick-lined fronts and Terbeck burners, and a Green economizer, by which the feed water is raised to 265 deg. F.

Turning now to the arrangement of the recovery plant as shown in Fig. 2—the coke-oven gases are drawn by the exhauster from the hydraulic main, through a series of condensers equipped with horizontal water-cooled tubes, in which they are cooled, and much of the tar and tar water is condensed to liquid form. Only one condenser of the group is shown in the diagram, and only one exhauster. Several condensers and two exhausters are provided, the latter being both steam-driven, although most of the other power required about the plant is provided by an electric generating station.

At this stage the gases are passed through Pelouze and Andouin extractors to remove the last traces of tar mist, and on issuing from these they possess a temperature of about 30 deg. C. (87 deg. F.), and still contain about one-fourth of their original ammonia, the other three-fourths being found in the tar water and liquor. The ammonia is separated from this liquor by distillation with lime. The combined gases, after cooling and equalization of temperature, are passed through a "separator," in order to extract some of the water vapor, and are then bubbled through sulphuric acid in the saturator in order to obtain ammonium sulphate. The crystals of this salt are removed as they are formed, by an air ejector, and after draining are dried by centrifugal action.

The lime liquor that flows from the ammonia stills is allowed to settle in large tanks. The clear liquid is used for quenching the coke while the lime sludge is discharged into wagons and is sold to farmers for agricultural use.

The gases that escape from the saturator, carrying the benzol vapor, have first to be recooled. For this purpose they are passed through a series of six Reutter condensers, equipped in such a way that the cooling water can be used either in parallel or in series. The cooling effect can thus be varied effectively, according to the temperature at which the gases enter the condensers.

The cooled gases are then passed through a Solvay type of benzol scrubber, consisting of a number of tray compartments, the adsorbing oil being fed in at the top and the gases entering the scrubber at the bottom. The effectiveness of this "stripping" operation depends upon the temperature at which the gases enter the scrubber, upon the quality of the wash oil used, and upon the number of tray compartments with which the apparatus is equipped. Good design and management are also necessary to obtain the best results. The benzol is finally separated from the oil in a Solvay type of still, from which oil is returned to the scrubber for further use.

The electrical apparatus that provides all the power and light required consists of a 500-kw. steam turbo-alternator, the turbine being of the three-stage, high-pressure Curtis type, running at 3000 r.p.m. and consuming 20.2 lb. of steam per kilowatt-hour. This figure covers all losses in the generating plant. The

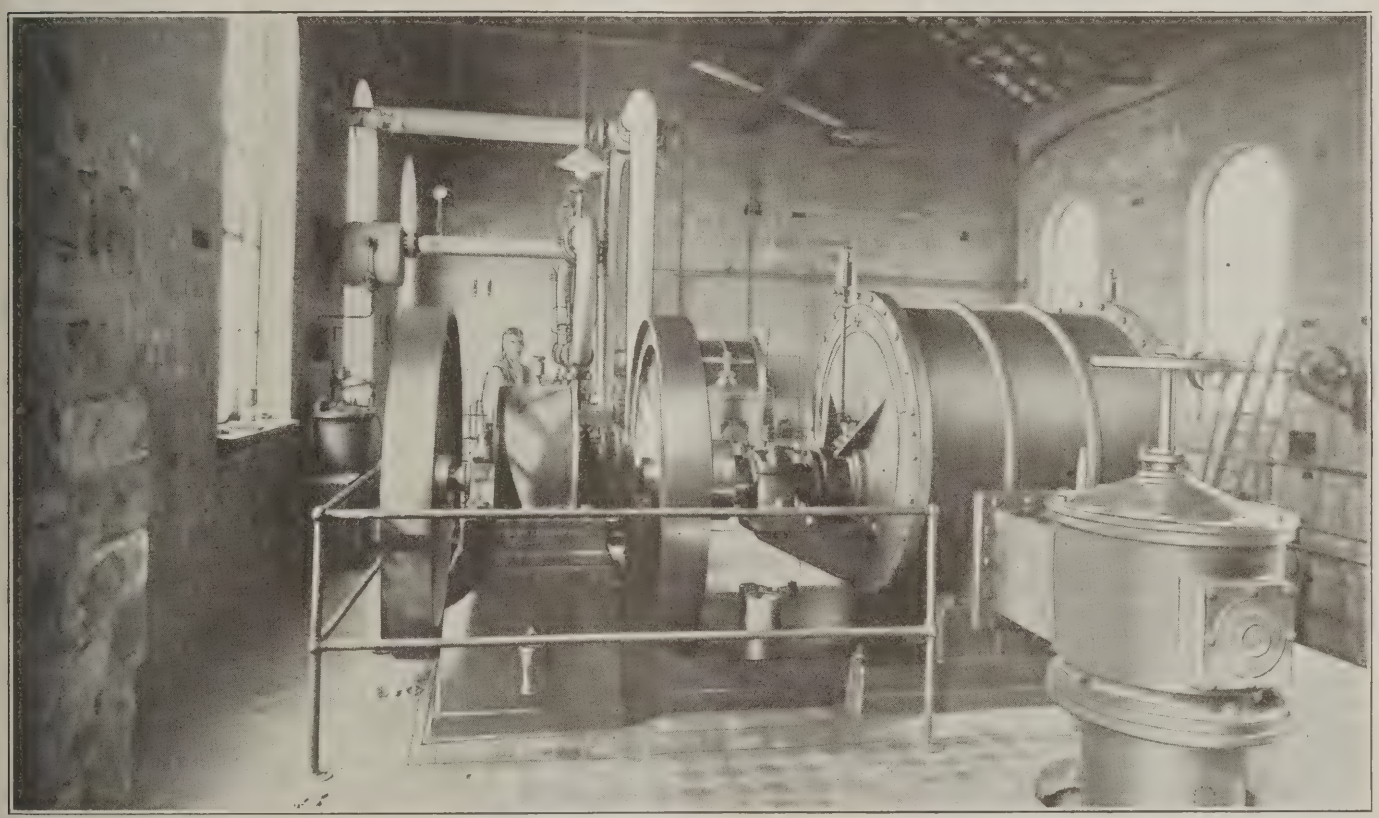


FIG. 6. VIEW OF THE INTERIOR OF THE EXHAUSTER HOUSE

three-phase current is generated at 3300 volts pressure, and is transformed to 550 volts for use in driving the machinery used in the washery and coke-oven plant. Fig. 4 shows the benzol recovery plant, Fig. 5 the turbo-generator and Fig. 6 the exhauster.

The fact that a washed fuel that has been stocked for some time in the open, and thus exposed to atmospheric influences, loses some of its coking qualities has been long known in the coking world. Should the use of stocked coal be necessary, in order to keep any byproduct coke-oven plant in operation, it is better to employ a coal that has not been submitted to a preliminary washing.

The Influence of Moisture upon Byproduct Coking Results

The cause of the greater loss of coking qualities which a washed coal undergoes by storage is the more rapid oxidation change which occurs when the coal is moist, this acceleration of oxidation being caused partly by the higher temperature which reigns in the interior of the stocked heap of coal, and partly by the action of the water in penetrating cracks and crevices of the coal, thus exposing fresh surfaces of the lumps to the action of the air, as the moisture evaporates and the coal breaks into smaller pieces by disintegration.

For immediate use, however, washed coal is better than unwashed for coking purposes, since not only is it possible to reduce the ash and dirt considerably by the process of washing, but this process enables the coke-oven manager to introduce the coal into the coking ovens with the most advantageous amount of water—namely, 9 to 12 per cent. Below 9 per cent., the yield of byproducts is reduced considerably, while above 12 per cent. the loss of heat and damage to the walls of the coke oven are excessive. Coal in its natural condition seldom contains more than 5 per cent. of moisture when delivered to the consumer (unless it happens to come from a very wet mine). It follows that the best percentage of moisture in coal intended for coking purposes, can only be attained by artificial means. A washing plant is therefore a necessary adjunct to the modern coke-oven installation, for in such a case the percentage of moisture in the washed coal is under the control of the coke-oven manager, and by good plant design and management it is possible to have always a good supply of washed coal on hand testing between 9 and 12 per cent. of moisture.

If coal is left too long after washing the moisture will drain away and the washed fuel will show only 5 per cent. or less of water, so that care and organization are required if the coal when charged into the ovens is to test within the limits named above. As proof that a washed slack, if left to drain, will dry down to quite a low percentage of moisture, the following tests made in my own laboratory, upon washed fuels from the South Yorkshire coal field may be quoted:

No. of Sample	Percentage of Moisture	Percentage of Ash	Calorific Values of Dry Fuel
1	4.70	3.30	14,787
2	2.05	5.50	14,626
3	1.83	4.85	14,637
4	2.75	3.25	15,048
5	5.73	5.80	14,387
6	5.10	5.70	14,385

With regard to the effects of moisture upon the yield of byproducts, the explanation for a higher yield of ammonia appears to be that the larger amount of moisture to be evaporated keeps down the oven temperature and thus prevents decomposition of the ammonia by heat; and that the moisture evaporated condenses with the tar and washes the ammonia salts out of it during its condensation to liquid form.

Two other advantages of charging into the ovens coal containing from 9 to 12 per cent. of moisture are that it is then easier to obtain compressed cakes or blocks of sufficient strength to resist the mechanical stresses of charging; and also that the heat of the oven during the charging operation is expended in drying the outer layers of the block, and there is consequently less escape and loss of gas than when a drier coal is employed for charging the ovens.

As regards the best method of sampling and testing the coal for moisture, it is necessary to point out that to obtain an accurate sample of a large heap of wet fuel is not at all an easy matter, and that the results of the test when obtained are only approximate. The most reliable sample can of course be obtained when the coal is being stamped into the box of the charging machine.

If the coal is sampled from the heap or from storage bunkers, it will be necessary to take quite a large number of shovelfuls from various parts of the heap or bunker, and to follow in general the plan of sampling, described in the Bureau of Mines Bulletin No. 116, on this subject.

It will also be necessary to quickly crush the sample of the fuel so obtained down to pea size. One pound of this rough sample should then be weighed out upon a tarred soup plate or other container and be placed under cover in some warm place such as upon some part of the brickwork of a boiler setting, where the plate and its contents will attain a temperature of 110 deg. C. (230 deg. F.) and with frequent turning over of the fuel kept at that temperature for 2 hours. The loss of weight in grams, divided by the factor 4.54, will give the percentage of moisture yet remaining in the sample being tested.

After some experience in the rate at which the stock of each class of washed fuel drains and dries, the coke-oven manager will be able to tell, to within 1 to 2 per cent., when the coal is ready for use. The appearance of wetness varies greatly with different coals, and a determination of the moisture (as described above) is the only really safe indication of the amount of water actually present in the fuel at the time of charging.

Large Tonnage of Pyrite Available

A production of 1,456,000 tons of coal pyrite could be made available in the East and Middle West if a price of 20c. per unit could be obtained for the material f.o.b. at the mines. The estimate, made by the Bureau of Mines, covers only recoverable pyrite with a sulphur content of more than 40 per cent. and includes only those mines that could produce 1 per cent. or more of their coal production as coal pyrite. The estimate is divided as follows:

	Tons per Year
Kansas	125,000
Missouri	175,000
Iowa	140,000
Illinois	238,000
Indiana	250,000
Kentucky	25,000
Tennessee	56,000
Michigan	12,000
Ohio	235,000
Pennsylvania	200,000
Total	1,456,000

Comparison of Bituminous and Anthracite Statistics for Pennsylvania—1918

By R. Dawson Hall
Associate Editor, *Coal Age*

A COMPARISON of the anthracite and bituminous coal industries in the State of Pennsylvania will possibly remove many misconceptions. It will be noticed from the table that the bituminous production in that state alone is 78 per cent. larger than the output of the anthracite mines. The amount of bituminous fuel shipped as coal is not in equal proportion because a large amount of the bituminous coal—18.24 per cent., to be exact—was used in 1918 for the manufacture of coke. However, the bituminous coal shipments exceeded the shipments of anthracite coal by 60 per cent.

The anthracite region has nevertheless some figures larger than any the bituminous region can advance. Though the bituminous field produces 78 per cent. more coal, the anthracite field uses 2.5 times as much coal in securing its quota. This important fact may be put more plainly as follows: The anthracite mines use 0.103 tons, or 205.4 lb., of coal per ton produced for power purposes. The bituminous mines use only 0.023 tons, or 46 lb., per ton of output. Thus the bituminous mines are 4.46 times as sparing in the use of coal for power as the anthracite mines.

Probably much of the difference cannot be avoided, for the amount of water to be pumped, the height of the lift, the length of the hauls, the hoisting and preparation costs are all against the anthracite region. But in this connection it must be remembered that the bituminous mines do much of their cutting by machine, whereas only a comparatively small amount of anthracite is thus cut. However, the coal used for power at the coke ovens in the bituminous regions in a degree balances the use of anthracite for fuel preparation in the hard-coal region.

In both the anthracite and bituminous regions the poorer coal is supposed to be used exclusively for steam-raising, but at most of those mines which do not have automatic stokers the better coal is used quite frequently; and the higher officers of the company do not really know in most cases what kind of coal is actually used in the raising of the steam. In both bituminous and anthracite mines the boiler equipment is usually out of date, though nowhere is that equipment as ancient as in standby plants of the latter region.

It may well be surmised that the large amount of coal used in the anthracite region arises in part from incomplete electrification. Long, improperly protected steam lines waste large quantities of good fuel. In many cases coal has to be hauled long distances on the surface to reach the breaker, and haulage of this kind when not electrical involves the use of much coal of good quality. The anthracite region needs to transmit its power electrically. The record suggests, if it does not prove, that the need is urgent for further electrification. Certainly efficiency has plenty of ground to work on at mines where one ton in ten is used for power purposes.

The tonnage of coal per employee in the bituminous region during 1913 was 837 tons, but the number of days worked was only 232. It is a big improvement when, as in 1918, the average man puts out 1296 tons even though he has the advantage of steadier work. The anthracite region during 1913 put out 520 tons per man, the number of working days being larger; namely, 257 as against 232 in the bituminous region. During 1918, with the impetus resulting from the war, the production per man rose to 974 tons.

Do these facts taken by themselves give a true index of patriotism? In 1918 the bituminous region bettered the record per man of 1913 by 54.8 per cent. The anthracite region improved its record 87.3 per cent. and did it with apparently less increase of time.

However, till we know how steadily each section had an opportunity to work, comparisons are unfair. It is well known that in the early part of 1918 the car supply in the bituminous region did not compare with that of the anthracite region.

COAL PRODUCTION, LABOR AND FATALITY STATISTICS OF PENNSYLVANIA, 1918

Production	Bituminous Coal Mines	Per Cent.	Anthracite Mines	Per Cent.	All Coal Mines	Per Cent.	Bituminous / Anthracite	Anthracite / Bituminous
Shipped to market, net tons	138,303,582	78.042	86,614,365	87.097	224,917,867	81.297	1.597	0.626
Used at mines, net tons	4,081,971	2.303	10,211,077	10.268	14,293,048	5.166	0.400	2.502
Sold to local trade, net tons	2,506,602	1.415	2,620,128	2.635	5,126,730	1.853	0.957	1.045
Used for coke, net tons	32,325,038	18.240	.....	.....	32,325,038	11.684	Infinite	Zero
Totals and ratios of totals	177,217,113	100.000	99,445,570	100.000	276,662,683	100.000	1.782	0.561
Coke production, net tons	21,681,825	67.074*	.....	.....	.....	.....	.....	.....
Labor:								
Employees inside	136,715	77.907	102,085	68.871	238,800	73.769	1.339	0.747
Employees outside	38,771	22.093	46,141	31.129	84,912	26.231	0.840	1.190
Totals and ratios of totals	175,486	100.000	148,226	100.000	323,713	100.000	1.184	0.845
Net tons per inside employee	1,296.25	.....	974.14	.....	1,155.86	.....	1.331	0.752
Net tons per outside employee	4,570.87	.....	2,155.25	.....	3,258.23	.....	2.121	0.472
Net tons per employee	1,009.87	.....	670.91	.....	854.66	.....	1.505	0.664
Fatalities:								
Fatal accidents inside	445	90.816	458	81,786	903	86.00	0.972	1.029
Fatal accidents outside	45	9.184	102	18,214	147	14.00	0.441	2.267
Totals and ratios of totals	490	100.000	560	100.000	1,050	100.00	0.875	1.143
Fatal accidents per inside 1,000 inside employees	3.255	.....	4.486	.....	3.781	.....	0.726	1.378
Fatal accidents outside per 1,000 outside employees	1.161	.....	2.211	.....	1.731	.....	0.525	1.905
Fatal accidents per 1,000 employees	2.792	.....	3.778	.....	3.244	.....	0.739	1.353
Net tons per fatal accident inside	398,240.70	.....	217,130.07	.....	306,381.71	.....	1.834	0.545
Net tons per fatal accident outside	3,938,158.08	.....	974,956.57	.....	1,882,059.06	.....	4.039	0.248
Net tons per fatal accident	361,667.57	.....	177,581.38	.....	263,488.26	.....	2.036	0.491

* Percentage of coke to coal used for coking.



Coal Industry Would Be Hampered by Continued Federal Control

Discussion of continued Federal control of the coal industry leads George H. Cushing, the secretary of the American Wholesale Coal Association, to outline a course which he thinks should be pursued in this matter. He says:

The coal industry is divided into three parts—production, wholesaling and retailing. While each is distinct from the other two, they are as inseparably parts of a common enterprise as are the head, arms and feet of the body. They are one in objective and obligation. Therefore, no safe program for coal can be devised which does not rest upon the sanction and approval of all three.

Our civilization is built around the use of power. The generation of power demands the consumption of coal. Coal is the one dependable and essential fuel. Therefore, the immediate safety of our civilization depends upon an adequate production of coal. Our future safety depends upon the careful use—and hence conservation—of our coal today.

For these reasons the public has deep interest in coal. No program can be adopted safely which leaves the people in ignorance. Therefore, a necessary preliminary to any program is an elaborate publicity campaign. Without it coal is in danger of being misunderstood.

The most potent cause of waste in coal-mine operation is the fact that each existing mine must compete not only with all other existing mines but, potentially at least, with all the mines which can be opened into all the coal lands in the United States. That is, so soon as coal mines become uniformly profitable, enough new mines can be opened into the reserve coal land to throw the industry into practical insolvency. This degree of competition is wasteful of our coal measures because it compels the operator to take only the cream of his coal, leaving unrecovered and unrecoverable in the ground a percentage of his precious deposit.

Such intensely competitive and wasteful practices in production induce equally intensive and wasteful measures in wholesale and retail distribution. Thus the public and the industry suffer together. This practice cannot long endure.

To the end that competition may be kept in limits comparable to those in other industries, I believe:

First, that the Congress of the United States should declare by resolution that, for the purpose of legislation, the extractive industries should be put in a class by themselves.

Second, that, to ascertain what other helpful measures are needed at once in the coal industry, the Congress of the United States should at once provide for an inquiry into the economics of the coal industry; should provide money to defray the necessary expenses of such an inquiry; and should empower the President of the United States to appoint a commission—nominated to the President by the various interests concerned—representing the public, the users of steam coal, the operators, the wholesalers, the retailers and the miners.

It has been fully demonstrated in this and other nations that Federal control or detailed Federal supervision of an industry results in the dwarfing of the economic development of the controlled industry.

The coal industry of the United States is not, in the matter of efficiency, developed to the point where its growth can safely be checked. For years to come, it must be left free to develop and expand into a truly efficient industry through the operation of that kind of moderated competition practiced in all other industries.

Therefore, I believe:

First, that it should be the announced policy of the people of the United States to leave the coal industry free from detailed control or restraint until moderated competition operated upon by enlightened self-interest has developed an efficient industry.

Second, that it should be the announced policy of the Federal Government to build up an educational organization within one of its departments which should study to improve the business methods employed by the coal industry and to encourage the use of these improved methods by the coal companies.

New Contingent Fee Clause Part of All Railroad Administration Contracts

A new contingent fee clause is being inserted in all Railroad Administration contracts. This is the result of opposition to the old clause. The coal industry was importantly represented in this opposition. The official statement issued in this connection reads as follows:

Walker D. Hines, Director General of Railroads, announces that, with the approval of Attorney General A. Mitchell Palmer, he has consented to a modification of the covenant inserted in purchase contracts under the direction of the Department of Justice issued June 18, 1918, prohibiting the payment to agents of fees contingent upon the procuring of contracts with the Government in so far as it relates to railroad contracts.

Since this order was promulgated by the Attorney General there has been a good deal of complaint from railway supply houses that its provisions were working a hardship upon them and that the Government itself was losing the benefits of a system which, previously, had proven both economical and satisfactory in every particular.

Hereafter the Attorney General's order will not affect contracts made between the Railroad Administration and supply houses which, previous to Government control, carried on their business through bona fide selling agencies.

At the suggestion of John Barton Payne, general counsel for the Railroad Administration, the following clause will be inserted in appropriate cases in future contracts:

"Provided, however, that this covenant shall not invalidate a contract obtained through a bona fide commercial representative employed under a general contract covering designated territory and shall not prohibit or penalize the employment of the same agencies, rates and methods of compensation in dealing with the United States heretofore customarily employed by the contractor in the regular course of his business in similar dealings with the railroad corporations."

Government Interested in Development of Inland Waterways

Extensive use of the inland waterways of the country in coöperation with the railroads is urged by the Director General of Railroads in outlining his waterways policy. He believes joint rates should be made and through bills of lading issued. If the railroads are turned back to their owners, Director General Hines favors the continuance of Government operation of the lines established by the Government on inland waterways. He tells what the Government has done in this connection. With regard to the coal-carrying barge line on the Warrior River, he says:

Service on the Warrior River was delayed because of the difficulty in obtaining and equipping available craft. This service was inaugurated December last, chiefly for the transportation of coal. Joint through rates on coal, in connection with the rail carriers in that district, are being actively considered. The present service provides ample outlet for mines directly on the banks of the Warrior River and without rail connection. Equipment to make practicable the carriage of general merchandise by existing craft is now being designed. This will link the water service on the Warrior River with that on the lower Mississippi, and a comprehensive system of joint water, as well as water-and-rail rates between these two water projects is being developed.

For the Warrior River $698,241 has been expended for the purchase of three wooden towboats, twenty-three 500-ton wooden coal barges, three harbor transfer coal barges and six self-propelled steel barges of an average capacity of 825 tons each. Contracts have been awarded for the construction of four self-propelled steel barges, with a capacity of 1800 tons for coal loading, but equipped to load up to 400 tons each of merchandise provided the coal loading is correspondingly decreased. These barges are for service between Cordova and New Orleans.

Bids have been received and contracts are about to be let for three steel towboats for service between Cordova and Mobile.

Contracts have been let for twenty 500-ton wooden coal barges for service between Cordova and Mobile. The aggregate contract price under these contracts for Warrior River equipment is $1,508,300.

Most of the old equipment purchased as above stated, for use on the Warrior River, is now in operation.

The four self-propelled barges for which contract has been let are expected to be completed early in the fall. The three twin-screw towboats for which contracts are about to be let are expected to be completed about the same time. The twenty wooden barges will be completed between Apr. 1 and June 1, and, pending the completion of the towboats above referred to, towboats will be leased to propel these barges.

With regard to the Chesapeake and Ohio canal, Mr. Hines says:

The Chesapeake and Ohio canal was never operated by the Railroad Administration. At the beginning of the season of 1918, on account of increase made by the canal trustees in toll rates and the increases in operating expenses, the Canal Towage Co., which was the only company operating boats on this canal, announced that it proposed to discontinue operations, as it could not pay operating expenses.

In order to avoid the loss of this means of transportation of coal to Washington and vicinity during the acute congestion which then existed on the railroads and the shortage of coal which then appeared imminent if war conditions continued, the Director General of Railroads at first made an arrangement whereby he assumed payment of the canal tolls on coal traffic on the Chesapeake and Ohio canal. Later in the season, in connection with the increases made in rail freight rates on coal, this arrangement was revised so that for the balance of the season the Director General of Railroads assumed the actual deficit of the Canal Towage Co. in operating its boats. This was substantially less per ton than the canal trustees charged for tolls, the Canal Towage Co. under this arrangement paying such tolls.

For the same reasons which led it to pay part of the expense of operating the canal, the Railroad Administration constructed ten new canalboats to increase the tonnage transported via this canal, these boats being leased to the Canal Towage Co. for operation.

The Railroad Administration has made no arrangement with the Canal Towage Co. to pay any part of its operating expenses for the present year. The same emergency does not exist as obtained last year. Arrangements, however, have been made for divisions between the railroad and the canal of the freight charges from the mines to destination which will make it possible for the Canal Towage Co. to operate its boats on the canal during the coming season as heretofore, and the boats built by the Railroad Administration will be operated by the Canal Towage Co. on a rental basis.

Railroads Will Make Public All Details Concerning Coal Contracts

The National Coal Association feels that its contention with the Railroad Administration is more than half won as a result of the following order which has been issued by the Director General of Railroads:

In order to make effective the policy already announced as to publicity in connection with railroad fuel contracts, it has been decided to post on all bulletin boards or in a record book open to the public at the headquarters of the purchasing agent of each railroad under Government operation the following facts: The name of the coal company or coal operator to whom a contract for railroad coal has been allotted by the railroad in question, the price of the coal contained in the contract, the tonnage involved in the contract, the duration of the contract. Through this method the information listed above will be made available not only to coal miners and coal operators, but the public generally.

Government Fuel Yard Soon To Operate

Director Van H. Manning, of the Bureau of Mines, is authority for the statement that the Government coal yard in Washington will begin operations about May 1. When completed this yard, which is located at the New Jersey Avenue freight yard, will be the largest plant of its kind in the United States. It will furnish coal to the Government and municipal departments in the District of Columbia.

The yard covers approximately three acres and will handle about 400,000 tons of coal a year. It has a daily capacity of 1200 tons and storage space for 30,000 tons. The yard will in no way interfere with the local coal dealers, and is solely for Government use. For years the local dealers handled the Government coal, and last year the Department of the Interior thought it could institute economies in coal purchases by handling its own coal, and accordingly did so.

So successful did this coal-handling department prove during the coal shortage in the winter of 1917-1918, that Congress appropriated $432,300 for the establishment and operation of a Government coal yard. George S. Pope is chief engineer of the fuel yard and R. A. Dye chief clerk.

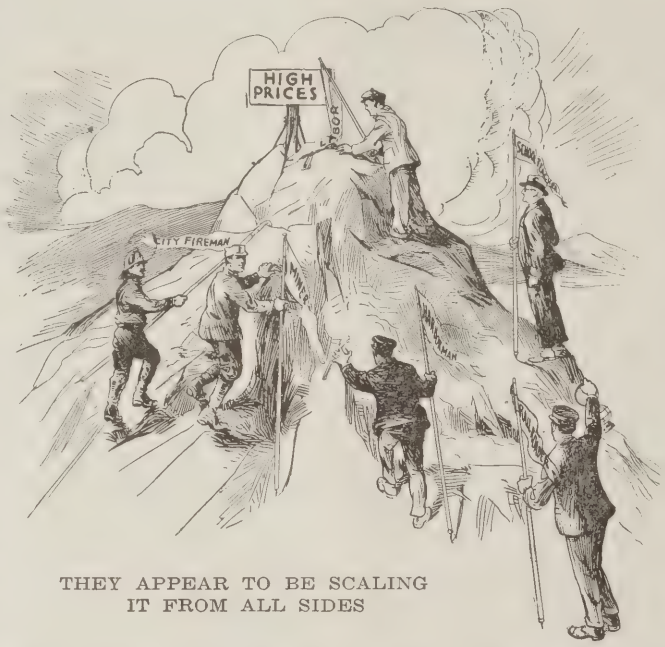
June 3 has been chosen as the date for the annual meeting of the American Wholesale Coal Association. The meeting will be held in Cleveland.

EDITORIALS

Buyers Have Duties But No Consciences

AWAY WITH double standards! If it is wrong for a seller to "bull" prices by refusing to sell at reasonable figures, it is wrong for the buyer to seek to "bear" prices by declining to buy when a reasonable offer is made. The buyer is the most unconscionable rascal in the body politic, but he does not know it. He ties up business at will, lays workmen idle, evicts the poor, lowers the productive capacity of the world, and inflicts endless misery in the hope of decreasing wages.

A sorry person he is indeed. He has unconsciously bought up the daily press, for the buyers of the country are the readers of the daily papers and the advertisers in daily periodicals. The daily press should be the buyer's father confessor instead of his press agent and confederate. As it is, it keeps his eye closed to the criminality and insensate folly of his way, and spends its unprofitable time inventing stories reflecting on the morality of the producer.



THEY APPEAR TO BE SCALING IT FROM ALL SIDES

As many as 5000 automatic stokers have been installed on American railroad locomotives. It is therefore important that fine coal delivered to the railroads be free from steel couplings, pieces of wood or chunks of slate, which can do as much harm if thrown into such machinery as if dropped into a reciprocating engine.

Labor Still Climbing a Hill of High Prices

REACTIONARIES may be confident—it is an uncomfortable way they have—that prices are going to come down, but prices will keep on soaring just the same. Certain kinds of labor did so much climbing during the war that "alpinism" has become a habit if not a disease. The hill of high prices is being scaled from all sides. Some working men are finding it necessary to get increases to meet the raised cost of living, and some people are still seeking advances in wages for no better reason than because they find it mighty pleasant to receive them.

As a result of the energetic footwork of the laboring classes and their skill with the alpenstock, prices are going to go up, not down. The hill of high prices has been found scalable from all points of the compass. Though steep as the Matterhorn, the veriest of tyros find it easy climbing.

How can prices do otherwise than rise with the prospect of higher freight rates in view, the outcome in part of a $65,000,000 increase granted to railroad labor, which, if the presumably well informed are correct in their surmises, is but a forerunner of another advance that is already under official consideration? The harbormen have been granted a ten-hour day to replace the present day of 12 hours, and they also seek more pay into the bargain. The mine workers, as everyone knows, are agitating energetically for more pay with less work, despite all their many and recent increases in scale. No one expects them to get what they want, but they are seeking it nevertheless. The city firemen, the school teachers and other civil-service employees are looking anxiously for more compensation for their important labors, and in justice to them and to us we must all wish them luck. They will get their increased pay from the taxes, and the taxpayers must get their money from the public, which means, of course, higher prices.

Look where we will we face higher charges for everything. The best way to meet the situation is to buy now before they go higher and buy even if an immediate profit in the use of the thing purchased seems doubtful or entirely unlikely. For instance, now is the time to erect a factory or a house if one will be needed shortly. It may not be possible to rent out either at a profit. To charge a rent commensurate with cost may subject one to all manner of animadversion as an unconscionable profiteer, but one may be sure that rents will be high enough ultimately to more than justify the premature erection.

All kinds of expenditures for materials and construction for which there is prospective use are justifiable and profitable. "Buy it now" is not so much patriotism as hard-headed sense. "Business as usual" and "Let's go" have been suggested as slogans, but good as they are they fail to recognize the situation as it exists. Perhaps a better legend for reviving business would be "Go while the going is good." Today we can buy more cheaply, more readily and more autocratically from the seller than in the near future. Let us beware of delaying our purchases till prices are up. Everybody will soon be regretting that he did not buy in this, the spring of 1919, and will be recalling that prices sagged a trifle at that time preparatory to a well defined, even if not steep, ascent thereafter.

"If We Break Faith with Them Who Die"

OUR SACRIFICE of human lives is over. Some few have paid the debt in the best they had—in human life and limb. There remains only to be paid the more trifling debt in dollars—bills for contracted material and the cost of maintaining the troops still unmobilized. Most of us wish that we could add some small additional amount to the loan for the purpose of making certain that the discharged soldier would get immediate work without the degradation of pleading for it from door to door, without the uncertainty due to the slackness of employment. But the Government is distressingly inactive this year in building, dredging, railroad and highroad making, and in irrigation activities. It appears to be unusually penurious, though in this, of all years, it should be most energetic.

However, we have the war to pay for and the war to finish. The least, we civilians, can give is our money, and that we are only asked to lend. We must not break faith with those who have died. They fell on the field of carnage to maintain our honor, and we are asked merely to lend our money to maintain it. It is a small service, but unfortunately the smaller the service the harder it is to get it accomplished. It is necessary to bribe the people with a promise to pay 4¾ per cent., or 3¾ per cent. without taxation, when the public should be willing to lend its resources gratis seeing that the loan goes to pay for the arms, forged to support those who not only *lent*, but *gave*, their lives in battle.

A little service, this purchasing of the Victory Liberty Loan, but it falls to us and we must meet it. *Coal Age* prints a poster today as a loose-leaf insert showing the appeal of Columbia as the representative of those who sleep in Flanders field, at Chateau Thierry, along the Ourcq and the Vesle, along the slopes of the St. Mihiel salient and in other parts of the Argonne. Quoting (with some changes in personal pronouns) Captain John McRae, of Guelph, Can., who gave his life for our common cause, we may well say: To us

> " . . . from falling hands they throw
> The Torch—be ours to hold it high.
> If we break faith with those who die,
> They will not sleep tho' poppies grow
> In Flanders' fields."

A hundred million people are loudly acclaiming the United States. Let not one of them be found so mean as to fail to give her a full meed of support.

Redfield says prices will fall, but only slowly. Prosperity seekers on the other hand declare that we are due for a long period of stable prices. If either is true why should anyone buy? Rather let us see the facts as they are. Prices are bound to rise, and buying the needful is merely self-defense.

What Is Fuelless in Fuel?

ASKED what are the impurities in coal, we usually say slate, clay, bone and pyrite. This enumeration covers those impurities generally regarded as extraneous, though bone is at least partly intrinsic, and pyrite is possibly rather a segregation from the seam than really extraneous matter. But there are intrinsic impurities—namely, moisture and the incombustible volatile material. The latter is important, for much of the volatile content is really not at all combustible though many widely known authorities still often term all of it "volatile combustible matter," despite the fact that they know much of it has no heat value. Where the volatile matter is large, it is a sure guess that much of it cannot be burned; for in a chemical sense it has been burned already.

Whether impurities are extraneous or intrinsic, whether they are volatile or incapable of distillation, makes no difference; so long as they are unburnable they are useless for heat raising. They will not pay their freight charges, and coal containing them in excessive quantity must be consumed at or near the point of production and cannot enter into international trade.

Sulphur, however, is burnable. It is only partly to be regarded as an impurity, seeing it has a fuel value. Similarly there probably are some hydrocarbons of low hydrogen content which burn with less heat than is given out by those having a high hydrogen content, and so do not have full heat value. The presence of many of these would lower the heating value of the fuel.

Deductions are inevitably made for slate, clay, bone, pyrite, moisture and incombustible volatile matter in the selling price of the coal. Should deductions also be made in the freight rate, which is somewhat absurd, but not by any means unknown, they still would be objectionable for transportation, because the coal which is admixed with these neutral substances does not burn efficiently; and furthermore, the worthless part of the coal just as much as the better material has to be handled and its ashes have to be removed.

It is for these reasons that only the best coal is welcomed abroad. The man who would buy fuel does not want silicate of alumina, pyrite, moisture or carbon dioxide or, possibly, carbon monoxide. Even washed coal with a 5 per cent. ash that has excessive moisture and much oxygenated carbon is not a desirable fuel. It is good enough within a certain radius of its point of production, but it will not serve for an international fuel.

Walter Hines seems to think that wages are too high for him to furnish the soldier boys with employment. He needs to read the slogan "After the war, a job."

Too Great a Levity Among the Augurs

IT IS SAID that the Roman augurs were wont to wink at each other as they passed. So likewise the prognosticating and directing augurs at Washington. The Fuel Administrator threatened a coal shortage next winter, and the Railroad Administrator favored Mr. Garfield with a wink, which later broke into a broad smile. They do not take one another seriously in Washington; but, at that, Garfield was not winking. Neale may yet be stumping the country again in the interest of coal production if labor trouble supervenes or Hines delays any longer his coal purchases.

It was loudly heralded that the Administration was going to see that during the reconstruction or readjustment period there would be work for everyone. The nation fearfully expected the launching of chimerical projects. We heard of them, it is true, but that is all. Now we have to complain that even obvious and needful purchases and projects have been wilfully, or should it be said, ruthlessly delayed.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

American mine workers seem to be taking on a new point of view. In the anthracite region slackness of work has given place to something akin to activity, and the mine workers are better satisfied. In the bituminous region a sort of mental depression in the minds of the employees has resulted from their continued idleness. At first the slackness goaded them into something like defiance. Their complaints were denunciatory in character. The men wanted shorter hours and more pay for the lessened service.

They seemed to believe that all that was needed was that the would-be recipient should ask and he would receive. Now it has dawned on the mine worker that all is not "cakes and ale." He now has taken up the defense instead of the attack. Instead of demanding an increase, he is declaring that he will not stand for a cut.

This is a better attitude. So long as he stands on it he has almost everyone's sympathy except apparently that of the Railroad Administration. A cut in mine labor would open up vistas of possible reductions in all wages. The wage reductionists would hail "the day" which they have been anticipating and toasting. There would be a further period of waiting; business would continue to stand still till everybody had arrived at the conclusion that wage reduction had reached its end.

Wages cannot be much reduced till food comes down in cost. Just now the cost of food is rising. It was 2 per cent. higher in March than in February.

Suppose we had a reduction of mine wages. People might wait a whole year anticipating the fall of more such juicy apples from the tree of present wages, and when they had concluded that no more reductions could come from complaisance on the part of the worker they would then look for further reductions on the ground of a lowering of food prices consequent on the ending of the Government guarantee on wheat. Thus we would have one wait followed by another. It is far better for all concerned to keep wages where they are, for conditions are already shaping themselves to meet them.

Strike To Settle a Long Unsettled Issue

More than 1500 coal miners employed in Arkansas by the Central Coal and Coke Co. of Kansas have struck to compel the company to settle the grievances of its employees at Calhoun, Okla., and in Kansas. An order was issued by Harry A. Garfield, United States Fuel Administrator, directing the men to return to work. Dr. Garfield sent word to John Wilkinson, president of District No. 21, asking him to rescind the order which called out all the 4300 mine workers employed in the Southwest plants of the Central Coal and Coke Company.

Mr. Wilkinson declined to execute the order and said that the strike would continue until a satisfactory settlement had been reached. Dr. Garfield asked that the men submit their grievances for mediation to the labor division of the Administration, under the agreement of July 23, 1917. Mr. Wilkinson replied that the dispute was over machine crews' starting time, that it arose before the inauguration of the Fuel Administration, that it was a question left unsettled by the machine commission designated to make a machine scale and that he "respectfully declined" to rescind the order.

He called Dr. Garfield's attention to the stand of the latter in regard to the McAlester-Edwards Coal Co. dispute at Pittsburg, Okla., where there has been a strike for many months. When the Fuel Administration was asked to interfere in this case, Mr. Wilkinson alleges that it replied that, after investigation, it had found that it had no authority to force the company's compliance with its orders, because the dispute arose before the inauguration of the Fuel Administration.

All of the mines of the Central Coal and Coke Co. at Pittsburg, Kan., are idle, the 1200 miners of the company not reporting for work Apr. 16, following the strike order issued by President Alexander Howat of District 14.

On Apr. 20 H. A. Garfield, in a message to Alexander Howat threatened to revoke the provision of the agreement of November, 1917, between the coal miners and the coal operators, which gave the miners an increase of $1.40 a day, unless Howat ordered the striking miners of the Central Coal and Coke Co. to return to work.

Howat in answer wired to Garfield that he rejected "with contempt the cowardly proposition submitted." The miners, Howat wired, are prepared to fight to the last ditch against the automatic penalty clause, which he denounces as "infamous."

Labor Affairs Across the Sea

The mine workers of the United Kingdom of Great Britain and Ireland have approved by a large majority the report of the Sankey Commission. When the Miners' Federation met in conference, on Apr. 16, it was announced that the ballot on the report had resulted as follows: For acceptance, 693,004; against acceptance, 76,992. The conference decided unanimously in favor of the government's terms, which are the same as those put forward in the majority report of the Sankey Commission.

The British mine workers complaint about housing is amply justified. The Sankey report says the houses are "a reproach to our civilization. No judicial language is sufficiently strong or sufficiently severe to apply in their condemnation."

It was stated in one mining district alone there were 2768 persons living more than five to a single room, 1237 more than six to a room, 510 more than seven to a room and 190 more than eight to a room.

The coal-mine workers of Australia are to receive an increase of 22½ per cent. and the price of coal is to be increased concurrently by the sanction of the government. The premier of New South Wales objects vigorously to the change, saying it would increase the fuel bill of that province a half million of dollars a year. Acting Premier Watt of Australia declares the coal shortage grave and likely to close down industry.

On Apr. 16 it was reported that the railroads, short of coal, had taken off the express trains running from Frankfort and Leipsic to Berlin among many others. The strike, however, was dwindling.

An expert coal council has been created to coöperate with the Economic Ministry in matters of coal production and supply. The council will consist of workmen, producers, consumers, scientists and mine directors and will formulate new laws relating to coal production.

The executive board of District No. 11, which includes most of the Indiana coal field, has protested against a cut in the price of coal, declaring that it would result in a lowering of the mine workers' wage scale. The board sent a communication to W. D. Hines, director-general of railroads, protesting against the proposed reduction in the price of coal to railroads. The miners' officials say that if the railroads are allowed a lower price it would result in the public in general demanding a lower coal rate. At a meeting held in Moose Hall, Clinton, Ind., Apr. 13, the workers of the Clinton coal field showed their approval of the attitude of their chiefs.

Wait Your Turn at the Window, Please



DISCUSSION BY READERS

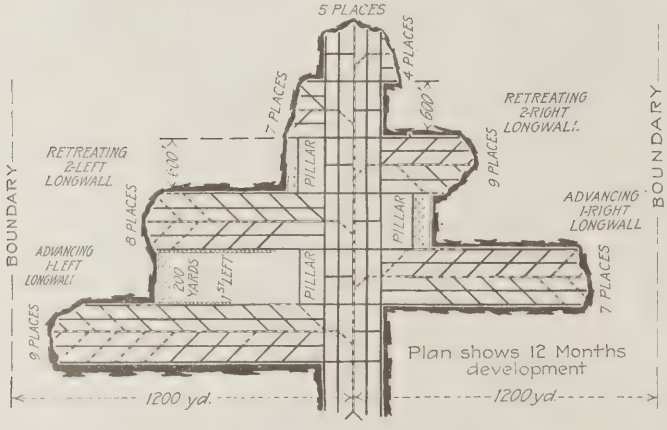
EDITED BY JAMES T. BEARD

A Modified Longwall System

Letter No. 1—The article of F. A. Pocock, *Coal Age*, Feb. 27, p. 395, describes an interesting modification of longwall mining that appears to have for its chief object the extraction of a larger percentage of coal than is possible by any other method, in my knowledge. The article describes this method as applied to the working of a 3-ft. seam of coal under 80 ft. of cover, which is a shallow depth for longwall working.

While the general plan presented appeals to me as well adapted to the mining of 3-ft. coal, there are some changes or modifications that I would make and which seem to me to be very necessary, in this particular case, owing to the tender roof, which it is said will not support itself over any considerable area. I would suggest that, instead of driving the entries 20 ft. wide, the width should be reduced to as near 12 ft. as is possible and avoid paying yardage. This width would still give ample room for the stowage of the waste due to brushing top or lifting bottom on the roads.

In the plan presented by Mr. Pocock, let me say I can see no advantage in driving the diagonal crosscuts shown in the 5-entry side headings, unless the purpose



PROPOSED LONGWALL PANEL SYSTEM

is to preserve the general plan of the diagonal roads common in longwall workings. No line of dip is shown on the plan, and it is only fair to assume that this is a level seam. In the drawing back of pillars, it is found generally better to cross an old place, as I would say "in parallel," rather than otherwise, and then open up a new face on a new set of pillars.

Now, it is a question in my mind whether it is possible to obtain an output of 3000 tons of coal a day, as is claimed for this system. Let me say I would never figure on cutting 10 ft. deep on a conveyor face, as Mr. Pocock proposes to do with the arcwall machine he uses. It may do for the fast places, but I think it will not answer in a longwall face, using a face conveyor.

Allow me, then, to make a brief estimate of what would be the possible output of the mine, in this case, as based on the development, after 12 months. The dotted line showing the working face at this period, in the plan given by Mr. Pocock, page 395, is, of course, only an approximate line. In the accompanying figure, I have attempted to show what may be taken as a more exact delineation of the work in progress at the end of this 12-months' period.

My plan is drawn to embrace only that portion of the development up to the time mentioned and includes the first, second and third left and right branches, embracing the longwall conveyor faces of the first and second left and the first right. The second right longwall face has not, apparently, been opened at this time, because the third right branch has not been extended far enough to include the 300-ft. pillar protecting the main headings.

ESTIMATED TONNAGE DURING THE FIRST TWELVE-MONTHS' DEVELOPMENT

Now, estimating the output on the assumed basis of Mr. Pocock's figures, with the exception of allowing only a 6-ft. cut on each longwall conveyor face, instead of 10 ft. as he suggests, and counting the number of places in each branch as marked on the plan, taking a cubic yard of coal in place as producing 1 ton of output, gives the following results:

First left branch...	$9(3 \times 20 \times 10) \div 27$	= 200 tons
First left longwall..	$(3 \times 600 \times 6) \div 27$	= 400 tons
Second left branch..	$8(3 \times 20 \times 10) \div 27$	= 177 tons
Second left longwall.	$(3 \times 20 \times 6) \div 27$	= 400 tons
Third left branch...	$7(3 \times 20 \times 10) \div 27$	= 155 tons
Main headings	$5(3 \times 20 \times 10) \div 27$	= 111 tons
Third right branch.	$4(3 \times 20 \times 10) \div 27$	= 88 tons
Second right branch	$9(3 \times 20 \times 10) \div 27$	= 200 tons
First right longwall.	$(3 \times 600 \times 6) \div 27$	= 400 tons
First right branch..	$7(3 \times 20 \times 10) \div 27$	= 155 tons
Total		2286 tons

This shows a total output, at the end of a 12-month development, of 2286 tons. In his estimate, page 396, Mr. Pocock has only included the first and second left and right branch headings, and the first left and first right longwall faces, basing this estimate on a 6-month development. By estimating on three shifts a day, he obtains a total of 3322 tons as the possible output at the end of the first six months. In my opinion, this is overestimating the actual possibilities in practice. I have therefore based my estimate on a single shift and limited the undercut to 6 ft. on the longwall faces, while allowing a 10-ft. cut in the headings.

It occurs to me, after a little further study of this plan, that it proposes to work each alternate longwall face on the retreating system. In that case, the first-left and first-right longwall faces would be worked advancing, while the second-left-and-right longwall faces would be worked retreating. That being the case, my estimate should be 400 tons less than that shown above. However, in practice, it is my belief that two-thirds of this estimated amount, or say 1500 to 1800 tons a day, would be all that it would be safe to expect at the end of a 12-month period.

I am pleased to state that the general proposition appeals to me as being well adapted to give a rapid development in the working of a thin seam of coal. But I would suggest that the depth of cover should not be less than 200 ft. to obtain the best results in longwall working. I believe the principles involved in this method are those that must ultimately be applied to work such seams. W. H. LUXTON.

Linton, Ind.

Perpetuating the Thrift Habit

Letter No. 1—The Foreword in the issue of *Coal Age*, Feb. 6, is a timely presentation of the need of perpetuating the thrift habit. Until recently, it cannot be said that thrift has been a particularly American characteristic. The average American has not chosen to look far enough ahead to create in his mind a desire to save. There are notable exceptions to this rule, however, and the difference between those who have and those who have not formed the habit has proved clearly that thrift is one of the fundamental principles of wealth and independence.

It requires an extraordinary occurrence to revolutionize a fixed habit; and, perhaps, no habit is more fixed among Americans than that of extravagance. Our thrift has been appealed to through our patriotism, in the hour of the country's need. Today, 25 million Americans are feeling a thrill of security through having invested in Government Bonds and War Savings Stamps, while the little Thrift Stamps have made it possible to develop in the youngest child this much-to-be-desired habit.

Could the same noble ideals dominate us, without a recurrence of the world's tragedy, thrift would soon become a characteristic of the average American. No greater blessing could grow out of our overwhelming desire to see the world safe for democracy.

Now that the war is over and there is a tendency on our part to fall back into the old habit of extravagance, the question arises, Is the thrift habit here to stay? No stronger arguments can be presented than those offered in the Foreword to justify the contention that thrift among employees is as good for the employer as for the employed. The man who owns his own home or has his savings invested in Liberty Bonds will not lend an ear to the destructive theories of Bolshevism. On the contrary, the tendency is to make him conservative, loyal to his country and a good citizen.

PROHIBITION A FACTOR IN ADVANCING THRIFT

One of the avenues that has been open, heretofore, to the foolish expenditure of money has been the uncontrolled desire for drink; but the National Congress has now passed the Prohibition Amendment, and we are anxiously watching and waiting to see if it will effectually block this road to extravagance. Experience in the bone dry districts of the past and the failure of local prohibition in places is no proof that nation-wide prohibition will likewise fail. The country is hoping and praying that this will prove an adequate barrier to the great evil of drink.

We must remember, however, that men cannot be forced to save. The appeal to the man must be made through some great channel as that of patriotism to his country, loyalty to his family, and the creation and building up of a strong national characteristic that will be manifest in the thrift of our people. Even great financial panics have not stimulated men to save against the proverbial "rainy day." The present lull in the country's prosperity has made many a person do some hard thinking of how he could have saved money in the past. Let us hope that the lesson taught will be a lasting one and coming prosperity be attended with the growth of thrift everywhere.

Many communities have started plans tending to induce the thrift habit, by making it possible for a man to purchase a home on practically the same plans that he can rent a house. The incentive of ownership of property is a strong factor in perpetuating thrift. The Carnegie Steel Co., recognizing that fact, has sold stock to its employees, on easy terms, and there are doubtless many other ways of appealing to the self-interest of the individual and thereby nursing the thrift habit. The present bond issue offers another opportunity for the investment of savings that engenders citizenship and creates industrious workers and community builders.

THRIFT ENFORCED IN GERMANY MADE THE WORLD WAR POSSIBLE

Notwithstanding all the evil that has been brought to light by the war, as existing in the German nation, we can afford to take one lesson from that people—it is the lesson of *thrift*. It was the thrift habit enforced on the German people that made the undertaking of a war on such gigantic proportions possible. If the same habit of thrift can be united with our other virtues, which the German people did not possess, we may well feel secure as a nation, for all time to come.

In closing, let me say that the perpetuation of the thrift habit among our people will build for this country an enduring prosperity, but we can do it neither by spending money nor by hoarding money, but only by investing our savings. In this regard much depends on mine managers and leaders of our industries.

Thomas, W. Va. W. H. NOONE.

To Abolish Illiteracy

Letter No. 1—I was greatly pleased a short time ago to read the editorial in *Coal Age*, Feb. 20, p. 368, bearing on the subject of the widespread illiteracy in this country. The importance of greater efforts being made to wipe out this condition has been brought to light by the facts recorded in the registry of men in the late war. The records show that the large majority of our alien population are unable to read or write the English language, and a good portion of them are no better equipped in respect to their own language.

As stated in the editorial, Senator Hoke Smith, of Georgia, introduced a bill in the last Congress, calling for the appropriation of twelve and one-half million dollars a year, for four years, for the purpose of overcoming this evil. Let us hope that this bill will be amended, before it is passed, making it compulsory for adult illiterates to attend some kind of a school where they can be taught to read and write the English language, and be made acquainted with the principles of American citizenship and American ideals.

The opportunities offered aliens, through the medium of our institutions, to enable them to acquire knowledge were never better than they are at the present time. The requirements are such that there is no man, however humble, who is unable to avail himself of these op-

portunities and privileges. In every community, this work is being conducted by the Y. M. C. A. and other organizations.

In many coal-mining districts, the larger companies have provided buildings, and teachers to give instruction to all employees who can be induced to attend; and mine officials, almost without exception, have shown deep interest in the work, realizing that the more intelligent their employees become, the more efficient results are produced by their labor.

Need of a Law Fixing a Standard of Learning Among Aliens

It is a matter of regret that so large a portion of these alien employees look with suspicion on any effort put forth by the operators, thinking that their employer's chief object is to rob them. To overcome this difficulty it seems absolutely necessary that a law should be passed that would compel not only aliens, but also home-born adults to acquire a certain standard of learning and knowledge. The present state of Russia today is due to the illiteracy of its people, 90 per cent. of whom are said to be unable to read or write.

It is worthy of note, in this connection, that the Naturalization Court of Luzerne County, Penn., has decided that no applicant will be given his citizen papers before he can read and write the English language, or is making reasonable effort to acquire that ability. If the judges in other counties would take the same stand, it would go far toward inducing aliens to attend the night schools provided for their benefit.

The success and prosperity of every operation is largely measured by the standard of learning among its operatives. In order that everything shall work to the best advantage, each employee must be able to think and act for himself. Men that cannot read must depend on what is told them by those who can, and they naturally become the tools of their informants. It is safe to say that this condition is the primary cause of a majority of our strikes and disputes in mines and factories. A large portion of the workers are unable to read and think for themselves, and fall under the influence of agitators who can see but one side of the question.

Our thanks are due to Senator Hoke Smith for his efforts to wipe out illiteracy from the country. Twelve and a half million dollars spent annually for this purpose cannot fail to bring results in time. Money spent to uplift and educate citizens is money well invested, both from a humane and an economic standpoint. Let us do what we can to advance the cause.

West Pittston, Penn. Richard Bowen.

Certification and Safety

Letter No. 3—I wish to refer to the excellent letter of James Touhey, *Coal Age*, Feb. 20, p. 374, in which he has emphasized the need of arriving at a definite answer to the question of certification of mine officials, which was recently discussed by the Coal Mining Institute of America, in their meeting at Pittsburgh. It certainly is disappointing, to say the least, that no conclusion was reached in that discussion; but, on the contrary, there developed a wide diversity of opinion.

While it is possible that the discussion of the question in *Coal Age* will reveal some differences of opinion, I am sure that, in this as well as in other important discussions relating to coal mining, facts and principles will be spoken that will be a benefit to the coal industry. The suggestions offered may not always prove alike applicable, but it still remains true that the difficulties of coal mining are brought more into subjection through the knowledge gained by discussion.

Referring to the question of the uncertification of mine officials, which was made legal by an enactment of the Pennsylvania Legislature, the action of the lawmakers seems to have been founded on the theory that a man, thoroughly tried in the mining game and found to be efficient and reliable, should be permitted to assume the duties and responsibilities of the office of mine foreman, whether or not he has been able to secure the certificate of the State Mining Board.

Results Realized the Best Guide for the Future

In questioning the wisdom of this act, we must be guided by the results that follow in its wake. If the statement is true, as reported made at the Pittsburgh meeting, that "the employment of 28 uncertified men, in one inspection district alone, was largely responsible for the increase in the number of mine accidents in that district," it would seem to call for an investigation.

It seems incredible that any operator would continue to countenance incompetency on the part of a foreman in his employ; nor can we understand that the state would permit an attitude of neglect or indifference in respect to the safety of mine workers. While I believe that no operator would knowingly favor practices that are unsafe, it is frequently possible for such practices to be followed in a mine, before they are discovered by the higher officials.

A Plea for Service Certification

Personally, I can conceive of no reason why there should be an uncertified official placed in charge of a mine; or, in other words, why a competent official should not possess a certificate, except by reason of illiteracy. However, if such a one has been able, by service, to prove his competency and responsibility, in the management of a mine, and has shown that he is thoroughly practical, though unable to pass the examination before the state board, it appears to me that there is no valid reason why an operator should not be permitted to place him in charge of the property in which the operator's capital is invested.

No one, it seems to me, will deny that it is better that such a man shall be given charge of a mine, than one who possesses a certificate but has little practical experience in underground work and conditions. It is my opinion, that the thoroughly practical man, though illiterate, should not be denied his place of service in a mine where the company or the operator has confidence in his ability to safely control the operations underground. There is no doubt that the repeal of the present revised law, in Pennsylvania, would eliminate a number of these men and prove a hardship to them.

Where *A* Certificate Should Be Demanded

There is, however, another type of uncertified mine official. It is the man who might easily procure a certificate if he so desired. He has all the advantages of a common-school education and may have passed through the high school. His long experience as a competent mine foreman has, perhaps, given him a high regard for his own ability and inculcated in him a certain con-

tempt for the examination proceedings. This man will often excuse his neglect to enter the examination by stating that he has not the time or inclination to prepare himself for the technical work.

In my opinion, the type of man last mentioned should be legally bound to take the examination and should not be employed as mine foreman until he has secured a certificate. It may happen that the examination of this man, so high-minded in his own esteem, will prove that there are one or more points bearing on the welfare and safety of the men in respect to which his knowledge is deficient, which should cure the man of his egotism.

State Law Must Regard Public Welfare

Not to be misunderstood in regard to this important question, let me say that the state should compel compliance with any law intended for the general good of an industry. I will say that the fact that mine accidents increased in one district, owing to the employment of 28 uncertified men as foremen, should prove sufficient evidence that the repeal of the law that made such employment possible is the only remedy, unless it is shown that the incompetency of these uncertified men reflects on the mine inspectors of the district, who should then be held responsible for their lax interpretation of the law.

It may be that the examination for mine foremen and firebosses' certificates, in Pennsylvania, is a little stiff, in respect to the mathematical requirements. If so, it should be possible to modify the examination in such a way that illiterate or practical men will be able to prove their competency and secure a certificate. I feel that the law should protect the illiterate man who has qualified himself in a practical manner for holding the position of foreman in a mine. It may be that an oral, instead of a written examination, would be better adapted to determine the man's competency in such a case. It is my belief that practical men who can prove their qualifications for the position should receive the state's approval to act as foremen and firebosses in mines. This, however, is a question for the state.

Thomas, W. Va. ESSEX.

Efficiency in Firebossing

Letter No. 12—There is much to be said in regard to securing the highest efficiency in a fireboss's work; it is a question of great importance and should be given careful consideration. However, few realize what an unpleasant and dangerous task a fireboss must perform, until they have had the actual experience themselves.

Where the territory to be examined is large a fireboss comes pretty near to having done a day's work when he has completed the morning examination of his district and has traveled the rough roads, climbed over falls and crawled through small openings on his hands and knees, all the time searching for the dangers that lurk on every hand.

The Firebosses' Time Is Never His Own

The duties of this position are such that a faithful fireboss can seldom call the time his own. His evenings are cut short, because he must go to bed at an early hour, so that he will be ready and fit for work when the time comes to enter the mine in the morning. Should he oversleep, his chances are slim for holding his job, as such neglect on his part would throw the mine idle for the day.

Mention has been made of mine foremen's proneness to look upon the fireboss as "a necessary evil." I must admit that this may be true in some parts of the country, and that the fireboss is not always given credit for the work he has to perform, in the same manner that a good coal hauler or a motorman receives credit for what he accomplishes. Such feelings toward a fireboss only exist where mine foremen and superintendents have never performed the same work themselves and do not realize the real nature of the task.

No superintendent or foreman who has climbed the ladder from firebossing in the mine to his present position fails to recognize that he is *not* securing the greatest efficiency in his fireboss by giving him such work as timbering or tracklaying. There should be, in every mine, sufficient work for a good fireboss to perform and keep him busy during a full shift without going outside of his own routine of business.

The Kind of Work That Should Fall to the Lot of a Competent Fireboss

In a newly developed mine, where there is not much area for a fireboss to cover, I should expect him to perform some other labor after he has completed his examination of the working places. But the kind of work that would naturally fall to him is bratticing, clearing gas from the working faces where it may have accumulated since he made his round in the morning, marking off cross-cuts in rooms and entries and similar tasks.

All matters pertaining to safety and first-aid work should be attended to by the fireboss. He should keep the fire extinguishers in good condition, see that the first-aid supplies are on hand and available for use when needed, and give any needed instructions to the men in their working places.

In concluding, let me suggest that those who would have firebosses do work of timbering, tracklaying, etc., set their alarm clocks and follow the fireboss, some morning when he makes his rounds in the mine. If they would do this for a few months, or even a few days, they would soon become aware of how the work tests a man's physical ability. They would know better, then, what the faithful fireboss undergoes, for which, too often, he receives little credit.

Poston, Ohio. JAMES H. TAYLOR.

Letter No. 13—I too have had a few years' experience in the work of firebossing, and it has forced me to the conclusion that every mining company ought to give all the encouragement possible to this class of their employees. They should be given the incentive of promotion, and made to feel that this will be their lot as often as vacancies occur, providing that they prove to be faithful, sober and reliable men and are capable of filling a higher position.

Kindly permit me to refer to the letter of F. G. J., *Coal Age*, Dec. 19, p. 1133, and say that I fail to agree with his idea that the foreman who puts his fireboss to work digging coal and laying tracks or switches is not developing the highest efficiency of that official, in his own particular line. In another place, the same correspondent says that when a foreman does this he "is off the track, all wheels."

It is my opinion that the fireboss should not be set to work to dig coal; but if the mine is running short-handed any time, I think that a foreman is fully justified in giving his fireboss some work that will employ him during his full shift. I feel that a fireboss, under

such circumstances, should be willng to perform work that is important, after his examination of the mine is completed and, in answer to the question doubtfully asked, "Is the foreman doing his duty to the company or the fireboss?" I would say, Yes!

Let me suggest, here, How can a fireboss expect to become an efficient mine foreman if he does not know how to lay tracks, set timber and perform other work that is necessary to be done in the operation of a mine. In doing this, I do not think that a foreman is lowering the standard of firebossing. On the contrary, he is increasing the general efficiency of the mine by training the next man under him so that he will be able to perform his duties in his (the foreman's) absence from the mine.

The Training a Good Fireboss Needs

The fireboss who has had such training will be better prepared for promotion, because of his ability to perform other work than that in his own particular line of duties. It is important that he should know, from his own experience, how long a time is required for a man to lay a switch, set a timber, or do any other work that may be required of him.

In my own experience of six years of firebossing, let me say that when I had completed my morning inspection I have often acted as roperider, mule driver, tracklayer, machine runner and timberman. But, in all that time, I have never been asked by my foreman to do anything contrary to the state law. Had he made such a request, my answer would have been, "No, I would rather give up my place than to be unjust in my duty to the state and to the miners in my charge." I want to add that, in my opinion, every mine foreman should have come into his position only after five years of practical experience underground and by the fireboss route.

Utah.

Carbon County, Utah.

Lubricating Mine Cars

Letter No. 1—In response to the request for an expression of opinion, from mining men, as to the cost of lubricating mine cars equipped with the average type of plain-bearing wheels, a comparative reference being made to the cost when cars are equipped with roller bearings, I am pleased to submit the following data, hoping to let light in on a subject that has frequently been in dispute:

We operate a drift mine and have in use 420 mine cars equipped with plain bearings. These cars will average 12 mi., each, per day. Our records show that we purchased, during 1918, 6204 gal. of blackstrap oil. Of this amount 1034 gal. were used on the mining machines, which supply was kept at a point nearly a mile from our mine-car oiling station. This fact precludes the idea that any of the oil supply for mining machines could, by any mischance, be included in that used on the mine cars. The balance of oil used for lubricating the cars was 6204 — 1034 = 5170 gal. Our oil contract, for 1918, was 11.5c. per gal. The average cost of lubricating each car, for that year, therefore, was (5170 ÷ 420) × 0.115 = $1.415.

During the year 1918 we worked a total of 240 days, and paid our oiler $4.18 per day, which made a total of $1003.20, and the cost of labor for oiling each car was 1003.20 ÷ 420 = $2.389 per year, which, added to the cost of the oil, gives 1.415 + 2.389 = $3.804 per car, per year.

Now, for the sake of comparison, let me assume that our cars were equipped with flexible roller bearings, instead of plain bearings. In that case, the cost would have been about as follows: I will take the figures quoted by "Observer," in the inquiry to which I have referred, and assume 16 lb. of grease to be required, per car, per year. The market quotation for flexible-bearing grease, in this vicinity, is 17c. per lb. and not 10c., as stated by "Observer," This would make the cost for grease 16 × 0.17 = $2.72, per car, per year.

Greasing vs. Oiling Mine Cars

It takes much longer to grease cars than to oil them, and "Observer's" estimate of 40 days, for greasing the cars, is probably correct. We pay for this work $4.18 a day, which would make the cost of greasing 420 cars, 40 × 4.18 = $167.20, per year, or 167.20 ÷ 420 = $0.398, per car, per year. The total cost for grease and labor is, therefore, 2.72 + 0.398 = $3.118, per car, per year.

Now, the apparent saving by greasing, instead of oiling the cars, is 3.804 — 3.118 = $0.686 per car, per year. In our case, the saving for greasing 420 cars would be 420 × 0.686 = $288.12, per year. Comparing this small saving with "Observer's" estimated saving of $6530, per year, for greasing 500 cars, I might ask, in the language of the street, "Where does he get that stuff?"

View of a Prejudiced Salesman

Quite recently, a demonstrator who represented one of the largest grease companies in the United States called at my office on business. While we were conversing, the mail was brought in, and the issue of *Coal Age*, for February 20, was laid on my desk. I am always especially interested in the *Coal Age* discussions, and my eyes quickly caught this inquiry of "Observer," to which I have referred.

After a cursory glance through the article, I handed it to my visitor and asked for his opinion, it being in his direct line. Taking a few moments to glance through the article, he replied, "Obviously inspired." Such also is my opinion. My visitor was especially interested in the price of 10c. for grease, and informed me that flexible-bearing grease was then selling for 17c., with a possibility of its going higher in a few days.

I frankly admit that our cost of lubrication is low, as compared with many mines that I have visited. However, we hire a competent man and give him the best oil we can buy. He has other duties to perform besides oiling the cars. We have very few complaints from drivers and other men, in regard to stiff running cars, although we occasionally find a dry wheel.

Our practice of oiling cars in broad daylight is a distinct advantage over the practice of performing this work in the dim light of a shaft bottom. I too have seen mines where much oil is wasted; but, in every case, the oiling was being done by a young irresponsible boy. In a mine where haulage is performed over a good track and roadbed, and the rolling stock is kept in good condition, there is little cause for low production owing to delays on the road. Let me close with the remark that it would be interesting to get actual figures on the cost of lubricating flexible-bearing mine cars.

J. S. Gelston, Supt.,

Noblestown, Penn. Fayette Coal Co.

INQUIRIES OF GENERAL INTEREST

EDITED BY JAMES T. BEARD

Surveying in an Inclined Seam

I beg to submit the following question for solution in *Coal Age*. As it is worded it is difficult to understand:

A vein dips 60 deg. to the south and strikes N 70° E. Consider the outcrop of the vein as having an elevation of 3650 ft. At a distance of 500 ft. from the outcrop, a vertical shaft is sunk to intersect the vein, the elevation of the surface at this point being 3601. From this shaft, the mouth of a crosscut tunnel bears S 60° E, 2000 ft., on a vertical angle of —30 deg. This tunnel is driven N 33° W, on a 2 per cent. grade, to intersect the vein. It is required, now, to find the length of a slope driven on the vein, from the foot of the shaft to the head of the tunnel. STUDENT.

Shamokin, Penn.

We believe the accompanying sketch, which approaches an isometric perspective, will make the probable meaning of this question clear. Assume two vertical planes, as indicated by the fine dotted lines in the figure, are passed through the outcrop and the shaft, respectively, and parallel to the strike of the seam, which is N 70° E. This seam dips to the south and the direction of the dip, which is at right angles to the strike, is therefore S 20° E. The inclination of the seam is given as 60 deg.

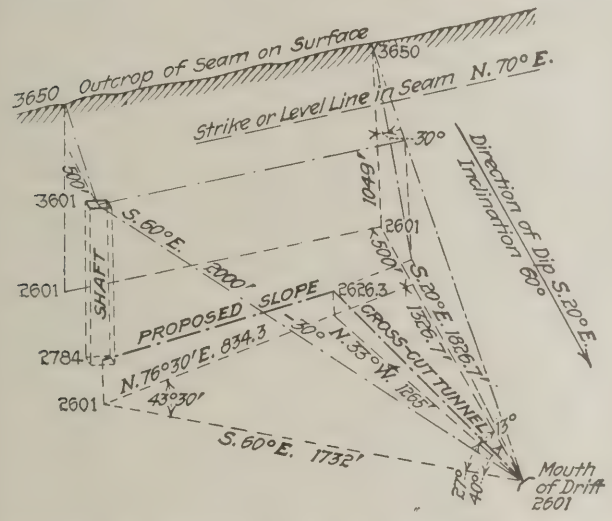


DIAGRAM OF OUTCROP, SHAFT, TUNNEL AND SLOPE

In the space at our disposal, it is only possible to give, in their order and briefly, the successive steps in this problem. The first step is the calculation of the horizontal triangle underlying the crosscut tunnel, the proposed slope and the line joining the top of the shaft with the mouth of the drift. All that is known in this triangle is the direction of two of its sides, as given by the bearing of the mouth of the crosscut tunnel from the shaft, S 60° E, and the direction of the crosscut tunnel itself, N 33° W, respectively. The difference between these two bearings is 60 — 33 = 27 deg., which is therefore the angle included between the two sides of the triangle mentioned. It is necessary, now, to calculate the lengths of these two sides. The first side is the horizontal projection of the line joining the top of the shaft and the mouth of the tunnel and its length is found as follows:

From the reading of the question, the 2000 ft., from the top of the shaft to the mouth of the drift, is to be taken as pitch measurement, on an inclination of —30 deg. This corresponds to a horizontal measurement of 2000 × cos 30 deg., or 2000 × 0.866 = 1732 ft. Likewise, the mouth of the drift is 2000 × sin 30 deg., or 2000 × 0.5 = 1000 ft. below the top of the shaft, making its elevation 2601.

The second side of the triangle is the horizontal projection of the crosscut tunnel. In order to calculate its length, assume a vertical plane is passed through the mouth of the drift and parallel to the full dip of the seam. Projecting the line S 60° E, 1732 ft. onto this vertical plane gives, for its corresponding length, 1732 × cos 40 deg., or 1732 × 0.766 = 1326.7 ft. Adding to this the distance from the outcrop to the shaft, 500 ft., gives 1826.7 ft. for the horizontal distance the mouth of the drift is from the outcrop. The vertical height of the outcrop above the drift mouth is 3650 — 2601 = 1049 ft.

Now, in order to determine the point where the crosscut tunnel intersects the seam, it is necessary to project the line of the tunnel on the vertical plane passing through the mouth of the drift and parallel to the full dip of the seam. This projected line will have a slightly greater grade than that of the tunnel. The increased grade is found by dividing the grade of 2 per cent. by the cosine of the angle between the cross-tunnel and the plane of projection, which is 13 deg. Thus, 0.02 ÷ 0.974 = 0.0205, which is the tangent of the grade angle of the projected line. Then, calling the rise of this projected line at the point where it intersects the seam x, we have

$$\frac{x}{0.0205} + (1049 - x) \tan 30^\circ = 1826.7$$

$$x = 25.3 \text{ ft.}$$

The elevation at the head of the crosscut tunnel is, therefore, 2601 + 25.3 = 2626.3 ft. Now, dividing the given rise, by the percentage of grade of the tunnel gives, for the horizontal length of the tunnel, 25.3 ÷ 0.02 = 1265 feet.

In the horizontal triangle previously mentioned, there are now known two sides and their included angle. The lengths of these sides are 1732 and 1265 ft., respectively, and the included angle is 27 deg. Then, calling the angle that the proposed slope makes with the line joining the foot of the shaft and the mouth of the drift A, it is found thus

$$Tan\, A = \frac{1265\ sin\ 27^\circ}{1732 - 1265\ cos\ 27^\circ} = \frac{1265 \times 0.454}{1732 - 1265 \times 0.891} = 0.949$$

The angle A is, therefore, 43° 30′, which makes the bearing of the proposed slope N 76° 30′ E. The horizontal length of this slope in 1265 × sin 27 deg. ÷ sin 43° 30′ = (1265 × 0.454) ÷ 0.688 = 834.3 ft.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Hoisting Engineers' Examination, Springfield, Ill., Dec. 18, 1918

(*Selected Questions*)

Ques.—What is the breaking strain and safe working load for a good steel hoisting rope 1¼ in. in diameter?

Ans.—The breaking strain of a crucible, cast-steel, 6-strand, 19-wire, hoisting rope, 1 in. in diameter, is 39 tons. Then, since the strength of wire rope varies approximately as the square of the diameter of the rope, the breaking strain of this rope, 1¼ in. in diameter, is

$$S = 39d^2 = 39(1\tfrac{1}{4})^2 = 60.9 \text{ tons}$$

For a moderate depth of shaft, say not exceeding 100 yd., the working load on this rope would be taken, commonly as one-fifth of the breaking strain, or in this case, say 12 tons. In deeper shafts and where a high speed of hoisting is employed the safe working load may be estimated as one-eight or even one-tenth of the breaking strain of the rope.

Ques.—(a) What is steam and how is it produced? (b) What is meant by high-pressure and what by low-pressure steam?

Ans.—(a) Steam is the vapor that is produced when the temperature of water is raised above its boiling point, for any given pressure. In steam-engineering practice, steam is produced by the evaporation of water in a boiler constructed for that purpose and provided with a furnace for heating the boiler.

(b) This question cannot be answered intelligently without knowing its application. In steam-heating practice, "low-pressure steam," is generally understood to refer to a steam pressure not exceeding 15 lb. gage. On the other hand, in steam-engine practice, the terms "low pressure" and "high pressure" applied to steam have a purely local designation or meaning. What would be low pressure, in the operation of some types of engines, would be high pressure for engines of another type. In ordinary hoisting practice, where steam engines are employed, the term "low-pressure steam" may be taken, generally, as steam pressure not exceeding 150 lb. gage, and higher pressures than this might be termed "high-pressure steam;" but there is no actual line of demarkation in engine practice.

Ques.—Define a unit of heat.

Ans.—A unit of heat is the quantity of heat required to raise a unit weight of pure water, at its maximum density, 1 deg., in temperature. There are several heat units in common use, depending on the denomination of the unit of weight and the scale of temperature used. For example, the British thermal unit (B.t.u.) is the quantity of heat required to raise the temperature of 1 lb. of water 1 deg. of the Fahrenheit scale. The French unit is the quantity of heat required to raise the temperature of 1 kg. of water 1 deg. of the Centigrade scale. This unit is called a "calorie." Another unit, sometimes used, combines the two units just given and is called the "pound-calorie." It is the quantity of heat required to raise 1 lb. of water 1 deg. of the Centigrade scale. In each case, the water is pure distilled water, at its maximum density (4 deg. Centigrade).

Ques.—What is meant by water line, steam space, and heating surface of a boiler?

Ans.—The water line of a boiler is the mean water level, which is midway between the lower and upper try-cocks of the water column of the boiler.

The steam space of a boiler is all the space above the water line.

The heating surface is the entire surface of the boiler and tubes or flues that is exposed to the hot gases and flame of the furnace.

Ques.—(a) Define the terms "natural draft" and "forced draft." (b) How is the latter produced?

Ans.—(a) Natural draft, in boiler practice, is the ordinary draft produced by the column of heated gases ascending the stack. A forced draft is that produced by a fan or blower.

(b) Mechanical draft is produced in two ways: What is commonly called "forced draft" is caused by blowing air into the ashpit, which is closed, whereby the air is forced up through the fire. An "induced draft" is often produced by a steam jet or exhaust fan in the flue leading to the stack. By this means, air is drawn through the fire and the draft increased. Both of these forms of artificial draft are often styled "forced draft."

Ques.—What thickness of steel plate is required in the shell of a cylindrical boiler 60 in. in diameter, for a safe working pressure of 100 lb. per sq.in., the tensile strain on the boiler plates not to exceed 8000 lb. per sq.in., and no allowance to be made for joints?

Ans.—Let p = safe-working steam pressure (lb. per sq.in.); d = diameter of boiler shell (in.); t = thickness of metal in the shell (in.); S = allowable stress in the steel plates forming the shell (lb. per sq.in.) Then, the required thickness of the shell in the cylindrical boiler is calculated thus:

$$t = \frac{pd}{2S} = \frac{100 \times 60}{2 \times 8000} = \tfrac{3}{8} \text{ in.}$$

Ques.—What pipe fittings, valves and other attachments are used in setting up and connecting a boiler and engine?

Ans.—First, the feed pipe, with its check valve and two stop valves, connecting the feedpump with the boiler. Second, the steam pipe leading from the boiler to the engine, with its globe valve and non-return stop valve. Third, the blowoff pipes, including both the surface blowoff and that from the mud drum with their valves. The attachments that come with every boiler are the water column, with its try-cocks and gage for ascertaining the water level in the boiler; fusible plugs for guarding against the danger of low water in the boiler; the safety valve for relief of any excess boiler pressure. To these attachments will generally be added the feed-water heater and a steam separator for separating the steam from its entrained water, together with a steam trap for draining off the water that collects in the pipe system.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

American vs. English Coal Output and Prices

A situation of extraordinary gravity has developed in England in relation to coal. Unless it is corrected, and at present this appears to be a thing of great difficulty, the British are certain to labor under heavy handicap in manufacturing and in world trade.

Coal sells today in Birmingham, Manchester, Bradford and other big industrial centers at $10 a ton wholesale. That means a long ton of 2240 pounds. The cost of coal at the mouth of the mine has been climbing steadily. In 1913 it was $2.18 a ton. In 1915, $3.11; in 1917, $4.17½; in 1918, $6.20. Now the miners demand a six-hour workday and an increase in wages. If they get them it is estimated the cost of coal at the mine mouth will average $8.25 a ton.

It must be understood British coal is bituminous. It must be understood also that one-third of all the coal mined in England and Wales has been exported, going to Italy, Spain, Norway, Sweden, Africa, South America and to the innumerable coaling stations mentioned along the lanes of the seven seas.

Pocahontas coal, one of the highest grades of bituminous in America, sells at $2.75 a ton at the mines. This is 40 cents a ton higher than the last price set by the fuel administration. Compare that with the British price and you will appreciate the plight of the British coal producer.

British trade has been buttressed by British control of coal. Thousands of ships went out from British ports with coal and came back with freight—raw material, usually, for British manufacturing establishments to turn into finished goods. Cargo each way lessened the freight rates.

Return Cargoes a Stumbling Block

One of the difficulties America labored under in endeavoring to build up a foreign trade has been that usually it was not able to provide freight both ways.

Now it appears as if America is going to win from Great Britain a considerable percentage of the coal trade of the seas. Great Britain's exports normally have been 80,000,000 tons a year. Today America can deliver coal in South America, Spain, Africa or the Mediterranean cheaper than the British.

Appreciating what this portends, the British Government has taken radical action. It has made a thorough investigation of the coal situation. It has discovered that while the price of coal has been vaulting to heights never reached before in England, production has been decreasing not only in gross quantity, but in tons per man employed. From 274,000,000 in 1913 the yield in 1918 in Great Britain dropped to 218,000,000. Nearly 1,000,000 men are employed in coal mining in the British Isles. In America the production has been increasing enormously until now the gross output is more than three times that of Great Britain. But that is only part of the story. The American coal miner produces three times as much coal per day as the British miner.

The investigation of the British Government shows that mine owners have taken advantage of the public in the war period. Their net profits in 1914 on a production of 266,000,000 tons was $75,000,000. In 1918 on a production of 128,000,000 tons it was $195,000,000.

It practically is certain the Government will take over the British coal mines, close all those where the production costs are excessive and do everything possible to increase production in mines where the costs are moderate comparatively.

This will help, but not enough. The chief difficulty is basic. The British mine is not equipped for economical working as is the American mine, and the British miner is not comparable to the American miner in ability.

Nothing that has come out of the war is likely to play a larger part in promoting America's foreign commerce than this revolution in the coal situation.

America's coal exports have been small. They are likely, as soon as sufficient tonnage is available, to reach to tens of millions of tons a year. That will mean much in lessening the ocean freights and drawing raw materials to America for manufacture. The largest single item, however, will be in making it possible for American industrial establishments, through comparatively cheaper fuel, to meet foreign competition in all the broad markets of the world.

Exports of Coal and Coke During February, 1919

Districts	Anthracite, Tons	Bituminous, Tons	Coke, Tons
Maine and New Hampshire	7	3,573	39
Vermont	574	987	29
Massachusetts	250	1,035	.....
St. Lawrence	56,127	89,288	3,221
Rochester	8,069	45,881	790
Buffalo	145,644	129,956	13,332
New York	615	3,561	1,586
Philadelphia	9,503	21,468	.....
Maryland	.....	31,858	3,777
Virginia	.....	194,814	920
South Carolina	.....	3,960	.....
Georgia	.....	1,466	.....
Florida	.....	2,024	.....
Mobile	.....	44	.....
New Orleans	.....	2,025	14
San Antonio	127	1,817	2,587
El Paso	25	2,018	933
Arizona	.....	1,294	9,367
Southern California	.....	13	.....
San Francisco	.....	.....	32
Washington	4	354	297
Dakota	73	402	151
Duluth and Superior	.....	1,552	27
Michigan	.....	128,364	7,390
Ohio	.....	46,037	4,314
Porto Rico	.....	160	.....
Total	221,018	713,951	48,806
Countries:			
France	.....	.....	1,311
Italy	.....	4,933	.....
Netherlands	.....	15,076	.....
Turkey in Europe	201	200	.....
British Honduras	.....	45	.....
Canada	210,721	446,429	29,490
Costa Rica	.....	.....	40
Gautemala	.....	50	3
Honduras	.....	750	10
Nicaragua	.....	224	13
Panama	.....	8,661	.....
Salvador	.....	.....	7
Mexico	152	5,142	13,589
Newfoundland and Labrador	250	.....	.....
Barbados	40	10,692	.....
Trinidad and Tobago	.....	3,064	.....
Other British West Indies	50	.....	.....
Cuba	9,503	40,644	.....
Virgin Islands	.....	469	.....
French West Indies	.....	1,641	2
Dominican Republic	.....	1,099	.....
Argentina	.....	38,993	218
Brazil	.....	67,825	190
Chile	.....	49,056	.....
Colombia	.....	1,371	.....
Peru	.....	5,580	3,913
Uruguay	.....	12,007	.....
Venezuela	.....	.....	20
Turkey in Asia	101	.....	.....
Total	221,018	713,951	48,806

BUNKER COAL

Maryland	21,819
New York	209,619
Philadelphia	23,819
Virginia	69,845

The Department of Mines of Australia has been investigating the coal deposits at Leigh Creek in the hope of finding coal suitable for commercial uses, but so far has not met with success. A method is now being sought whereby the low-grade coal found in Southern Australia can be utilized, as all coal used there at present is shipped from Newcastle, England, and the lack of ships is making it difficult to procure ample supplies.

Low Prices Will Help American Coal Exporters

For a number of years before the war the output of coal in the United States was substantially increasing, per unit of labor, while in England the tendency was in the opposite direction. Also, the costs of production in Great Britain were higher than those in the United States. But by reason of geographical and other advantages England kept a long lead in the export of coal.

The demands of the British miners and the continued diminishment in the output of Great Britain's coal mines have made it possible for the United States to enter foreign markets where England had formerly reigned supreme, says an article in a recent issue of the Philadelphia *Public Ledger*. And in this connection it may not be inappropriate to call to attention certain interesting investigations into the general problem of international fuel prices conducted on behalf of the United States Government before the war.

These investigations related, primarily, to the possibility of diverting trade from the old Suez Canal route to the new Panama route by means of cheap coal. When competition between the Suez and Panama routes, and between American and British industries comes into full play, the price of coal will be a dominating factor. In many cases where the distances between western European and eastern American and Canadian ports, on the one hand, and those of the Orient, Australia, New Zealand and South America, on the other, are anything like equal by the rival routes, coal prices will decide which way the vessels will go; and, of course, whether they use British or American coal on their voyages. If coal prices are much lower at stations on the Panama route than at those on the Suez route, the new waterway will attract the most trade and British interests will suffer to that extent.

Government Started Investigation

Our Government recognized the importance of this coal price question as soon as it was seen that there was a good prospect of the Panama Canal being opened to traffic. Experts were set to work on an elaborate investigation. Various classes of coal were tested for their steaming values, their prices at different coaling stations compared, and estimates as to the price at which American coal might be supplied to vessels using the Panama Canal were prepared.

It was laid down that cheap coal would do as much as low tolls to attract traffic to the new canal and build up the industries of the countries whose trade would be tributary to the canal. It was pointed out that the Government would have to maintain coaling stations at the canal to supply the navy, and that the sale of coal to merchant vessels would simply require larger storage. Further, it was insisted that coal should be supplied at or near bare cost. Since then the Government has established huge coaling stations at both ends of the canal, and it has been decided to increase greatly the coaling accommodation at several ports on the Panama route.

It was established as a result of the investigation that New River coal was only 5 per cent. inferior to best Welsh coal in steaming quality, and from a long list of prices given in a Government publication it appeared that even then, before the Government had got its scheme launched, New River coal was being supplied to ships at St. Lucia, Windward Islands, at about $5.50 a ton, while Welsh coal was about $6 at Port Said. It was stated that while Welsh coal was in the neighborhood of $5.75 at Southampton, Morrisdale coal was only $3 at New York.

It was pointed out that the coaling stations along the Suez route obtained their coal mainly from Wales, England and Scotland, and that the prices varied from 21s. for Durham to 26s. for Welsh at Port Said, whereas it was anticipated that New River coal could be supplied at Colon, or Cristobal, Panama, at least as low as $4.43 by

the time the canal was opened and as low as $3.96 eventually. When the war broke out the Panama Railroad Co. was getting its coal for $2.70 Norfolk, plus $1.39 for transportation to Colon.

By way of illustration, a steamer of 4640 tons gross, making a round voyage of ten knots from New York to Manila by way of Suez, coaling at the usual stations, costing $20,868, was assumed to have made the trip via Panama, coaling at New York, Newport News, Colon, San Francisco, Japanese ports, Moji, San Francisco again, and Colon, and the cost was figured at $18,222—a saving of $2646. The saving was found to be due to the lower prices at Panama than in the Mediterranean and at Japanese ports than at Sebang.

Another Coal Field Dispute in Europe

The coal fields of the Teschen district, in dispute between the Czecho-Slovakia and Poland, present one of the most difficult problems before the peace conference. Both nationalities claim the district is essential to their development. Of the total population of 600,000 about one-third are Czecho-Slovaks and the rest Poles, but if the district were divided on racial lines the industrial district and the railways would be split so as to be of little value to either country.

The Teschen mines are declared to provide the only coking coal available for Czecho-Slovakia and consequently her industries cannot live without them. Warsaw is supplied with gas from the Teschen fields and is dependent upon them for the light, heat and power for the city. Poland, it is stated, has other coking coal fields, but has not developed them.

The Peace Conference Commission on Polish Affairs and the Inter-Allied Commission sent to Poland have been working hard in an endeavor to arrange some plan which will make the Teschen coal available for both countries.

Swiss to Get Saar Coal

The Swiss Federal Council has ratified the economic agreement made with France in Paris, on March 25. Under this agreement, the French government will undertake to deliver to Switzerland each month 60,000 tons of coal from the Saar mines situated on Lorraine territory. The convention stipulates that the French government will assure Switzerland of a supply of steel, to the best of its ability. In return Switzerland shall export to France 25,000 head of cattle, of which 15,000 are to be delivered immediately and the remainder during the present year. The convention will be valid until Dec. 31, 1919.

Poland's Coal Deposits

One of Poland's greatest needs is the modern development and full exploitation of its coal mines, says George Fudakowski, manager bf the Commercial and Industrial Bureau of the Polish National Department, at New York.

Poland's coal fields occupy an area of 2048 square miles and are situated in Dombrowa, Cracow and the Silesian Basin. The deposits in this area are estimated at 94.33 billion tons, of which 61 per cent. is in Upper Silesia; 34 per cent. in Galicia and Austrian Silesia, and 5 per cent. in former Russian Poland. The coal is of good quality, produces little ash, but only the coal of Upper and Austrian Silesia can be transformed into coke. The beds are of considerable thickness and are generally found not far from the surface.

In 1911 the coal produced from these three sources amounted to over 52,000,000 tons, exceeding the annual production of France, which was estimated in 1910 at 41,000,000 metric tons, and represents one-third of the production of coal in Germany without Upper Silesia, the total production of Germany in 1913 being 191,500,000 metric tons.

Mr. Fudakowski says that it is the purpose of the Bureau to present to American investors the development of electrical power in the Polish Silesian coal districts, transmitting it to the main industrial centers in the vicinity of Lodz and Warsaw, a carrying distance of between 120 and 180 miles. This, he says, will permit not only the control of electric power distribution in the mining district, with its numerous industrial establishments, but it will also permit supplying other industrial and agricultural establishments throughout the country.

Foreign Coal Trade Opportunities

A firm in Spain desires to get in touch with shippers of gas and steam coal for that market. Quotations should be given f.o.b. port of departure. Reference. Address Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its branches, and refer to Opportunity No. 29043.

A wholesale coal dealer in Sweden wishes to purchase steam coal for use in smithys, gas, and for briquets, etc. Quotations should be given f.o.b. Cash will be paid. Reference. Address Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its branches, and refer to Opportunity No. 29044.

Italians in Straits for Coal

Italian public opinion is very much aroused by the apparent indifference of other countries toward the great crisis that Italy is facing. The coal situation is most serious and unless immediate relief is obtained many of the largest industries will be obliged to suspend activity. The attempt to increase the limited English supply sent to Italy with supplies for various other countries has failed. France has promised to ship 80,000 tons of coal monthly, amounting to about one-tenth of the minimum requirements of Italy. America could furnish the difference, but there is not the necessary tonnage available. Transportation from Germany is also difficult.

Will Take Years To Rehabilitate Pas de Calais Mines

While the securing of coal from the Saar valley will permit some activity in the iron industry in Alsace-Lorraine, Westphalian coal must be had if the industry is to be brought to full efficiency. This is the opinion of Frank H. Probert, the dean of the College of Mining of the University of California, who just has returned from a visit to Europe. Professor Probert, who is consulting engineer of the Bureau of Mines, visited the mining areas in the devastated regions as a member of the Bureau of Mines committee, which is studying the problems presented in the rehabilitation of mines there.

The physical damage done to the iron mines in Alsace and Lorraine, says Professor Probert, was not great. The principal damage has been caused by the pursuit of ore extraction without thought of the permanency of the work or advance development. Much time will be required to replace the steel plants. Most of the magnificent plants in this area were subjected to scientifically conducted destruction. Ample proof of the wilful nature of this destruction is in the possession of the allied military authorities.

Such plants as are left must depend on German coal. Professor Probert is hopeful that an arrangement can be made which will permit of the importation of Westphalian coal for these plants. The absolute destruction of the coal mines in the Pas de Calais section makes it necessary to use either the Westphalia or the coal from the Saar valley. The Saar mines, however, produce a poor quality of coking coal. It will not be possible to operate blast furnaces efficiently unless provision is made for the introduction of better coal.

It will be five years, in the opinion of Professor Probert, before it will be possible to dewater and to reopen the mines in the Pas de Calais section. It will be ten to fifteen years, according to his prediction, before they can be brought back to pre-war production. The flooding of the eastern end of the district offers the greatest problem in reclaiming these mines. It will be necessary to remove some 25,000,000 cubic meters of water. While it is not known how much quicksand has come into the mine, Professor Probert believes that it will be possible to reclaim most of the old shafts and laterals.

Prepayment of Charges on Slack Coal Consigned to Canada

Effective Apr. 15, 1919, Canadian railroads will include in their coal tariffs from frontier points to Canadian destinations the following statement: Freight or other charges will not be advanced on shipments of bituminous slack coal from United States points. All charges through to destination must be prepaid or guaranteed.

1. The New York Central R.R. will not itself guarantee to the Canadian lines collection of charges either to or beyond the frontier on bituminous slack coal.

2. Charges must be prepaid through to destination or satisfactorily guaranteed by shippers and prepayment or guarantee will be passed to Canadian carriers by the New York Central R.R.

3. Reconsignments of bituminous slack coal from original destinations in the United States to destinations in Canada, or from one Canadian destination to another to which the rate from the mines is higher, will not be performed by the New York Central R.R. unless the party requesting such reconsignment prepays or makes satisfactory guarantee of all freight or other charges through to such Canadian destinations.

4. When charges are guaranteed, a statement to that effect must be shown on or accompany the original waybills.

Our Coal Wanted by Swiss

The New York *Tribune* reports:

"Charles A. Anderson & Co. have received cable requests to buy up a large tonnage of coal for Swiss consumers. This is said to be the first time that country has sought to buy coal in the American market, as her logical sources of supply are, under ordinary circumstances, Germany, France or England. The labor troubles in England as well as in Germany, and the wrecking of the French mines in the Lens region during the war, are said to have forced the Swiss to seek fuel supplies in this country. The coal will be forwarded as soon as arrangements can be made for transportation.

An order for 25,000 tons of coal for export delivery has been placed in the Fairmont region of West Virginia. This coal will be shipped to a neutral European country by way of Curtis Bay and is regarded as the beginning of the export movement. One of the large companies in Harrison County started to get out this coal on Tuesday, Apr. 8.

There will be no import duties on coal or siderurgical material into Italy until May 1, according to a cablegram received by the Bureau of Foreign and Domestic Commerce of the Department of Commerce. On account of the coal shortage the consumption of gas has been restricted to certain hours each day. The Commissioner of Fuel stated, in an interview, that the fuel products of the country could be developed to meet its requirements. He also stated that he was in a position to supply 800,000 tons of lignite for railway industrial purposes.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Mar. 9	Amer. S.S. Lake Markham	Havana, Cuba	2380	349
Mar. 9	Amer. S.S. Lake Gratis	Barbados, B. W. I.	3463	468
Mar. 9	Amer. S.S. American	Rio de Janeiro, Brazil	7101	1496
Mar. 9	Amer. S.S. Calispell	San Juan, P. R.	2995	216
Mar. 10	Ital. S.S. Alcazar	Gibraltar FO (Italy)	4082	479
Mar. 11	Br. S.S. Benedict	Para, Brazil	1887	853
Sewalls Point				
Mar. 8	Nor. S.S. Ryvarden	Kingston, Jamaica	1522	199
Mar. 8	Am. Sch. F. H. Odiorne	Hamilton, Bermuda	381	....
Mar. 10	Amer. S.S. Lake Yahara	La Plata, A. R.	2586	850
Newport News				
Mar. 2	Am. Sch. General Pershing	Rio de Janeiro, Brazil	2466	....
Mar. 5	Amer. S.S. Lake Fluvanna	Fort de France, Martinique	2983	378
Mar. 8	Amer. S.S. Lake Chelan	Cienfuegos, Cuba	2030	122
Mar. 9	Am. Sch. Irene S. Wilkinson	Rio de Janeiro, Brazil	1150	....

COAL AND COKE NEWS

EDITED BY ALEX MOSS

What Happened in March

[The bracketed figures in the text refer to pages in the present volume and should the reader desire further information he can obtain it by reference to the pages indicated.]

Mar. 3—Senator Vardaman declares that high prices of anthracite during the war were the outcome of monopoly, and that royalties in the anthracite region are too high [XV, 451, 496, 497]—Governors of states and mayors of cities meet in conference at the White House, Washington, D. C., with members of Cabinet and others. They discuss means of reviving business.

Mar. 4—About 16,000 harbor workers in New York harbor go on strike against Macy award of 12-hours' pay for 8 hours of labor and other concessions. They demand an increase of 30 per cent. in the wage rate also.—A. L. Dickenson, financial advisor to the Coal Controller of Great Britain, announces that for the first 8 months of 1918 the profit on mining in that country averaged 86c. per ton on coal having an average cost of $6.05, which is 14.2 per cent. profit per ton. This is over three times average profit in the 5 years ending 1913, when the profit was 24.3c. per ton and the price at the pithead $2.13. Some companies in 1918 were making $1.46 per ton—S. D. Warriner makes reply to the Mar. 3 statements of Senator Vardaman [XV, 494].

Mar. 5—Ten men almost overcome fighting "Jersey mine fire" at Chauncy Colliery of George F. Lee Coal Co. [XV, 510]—Governors and Mayors' conference adjourns sine die after recommending Government activity in railroad construction, the ascertainment by Government of fair prices for staples, opposing price fixing, urging further reductions in freight rates for building materials, opposing reductions in wages till prices fall, asking Federal Government to use its influence in favor of higher street-car fares, impressing on Government need for speed in making war contract settlements and announcing its policy as to excess material on hand, recommending inquiries into wastes of natural resources, calling for continuance of public employment agencies, urging the mustering out of soldiers at point of enlistment, advocating suitable memorials to the heroic dead and recommending that the controllers of natural resources who withhold them for speculative profit or visionary future development be compelled to release them.

Mar. 11—Charles P. Neill gives decision in favor of the cranemen, engineers and firemen engaged in steam-shovel work at the Jeddo stripping of G. B. Markle Co. [XV, 541].

Mar 13—Governor W. C. Sproul of Pennsylvania announces that he has asked Attorney-General W. I. Schaffer what powers are vested in the State Government to inquire into the rise in the cost of anthracite [XV, 553]—Mine workers protest against the Girard royalties as excessively large and as operating to close such mines as have to pay them [XV, 542].

Mar. 18—Policy Committee of United Mine Workers of America advocates 6-hour day, 5-day week, substantial increase on tonnage, daywork, yardage and deadwork prices with Government ownership [XV, 541, 583].

Mar. 19—Fuel Administration urges the buying and stocking of coal to avert coal famine next winter [XV, 579]—Dr. H. A. Garfield desires the National Coal Association to submit in a referendum to all its members a plan of governmental cooperation [XV, 580]—Thirteen United Mine Workers' leaders are indicted for being parties to a shooting at the mines of the E. E. White Coal Co. in November, 1917, the Raleigh, W. Va., grand jury returning a true bill [XV, 630]—Mine workers in Essen region, Germany, adopt resolution in favor of 7½-hour day, to be reduced later to 6½ hours [XV, 630].

Mar. 20—Sankey Commission makes interim report on the wage question in Great Britain advocating more wages, shorter time, regulated prices and government to stand some of the losses in production [XV, 585].

Mar. 25—Conferences between Industrial Board of Department of Commerce and the National Coal Association for the stabilization of price open at Washington, D. C.—Bill introduced into Pennsylvania House of Representatives providing for a 1 per cent. tax on all coal produced in the state [XV, 642].

Mar. 26—Conference between National Coal Association and Industrial Board to provide stabilized prices for coal [XV, 625].

Mar. 27—Conference for stabilization of coal prices ends, the National Coal Association declaring that the United States Railroad Administration is not willing to agree to buy coal at the price to be named but desires to get coal below cost at the expense of the smaller consumer.

Mar. 29—30,000 men on strike in the mines around Essen, Germany [XV, 721].

Mar. 31—Explosion at the Aguilar mine of the Empire Coal Co., in Las Animas, Col. Twelve men are entombed [XV, 686].

Harrisburg, Penn.

At present writing it appears probable that the Pennsylvania legislature will pass a resolution which will provide for an inquiry into the possibilities and advantages of health insurance and that it will abandon the proposed industrial accidents commission. Plans for health insurances and old-age pensions have been studied under action taken in 1917, especially in relation to the possibilities of establishing safeguards of this character against poverty and distress in industrial communities.

These inquiries will now be made more extended and, if present plans do not miscarry, the reports will be presented in the session of 1921 when the proposed commission for a revision of the constitution will also report. Those interesting themselves in the proposed legislation are disposed to make haste slowly, feeling that large changes are in the air and that it would be a mistake to enact legislation that would have to be changed in a few years.

Workmen's compensation is likely to occupy much of the attention of the legislature during the concluding weeks of the session of 1919. Efforts were made in the last session to change the law so as to provide for larger allowances, but it was thought best to let the code of 1915 prove its value or its need for revision by a further test of time. This year, however, the trend of public sentiment seems to favor changes, and the experiences of the last year are held to show the need for alterations. There are not lacking those who are vociferously and persistently advocating a larger measure of compensation.

During the week's recess of the legislature amendments have been prepared, for submission to the legislators, which will give the compensation board power to order direct payment to any dependent minor. It is said that this provision will make it unnecessary to appoint guardians where small amounts only are involved.

The problem as to who shall be deemed to be a dependent is to be settled by the provision that "an employee, who has been a member of the household of his parents and who has within the last six months prior to the accident or death contributed any part of his earnings to its maintenance, shall be conclusively presumed to have been a dependent." The bituminous coal interests have for a long time opposed such a definition.

Compensation which was payable before to a widow, widower, parent or grandparent for a period of 300 weeks will now be lengthened to cover 400 weeks, and it is stipulated that if a widow remarries she is to be given a lump payment in lieu of part of the compensation then payable. It is claimed that the insurance companies, which have much experience in these matters, favor this disposition of the problem.

Pittsburgh, Penn.

In order to provide adequate facilities for a large increase expected in the student body of the school, the School of Mines of the University of Pittsburgh this week has moved from State Hall, in which it has been housed for the last ten years, to buildings on the upper part of the University campus.

The National Retail Coal Merchants' Association met at the Fort Pitt, Apr. 12, and resolved to seek representation in any scheme of distribution that the Government may establish during the period of reconstruction and to encourage early buying of coal.

J. L. Lewis, acting president of the United Mine Workers, declared Apr. 11 that the miners' organization would be obliged to take "drastic action" unless there is a change of policy on the part of Director General Hines. "Since I have been in Pittsburgh," said Mr. Lewis, "I have learned that he is making contracts for coal during April. The custom has been to contract for six months' supplies. This means that the Director General will arrange to get coal during May for less than he paid in April."

Charleston, W. Va.

More progress is being made by the coal industry of West Virginia in building up foreign trade than in getting back the trade suddenly cut off when the armistice was signed. The biggest factor in preventing a return to normal conditions insofar as West Virginia is concerned is the pronounced uncertainty as to just what the future holds, an uncertainty which has only been more keenly accentuated because of the destructive policy of the Railroad Administration. The only fly in the ointment in the growing foreign trade is found in the insistence of the foreign buyer that all coal be furnished in special sizes, no slack being acceptable. This entails the screening of the coal and the storing of the slack.

W. J. Heatherman, Chief of the West Virginia Department of Mines, has announced the appointment of four additional mine inspectors under the terms of the Hale bill re-creating the department. This will bring the total number of inspectors up to 19.

The four new inspectors are W. B. Riggleman, of Fairmont, recently in the mine rescue service, for the Fifth district; J. G. Vaughan, of Montgomery, for the Eleventh district; Edward Nicholson, of Thurmond, for the Twelfth district; and L. D. Vaughn, of Jaeger, for the Eighteenth district.

The 15 inspectors reappointed and reassigned are: S. E. Hawkshaw, of Thomas, First district; W. H. Sandridge, of Grafton, Second district; Evan L. Griffiths, of Clarksburg, Third district; James Golden, of Morgantown, Fourth district; M. B. Coulter, of Moundsville, Sixth district; Eli J. Mason, of Charleston, Seventh district; E. L. Brewer, of Charleston, Eighth district; Zach Evans, of Handley, Ninth district; L. B. Holliday, of Whitesville, Tenth district; R. M. Lambie, of Mt. Hope, Thirteenth district; V. E. Sullivan, of Beckley, Fourteenth district; Thomas Stockdale, of Bramwell, Fifteenth district; H. L. Butler, of Welch, Sixteenth district; J. W. P. St. Clair, of Williamson, Seventeenth district; and R. L. Jenkins, of Logan, Nineteenth district.

Fairmont, W. Va.

The opinion is generally prevalent among West Virginia coal operators that there will be no appreciable lake business insofar as this state is concerned until well toward the latter part of May. There is still a large stock of coal on hand in lake territory from last year's shipments, and from all the information lake shippers can gather there will still be between 3,000,000 and 4,000,000 tons on hand after the middle of May. As large Ohio consumers still appear to have much coal stored so, for the time being, there is not much prospect of a good market in Ohio manufacturing centers.

While somewhat puzzled as to the necessity of the recent order from the Interstate Commerce Commission requiring coal to be purchased by the railroads only upon competitive bids, operators from the Fairmont district insofar as they have had an opportunity to study the order are inclined to look upon it as a part of the effort to reduce the price of coal. Coal producers are not inclined to believe that it will accomplish that object if such is its purpose. The order was transmitted to members of the Northern West Virginia Operators' Association by George T. Bell, the vice president, and reads as follows:

"To All Members—Please be advised that in accordance with section ten of the so-called Clayton act, the Interstate Commerce Commission has prepared regulations requiring the railroads to purchase supplies of all kinds by means of competitive bids, these competitive bids to be publicly opened. The commission has served notice on the railroads and the Director General of Railroads to show cause on or before May 15 why these regulations should not be put into effect immediately. The regulations provide that each bidder will have the right and opportunity to be present in person or by duly authorized agent at the time the bids are opened, and that a tabulated list of all bids will be furnished each bidder or his representative if requested."

Lead, S. D.

Pursuant to the wishes of the citizens of South Dakota, as expressed by the adoption of an amendment to the state constitution at the last election, whereby the state is to engage in coal mining, the Legislature of 1919 passed an act authorizing the appointment of a coal commission with full power to engage in the mining, sale and distribution of coal. The commission is composed of three members, of which the Governor is to be chairman. The act further provides for the acquiring of property by purchase or condemnation and appropriates money therefor.

South Dakota has lignite coal areas extending through Harding, Perkins, Corson, Dewey, Ziebach and Meade Counties, and the amount of available fuel is estimated at two billion tons. Many of the districts are so far distant from a railroad as to make their utilization impractical at this time, but those favorably situated will be investigated with a view to furnishing fuel for state needs. Investigations have been started in Dewey County to determine the extent, thickness of seams and overburden, and upon the result of this work will depend the future of this new industry. Should conditions warrant, the state will enter coal operations on a large scale with steam shovels for both stripping and mining. Much depends on the preliminary investigations, and the field will be thoroughly tested before steps are taken looking to a production of this fuel.

Victoria, B. C.

New coal areas are being developed both on Vancouver Island and in parts of the British Columbia interior. On the Island licenses have been applied for in the Comox district, and it is understood that T. R. Stockett, formerly of the Western Fuel Co., Nanaimo, B. C., is organizing a company in Seattle to develop the coal of these lands. H. W. Treat, of Seattle, also is proceeding with his preparations to open up areas which he has acquired on Chemainus Harbor, apparently confident that the Provincial title which he has acquired will be upheld by the Privy Council. Besides, it is authoritatively announced that coal measures 2½ miles south of Kamloops, B. C., are to be worked again after many years. Some eighteen years ago the blacksmiths of Kamloops and some of the householders of the community used to burn this coal. James L. Brown, of Vancouver, has held the ground for some time. Accompanied by David Evans, consulting engineer, Mr. Brown has returned from an inspection of the property and, as a result of Mr. Evan's examination and on his recommendation, a diamond drill is to be used to determine the extent of the coal measure. The coal is highly bituminous in character and the measures are reported by Mr. Evans to be of the same age and series as those of Vancouver Island.

New York, N. Y.

The War Department will open bids in Washington on May 7 for delivering approximately 2,500,000 tons of bituminous coal during the year beginning July 1 to the various army posts, camps, hospitals, etc., under its jurisdiction throughout the country.

The requirements for the camps, etc., in New York State are given as follows.

Camp Mills, Hempstead, L. I., 19,200 tons run-of-mine; Camp Upton, 30,200 tons run-of-mine; Fort Wadsworth, Staten Island, 720 tons run-of-mine; Watervliet Arsenal, Watervliet, 5894 tons run-of-mine; Army Reserve Dept., South Schenectady, 2900 tons run-of-mine; Fort Slocum, 1200 tons run-of-mine; Stores and Warehouse Division, Governor's Island, 960 tons 2½-inch lump; Fort Terry, 1392 tons run-of-mine; Air Service Depot, Garden City, 10,000 tons run-of-mine; General Hospital No. 38, Eastview, 6000 tons run-of-mine; General Hospital No. 5 and Fort Ontario, Oswego, 4950 tons run-of-mine; General Hospital No. 1, Williamsbridge, 865 tons run-of-mine; General Hospital No. 8, Otisville, 5970 tons run-of-mine; Port Utilities Officer, New York City, 420,000 tons run-of-mine (this tonnage for bunkering transports; only bids specifying recognized classified bunker coal will be considered).

Included in the requirements for New Jersey are: Fort Hancock, 2700 tons run-of-mine; Engineer Depot, Kearney, 10,800 tons ¾-in. lump; Camp Dix, 10,200 tons run-of-mine, Army Supply Base, Port Newark, 8300 tons run-of-mine; Raritan Arsenal, Metuchen, 11,400 tons run-of-mine; General Hospital No. 3, Rahway, 19,520 tons 4-in. lump; Amatol Arsenal, Amatol, 29,500 tons run-of-mine.

PENNSYLVANIA

Anthracite

Yorktown—After an idleness lasting since last February, caused by the light demand for anthracite coal, the Jeanesville and Yorktown collieries of the Lehigh Valley Coal Co. started work on Apr. 15.

Shenandoah—Two men were instantly killed and six other firemen narrowly escaped with their lives when a steam boiler burst at the Locust Gap colliery of the Philadelphia and Reading Coal and Iron Co. The men were employed at the boiler house as firemen and both were buried beneath tons of debris. The boiler left its foundations, sailing 25 ft. into a bank of rice coal. Three other boilers were damaged.

Sunbury—An attempt will be made to induce the County Commissioners of Northumberland County to raise the assessments on coal land from $17,000,000 up to a much larger figure. T. Ellsworth Davies, of Scranton, estimates that there are 3,803,710,965 tons of coal in the county. On this estimate some fearful and wonderful estimates of valuation are being based.

Hazleton—Rumors are current that the Lehigh Valley Coal Co. and C. M. Dodson Co. are negotiating for the purchase of the G. B. Markle Co.'s collieries, the largest independent anthracite operations in the world.

Pottsville—The Tax Revision League has charged the county commissioners with making a "fraudulent and illegal assessment" of the coal lands in Schuylkill County. M. L. Ryan, counsel for the league, seeks to have the assessment set at least $200,000,000 higher than the figure set by the commissioners.

Wilkes-Barre—The air shaft at the Harry E. Colliery of the Forty Fort Coal Co. caught fire and was destroyed on Apr. 8. At that time 500 men were underground and their lives were endangered, but the mine was cleared without accident. The fire lasted several hours and the operation of the colliery may be delayed several days. On the same day in the evening the washery of the Red Ash Coal Co. in Laurel Run Borough, which is a source of employment to 150 men was destroyed by fire. Its value was about $100,000.

Bituminous

Elizabeth—The Pittsburgh Coal Co., which absorbed the Monongahela River Consolidated Coal and Coke Co. has gradually been withdrawing from the river trade. It has just ordered the dismantling of six of its big river boats which were at one time among the most powerful tow boats in western waters. They were used to tow coal from Pittsburgh to Southern ports.

Punxsutawney—The Rochester and Pittsburgh Coal and Iron Co. has closed down the Walston No. 3 Slope mine, which was opened nearly 40 years ago and was the oldest producing mine of large size in this section. It is doubtful if the plant will ever be operated again as the coal is practically worked out. The same company closed ten of their large mines in Indiana County.

Brownsville—The following coal and coke plants in the Lower Connellsville coke region, in Fayette County, have closed down indefinitely during the past week: the Royal ovens (365 ovens) of the W. J. Rainey Coke Co. at Royal Works, on the Pennsylvania R. R. (the mine here is still operating, shipping coal); the Atlas Coke Company (220 ovens) at Helen, on the Pennsylvania R. R.; and the Union Connellsville Coke Co. (140 ovens) at Simpson, on the Monongahela R. R.

Blairsville—Paul Minko, aged about 27 years, the unnaturalized Russian resident at Idamar, who set fire to the tipple of the Idamar Coal Co. Apr. 5, completely destroying it, confessed the crime here and has been sentenced by Judge Langham to pay the costs of prosecution, a fine of $500 and to undergo imprisonment in the Western Penitentiary by separate and solitary confinement for a period of not less than three years and not more than seven years. The temporary tipple has been completed and the mines are again in operation. Minko was incensed at the company because his boarding mistress collected an unpaid board bill through the company's office. By Apr. 9 17,000 ft. of lumber had been used in replacing the burned structure which was already being used for the dumping of coal.

WEST VIRGINIA

Fairmont—Mine No. 11 at Monon belonging to the Jamison Coal and Coke Co., resumed operations on Apr. 10. It is said that export orders via Curtis Bay are the cause of this revival of activity.

Fayetteville—Under the terms of a verdict against the Long Branch Coal Co. awarded in the Circuit Court of Fayette County, May Donald, hardly more than a child, was awarded $19,000 damages. The company after moving to set aside the verdict gave notice of an appeal. The plaintiff's claim was that amputation of her right arm had been necessary as the result of being struck by the truck of a mine car which had become derailed.

A loss of fully $100,000 was sustained when fire destroyed practically the entire business section of Smithers, a Fayette County mining town, though none of the coal plants appear to have been damaged by the fire. The loss sustained is in effect total, as few of the buildings destroyed were covered by insurance.

Elkins—The Weaver mines of the Doris Coal & Coke Co. are now being operated on a full time basis. Other mines in the same section which are also being operated without any break are the mines at Arden. Railroad requirements are said to be partly responsible for the continuity of operations.

Kingwood—The mines in Preston county working in the upper Freeport seam of coal are practically idle on account of lack of business except the Tunnelton mine of the Merchants Coal Corporation and the Car-Diff mine of the Car-Diff Coal Co., both of which are working on Baltimore & Ohio R. R. contracts.

Keyser—At a recent meeting of the Upper Potomac and Georges Creek operators they voiced complaints regarding discrimination by the railroad administration alleging that it hauled coal long distances at a loss in order to secure a low price for coal for its own use. The members also declared themselves in favor of a dissolution of the Tidewater Coal Exchange.

OHIO

New Straitsville—Claiming that they are on the point of starvation because of lack of work, coal miners in this region have appealed to Governor Cox to have pressure brought on the Railroad Administration for a more equal distribution in railroad contracts. The miners point out that some of the mines have been working full time while others have been idle since Nov. 11. They urge a special investigation on the ground that many miners are returning from service and have no work.

ILLINOIS

Duquoin—One of the largest conferences of its kind will be held here Friday, May 9, when representatives of miners, operators and school authorities from all over the southern Illinois district will convene for a joint discussion on vocational training for miners.

Murphysboro—Much improvement has lately been noticed in the work of the mines in the coal fields of Jackson county. Blair's mine at Murphysboro, together with Big Muddy No. 9 and No. 10, have worked practically every day during the last two weeks. No reason is given for this sudden increase, and it is not known how long it will last.

Benton—The Benton Coal Co. broke its record Saturday, Apr. 12, with 2800 tons and 1044 dumps. Its previous record was 2634 tons and 927 dumps. The mine, which is an old one, has greatly increased its output since the new superintendent, Walter Nichols, has been on duty, and the company hopes soon to reach the 3,000 ton mark.

Clifford—The big mine of the Big Muddy Coal and Iron Co. has resumed operations after having been closed down since last November. During the time the mine was closed down extensive improvements and repairs have been made. A new washhouse has been constructed.

IOWA

Sioux City—The Sioux City Coal Exchange will bring suit against Iowa railroads to compel a reduction in rates on the ground that high freight rates are interfering with the city's industrial development. Kansas City, Mo., has a freight rate from the Iowa fields of $1.10, whereas Sioux City consumers have to meet a freight rate of $1.50 to $1.75 a ton.

KENTUCKY

Versailles—The Farmers Union Supply Co., a coöperative corporation started by farmers for the delivery of coal in Versailles, has purchased a coalyard in that town and expects to increase its capital stock from $15,000 to $35,000 in order to finance the new venture. The coal will be brought in by railroad, and the farmers who need supplies will haul it away, the coal being stored in concrete bins.

NORTH DAKOTA

Scranton—The three-unit briquetting plant of the Johnson Fuel Co. at this place is nearing completion and will be placed in commission some time during May. The present arrangement utilizes three Fernholz briquet presses with a daily capacity of 75 tons briquets each. The plant is a large brick structure with sufficient room for eight presses, and it is probable that the full space will be used as soon as conditions permit, giving a daily capacity of 500 tons. No binder is used in the manufacture of the briquet and the fuel finds a ready market. The coal is obtained from the Scranton lignite mine and is recovered by underground and open pit methods of mining. Steam shovels are used in stripping and also for loading the coal and sufficient coal has been uncovered to keep the present plant in continuous operation for several years. The overburden has an average depth of 18 ft., but in places reaches 50 ft. The coal seam averages 18 ft. in thickness and extends through the entire field. Two steam shovels are used at the property, one having a 2½-yd. bucket and the other a 2-yd. bucket.

COLORADO

Denver—William Wardell, a mine foreman, and Joseph Jackson, a fireboss, were blamed for the explosion in the Empire mine, Aguilar, Colo., in a report by the chief inspector. The foreman failed to withdraw the men when the fan stopped, and the fireboss was remiss in reporting the condition of the mine.

WASHINGTON

Chehalis—Extensive operations on coal lands lying west and northwest of Vader, in southern Lewis county, are being secured by people who are said to represent Portland capitalists and others.

Issaquah—A ton of dynamite in the powder house of the Pacific Coast Coal Co.'s coal mine at this place exploded on Saturday night, Apr. 5. The town was rocked, several mine buildings being wrecked and a number of other houses damaged. The loss is estimated at between $5000 and $10,000. No one was injured. John Kerr, night watchman, explains that he was making his rounds and was due to register at 10 o'clock. He was nearing the powder house when he noticed smoke, and stepping closer recognized the spitting flame of a fuse. Kerr turned and ran toward the office, reaching it just as the powder house went up. Besides shattering windows in many of the houses in the immediate vicinity, the side of the compressor house was blown in. It is not thought, however, that the compressor or other machinery was damaged. The timbers at the mouth of the mine were blown down. It is suggested by the evidence that the explosion was deliberately planned, and in this connection it is recalled that the Issaquah Coal Mining Co., as it formerly was known, was controlled by Alvo von Alvensleben, a German interned at Fort Douglas, Utah, and who is said to have been backed by the personal capital of his emperor. Alvo von Alvensleben, it may be stated parenthetically, had coal mining interests in British Columbia, the most notable being what is commonly known as the Jingle Pot mine, Vancouver Island, which still is a producer.

Personals

Harry S. Lewis, formerly sales manager for the Reilly-Peabody Fuel Co., is now manager of sales for the International Fuel Corporation, Pittsburgh, Penn.

W. S. Neal who has been connected with the Standard Pocahontas Co., will be retained by the Central Pocahontas Coal Co., its successor, as superintendent at its No. 3 plant.

T. J. Hudson, of the Chicago Pneumatic Tool Co., Chicago, Ill., has been appointed acting manager of the pneumatic tool sales division, effective Apr. 15, succeeding **F. H. Waldron**, who returns to Minneapolis, Minn., as district manager of sales for the Minneapolis territory.

Mr. Miller, who has at different times been superintendent of various mines of the Pittsburgh Coal Co., has assumed the position of superintendent of the Edna mines of the United Coal Corporation, of Pittsburgh, Penn., taking the place left vacant by the recent resignation of Joseph Maize.

Walter H. Greene has become associated with Whitney & Kemmerer in their New York office, 143 Liberty Street. Mr. Greene was for seven years connected with the firm of Pattison & Bowns, 1 Broadway. He served in the United States Air Service during 1918 and was promoted to lieutenant.

Stanley Gleason has resigned as division engineer of the Pittsburgh Division of the United Coal Corporation. This division has been consolidated with the Somerset division and the work taken care of by F. A. Wyant, formerly engineer of the latter division, whose headquarters have been transferred to Pittsburgh, Penn.

Arthur A. Allan, of Wilkinsburg, Penn., has resigned as assistant general superintendent of the United Coal Corporation of Pittsburgh, Penn., effective May 1. No successor to Mr. Allan has been appointed, but the duties of the position will be taken care of between Harrison T. Booker, general superintendent, and J. D. Martin, chief engineer.

Walter E. Hope, who was director of State Organizations for the United States Fuel Administration, has been nominated to be alumni trustee of Princeton University for five years. His election is assured in June. Mr. Hope, who is a member of the law firm of Masten & Nichols, New York City, was chairman of the special Government Commission sent abroad last Fall to investigate fuel conditions in Great Britain, France and Italy.

Obituary

Charles Baxter Greene, 71 years old, who for 55 years was connected with the coal department of the Delaware, Lackawanna & Western RR. Co., and later with the Delaware, Lackawanna & Western R.R. Co. Coal Department, died at his home in Brooklyn on Apr. 13. Mr. Greene was born in Manhattan and was a descendent on his mother's side of Robert Morris, one of the signers of the Declaration of Independence.

Robert Lee died in Rock Island Ill., after 51 years of service with the Coal Valley Mining Co. He began work with the company Sept. 11, 1856, becoming a mining engineer and holding a position as superintendent of the railroad of the company for a number of years. He was in the mercantile business for himself for some time, but in August, 1875, returned to the coal-mining business as head of mining operations in Mercer County, for the Coal Valley company. He remained until Sept. 11, 1907, 51 years after having taken service with the company. He was succeeded by his son Robert E. Lee, who is now president of the Coal Valley Mining Co.

Industrial News

Chicago, Ill.—Briggs & Turivas, Inc., iron and steel, have opened a New York office at 1805 Equitable Trust Building, to be under the direction of Carl R. Briggs, president of the corporation.

Morgantown, W. Va.—The Monongahela Railway will be compelled to furnish the Arden Coal Co. sidetrack facilities at Round Bottom, W. Va., the Public Service Commission having handed down a decision directing the railroad company to install the siding.

Wilkes-Barre, Penn.—The Hudson Coal Co., has given up its Leggett Creek operations in North Scranton and on May 1 an application will be made to the governor of Pennsylvania for a charter for an intended company to be known as the Leggett's Creek operation in North Scranton.

Columbus, Ohio—The Ohio Blue Ridge Coal Co., which had opened offices in the Brunson Building several months ago, has closed. Allen Pyne, the president, has retired from the coal business and Jay Millar, the secretary, has taken the position of sales manager for the Central West Coal and Lumber Company.

Buffalo, N. Y.—There were seven formal and four informal bids for the city waterworks coal contract, some bidders refusing to conform to the specifications, which were called unnecessarily rigorous. The lowest formal bid was of the Valley Camp Coal Co., of Cleveland, $1.97½ per net ton of 48,000 tons of slack, mine price, on a freight rate of $1.70. The highest formal bid was $2.50, same conditions.

Chicago, Ill.—The Winslow Boiler and Engineering Co., which is about ready to go into the production of its new model "Steamobile" truck, would be glad to receive catalogs from makers of steam boilers and heaters, oil-burning apparatus, steam-engines, apparatus for burning pulverized coal, steam valves, unions and fittings for high pressures and temperatures, machinery and shop tools and equipment. The literature should be addressed to the factory, 530 No. Western Ave., Chicago.

Philadelphia, Penn. — The Lehigh & Wilkes-Barre Coal Co., in its annual report, shows net earnings of $3,069,280 for 1918, after interest and taxes, against $5,431,900 in 1917, a decrease, roughly, of more than 40 per cent. The Barrett Co., a producer of coal-tar derivatives, made its annual report on the same day as did the Lehigh & Wilkes-Barre. It shows that the 1918 net profits, after Federal taxes and charges, were $3,947,783, against $3,728,302 in 1917, or an increase of more than 5 per cent.

Columbus, Ohio—M. S. Connors, Federal manager of the Hocking Valley R. R., announces that there are 14 coal vessels at the Toledo docks awaiting the arrival of coal to be loaded for the Northwest. These boats have a carrying capacity of approximately 125,000 tons. May 1 is the date set for the official opening of the lake trade, although several cargoes have been loaded and are under way. The main lake trade is not expected to be active until after the middle of May. Reports from the Northwest show that the expectancy for lake shipment is 21,000,000 tons as compared with between 28,000,000 and 29,000,000 tons last year.

Columbus, Ohio—A reorganization of the Sunday Creek Coal Co. has been effected by the incorporation of that concern under Ohio laws with a capital of $7,500,000. Of the capital, $6,000,000 is common stock and $1,500,000 preferred stock. The company will take over the properties of the Sunday Creek Coal Co., of New Jersey, the Buckeye Coal and Railway Co. and the Ohio Land and Railway Co. There has been considerable litigation about these properties during the past five years, but now all is cleared up and the new company without any indebtedness and under the management of John S. Jones, of Chicago, will be in a position to carry on the business formerly conducted by the three separate companies.

Philadelphia, Penn.—At the annual meeting of the Anthracite Coal Operators' Association, held at the Bellevue-Stratford, Apr. 3, Percy C. Madeira, of Madeira Hill & Co., was elected president, and John Markle, of G. B. Markle & Co., Inc.; W. L. Connell, of Connell Anthracite Mining Co., and Alan C. Dodson, of Weston Dodson & Co., Inc., vice presidents. Howard W. Perrin, of Susquehanna Collieries Co., is treasurer and W. J. Thompson, of Bethlehem, Penn., is secretary. The office of secretary, formerly held by Alan C. Dodson, will be moved to Philadelphia in the near future. The association has been in existence for three years. It comprises eighty companies operating ninety-nine collieries. Its members produce about 90 per cent. of all the coal mined by the individual operators.

Madrid, Spain—The consulate in Madrid desires up-to-date catalogs representative of all phases of American industry and commerce. The potential importance of the Spanish market in itself and its influence on the Latin-American markets have already been brought to the attention of American manufacturers and exporters. The peculiar situation of Madrid as the geographical, railway, financial and political center of this Spanish market is well known, and the advantage of having such catalogs on file in the Madrid consulate for ready consultation by local distributors to the Spanish trade and by visiting merchants from the Provinces is clearly apparent. Ely E. Palmer is consul.

$60,000 to $85,000. It is understood that the increase will be used for proposed expansion.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Ending of Port Strike Will Help Tidewater Shipments—Improved Bituminous Output—Industrial Demand for Soft Coal Not Large—Railroad Controversy Not Yet Settled—Anthracite Industry Enjoying Renewed Prosperity

THE ending of the harbor strike in the port of New York brought heartfelt sighs of relief from dealers and consumers who depend upon water carriage for their coal supply. Vessels are being speeded to tidewater as quickly as possible, and the resumption of water-borne fuel shipments to points on the two rivers and Long Island Sound will prove of material benefit to a large number of operations whose output has been embargoed for the past six weeks.

Production of bituminous coal during the week ended Apr. 12 mirrors the noticeable betterment in demand. The total output of the mines of the country for that week is estimated at 7,417,000 net tons, as against 6,967,000 net tons during the week ended Apr. 5.

Demands for coal for industrial purposes are still insufficient in aggregate to keep all the soft-coal mines working full time. Many operations are closed down, while others work only two or three days a week. The mine workers in many regions have petitioned the governors of their respective states to bring pressure to bear upon the Railroad Administration, to the end that the working time at the mines be equalized. At present the anomaly is presented of some mines in a district working nearly full time on contracts for railroad coal, while other operations in the same field are idle because the railroad purchasing agent has placed all the business for his road with a few favored operators.

The railroad fuel problem has served to impede the progress of the soft-coal industry for years. The matter assumes new phases and angles with such frequency that no sooner is one question in controversy settled than another development manifests itself to plague the operators. Like Banquo's ghost, it will not be downed. Latest reports have it, however, that an amicable understanding will be arrived at in the near future.

Industry in general has not yet resumed its maximum activity. As a consequence the consumption of fuel at this time is comparatively negligible when it is remembered that the soft coal operators can produce well over 600 million net tons of coal a year. The good grades of bituminous are finding a ready market, and it is gratifying to record that no idiotic price-cutting, with all its attendant evils, is in evidence. Prices are being held at the former Government figures, and quite a little contract business has been closed on this basis. In short, it can be stated that the soft-coal market is satisfactory, with all indications pointing to a slow but steady improvement.

News from the anthracite field is cheering. Operations that have been closed down for months are now working anew, and if present conditions continue the fear of a coal shortage next winter can be dispelled. The admonishments to householders that they order their coal early seem to be bearing fruit, for the sales of domestic sizes are reported to be satisfactory.

The small sizes of anthracite continue to drag, though the opinion is expressed in some quarters that steam coal will find more favor within the next two months as the result of increased industrial activity. During the week ended Apr. 12 it is estimated that 1,750,000 net tons of anthracite were sent to market, about half a million tons more than the output of the week ended Apr. 5.

WEEKLY COAL PRODUCTION

The output of bituminous coal during the week ended Apr. 12 was a considerable improvement over the tonnage produced during the week preceding. Estimates place the current week's output at 7,417,000 net tons, as compared with 6,967,000 net tons during the week ended Apr. 5. As in previous weeks, the current week's production fell far below that of the same week of 1918, the decrease amounting to 3,300,000 net tons. For the calendar year to date the output is estimated at 120,840,000 net tons, and falls approximately 35,000,000 net tons behind the output during the same period of last year, estimated at 155,308,000 net tons. The average production per working day during the week ended Apr. 12 is estimated at 1,236,000 net tons, as compared with 1,373,000 net tons for this calendar year to date, and 1,765,000 net tons for the preceding year.

The production of anthracite in the United States during the week ended Apr. 12 is estimated at 1,750,000 net tons and exceeds the previous week's production by one-half a million net tons, but falls behind the output of the corresponding week of last year by 120,000 net tons. The total production for the calendar year to date is estimated at 20,693,000 net tons, as compared with 27,434,000 net tons during the same period of last year. The daily average per working day during the current week is estimated at 292,000 net tons, compared with 235,000 net tons for the calendar year to date, and 312,000 net tons for the period Jan. 1 to Apr. 12, 1918.

Carriers' reports for the week ended Apr. 12 shows an increase in loading in all fields with the exception of the Illinois, Indiana and western Kentucky district. In this district the decrease amounted to 1500 carloads while considerable improvement occurred in central Pennsylvania, where the increase over the week preceding amounted to 3063 carloads; in western Pennsylvania, 1450 carloads; in Ohio, 1723 carloads.

Shipments of bituminous coal from the tidewater harbors to all points during the week ended Apr. 12 are estimated at 484,169 net tons, and exceed the previous week's shipments by approximately 14,000 net tons. Compared with the same week of last year, the tonnage moved during the current week was 237,423 net tons lower. Improvement occurred during the week at New York and Baltimore, while at Philadelphia and Hampton Roads slightly less tonnage was moved than was reported during the week ended Apr. 5.

Bituminous coal shipped to New England by tidewater during the week ended Apr. 12 is estimated at 117,478 net tons, and with the exception of Philadelphia's movement of 172 net tons, the tonnage loaded for the week originated at either New York or Hampton Roads. The tonnage loaded at New York exceeded that of the preceding week by 4000 net tons, while Philadelphia's tonnage decreased to practically nothing during the current week, and Hampton Roads tonnage fell behind that of the preceding week by 3600 net tons. The current week's movement was but 43 per cent. of the tonnage loaded during the corresponding week of 1918.

The production of beehive coke in the United States during the week ended Apr. 12 is estimated at 318,458 net tons, and is the lowest production recorded in recent years. This low tonnage was approximately 31,000 net tons below the production of the week preceding, and was but 55 per cent. of the output of the week of Apr. 13, 1918. The large falling off during the current week was localized in Pennsylvania where the decrease, compared with the week preceding, amounted to approximately 27,600 net tons. West Virginia also fell behind slightly, while in the other states little change occurred compared with the week of Apr. 5. The daily average during the week ended Apr. 12 is estimated at 43,076 net tons, as compared with an average daily production for the calendar year to date of 75,504 net tons, and in the same period of last year of 93,684 net tons.

BUSINESS OPINIONS

American Wool and Cotton Reporter—The demand for fine wools at an advancing tendency is a feature of the wool market. It is expected, however, that low wools will also be in demand soon in larger quantities than they are at present. A few of the manufacturers are declining to sell goods more than two months ahead, feeling that values will be greater later. A fair demand for cotton from the mills has been evident during the week under review, but it is not anywhere near as large as it might be. Cotton is really in a strong position until a substantial crop is in sight.

Marshall Field & Co.—Current wholesale distribution of dry goods is running a little below the high figure of the corresponding week a year ago. Retailers were very busy with Easter trade and not so many were in the market as compared with recent weeks. There have been advances in the price of staple cottons and the firm tendency of the market has stimulated business for fall. Orders from road salesmen for both immediate and future delivery were larger than for the same week of 1918. Collections are satisfactory.

The Iron Age—While they wait for a final decision of the question whether the Government will help or hinder the effort to encourage buying of iron and steel, pro-

ducers are doing little new business and are showing no great concern about the course of prices. The widespread propaganda of the Department of Labor and in many lines of trade and industry in behalf of wage and price maintenance has even robbed an open market of some of its old-time terrors. Meanwhile ultimate consumers of such products as wire and pipe are in the market with their small needs, which jobbers are passing on to the mills, but nowhere along the line is any stock being accumulated. On what they are selling, mills are getting in nearly all cases the prices named at Washington on Mar. 20.

Dry Goods Economist—An important development of the week is the new light thrown on the price trend. While retailers are skeptical, and naturally so, of predictions as to higher quotations coming from those from whom they buy, it is certain that due attention should be given to the statement issued by the National Wholesale Dry Goods Association, at its meeting, to the effect that the bottom has been reached. The jobbers also declare that scarcity is apparent in several lines, and in view of this condition they predict not only the maintenance of present prices but also a movement toward higher levels.

Atlantic Seaboard

BOSTON

Little change in generally dull market. Railroad buying awaited with much interest. Prices on better grades so far unaffected. Only scattered sales all-rail. Hampton Roads shippers sadly need orders. Freight rates do not induce buying. Needs of New England this year over-estimated. All-rail demand steady, but less than normal for April. Retailers well supplied with orders.

Bituminous—The market may still be described as generally dull. The past week has shown no significant development; prices and requests continue without material change. The larger buyers are still withholding inquiries and for the next thirty days it is hard to see how there can be any decided move in any direction. Neither all-rail nor in the West Virginia districts can operators show more than 50 per cent. output, and that mark in production is just about met in New England by 50 per cent. consumption on the part of many of the industrials, textiles in particular.

So far prices on the quality grades have remained unaffected by the low figures used in connection with railroad purchases; $2.95 per net ton is a fairly firm price for a large number of coals from the South Fork region in central Pennsylvania, and today it seems to matter little on these grades whether the price sought is for contract or for spot shipment. There are still a few special coals on which higher prices are named. Sales of the latter are confined to instances where the coals are well known and are required because of coking or other preferred characteristics. The grades that sell down to $2.50 have today only a restricted market, so pronounced is the attitude of most buyers in favor of the coals of recognized higher value. Freight rates are so high to this territory that 15c.@25c. on the delivered cost is considered negligible, and as the season advances buying sentiment is more and more discriminating.

All-rail territory has yielded only scattering sales the past fortnight. To find spot buyers the most careful combing is required, and the volume is very light. Those within 50 miles or so of tidewater are also watching developments on West Virginia coals by water. In normal years there have been plenty of opportunities to buy these coals at relatively low cost, and so far a large number of buyers see no reason why this season should not show similar developments. The export demand is not regarded very seriously here, as yet, and it is generally looked upon as too early to take on large tonnages while there are still ample stocks in reserve.

It is certain the Hampton Roads agencies sadly need orders for current shipment. There are large accumulations at the piers, and no snap to the demand from any direction. The number of bottoms loaded for New England is very small, and most of the distributing factors here are simply waiting for something to turn up. A fair market for prepared coal is reported from the west, but this is of help only to those shippers who have outlets for their slack. For run-of-mine there is only a hand-to-mouth demand in this territory from regular contractors, and those only who take their supplies either directly on the seaboard or who are short distances inland. Prices on the basis of $2.75 per net ton f.o.b. mines for both Pocahontas and New River are being maintained fairly well by the larger shippers, but there is quite a tonnage available through smaller factors that can easily be had on the $2.35 basis for both coals.

The lower rates on bottoms from Hampton Roads have not influenced buying, so far as we can observe; $2 is now the freight rate on either steam or barge tonnage from Norfolk to Boston, Providence, R. I., being 25c. less, and it is hardly expected that barges will move later at any material reduction from this basis. For New York loading to points on Long Island Sound rates are firm at $1, mainly for anthracite, but this has a bearing on freights from Hampton Roads. So long as such rates as these can be had for short distances the owners of barges will be unlikely to send them to Norfolk for very much less than $2. There is reason, therefore, for the prediction that Southern water rates are probably on as low a level as will obtain the present season.

Bituminous prices at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net ton as designated:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.80@3.35
Philadelphia, gross tons	4.20@4.90	5.00@5.40
New York, gross tons	4.50@5.25	5.35@5.80
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.65

Georges Creek is quoted at $3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at $4.69 @ 5.15 f.o.b. Norfolk and Newport News, Va., per gross ton, according to the shipper, for spot or contract. Alongside Boston the present gross ton range would be $7.15 @ 8.10. It is understood that factors are naming $7.90 per gross ton on cars Boston for distribution inland, through the season.

Anthracite — Demand all-rail is steady and consistent, but by reason of so much tonnage having been taken in March the volume for this mouth is less than would be considered normal for April. Retail trade is remarkably good, and there are increasing indications that consumers in general will make the effort to get their coal early. If this can be done throughout New England there is no doubt it will help very much in the season's distribution of fuel.

NEW YORK

Marine strike settlement creates heavy demand and will result in more coal coming to tidewater. All of the domestic sizes wanted, with egg and stove leading. The anthracite steam sizes holding firm with the market becoming stronger. Bituminous firm with demand good and prices steady. Dealers look for a busy summer.

Anthracite—The ending of the marine strike in this harbor has put the trade on a substantial basis. Demand at once strengthened and dealers were anxious to fill their bins, a majority of which were near depletion after a partial tie-up of shipping for seven weeks.

The settlement of the strike resulted in a rush of boats to the various loading ports. Carrying rates from the harbor are quoted at about 50c., which is a slight increase over the rates in effect before the strike.

With harbor deliveries back to normal shipments from the mines to this tidewater are expected to increase materially within the next week, and the line trade which has been receiving the bulk of the production will be expected to accept a reduced tonnage hereafter.

Trade during the last half of the week was practically at a standstill in this harbor. Shipping was irregular and there was little towing accomplished. Most of the docks were congested either by filled bins and cars or loaded boats waiting to be taken to destination. The situation at the upper docks was somewhat better than at the lower docks because of the shorter towing distance to the dealers' yards and the ability of the railroads to deliver barges with their own tugs.

Shipments to Boston and other New England points which have been made from Port Reading during the war will be resumed on May 1 from Port Richmond, Philadelphia, as the result of an order issued by the Railroad Administration. This will result in 11 tugs and 72 large barges which were transferred to this harbor from Port Richmond during the submarine scare along the Atlantic Cost returning to their former base of operations, and is said to be one of the results of the strike in this harbor. It also means a considerable loss in the matter of tonnage handled here.

There is a heavy demand for all the domestic sizes, particularly egg and stove. Pea coal, which usually moves slowly in this market, is receiving considerable attention and there is not much surplus about. Some shippers are offering a small tonnage to slight concessions, but this is almost negligible.

The steam sizes are stronger and little is heard of quotations below full schedule prices. The better grades of buckwheat No. 1 are in good demand, and in much better shape than was the case a few weeks ago. Rice and barley are in fairly good condition considering that the mines are operating nearly full time and the warm weather is coming on.

Bids opened on Apr. 15 for furnishing and delivering one of the City Departments with 150 gross tons of stove coal showed prices ranging from $10.97 to $11.98 per ton, while offers for furnishing and delivering 1790 gross tons of buckwheat No. 1 showed prices ranging from $6.39 to $8, according to place of delivery.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	5.85	7.70
Stove	6.10	7.95
Chestnut	6.20	8.05
Pea	4.80	6.55
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—There is a better feeling in the local bituminous trade. Local deliveries are being made more promptly and prices are, in many individual instances, a trifle stronger than they were last week, although the general range remains about as they were a week back.

The high-grade coals are in heavier demand and to a greater extent than heretofore consumers are looking for quality, realizing that though the first cost might be more they are saving money in the long run. This condition is evident probably to a greater degree in New England than here, but dealers look for an increased demand for the better coals from local dealers as the season advances and they become better supplied. However, the fair grades are in good demand with prices steady.

There was good movement here during the latter part of the week, even though the boatmen had the harbor pretty well tied up. Private boat owners were able to operate, according to their own statements, 25 per cent. of their bottoms and consumers were in the main taken care of to the extent of their immediate needs. Loaded boats were eagerly picked up and brought good prices. There were many empty bottoms anchored near the docks, and when the strike was declared at an end everybody endeavored to push his boat in first.

Embargoes were placed on various shippers at the lower docks but these were lifted as rapidly as the coal was moved.

Proposals asked for by a city department for furnishing and delivering 5020 gross tons of run-of-mine brought offers ranging from $5.80 to $7.07 per ton, depending on the place of delivery.

The line trade is active and many consumers have taken advantage of local conditions to ask for larger and more prompt shipments and is storing coal. Prices for all rail deliveries are reported by some salesmen to be stronger than on the tidewater basis.

Shipping has been taking considerable coal recently, there having been a large increase in the number of vessels coming to and leaving this port.

Quotations for coal for spot delivery or on contract range as follows.

	Spot	Contract
South Forks	$2.90 to $3.25	$2.95 to $3.50
Cambria County (good grades)	2.80 to 3.10	2.95 to 3.25
Clearfield County (good grades)	2.65 to 2.95	2.80 to 2.95
Reynoldsville	2.65 to 2.85	2.85 to 2.95
Quemahoning	2.75 to 2.95	2.95 to 3.10
Somerset County (best grades)	2.75 to 2.95	2.95 to 3.10
Somerset County (poorer grades)	2.25 to 2.50	2.50 to 2.75
Western Maryland	2.25 to 2.75	2.50 to 2.75
Fairmont	2.10 to 2.35	2.35 to 2.50
Latrobe	2.10 to 2.25	2.25 to 2.40
Greensburg	2.35 to 2.40	2.35 to 2.60
Westmoreland ¾-in.	2.60 to 2.75	2.65 to 2.75
Westmoreland run-of-mine	2.40 to 2.65	2.40 to 2.65

PHILADELPHIA

Anthracite business good. Shippers booked full for April, except on pea and smaller. Future prospects good. "Buy early" advertising campaign started. Holidays cut production at mines. Pea causing trouble, also steam sizes. Broken very free. Bituminous unsatisfactory. Excess coal in market. Prices fluctuate. Railroad price situation annoying. Mines on short time.

Anthracite—Such strides were made in booking business during the past week that all shippers supplying good grades of coal were practically sold up, at least for April, on egg, stove and chestnut. Most salesmen have been instructed to slow up in taking orders for prepared sizes and to devote their attention to pea and the smaller sizes. Cold and rainy weather made the dealers again divert their attention from filling cellars next winter to hurry calls for a ton or two for immediate use.

Many small dealers soon found their yards empty, as they had been slow buying, and coal is not being received in the substantial quantities now demanded. In fact a number of the larger buyers are now dangerously low on certain sizes, particularly stove coal. Due to their slow ordering it is hardly likely that the dealers will receive anywhere near the amount of coal they have ordered for this month's shipment, and already the cry is heard from some of them that the companies are holding back in order to reap the benefit of the 10c. advance.

From the shippers' standpoint the outlook for the remainder of the year is far more encouraging than at any time since the middle of April. Already many companies report that they have almost enough orders for the prepared sizes to keep them busy during the month of May. The retailers are busy, of course, but there is not the rush of the past few years. Their large orders are coming in steadily but slowly and some of them seem booked for weeks to come. They too are growing most optimistic and have faith in the future. There is little doubt now that they will be busy for at least two more months.

While the market for the larger sizes is in such good condition the operators have not ceased to worry about pea and the steam sizes. The smaller operators without storage room are undoubtedly cutting the price on pea coal. Contracts are being taken at $4.50 for the season, but this is probably exceptional. For occasional cars less than this has been taken, these no doubt being instances where demurrage had accumulated, the coal being disposed of to prevent further loss. The dealers continue to have fair stocks of this size, and those who are buying are only doing so to meet the current demand. They are fully aware of the situation as to this size and freely predict that they will get the coal much cheaper when summer comes.

The big companies are undoubtedly holding firmly to the circular of $4.80, and, while they report increased sales, they continue to store heavy tonnages. Buckwheat too is giving all hands much concern, and it is being offered around $3 by some smaller houses, while the companies are insisting on the $3.40 price on the larger contracts. Many of the latter still remain unclosed, however. Rice has been sold around $2.25, which is the company-circular price for barley. One house reports the latter selling at "any old price." The big companies also say that they have much broken coal for sale and while this size is practically only made as called for, it is one of the most profitable sizes, and they are always anxious to make sales of heavy tonnages.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.80	Buckwheat	$3.40	$4.45
Egg	5.85	7.70	Rice	2.75	3.65
Stove	6.10	7.95	Boiler	2.50	3.50
Nut	6.20	8.05	Barley	2.25	3.15
Pea	4.80	6.40			

Bituminous—Trade conditions are not at all satisfactory, as lately far more coal has come on the market than could be disposed of readily. Much of this arrived at this market because of the labor troubles on the docks at New York, making it almost impossible to ship coal in that direction via the usual routes. Strong efforts have been made to dispose of some of the tonnage locally, but with little success. Good coals were in fair demand, but the ordinary grades gave the shippers much trouble.

Consumers have not let up in their inquiries for contract prices, but seem to be more after information than anything else. They are in position to drift along with the stocks they have on hand, with the hope that they can strike a lower figure before making a contract commitment for their future needs.

The difficulty over railroad fuel seems to be as far from settlement as ever. Recently there were intimations that the railroads were prepared to ask for bids on a new basis, only to have the instructions cancelled afterward. While the companies have been depending on their stocks for most of their fuel, they have lately begun to take fair tonnages from the shippers. These are being purchased on the basis of a readjustment of price after the present controversy has been adjusted. Not many shippers are anxious for the business under such conditions and they are inclined to be quite critical of the persons responsible for the situation.

It is difficult to give a schedule of prices that would be fairly representative, as the fluctuations at times are quite variable. For instance, a mine may start with fair orders ahead and thinking that other new business might spring up will turn out an excess of tonnage, and, the demand not materializing, will be compelled to market at a loss. However, the following list gives an intelligent and fair estimate of the price situation:

Georges Creek Big Vein	$3.00 @ $3.10
South Fork Miller Vein	2.90 @ 3.05
Clearfield (ordinary)	2.70 @ 2.90
Somerset (ordinary)	2.55 @ 2.75
Fairmont lump (ordinary)	2.35 @ 2.50
Fairmont mine-run	2.25 @ 2.35
Fairmont slack	2.15 @ 2.25

BALTIMORE

Better times in coal trade are indicated despite present light demand and unsatisfactory spot prices. Exports increase and inquiries growing. Hard coal men busy.

Bituminous—The soft-coal handlers here are full of confidence as to the general future and are even encouraged concerning the very near future. This despite the immediate situation which is marked by a light demand and offerings on spot coals off the prices which the trade realizes must be maintained in general to uphold a profitable figure on mining. On contracts this feeling is still reflected by refusal to give quotations below the old government maximums. Contract closings continue rather sparse, and most consumers in need of immediate coal are out in the spot market. There is however a growing line of inquiry as to contracts and the trade is confident that a large number of consumers now relying on the open market will soon be seeking the cover of contracts.

The government departments are also out in this market for additional supplies, the Proving Ground at Aberdeen, Md., and the Edgewood Arsenal wanting jointly some 42,000 tons of bituminous, and the Fort McHenry Army Hospital at Baltimore seeking about 48,000 tons. For some time past the trade here has been relying on a pick-up in the export business to absorb some of the oversupply of coal in the domestic market, and with the arrival of a number of bottoms for that trade during the last two weeks the improvement began. The first Custom House tonnage announcement made since the war at this port showed seven clearings between Apr. 8 and Apr. 12, with a total of 22,207 tons of cargo coal and 2895 tons of bunker coal. Two ships went to Brazil, two to Cuba, two to Holland and one to Peru.

Anthracite—Hard-coal men continue busy. The first heavy rush of customers to take advantage of the cut of 40c. per ton off the retail rate of last winter caught some of the coal men unprepared, and there was a shortage of certain sizes in some yards. Orders sent to mine connections quickly brought results, however, and since the first week in April the trade has been busy with deliveries. The number of incoming orders has let down for the time being, but there is already much business on the books. Possibly a larger proportion of the business than for years is on a cash basis, to take advantage of the rule of 25c. a ton off for cash within 10 days of delivery of the coal.

Lake Markets

PITTSBURGH

Chief favorable feature is that time is passing. Prices and operating rate practically unchanged.

The coal market of the Pittsburgh district has experienced no improvement in the past week, but operators receive some encouragement from the fact that at any rate time is passing, and the passage of time involves the further reduction of stock piles as well as the nearer approach of the period of heavy lake coal shipments. Lake coal has been going forward in an extremely limited way for three or four weeks past, while the really heavy movement is not expected until summer.

Coal prices are being as well maintained as formerly. That there is a considerable measure of strength in the foundation of the market is shown by the refusal of operators to make contracts at prices as low as are often accepted for prompt deliveries. On contracts $2.35 is but little departed from in the case of steam coal, while in gas coal that figure is well maintained. By-product coal has not developed an active trading market for any proportions, and nominally it is held at $2.35 for either prompt or contract deliveries but if any important contracts were to be placed by-product coal would probably develop a market level at materially less than gas coal.

Prospects of demand are no brighter. Domestic coal shows no prospect of improvement, while as to the steel industry, it is operating at a lower rate each week and shows no disposition to make lower prices for the purpose of stimulating demand. Leading steel producers do not seem to think the time is ripe for increasing sales by reducing prices, and will probably maintain the present prices until June.

The market is as follows: By-product coal, largely nominal, mine-run, $2.35; high grade gas coal, $2.10@2.20; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $2.60@2.70; steam coal, slack, $1.90@2.00; mine-run, $2.00@2.35, all per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous not improving. Lake trade depresses slack prices. Some big mines closing. Car shortage showing. Predictions of better business by August. Anthracite more active. Lake trade opening.

Bituminous—The demand for steam coal does not improve. Consumers seem bound to use up their supplies before they buy again, though jobbers are advising them of the risk of holding off, because a possible car shortage or a sudden rush to buy when the stocks are gone may at any time cause a bad panic. Such a state of things now appears on the face improbable, but a general return of business activity would surely cut down the car supply, and then the market would stiffen.

Some shortage of cars is already reported, mostly caused by the ordering of steel hoppers into the steel trade and by the increased movement to the lakes. The main demand along the lakes being for the three-quarter lump, the mines are making a large quantity of slack and are anxious, of course, to dispose of it. This is making the market for slack extremely limp. The Canadian trade is quiet, but if the Dominion government takes care of the bituminous coal that was purchased by anthracite retailers as a substitute for that fuel—and that is what was promised—then the trade in bituminous should improve.

The price of bituminous sizes holds well, but slack is off, quotations being $4.65 for Allegheny Valley, all except slack; $4.45 for Pittsburgh and No. 8 lump, $4.20 for mine-run from the same bed, and $3.80 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The situation does not change much. Shippers find the demand so good on all-rail routes that they are obliged to cut out most of their loading to the lakes. Some of them have been a week putting in their latest cargoes and none of them is as active as they usually are at the opening of navigation. So far about 50 cargoes have been loaded, and several coal-laden steamers have sailed, but the movement is small yet, on account of the lack of down freights. Some grain is offering and possibly the season will be in full activity before the fleet is ready to return. The clearances show seven cargoes, aggregating 63,760 net tons, all for head-of-the-lakes ports.

The local price of anthracite remains as follows to the end of April:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8.55	$10.25
Egg	8.45	10.20
Stove	8.70	10.10
Chestnut	8.70	10.50
Pea	7.00	9.05
Buckwheat	5.70	7.75

With 25c. additional for loading to lake vessels.

CLEVELAND

Opening of the lake season has transformed conditions in the No. 8 district so that some mines now are reporting a labor shortage. The demand for lake coal is the heaviest in years for this season of the year with the possible exception of 1918. Steam-coal consumption in Northern Ohio now is at a new low mark, with buying in proportion.

Bituminous—Operations in the iron and steel industry in Northern Ohio—the largest single user of coal in that district—now are as light as in 1914, just before the war, and in some cases lighter. This condition naturally is reflected in the coal market. Even though stockpiles are nearing the point where it will be dangerous to defer buying much longer, industrials will not even discuss purchasing or prices, and it is doubtful if a 25c. cut under present prices would move much coal.

Yet in the face of this seeming discouraging situation, operators here are more cheerful than in weeks. Upper lake dock interests are hard after No. 8, ¾-in. lump, and some operators have covered for a large percentage of their summer's output. No. 8 operators have "sold" upper lake dock men on the proposition that later on coal is going to be scarce, and that it will be the part of wisdom to crowd all bituminous possible up the lake early in the season.

Labor is getting more and more restless in southern and eastern Ohio. With prospects of wage discussions coming soon, operators appear determined to get out as large a tonnage as possible this spring. Some of the larger retail dealers are reported to be buying heavily, feeling confident prices will go no lower. They are buying high-grade coal at $2.15 and $2.20, compared with $2.60 under Government regulation. These prices so far have not proved tempting to steam-coal users, but resumption of business will see a rush to cover, and the forecast is that sometime over night prices will advance beyond expectation.

Quite an appetite for both anthracite and Pocahontas is being evidenced. The buying movement has not been passed along to consumers so far. Anthracite prices, of course, advance beginning May 1, and every retailer is certain his supplies of Pocahontas will cost him more in the fall.

Lake Trade—Though it was generally expected that 50c. to Milwaukee and other Lake Michigan ports, and 42½c. to Duluth and Superior, would be the lake coal freight rates this season, instead of 55 and 48, respectively, for last season, the rate matter has been entirely opened by the Railroad Administration. This awakened operators to the realization that Government control has not been shaken off altogether.

Cleveland coal prices, per net ton delivered, are:

Anthracite:	
Egg	$10.85 @ 10.95
Chestnut	11.00 @ 11.15
Grate	10.90 @ 11.05
Stove	10.90 @ 11.05
Pocahontas:	
Lump	7.50
Mine-run	7.20
Domestic Bituminous:	
West Virginia splint	7.05 @ 7.15
No. 8 Pittsburgh	6.10 @ 6.25
Massillon lump	6.90 @ 7.05
Steam coal:	
No. 6 slack	4.40 @ 4.50
No. 8 slack	4.70 @ 4.85
Youghiogheny	4.90 @ 5.05
No. 8, ¾-in.	5.35 @ 5.50
No. 6 mine-run	4.40 @ 4.50
No. 8 mine-run	4.70 @ 4.85

DETROIT

Sales of bituminous coal are few in both the steam and domestic branches of the trade.

Bituminous—Should the stagnation of the Detroit market continue, developments troublesome for buyers are quite likely to occur according to the expressed judgment of Detroit wholesalers. The prediction is made that buyers, who, for one reason or another are holding back, will all be coming into the market together in the late summer or early fall, and the result will be a shortage in supply.

Neither the users of steam coal nor the retail dealers appear to be developing a receptive attitude toward buying. Jobbers say orders are few and come irregularly and, in most instances, are of small size. They declare that business could scarcely be more unsatisfactory. Some of the retailers are taking domestic lump in one or two car lots, conditional on immediate shipment, to enable them to get the coal to customers before domestic buying ceases.

The unwillingness of buyers to release orders is attributed by the jobbers to the large supplies of bituminous that are still to be found in the yards of steam plants and retailers.

The steam-coal users, in some instances, are said to be waiting because of a feeling of uncertainty concerning the stability of prices, though a larger proportion of them is delaying buying to afford opportunity for clearing their yards of stock which they do not desire to mix with the better grades of steam coal now obtainable from their normal sources of supply. The retailers are reluctant to add to their already large stocks of bituminous, as in doing so more of their working capital would be tied up for several months.

Interest in contracts is lacking. Prices quoted in connection with the few inquiries received are said to be those fixed by the fuel administration. On day-to-day business, however, small sizes are offered at a lower basis. The reduction on slack is reported as much as $1 a ton below the Government price. The latter is generally maintained on lump and prepared sizes.

Anthracite—Domestic consumers are not displaying much alacrity in stocking up with anthracite for next winter's needs. Despite the impending advance in price, only a few of the householders are buying now. The supply in the hands of dealers is adequate.

COLUMBUS

A turn for the better is shown in the Ohio coal trade. Demand is improving and a better tone is exhibited. The screenings situation is not so bad as formerly, owing to a reduction in lump production and a better demand for the small sizes. Prices are still uncertain.

The Ohio coal trade shows a distinct improvement from the previous week, and consequently more optimism is in evidence on all sides. There is a good demand for the fancy grades such as Pocahontas and splints, and many operators have their output sold for a month ahead. The railroad fuel situation is still hanging fire.

Bids to supply fuel for the month of April were opened recently by quite a few railroads in this territory. No announcement has yet been made as to tonnage awarded and prices. Some low prices were quoted, but generally speaking the larger concerns upheld quotations. When the railroad fuel question is adjusted it is believed the entire trade will be stabilized. Iron and steel plants are increasing their requisitions slightly and general manufacturing appears to be improving.

The domestic trade is quiet, as is usual at this time of the year. Retailers are only doing a small business and their stocks are generally sufficient for the present. Dealers are buying the better grades quite actively. Retail prices are being shaded to a certain extent but not sufficient to demoralize the market. Many dealers believe that there will be a strong demand early in the stocking season and are making preparations accordingly.

The lake trade is slow in opening, as was predicted. Officially, navigation opens May 1, but some cargoes have been loaded. Shippers are not making large lake contracts as the price question is still unsettled. Shippers who control docks in the upper lake region will start soon, but the main bulk will not be moving until after June 1.

CINCINNATI

General market conditions satisfactory, though no great demand is yet in evidence.

Conditions in the Cincinnati district remain about as they have been for the past several weeks, with only a comparatively light demand, although in some instances dealers are reporting slight indications that the situation will improve in the near future. The renewal of contracts for steam grades, which has occupied the attention of the trade for some time past, has shown a tendency to fall off to a certain extent, undoubtedly due to the uncertain conditions prevailing in some of the industrial lines.

While industrial conditions in this district are generally reported as fair, few, if any, of the factories are working up to their full capacity, while some of them have appreciably slackened. This condition naturally has its depressing effect on the demand for fuel. It is the consensus of opinion among business men generally that with the signing of the peace pact confidence will be restored and business will gradually adjust itself to more nearly normal volume, while some few predict a real boom stage when the retarding influences are removed. The local trade is confidently looking forward to the future, but in the meantime would appreciate any influence which would effect an immediate improvement.

Contrary to the general expectations the dealers supplying the domestic trade find themselves confronted with a slight, though very satisfactory increase in demand. It was the opinion of most of them that as a result of the mild weather during practically the whole winter, and the fact that the people had prepared for an entirely different brand of weather by laying in a large supply of coal last summer and fall, the demand would show a large decrease. However, they are pleased to find themselves mistaken. Altogether, the present state of the market may be described as satisfactory, all things considered.

LOUISVILLE

Eastern Kentucky operators increasing production and meeting with good demand. Western Kentucky trade finding things dull, due to close differential in prices as between grades.

Eastern Kentucky operations are now up to a 65 to 70 per cent. full-time basis, there being an active demand for steam coal as well as a fair demand for domestic grades. The better grades are getting the call, and the operators in that section are feeling optimistic. The demand for steam coal is picking up steadily, both mine-run and nut and slack showing movements. Domestic demand is not so strong as it was, but many retailers are beginning to buy and stock some coal.

In Western Kentucky the mines are doing a little less than 40 per cent. as a whole, due to there being little demand for lower grades when the market is fully supplied with the better eastern Kentucky stocks. Operators from the western section of the state are feeling a bit optimistic just now, especially in connection with the outlook for block coal. However, a fair volume of nut and slack as well as mine-run is moving.

Prices are being well maintained throughout the fields, there being little quoting except for April, May and June delivery on domestic coal. Several good railroad contracts for engine coal are about to be closed, and prospects are generally good in connection with the lake outlook.

Eastern Kentucky is quoting block at $2.85 to $3; Jellico grade, $3.25; egg, $2.75; mine-run, $2.40; nut and slack, $2; Western Kentucky is quoting block and egg, $2.60; mine-run, $2.35; nut and slack, $2.05.

BIRMINGHAM

Domestic coal moving well but steam demand slack. Prices remain firm. Mines operating on three- and four-day schedules, but a better average daily output is being obtained.

Coal men report a sustained demand for all grades of good domestic coal, the supply of which is short even at this early season, and the lower grades of domestic fuel are now being taken by dealers, who are beginning to show some accumulation of stocks in their yards. Domestic mines are running full time, though the output is not up to normal. Prices are as follows per net ton at mines for lump and nut:

Carbon Hill	$3.15
Corona	3.40
Big Seam	2.90
Black Creek and Cahaba	3.85@4.50
Montevallo	5.00

There has been no noticeable improvement in the steam situation, those consumers who do have contracts in force buying as their needs materialize. Sales are confined to small lots and few contracts are being made. Sales agents and jobbers, however, are in no wise pessimistic and are confident that a good market will develop as soon as industrial conditions become more settled. Government prices in effect Jan. 31 still obtain for steam coal.

Coke

CONNELLSVILLE

Market continues to decline. No sale for byproduct coal. Heavy restriction in Connellsville coke output.

The Connellsville coke market has continued to exhibit a declining tendency, prices being a shade lower both on spot lots and on deliveries to the end of the month, while it develops that more contracts were settled at $4 and fewer at $4.25, for April deliveries, than was originally reported.

How much liquidation in production costs there has been cannot be estimated. It is known that there is considerably more efficiency, and it is rumored that wage reductions at small operations have been fairly

numerous. The large operators have not made any reductions whatever. While coke is now available at prices considerably below what was recently claimed to be the cost of production, it does not follow that actual losses are being experienced, since the cost computation was based on coal at the market price, and that market price would represent a profit, the difficulty being that coal cannot be sold in any tonnage at the market.

The Connellsville coke industry has had to stand the brunt of the reduction in blast-furnace operations, by reason of there being so many steel interests that use both byproduct and beehive coke when they are running full, but when blowing out furnaces shut off the beehive coke before they touch their byproduct operations. On the other hand the Connellsville operators are not experiencing any competition in the market from byproduct ovens, coke supply being too limited to enable the byproduct ovens attached to blast furnaces to attempt to dispose of surplus coke to other furnaces. The result of the decreased coke consumption falling particularly upon the Connellsville region is that production is now running not over 150,000 tons a week, whereas in July, August and September, before the influenza epidemic affected production, the weekly output ranged from 325,000 to 350,000 tons, so that there has been a decrease of about 55 per cent.

Odd lots of furnace coke have been available at $3.60, and this price has also been quoted on deliveries to the end of the month. There is a rumor current that the remarkable price of $3.30 has been reached, and this may be correct if it involved coke of such character that it could be used by very few furnaces. April settlements appear to have been chiefly at $4, with a few at $4.25. Deliveries continue, in a limited way, on contracts that were written at "last Government price" but voluntarily reduced to $5. Foundry coke remains at $4.50@6.00, depending on brand, with fairly good demand in small lots. All prices are per net ton at ovens

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Apr. 12 at 150,415 tons, a decrease of 21,935 tons.

Buffalo—The trade is decidedly quiet and will remain so till the iron trade is more settled, for then the ore contracts and charters for distributing the Lake Superior output will be made and the regular season will open. As yet nothing in that line has been done and all vessels that have gone after ore will merely carry some that was left over last fall or on long-term contracts that they may have. The price of coke, f.o.b. here is $7.25 for 72-hour foundry, $6.60 for 48-hour furnace and $6.10 for off grades. Breeze and other fuel cokes are practicably unsalable.

Middle Western

GENERAL REVIEW

More sales being reported, opinion being strong that market will show steady improvement from now on. Prices holding up. Domestic demand inactive.

There has been little change in the Mid-West market during the past week. However, what difference exists is for the better. Operators and jobbers alike are reporting more sales, and at reasonable prices. There is a prevailing opinion that from now on the market will improve slowly but steadily. Practically all of the large operators in this district received bids calling for their best contract propositions to supply coal to the various army camps and stations in this territory. Careful investigation shows that nearly all the operators making bids for this business have kept strictly to the late Government prices. A number of operators decided not to make any bids for the business, on account of the red tape involved in the making of a contract with the Government. Some also said that contracts with the Government are entirely too one-sided, favoring, of course, the Government.

Prices are holding up fairly well. While there has been but little demand for Franklin County screenings, we understand the prices on this grade of coal have been maintained steadily, and without deviation. Other southern Illinois coals, especially from the Belleville district, have been selling at cut prices. This is also true of coal from the northern districts of the state, and the Springfield district, considering the Springfield region as a whole, has maintained the price on its product remarkably well. The high-grade producing districts in Indiana continue to adhere strictly to list prices and report considerable business received on this basis.

The domestic situation in this territory, and especially in northern Illinois, is inactive. This is because practically all householders have some coal in their bins. Those who ran out of coal purchased late in March, or before, and as a result are no longer in the market. Dealers report that their trade show practically no inclination toward stocking coal. This means, of course, that there will be a congestion later in the season.

CHICAGO

Much "distress" coal dumped here. Good demand for Pocahontas. Why public is paying high prices for coal.

The Chicago steam market is not improving so fast as had been hoped, and Chicago continues to be a dumping ground for "distress" coal. The domestic situation is quiet in the extreme. There is a good demand for Pocahontas, and we understand that the price on this coal is holding firm at $3.50 to $3.75 for lump. There is a prevailing opinion among the retailers that when this country begins to export coal but little Pocahontas will reach this market.

Mr. Upham, the president of the Consumers Co., issued a statement to the public wherein he claimed that the high prices for coal are entirely on account of Government supervision. He says that the retailers are not the coal profiteers, but that the United States is to blame for the high prices. To give an idea of his argument, we quote the following paragraph:

"Take bituminous coal, an Illinois product. Price fixed by the Government at $2.50 per ton at mines. The freight rate, which was 90c. per ton, is now $1.55, plus a 5c. war tax, which brings the retail price up to $4.10 per ton, more than the retail price before the war. Teaming was then 70c. per ton, and is now $1 per ton. We allow 85c. for shortage, yardage and profit, and pay the $1 teaming charge to the men. That brings the price of Illinois coal up to $6 per ton."

MILWAUKEE

Prospect of higher prices for anthracite serves to stimulate the demand. Early agitation in favor of the establishment of municipal coal yards.

Newspaper gossip, suggesting a possible advance of $1.50 per ton on anthracite over present prices, has had the effect of stimulating business to some extent. Dealers report a tendency on the part of domestic consumers to put in supplies for next winter, with the result that deliveries are more active than for some time past. Other conditions remain the same. There is plenty of coal on hand, and cargoes will be reaching the docks from the lower lakes in the course of a few days, but there is no sign of price shading even on the commonest bituminous grades. The prospect that coal will be no cheaper, with the strain of war's needs removed, naturally causes dissatisfied comment, and public agitation of the matter may be expected. Mayor D. W. Hoan is in the field early with an argument in favor of the establishment of municipal coal yards, not only in Milwaukee, but at interior points.

ST. LOUIS

An easy, quiet and unattractive market, with plenty of coal and no orders. Steam and domestic city and country business quiet.

Local conditions are extremely easy. The weather is mild and there is but little demand for domestic fuel. Such orders as come in are for small amounts only and for the cheaper grades. A few orders have been placed for storage coal for household use, but these are scattered. The wagon-load steam business is easy on account of the slowing up in activity on the part of manufacturing plants.

The country demand for all kinds of coal is practically off, except on nut for range purposes in the smaller places. There is some call for anthracite chestnut, but other than that there is little coal moving.

In the Standard district business is at a standstill. The trouble right now is to move lump and egg. Nut and screenings are in fairly good demand, but even at that the operators do not seem to realize that they can get the cost of production, and lower prices still prevail.

In the Mt. Olive field conditions are tranquil. Mines are working a couple of days a week, as in the Standard field. The coal here is moving to the north. There is little coming in locally. There is a little railroad coal moving, but it is light, and there is some question as to the price.

In the Carterville field of Williamson and Franklin Counties, as well as in the Du Quoin field, things are moving along slowly but apparently satisfactorily to both miner and operator. Some mines manage to get a couple of days a week, and some of them do better than that; others have been shut down for some time, and a number are expecting to shut down to make necessary repairs.

No Arkansas coal is coming in, and judging from the attitude of the dealers little will come in, even if the mine troubles in that state were settled. There is no demand for smokeless, although none is offered for this market.

The present prevailing circular per net ton f.o.b. mines is:

Williamson and Franklin County Association:		Mt. Olive and Staunton		Standard	
Lump, egg and nut	$2.75	....		....	
Washed Nos. 1 and 2 nut	2.85	....		....	
Independent:					
Lump, egg and nut	2.55	2.55	Lump and egg	2.25	
Washed Nos. 1 and 2 nut	2.85	....	2x3 nut	2.00	
Mine-run	2.35	2.20		2.00	
Screenings	2.20	2.05		1.75	
3-in. lump	....	2.30		....	
2-in. lump	....	....		2.15	
2x6 egg	....	....		2.10	

Williamson-Franklin rate to St. Louis is $1.07½; other rates $0.92½.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Apr. 21, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	..
Burns Brothers, Com	(BB)	163½	164½
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	..
Central Coal & Coke, Pfd	(CK)	63	..
Colorado Fuel & Iron, Com	(CF)	43	43½
Colorado Fuel & Iron, Pfd	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	..
Elk Horn Coal, Com	(EH)	26¾	27½
Elk Horn Coal, Pfd	(EH)	..	47
Island Creek Coal, Com	(ICR)	39	..
Island Creek Coal, Pfd	(ICR)	75	..
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	..
New Central Coal of West Va	(NCC)	5	..
Pittsburgh Coal, Com	(PC)	50	50½
Pittsburgh Coal, Pfd	(PC)	86½	87
Pond Creek Coal	(PD)	13	15½
Virginia Iron, Coal & Coke	(VK)	53½	56

* Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	..
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	..
Colorado Fuel & Iron, Gen. 5s, 1943	89½	91
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	73½	74½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	88½
Lehigh Valley Coal, 1st Gtd. 5s, 1933	96	..
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	100⅛	..
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	79¼	..
Pleasant Valley Coal, 1st S. F. 5s, 1928	90	..
Pocahontas Coal & Coke, Joint 4s, 1941	80½	..
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	83½	84½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	87½	88
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	98	..
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	..	83
Utah Fuel, 1st Sinking Fund 5s, 1931	92	95½
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	87	..
Virginia Iron, Coal & Coke 1st 5s, 1949	65	70
	84	85½

COAL AGE

Volume 15 New York, May 1, 1919 Number 18

All Price Revisions Will Be Upward

By R. Dawson Hall

BACK in 1900 there was an owner of a large lumber tract who said he wouldn't cut his timber so long as wages stayed so high. He could remember when men earned only 50c. a day and board, and he would "like to see the workingman who could earn legitimately more than a dollar a day." He's dead now, and the timber has been cut by more aggressive men. They made a big profit on the job despite the high wages, because prices were high as well as wages.

In considering whether wages are high or low it doesn't do to look back to Buchanan's day. We have had a Civil War since he was President. Nor should we worry about prices in 1913; there has been an even greater war since then. Prices are higher and wages are higher, but there is no need for bewilderment. All we have to do is to learn the value of the new dollar. We have in the readjustment period to readjust our thoughts and conceptions to a new sixty-cent standard. It is just as much a depreciated dollar as if some monarch had clipped away 40 per cent. of its substance after the manner of merry monarchs a few centuries ago.

"Prices and wages have gone up, and what goes up must again come down," people very simply but not very profoundly remark. As a boy we learned that the ball that went up sometimes stayed up and never came down. So the ball of prices beaten by the battledore of war has fallen on the roof of increased currency and lodged in the eaves trough of high wages. It can't be reached or brought down.

The war has lifted the cost of production and the selling price, but it not only caused these prices and wages, it also created conditions that will keep them fast—it built the unions which will not allow wages to fall; and it created a large volume of unnecessary currency that cannot be withdrawn or absorbed for years, if indeed it can ever be. The large quantities of this currency, like too many men on a job, get in their own way so that each "iron man" does less than a man's work.

Every one wants prosperity; we all know it cannot come without popular certainty that prices will go up, or at least sail along unchanged. Those, therefore, who are convinced that prices are, in the main at least, as low as they will ever be, should call meetings to convince the public of that fact. The principal need of the industry, of mine owner, manager and miner is prosperous business, everyday operation. Go to it now! Let every man know that you are confident that there will be no further wage or price clipping, but that if any change occurs it will be a higher wage or price, especially in those industries that have not shared hitherto in the prosperity arising from the war. Don't be a trailer, be a motor and pull. Establish your business, even if in doing so you help your neighbor as much as you do yourself.

IDEAS AND SUGGESTIONS

To Save Time in Laying Out Mine Curves

By R. Dawson Hall

In the United States, railroad curves are calculated in a manner that makes it possible to have simple angles of deflection for 100-ft. chords. The American method of laying out a curve is much simpler than the English method, because the angles of deflection can be added mentally. The method of describing the curve is easily understood and is just as expressive as the English method of stating the radius.

When running mine curves the engineer usually falls back on the English method, using a definite radius of so many feet or tens of feet, letting the deflection angle be what it may. He does this because he thinks he cannot use the regular deflection table, as it is calculated for the 100-ft. chord, which cannot be used where the radius runs between 20 ft. and 200 ft. The chord would in many cases be longer than the diameter.

To make the procedure still in general use plain it may be said that it is usual to take the formula:

$$\frac{\frac{1}{2}\ chord}{radius} = sin\ \frac{1}{2}\ deflection\ angle$$

and assume the exact chord and the exact radius desired and calculate the deflection angle. This is all very well, but it is not advisable to accept that angle when it is found. It may run 9 deg. 45.3762 min., and if there are many chords to run the addition of them would make one dizzy. The better way is to say the deflection angle should be 10 deg., not 9 deg. 45.3762 min., and then take the table which the transitman will find in Searles, Trautwine, Nagle or other fieldbooks, and from that table make his calculations, remembering that the radius of a circle having any given deflection angle per chord is proportional to the length of the chord.

The same is true of the middle ordinates and tangential offsets. Let me compare the radii, midordinates and offsets for a 6-deg. standard curve laid off with 100-ft. chords and a 6-deg. miniature curve laid off with 10-ft., 20-ft. and 20-m. chords respectively:

Chord	Degree of Curve	Radius	Middle Ordinate	Tangential Offset
100 ft.	6	955.37 ft.	1.31 ft.	5.234 ft.
10 ft.	6	95.54 ft.	0.13 ft.	0.52 ft.
20 ft.	6	191.07 ft.	0.26 ft.	1.05 ft.
20 m.	6	191.07 m.	0.26 m.	1.05 m.

It will be seen that when the chord is one-tenth as long as is the chord on which the table is based the radius, the midordinate and the tangential offset are each one-tenth as long. The standard table is almost as readily used as if it were calculated for the laying out of a miniature curve.

As a 20-ft. chord makes a convenient length for mine work Frederick MacCoy, a mining engineer of Jerome, Ariz., has calculated a table for laying out curves which appeared in the *Engineering and Mining Journal*. It is a compromise between the English and American systems. The radius has been assumed to be as in the second column, and the deflection angle corresponding to that radius has been calculated. All the fractions of minutes in the deflection have been ignored or the nearest even minute has been taken and the results, thus mutilated or modified, are shown in the first column. Mr. MacCoy has recalculated the radius from the deflection in the first column and set that radius down in the third column as the "actual radius." It will be seen that it closely approximates the radius as recorded in the second column.

In laying out timbers, tipple bents and other work involving chords of unusual length, the better plan is to refer to the railroad tables, divide the figures given for the radius, midordinate and tangential offset by 100, and multiply by the chord chosen. The deflection angle, or "angle" of the curve, will then of course be based on the chord of unusual length which conditions have made necessary or desirable.

TABLE OF STANDARD CURVES FOR MINE TRAMROADS
(For Chords of 20 Feet)

Degree of Curve	Nominal Radius	Actual Radius	Log. Radius	Defl. in Minutes Per Foot
58° 00′	20 ft.	19.97 ft.	1.300370	87
46 00	25	25.08	399315	69
38 24	30	29.98	476855	57.60
32 52	35	34.99	543887	49.30
28 44	40	39.99	601905	43.10
25 32	45	44.97	652944	38.30
22 56	50	50.05	1.699410	34.40
19 08	60	59.96	777867	28.70
16 22	70	70.07	845562	24.55
15 18	75	74.95	874784	22.95
14 20	80	80.00	903089	21.50
12 44	90	90.04	954434	19.10
11 28	100	100.10	2.000440	17.20
10 26	110	109.98	041330	15.65
9 34	120	119.92	078897	14.35
9 10	125	125.14	097404	13.75
8 50	130	129.85	113458	13.25
8 12	140	139.87	145709	12.30
7 38	150	150.23	2.176760	11.45
7 10	160	160.00	204119	10.75
6 44	170	170.28	231172	10.10
6 32	175	175.49	244253	9.80
6 22	180	180.08	255464	9.55
6 02	190	190.02	278796	9.05
5 44	200	199.95	2.300927	8.60
5 28	210	209.70	321595	8.20
5 12	220	220.44	343298	7.80
5 06	225	224.76	351726	7.65
5 00	230	229.26	360320	7.50
4 46	240	240.47	381063	7.15
4 36	250	249.18	2.396511	6.90
4 24	260	260.50	415807	6.60
4 14	270	270.75	432569	6.35
4 06	280	279.55	446461	6.15
3 56	290	291.39	464477	5.90
3 48	300	301.61	479449	5.70

Note: Curves of less than 100-ft. radius should be laid out by half chords.

As Mr. MacCoy points out, a similar adaptation of tables of switch curves may be made to fit any gage of track by the use of the following rules: For the same gage the radii of the turnout are to one another as the square of the number of the frog. For the same frog with different gages, the radii and frog distances are to each other as the width of gage. For a standard unit, a No. 1 frog requires a turnout radius of 2 ft. on a 1-ft. gage. The same frog on a 3-ft. gage requires a turnout radius three times as long, or 6 ft. A No. 6 frog on a 1-ft. gage needs 6 × 6 times as long a turnout radius as a No. 1 frog on a 1-ft. gage—that is, 6 × 6 × 2, or 72 ft. Changing the gage to 3 ft. the turnout radius will be three times as long, or 216 ft. Similarly a No. 6 frog with a 1-m. gage requires a turnout radius of 72 meters.

Remodeling a Poorly Designed Switchboard

By J. J. Nolan
Linton, Ind.

Figs. 1 and 2 show a side and a front view of a three-panel switchboard which was erected some few years ago by a construction company at a certain Indiana mine without taking into consideration facilities or room on the rear of the board for repairing or renewing parts, the need for which the numerous con-

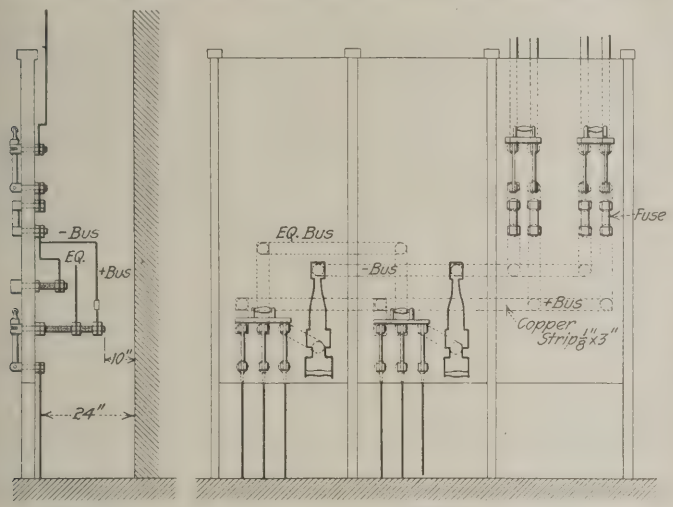


Fig. 1 Fig. 2

FIGS. 1 AND 2. SIDE AND FRONT VIEW OF THREE-PANEL BOARD

nections shown should have made evident unless all joints were designed properly and pulled up snug.

Trouble began later with hot connections in numerous places on the rear of the board. The limited room of 10 in. between the positive bus and the wall made it difficult to make permanent repairs, especially as the gas in the mine required the booster fans to be operated

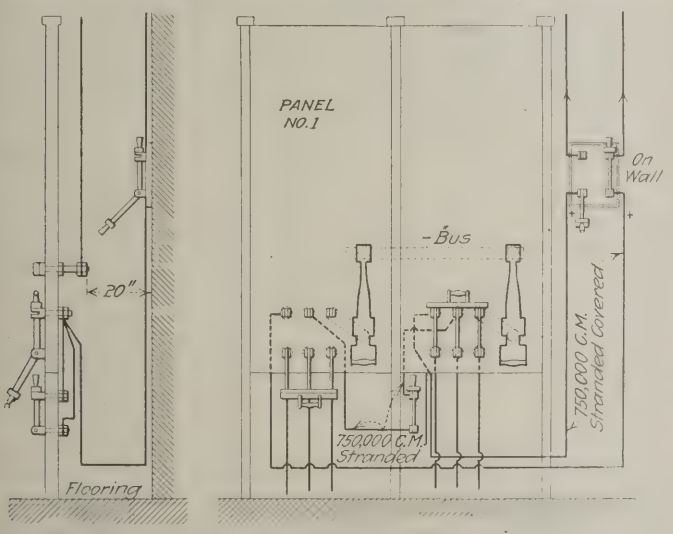


Fig. 3 Fig. 4

FIGS. 3 AND 4. PLAN OF BOARD AND SYSTEM OF WIRING

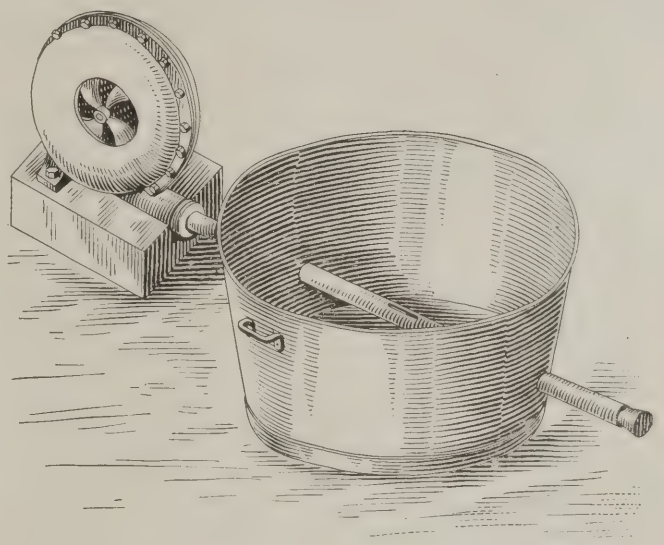
continuously day and night. Furthermore, as may be seen, the whole length of the three panels was charged on the rear whether one or two generators were running.

Figs. 3 and 4 show a plan of the board and wiring which I designed and later adopted to do away with one panel altogether as well as to reduce the number of connections on the rear of the board from 42 to 19. This increased the clearance between wall and bus from 10 to 20 in. and permitted the disconnection of the positive from either side as desired. The new arrangement makes for safety and allows plenty of room for the removal or repair of almost any part without entailing a shutdown.

The two single-pole knife switches on the wall and the one single-pole switch connecting the equalizers are left closed only when there is occasion to repair or remove some part of one panel. Fig. 4 shows No. 1 panel when cut out, also the equalizer and left-hand single-pole switch on the wall when repairs are to be made on this side.

A Prospector's Washtub Forge

A handy forge frame is made out of an old galvanized-iron washtub. A 2-in. pipe, with a slot $\frac{1}{4}$ x 2 in. cut in the upper side, is placed horizontally, as shown, and connected with the bellows or blower. The other end of the pipe is plugged with a piece of wood. The tub is then filled to the level of the pipe with dirt or ashes, and the rest of the way with coal. If the pipe gets stopped up, the wood plug can be drawn, and the



INGENIOUS FORGE MADE OF OLD WASHTUB

fine coke and ashes blown out. This washtub forge is much more simple for the prospector to put together than one constructed of lumber or rocks, and is fireproof. Furthermore, lumber is not always obtainable "forty miles from nowhere." The tub is wide enough to support conveniently the usual lengths of steel used in such work. If long pieces of hand steel are to be sharpened, a bent-rod support is easily attached to the tub. When the prospector moves, the tub is not necessarily an inconvenience, for it can be used as a packing case.

THE IMPERATIVE NEED for thorough lubrication and protection of wire ropes on slopes and shafts is pointed out by S. Hardesty in a paper on "Stresses in Wire Rope" in the "Proceedings" of the American Society of Mechanical Engineers. The lubricant chosen should be one which will penetrate to the inside of the rope and thoroughly saturate the hemp core. A heavy dressing which merely forms a coating on the outside of the rope may be worse than useless, for it may give a false sense of security while the inside of the rope is devoid of lubricant and possibly even rusting. If slippage of the strands and wires can take place, as in well lubricated ropes, then when a rope is bent around a sheave of proper diameter the stresses will be negligible.

Underground Coal-Loading Machinery*

By E. N. Zern
Pittsburgh, Penn.

SYNOPSIS — *Many types of coal-loading machines have been introduced in American mines. These vary from shaking chutes to elaborate and ponderous devices that both mine the coal and deposit it in a car. None has been received with universal favor, although most of the devices have achieved a fair degree of success. It is manifestly unfair to put any coal-loading machine to work unless mining, haulage and other conditions are made favorable to its operation.*

THE coal industry has ever been beset with problems, some evanescent, because the solution has been comparatively easy, and some recurring with such persistent regularity that it may be inferred they have never been solved. In this latter classification falls the labor problem, which is now doubtless the biggest problem confronting the industry.

In the past the perplexities which have arisen from an unsatisfactory labor situation have never brought disaster to the industry, but, instead, have benefited it to some degree. The labor situation, in a sense, has been responsible for almost every improvement in mining from the laying of the first pair of mine rails down to the adoption of the modern coal-cutting machine. During our seven centuries of mining experience, necessity has unfailingly mothered invention. Coal production is now but little more than a series of mechanical processes.

The mine, which we are now pleased to call modern, uses machinery to do the undercutting, electric or air-driven drills to bore the holes, explosives to bring down the coal and locomotives to haul it away. A few clever devices on the tipple or breaker assist gravity in the work of preparation. The missing link in the chain of mechanical operations is the device which will replace or simplify hand loading. The advantages of underground devices for the loading of coal may be stated as:

1. The output of coal per employee can be increased, or, in other words, fewer men will be required for a stated output. Present figures of production are so low that they should be easy of betterment.

2. The development area of the mine can be greatly reduced. With the use of machines it should be possible to get the same amount of coal from an area one-half to one-fourth as great as with present practice. The benefits to be derived from a restricted area are: (a) Less capital will be tied up; (b) ventilation will be cheapened and simplified; (c) haulage systems can be better organized—trips can be moved rapidly and with less delay; (d) trackwork, timbering, etc., being concentrated, can be done to better advantage; (e) fewer mine cars will be needed; (f) supervision will be more effective; (g) power costs will be reduced and (h) the safety of employees can be better guarded.

3. The roof can be kept in better and safer condition, owing to the rapid rate of advance of rooms and entries and the subsequent drawing of the pillars. Where combination mining and loading machines are used, the integrity of the roof is particularly well guarded, inasmuch as no explosive is employed.

4. Thin beds can be worked profitably. The number of mines now opened in seams from 3 to 5 ft. thick is surprisingly large. It is well understood that the problem of haulage and loading is particularly troublesome in low beds, and it may reasonably be expected that such mines will early embrace the help of machinery.

5. The summation of all advantages indicate that the cost of producing coal can be reduced.

The several devices here shown do not include all that have been brought forth during the past decade. Omission of several has been made necessary because they are at the present time undergoing reconstruction, and the feeling existed on the part of the maker that to show the experimental machine might prove an injustice to the future model. However, a sufficient number are here depicted to indicate the various principles underlying the construction and operation of past and present devices.

Mechanical conveyors, perhaps, should not be included as a type of coal-loading machine, inasmuch as they require that coal be shoveled into them. For the purpose of this paper, however, the term "coal-loading" is used with a liberality that will permit the inclusion of conveyors, the principle of which is found in most of the so-called "loaders."

The first coal-face conveyor used in the United States was the joint invention of Clarence Claghorn and W. C. Blackett. It was installed at Vintondale, Penn., and although it has already been described, a brief reference to it as a type will not be out of place.

The coal worked at Vintondale is the "B", or Lower Kittanning, bed, 42 in. in thickness, with a dip of 8 per cent. and an average cover of 200 ft. At one time there were two different arrangements, one using a single-conveyor system and the other using a triple conveyor.

The method of working with the single conveyor is as follows: The main entries are driven up the pitch through the center of the property and cross headings

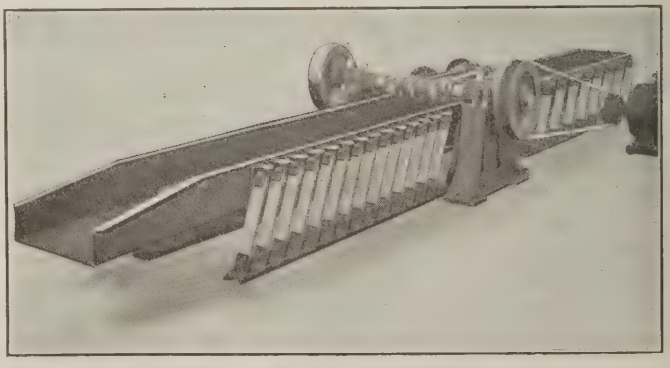


FIG. 1. BALANCED TYPE OF DODGE-ZIMMER CONVEYOR, SHOWING CHUTES AND SUPPORTS

*Abstract of paper presented before the annual meeting of the Coal Mining Institute of America, Pittsburgh, Penn., Dec. 5, 1918.

are turned from these every 400 ft. Block headings are driven perpendicularly off the cross-entries on 265-ft. centers, this allowing a solid face of 250 ft. These block headings are driven 15 ft. wide, but bottom is lifted only 7 ft. wide near the rib, and of such depth as to allow a clearance of 6 ft. from the top of rail. The length of the block heading is 350 ft., and the one nearest the outcrop is first attacked. The time required in removing equipment from one block to another is usually about 15 hours, the change, of course, being made when each block is worked out.

The conveyor consists of a trough or pan, made of sheet steel ⅛ in. thick, 12 in. wide at the bottom, 18 in. wide at the top and 6 in. high. The conveyor, which is 250 ft. in length, is made up in 6-, 12-, 15 and 18-ft. sections, connected together by means of ½-in. flat-headed bolts, countersunk. The conveyor chain is made of either steel or malleable cast iron, held together by bolts and so designed that repairs can be quickly made.

The number of men required to run a block with the single conveyor is 13, consisting of the block boss, machine runner and helper, driller (who also acts as shot-firer), engine boy, head man and six loaders. With a 5-

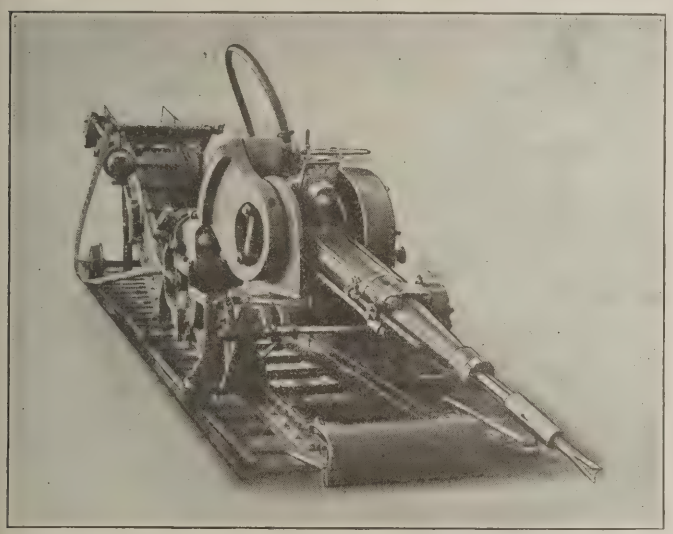


FIG. 2. INGERSOLL-RAND MACHINE READY FOR WORK

ft. undercut a block throws 125 tons of coal. Four cuts per week are, on an average, obtained from each block, making a daily average of 100 tons per conveyor.

The triple-conveyor system has been found an improvement on the single conveyor as it means less cost for development and for deadwork in mining the block. When the block is ready for operation, a conveyor 350 ft. long is placed on the block heading. Extending to either side is a conveyor 250 ft. long, with delivery ends directly over the main conveyor, one being 5 ft. in advance of the other. Each conveyor is driven by a 20-hp. motor, incased in a sheet-iron frame mounted on steel shoes, so as to be easily moved.

When a block is cleaned up, the timbermen move up the conveyor, set the break rows, pull the timber and make everything ready for the conveyor to start when the opposite block is loaded out. The main conveyor, which is made up of 12-ft. sections, is disjointed about every third day, and one of the sections taken out and moved to the block heading next to be worked.

The method of handling the cars to the conveyor is simple. A side track is laid 300 ft. long, of which the

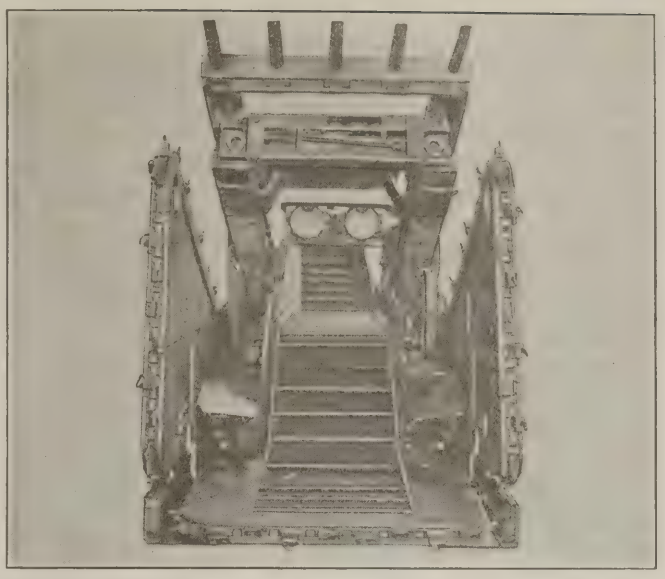


FIG. 3. FRONT VIEW OF JEFFREY-MORGAN MINING AND LOADING MACHINE

block heading is the center. Connection is made with the main track at the lower end and a crossover switch is placed directly under the conveyor. At the upper end of the siding is placed an electric hoist. A trip of 14 cars is shoved into the empty track, the rope is attached and the trip pulled up to the conveyor. As each car is loaded the trip is pulled forward. When loaded, the trip is dropped on the loaded siding, the rope disengaged and attached to the empties.

The working of the face is similar to that of the single block, and the output averages 150 tons per day. An account of this operation, given in 1907, stated that the cost averages for two years showed that block coal was loaded on the cars 35 per cent. cheaper than the district mining rate, and that this cost could be reduced when contemplated improvements were added.

Other forms of conveyors in use for transporting coal from the face to the main haulways are:

Belt Conveyors—These consist of an endless belt made of various materials and operated in the same manner as the chain-and-trough conveyor just described. In construction they are similar to the appliances used for conveying coal to bunkers in power houses or for bringing coal from a slope opening to the tipple. Where used in England[1] they are commonly built in lengths of 300 ft., although in some instances the conveyor attains a length of 600 ft. The belt usually runs at a speed of 50 ft. per minute and delivers from 20 to 25 tons per hour. The saving at one mine is reported as 10c. per ton in the cost of delivering the coal to the shaft bottom.

Shaking Conveyors—In the United States the only conveyor, I believe, which uses this principle is known as the Dodge-Zimmer conveyor and is made by the Dodge Manufacturing Co. One driving mechanism is employed, this being located either at the end or at the center of the conveyor. When located at the center it is known as the "balanced type," and when at the end as the "unbalanced type." In operation the conveyor has a short backward and forward motion, with a slight rise on the forward stroke which moves the material forward in the trough in a smoothly flowing stream and without transporting any of the mechanical parts.

[1]Sydney F. Walker, in *Coal Age*, Vol. 10, p. 744.

The conveyor consists of a steel trough of proper depth and width for the transport of the coal. This is supported by inclined laminated spring legs, and is attached to the driving mechanism by connecting-rods.

The great advantage claimed for this type of conveyor is the absence of working parts, as compared with the chain and flight type of conveyor. In operation the only part that moves on a wearing surface is the eccentric shaft in the driving mechanism; expenses of operation and maintenance are low because of the few moving parts; the power required to operate is small, a conveyor 12 in. wide and 65 ft. long conveying 7 tons of coal per hour, requiring but one brake-horsepower.

Moving Trough Conveyor—In this conveyor the trough moves along the coal face and delivers to mine cars at a central point. The movement of the working trough is accomplished by the aid of wire ropes coiled on a drum located at the central delivery point. In the Thompson apparatus there is one rope, the ends of which are secured to the ends of the moving trough, the middle of the rope being carried around friction drums or pulleys. The trough itself is moved from end to end of the face by a motion of the rope over the friction drum. The action is similar to that of an endless rope except that the trough is looped into the rope. In the Bridgewater conveyor the main-and-tail rope system is employed.

Any type of conveyor, so arranged as to be parallel with the face and advancing with it, offers the following advantages: It can be made low, some conveyors being only 6 in. above the floor; the distance through which the coal must be raised by the loader is small, hence he can load more coal with less muscular effort; it is unnecessary to rip the roof or take up bottom; it requires no track from the haulways to the face; coal can be shoveled with less fatigue since the conveyor is right at the loader's back; the conveyor can be readily worked in various lengths and made to follow the face throughout the working of the panel; it requires little power to operate, varying from 5 to 10 hp.; it increases the tonnage output per employee at a decreased cost.

Combination Mining and Loading Machines

The combination in one machine of a coal-cutting unit and a coal-loading unit represents an ideal, long in the minds of inventors. Such a machine combines the functions of the coal cutter, the auger for boring holes, the shotfirer, the explosive and the hand loader. In scope, then, the adoption of this principle to the winning of coal is about the biggest thing that has ever been projected in the history of the art. The displacement of explosives is one of the strong points in favor of this type, and when first brought out the statement that it eliminated explosives attracted attention.

The Ingersoll-Rand cutter and loader will be readily understood by all mining men as its main parts consist of a powerful air-driven puncher, mounted on a carriage over a conveyor. A lever is used to elevate or depress the puncher pick, a second lever moves it from rib to rib through the agency of a small air engine, while a third lever moves the whole puncher, together with its truck, bodily toward or away from the face, the conveyor remaining stationary within certain limits, or accompanying the forward or backward motion of the puncher, as desired.

The puncher itself makes about 160 strokes per minute and is controlled in the same manner as the ordinary hand-operated machine, going from rib to rib and making a cut extending the entire width of the entry. The conveyor is driven by a separate engine suitably controlled by a stop valve. The mine car is filled evenly by moving it about three times during the loading process.

Making the undercut is the longest part of the operation, requiring from 25 to 40 min., according to the

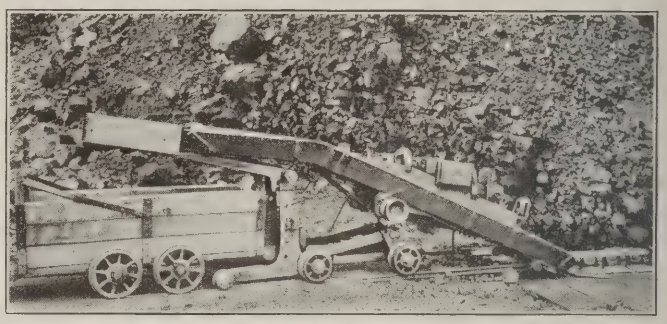


FIG. 4. SIDE VIEW OF FLAT FLIGHT JEFFREY LOADER

hardness of the coal. The knocking-down process ordinarily takes place faster than cars can be supplied. When it is completed the conveyor is pulled back about 7 ft., a section of track is laid, and the conveyor again moved forward into position.

Two set-ups during the shift constitute a 10-ft. advance of the entry. It is estimated that under suitable operating conditions, such as high coal of the quality found in the Pittsburgh bed, the machine should average 250 ft. of advance per month of 25 working days, working day shift only, night shift being reserved for the laying of tracks, piping, etc. Where conditions have been suitable and cars have been served to the machine without delay, as much as 20 ft. of advance has been made in a single shift. The average advance in entries of the Annabelle mine at Worthington, W. Va., where several of these machines have been in operation since 1913, is somewhat over 10 ft. The cuts average 10½ to 11 ft. wide and 6½ ft. high.

In 1913 the Jeffrey Manufacturing Co. built a number of machines based on the patents of E. C. Morgan. The principal elements in this design are the undercutting chain, the two shearing chains, the heavy reciprocating pick that knocks down the coal and the conveyors that carry it back and load it into a car. Fig. 3 shows a front view of the machine, which operates on the same principle as a breast machine, the first, or sumping cut, being made at either rib, usually the left. It is fed forward in a stationary pan, making a cut 5 ft. wide, 7 ft. deep and of a height to suit the seam. The machine has an undercutting chain with cutter head similar to that of a breast machine, and a shearing chain on either side. The frames carrying these shearing chains can be varied for different heights of coal.

Between the shearing chains is mounted a frame carrying a number of heavy punching picks. This frame is readily raised and lowered by the operator, who can cause the picks to strike at any height he desires. The coal falls onto a conveyor which is made thin enough to go into the kerf cut by the undercutting chain. This conveyor carries the coal to the rear end

of the machine and dumps it into a second conveyor, which is mounted so that it can swing at any desired angle to the machine.

After a cut is made, the machine is moved sideways by means of a rope hitched to a jack at the opposite rib, and then another cut is made. When slate is to be piled up at the side of the room, the rear conveyor is swung sideways, the slate rolled onto the front of the machine and gobbed by the two conveyors.

In a test run the machine required an average of 13½ min. to make a cut and about 3 min. to move the machine to the next cut, or about 16 to 17 min. time for each cut. The coal loaded averaged 21 tons per hour, although where roof conditions were good the machine has loaded 30 tons an hour. The height of the coal is 5 ft. 8 in. In another district an average of 60 tons per day was had for three months. In the driving of an 11-ft. entry it has averaged 20 ft. advance per shift of 8 hours under rather unfavorable circumstances. Figures show a saving of 32c. per ton by using the machine for entry driving. The crew for each machine consists of a machine runner, a helper and a driver. If the slate is heavy it may require an extra man for its handling.

In spite of the attractiveness of the combination mining and loading machines as labor-saving devices, they have so far failed to gain a prominent place in the sun. One trouble with them would appear to lie in the large number of working parts. In the next place, a combination type of machine is necessarily cumbersome and is moved with difficulty from place to place, even though such movement is not often required. Again, in spite of the care taken in design, failures due to breakage of vital parts are sure to occur.

Combination shoveling and loading machines as a type consist of a shovel or similar device, to pick up the coal after it has been shot down, and another device, as a belt, to convey it to the mine car. It therefore occupies a position midway between the combination mining and loading type of machine and the plain conveyor.

The Hamilton machine will be the first treated of this type, for the reason that it was one of the pioneers in its line. The Hamilton loader, in its original design, consisted of two conveyors, the rear one serving for

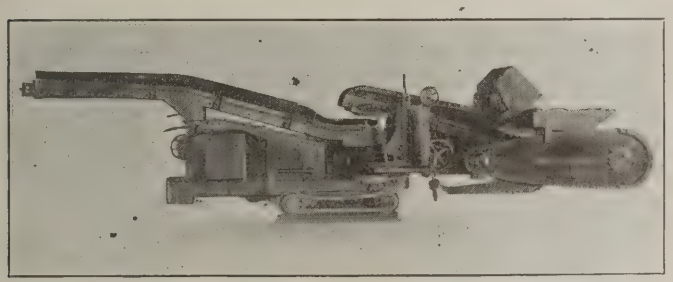


FIG. 5. MYERS-WHALEY SHOVELING MACHINE

gathering the coal and moving it to the front conveyor, which carried it to the car and also served as a picking table. The front conveyor was permanently mounted on a truck; the rear one, when necessary to move the machine to another location, was mounted on pony trucks. The entire machine was self-propelling and on reaching the face the rear, or gathering, conveyor was jacked up and the pony trucks removed, permitting the nose end of the conveyor to rest on the floor.

A novel feature of the first machine was that after the flights passed around the sheave wheel they folded up and entered the return guide pressed back against the chain, the advantage claimed being compactness, and that this prevented pushing the lumps off the car as it was being filled. In the later design this feature was discarded, the flights remaining stationary with respect to the chain.

The operation of this improved type is as follows: The coal being undercut and shot down, the loader is run to the working face of the room, after which the

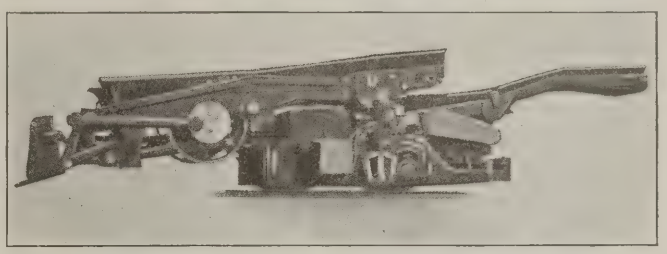


FIG. 6. VIEW OF HALBY SHOVELING MACHINE

pony truck is removed and the gathering conveyor let down upon the mine floor. Adjustable mine posts are set, one at either side of the room, as near to the mass of coal as possible. The ends of the feed chain are then slipped into hooks located at the bottom end of the posts, the feed motor is started, and the nose of the conveyor, which lies flat on the pavement, is swung to one side of the room.

The pit car being placed in position under the picking table, the machine motor is then started, moving the flights in the proper direction to gather coal. The machine is then moved forward by its own power into the pile, making a hole at one side of the room 3 or 4 ft. deep.

The machine is now ready for its movement across the room, which is effected by winding on the feed chain attached to the second post. As the radial sweep travels in its arc across the mine floor, the flights pick up and carry away all of the material lying in its path. The machine will gather lumps of coal as large as will pass between the roof and the top of the car.

After one sweep across the room, the machine is again advanced into the pile, the direction of the conveyor chain reversed, and the operation of the first cut repeated, with the coal going up the trough on the other side. The travel of the conveyor is 80 ft. per minute, and when the trough, which is 12 in. wide, fills 6 in. deep with coal, the machine is loading 2000 lb. per minute.

A haulage reel on the machine carries a cable which is placed around a sheave and serves to pull the loaded cars from the loader to the roomneck. When cars are unusually large, double reels may be used and operated on the main-and-tail rope system, handling both loads and empties to and from the machine. The time required in moving the machine from place to place and setting up is stated as not exceeding 20 to 30 minutes.

In 1909 a machine was designed and built by the Jeffrey Manufacturing Co. under certain patents owned by the Hamilton interests. It has flat flights without any obstruction. These flights slip under the coal in the same manner as a shovel and pick up the coal without any difficulty and with little hand shoveling necessary. In the driving mechanism for the conveyor is a

friction clutch that works very satisfactorily. If the conveyor happened to be forced against the rib, for instance, or the flights encountered any obstruction, the conveyor would simply stop, thus protecting the machine from breakage. The conveyor is pivoted over the car. The loader is pulled into the coal pile by means of ropes leading out from either side of the conveyor.

The Hamilton machine, in its original and improved forms, was experimented with for two to three years in various coal fields. It loaded coal at the rate of a ton a minute. It picked up the coal and left the floor practically clean. It would load extra large lumps, was easily handled and fairly free from breakdowns. To all appearances a machine had been produced which possessed every requirement, and was capable of loading at a rate equivalent to the work of ten men. But in spite of its good features it did not prove to be a success, largely because existing conditions in coal mines rendered it impossible to keep the machine in continuous operation.

The Myers-Whaley machine is mounted upon a main frame, supported by four flanged wheels running on the main track. A jib section is pivoted upon the front end of the main frame, so that it can swing laterally 45 deg. each way. This jib section carries the shovel and the front conveyor which receives the material from the shovel. Also pivoted at the same point on the main frame is a rear conveyor frame which is adjustable laterally, and the conveyor which receives material from the front conveyor and discharges it into a mine car. The seat for the operator is mounted on the jib section in such position that he can see in front of the shovel and direct its operations. The swinging of the jib laterally enables the machine to reach 10 ft. to each side from the center of the track, or a total width of 20 ft.

The shovel is entirely automatic in its action, and is a unique piece of mechanism consisting of a shovel member 34 in. wide, having an auxiliary, or rear section, fitted into it. The shovel is actuated and supported by a crank which rotates continuously, and which is driven by heavy roller chains on each side of the machine. The rear end of the shovel is carried by a cross shaft having rollers on its ends which run in cam grooves, so as to give the mouth of the shovel a motion similar to that of a shovel actuated by hand. The front part of the shovel discharges into the rear section, which has auxiliary cam rollers engaging in another cam groove and which turns the rear section partly over during each stroke. In this way the material is picked up and transferred to the belt conveyor. This crank rotates at a speed of 12 to 13 times per minute.

The No. 2 machine, the smallest model, has a height of 46 in., length 19 to 21 ft., width 4 ft. 9 in., net weight 9000 lb., and requires a mine height of 54 in. The No. 4 machine, the largest model, has a height of 54 in., a length of 22 to 26 ft., weighs 18,000 lb., and requires a mine height of 72 in. The largest machine is capable of loading coal at an average rate of one or more tons per minute, and is driven by a 20-hp. motor.

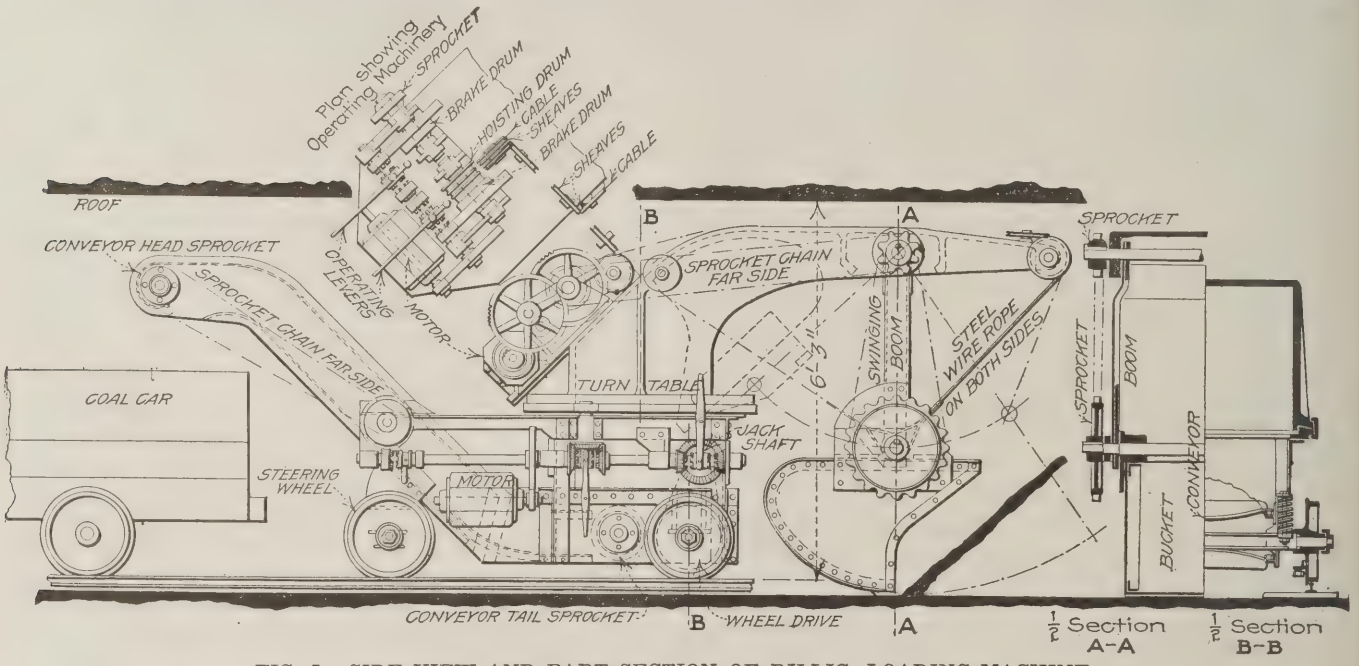


FIG. 7. SIDE VIEW AND PART SECTION OF DILLIG LOADING MACHINE

It will be evident that the room-and-track system employed is susceptible to variation and should be worked out at each mine in order to secure the best results. The swinging of the rear conveyor laterally enables the machine to load cars upon the track directly behind or upon a track closely parallel to the machine track.

The Halby machine is furnished in two standard coal models. The T-600 machine is designed for use in mines which permit of 6½ ft. or better headroom. This model is used where such headroom is available because of the fact that it permits of a high car under the rear conveyor. Its weight is 20,000 lb. The T-700 machine is designed especially for 5-ft. coal and may be used where there is a height of 5 ft. 6 in. from floor to roof. In this latter model the rear conveyor is so arranged that it will permit of the material being discharged on cars directly behind the machine, or on a track parallel with that on which the machine is operated.

The Halby machine is essentially a shoveler and loader, designed to operate under its own power, forward and backward on a track, with a shovel motion so devised that it makes an advance of about 10 in. into the coal pile, much after the fashion of a man in load-

ing. However, the principle of operation is such that in addition to the advance of the dipper through its motion and through the path of its travel, it is assisted by a simultaneous advance made by the machine itself on the tracks.

The mine car is coupled to the machine, whenever it is being loaded on the same track, and thus the machine and the car are moved together. As the dipper comes to its downward advancing position, the operator, who rides on the machine, advances the machine itself, and as the dipper is returning in its path, he likewise backs up. The dipper makes approximately ten turns per minute, and its capacity is such that under ideal conditions it would be possible to load a ton of coal in even less than a minute. However, as a general average, it requires about 2 min. to load a ton.

The operator, at the same time that he is moving the machine forward and backward, is enabled by the operation of a lever, and with practically no exertion, to move the dipper from side to side, and thus clean up approximately 7 to 8 ft. on each side of the center of the track. The machine is so arranged that it may advance with the dipper in motion, and at the same time swing to either side of the track, simultaneously discharging into a car at the rear, or on a track parallel with that on which the machine is standing.

Shovel Motion of Halby Machine

The propelling speed of the T-700 machine is 110 ft. per minute, and of the T-600 is 100 ft. per minute. The belt speed of the two types is 85 and 120 ft. per minute respectively. Either model will handle coal in large sizes, pieces weighing 1500 lb. being readily lifted on the dipper. The distinguishing feature of the Halby machine lies in its shovel motion, which is such as to permit a smoothly sliding discharge onto the belt.

The Dillig machine (see Fig. 7) is the invention of George Dillig, of Pittsburgh, and is unique in that it adapts, to a low-height mechanism, a shovel somewhat similar to that found on large power shovels. The machine consists of a low frame mounted on four wheels and provided at the top with an open circular track, or turntable, upon which is positioned a revolving outrigger. It is further provided with a conveyor arranged to receive the material immediately beneath the central opening in the turntable, and which conveys the coal and discharges it at the far end of the machine into mine wagons.

The revolving outrigger, mounted on the turntable, carries near its overhanging outer end an oscillating or swinging boom, controlled by means of cables operated by an electric hoisting apparatus shown mounted on the back of the outrigger. To the lower extremity of this oscillating arm, or boom, is attached a bucket, or scoop, free to revolve about its pin center, but controlled by means of a sprocket chain drive, also driven by the electric hoist.

The operation of the machine is as follows: The machine is properly positioned close to the materials to be shoveled; the hoisting cable pulls the swinging boom, with the bucket digging or shoveling, to a limiting forward position. At this point the bucket is made to revolve about a quarter turn or so, in a counter-clockwise direction, around its own pin center. With the bucket now filled and in a turned-up position so as to prevent the coal from spilling, the operator reverses the cable drum and the boom is swung back and carries the bucket to a dumping position, immediately over the centrally open turntable. Here the bucket is given a further counter-clockwise rotation, causing the material to be discharged through the turntable opening to the conveyor beneath. Immediately after the discharge the bucket is given a clockwise rotation and righted, while at the same time the boom swings forward again to attack the pile, and the cycle of operation is repeated.

The arrangement of the outrigger mounted on a turntable and free to move to the right or left of the machine permits the gathering of coal within an arc having a radius of 15 ft. The machine is electrically operated and self-propelled, and weighs 8000 pounds.

Machines belonging to the portable loader class are intended to simplify the manual labor of loading, rather than to displace it. It is a fact, too frequently forgotten, that the height through which the shovel must be raised determines the capacity of the loader. Thus, with the same expenditure of muscular energy to raise the coal, a man will load 29 tons into a wagon 52 in. above the rail, 44 tons into a wagon 32 in. above the rail, and 140 tons into a conveyor 8 in. above the floor, allowance being made for clearance in each case. But impressive as these figures may be, they still do not adequately bring out the advantage of loading into a conveyor over loading into a mine car, for in the act of raising the shovel, the foot-pounds expended in raising the body is greater than the foot-pounds exerted in lifting the coal. When loading into a conveyor coal does not have to be lifted more than a few inches; some of it can be rolled or pushed on, and all in all a tremendous saving in muscular energy is effected.

Construction Details of Westmoreland Loader

The Westmoreland loader is built according to the design of W. W. Jamison, of Greensburg, Penn. It weighs 10 tons, is electrically operated and self-propelled. The truck is rigid, with 12-in. wheels, one front wheel with loose axle, 4-ft. wheelbase, and when in operation the truck is clamped rigidly to the rail. A 3-ft. geared turntable rests on the truck frame, and on this is mounted a solid steel case, 12 ft. long, 32 in. wide and 12½ in. high, which swings free above the wheels through an arc of 160 deg., 80 deg. right and 80 deg. left, the width of sweep being 16 feet.

The steel case contains a ram in the form of a chute, 2 ft. wide, 6 in. deep above the floor, and with an adjustable shovel end at the front. The ram-chute hangs on rollers and is moved forward and backward by a rack and pinion at the top. This represents the unique feature of the machine. This ready horizontal movement of the ram, together with its sweep of 8 ft. on either side of the machine, enables it to keep close to the loose coal throughout the full 16 ft. or slightly more of width, and thus facilitates the work of the laborer.

The adjustable shovel end of the machine takes care of undulating bottom. It is rigid in operation for all sizes of coal, fine slack up to 200-lb. lumps being picked up at the rate of one ton per minute by the chain conveyor in the ram. The actual rated capacity of the loader under fair conditions is 20 tons per hour. Five men are required for its operation, this including the driver. The machine will work in seams that are not

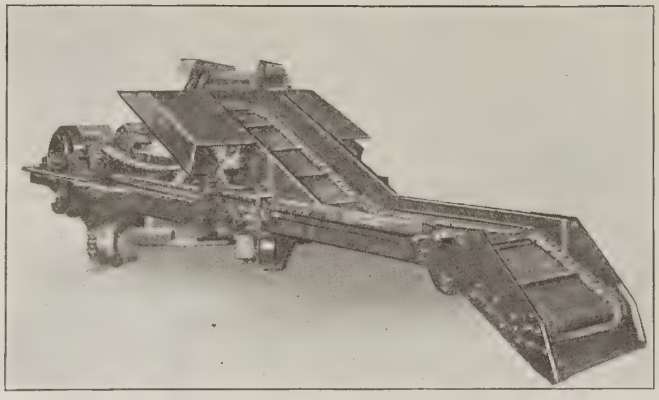


FIG. 8. WESTMORELAND LOADER, SHOWING SWEEP OF RAM

less than 4½ ft. thick, and will pass over curves of as low as 12-ft. radius. The total power requirement is 16 hp., consisting of three reversible motors.

The Jeffrey pit-car loader is a simple conveyor, light in weight and so balanced in construction that it is easily movable across a room. It is driven by an electric motor, so located as to add to the stability of the machine. This device is so simple that it has the distinction of having no distinguishing features in its construction. Its novelty would appear to lie in its cost, which is about one-seventh that of a shoveling machine. It will doubtless appeal to those who contend that coal mining is attended with too many delays to tie up larger amounts of capital in expensive machinery, and attract those who fear that the mine is no place for a machine designed to pick up the coal.

The claim of its maker that the output from a room can be doubled by the use of this machine appears to be conservative. The fact that it requires only two men to operate, whereas other machines require from four to eight, is vastly in its favor, for when the inevitable delays occur it is not difficult for two men to find useful work, in posting, extending track, etc. Quite a number of these machines have been in operation at the mines of the Dominion Coal Co., Canada, some of them for a period of three years, and it has been proved that two men will average from 50 to 75 tons per shift. For moving from place to place the machine is mounted on a small truck.

The Evans scraper loader is the invention of Cadwalader Evans. This device is nothing more or less than an adaptation of the old main-and-tail rope principle to the operation of a modified scraper (equally old) as a means for conveying the coal from the face and out to the roomneck, where it is dumped into the car.

The apparatus consists of a double drum hoist, which may be driven by either air or electric power, two wire ropes of suitable lengths, and a V-shaped bottomless scoop, or drag. In addition to this major equipment, each room is provided with deflectors, loading pans and aprons. All coal is loaded on cars in the entry, the plan being to set a trip of empty cars above the roomneck so that no time will be lost in spotting another car when one is loaded.

In the use of this device, present methods of cutting and loading are followed until the first crosscut is made at a distance of about 20 ft. from the entry. After this is made the scraper may be employed for loading the coal from the entire set of rooms thus connected by crosscuts, as it is through these that the cutting machine passes from place to place. The reason for following present methods of loading until the first crosscut is made is on account of moving the cutting machine, as it will be seen that with the short wooden inclines built in each room and necessary for elevating the coal preliminary to passing into the car, the entrance to the room is obstructed. In passing along the length of a room, or through the crosscuts, the cutting machine moves under its own power or can be drawn by the hoist ropes. There are no rails in the rooms.

The hoist is set in a pocket cut into the entry pillar, preferably midway in the room block that is to be worked. The hoist remains here until the block is worked out, including the drawing of the pillars. At the mouth of the pocket lead sheaves are placed, these sheaves usually being built in sets of three or four so that the ropes may be led to the right or to the left, to the room that is ready to be loaded out.

A part of the permanent equipment at each roomneck consists of two sheaves, mounted on suitable brackets for attaching to props, and used for leading the ropes across the entry and over the car to the face. The tail rope is led up the gob side and around a sheave attached to a jack screw, similar to a mining machine jack, and located near the right-hand corner, and is then fastened to the back of the scoop or drag. The main rope passes around a similar sheave at the left-hand corner and passes to the front of the scoop. It will be apparent that the object of attaching the sheaves to jack screws is to facilitate resetting as the face advances.

At each roomneck loading pans and aprons are installed and are not moved until the block is worked out. Where the coal is high it is necessary to construct a wooden incline, probably 20 ft. long. Where the coal is low and the bottom is taken up in the entry, this incline becomes unnecessary.

The scoop, or drag, is of sheet steel, V-shaped and bottomless. As the scoop is being pulled along the face it picks up its load, and when filled the main rope is removed from the sheave and the hoist starts drawing the scoop to the incline. Here the scoop discharges without the necessity of tipping. After discharge the hoist is reversed and the tail rope pulls the scoop back into position for another cycle. The scoop is flanged at the bottom so that it will avoid digging into the floor.



FIG. 9. VIEW OF THEW ELECTRIC SHOVEL LOADING ON ONE TRACK

It is figured that with rooms of 300 ft. length it is possible to load at least nine tons of coal per hour. The average haul in this case amounts to 150 ft., and the hoist being geared for a rope speed of 300 ft. per minute, the traveling should be done in 1 min. actual running time. Assuming that a minute is lost at the face and another minute at the loading point, there would be 20 trips per hour, which on a basis of 900 lb. per scoop amounts to nine tons. It requires five men to successfully operate the apparatus—one hoist man, one man on the entry to spot and trim the cars, two at the face and one timberman.

The Evans loader has the following advantages: (1) It requires no track in working places after the first crosscut is made, hence it eliminates a considerable labor and material expense; (2) it uses no complicated mechanism, but instead such components as are familiar to all mining men; (3) because of its simplicity delays are few and repairs light, it being quite likely that rope renewals will be the most burdensome item owing to the sharp bends in passing over sheaves; (4) is simplifies the problem of replacing loaded cars quickly with empties; (5) is can be worked in seams of practically any height, although more attractive to low-seam operation than to high; (6) the system is not affected by seams of moderate inclination; (7) in case of falls of roof little or no injury can result since the destructible element, the hoist, is away from the room; (8) it is flexible and can be easily adapted to the drawing of pillars.

Its disadvantages would appear to lie in that (1) the capacity of the system is low; (2) the abrasion of the coal in the scoop as it passes over the bottom, along with the churning of particles, causes degradation of the product; (3) the power consumption in dragging the scoop over the floor and in moving the cutting machine from place to place is large.

Preceding their use in mines power shovels have been used in the construction of tunnels for many years and have demonstrated their practicability for this kind of work. Because of their dimensions the employment of this type for underground loading of coal has been restricted so far to seams of unusual thickness. The Mammoth bed of the anthracite region would appear to be adapted for the use of power shovels were it found horizontal instead of pitching. The bituminous states of the East and Middle West have no beds that yield the required headroom; and it is not until we reach the bituminous and sub-bituminous coals of the Rocky Mountain states that deposits of sufficient thickness to permit the use of shovels may be found.

It is well known that beds of extraordinary thickness occur in Wyoming, and although not ideal because of their pitch, they are in all other respects well suited to this type of loader. The electric shovels are being used by the Union Pacific Coal Co. in the mining of a bed of bituminous coal 30 ft. thick belonging to the Rock Springs group of the Lower Mesa Verde formation.

The contemplation of any device that promises to make two tons of coal appear where but one appeared before, has a fascination all its own. In its development discouragements will be patiently met and endured. It will hearten us to know that the preceding innovations have, in almost every case, been attended with ill success initially, but that the early failures merely served as a goad to those inventive geniuses who refused to

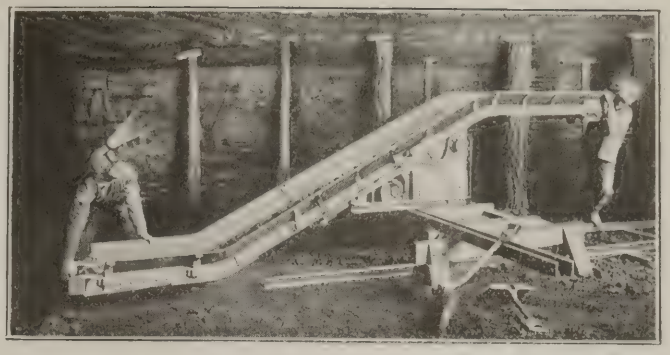


FIG. 10. MOVING JEFFREY PIT-CAR LOADER INTO A NEW POSITION

lose faith in the soundness of a principle. An improvement here, a strengthening of parts there, along with a change in mining practice, have all combined to overcome the primary defects in every device employed in mining from the ancient atmospheric engine to the modern storage-battery locomotive. We are due to witness again the same persistence, in fact much has already been done. The years spent in patient investigation and experimentation, plus the hundreds of thousands of dollars which have been expended in the development of coal-loading machinery, is already bearing fruit, and will result, I believe, in making these devices as common in mining practice, within the next decade, as is coal-cutting machinery and the electric locomotive at the present time.

What will be the machine of the future? Notwithstanding the varied appliances now on the market, the weight of mining opinion has not settled as yet on any one machine as the prevailing type. Nor is it likely to, for the various principles which can be applied successfully to coal-loading machinery, in combination with varied mining conditions, will result, I believe, in the introduction of a variety of types.

In closing it may be entirely unnecessary to caution against installing coal-loading machines of any kind unless the mine is prepared in advance to receive them, and yet, from the experiences of the past it is clear that the importance of this has, too frequently, been either overlooked or else underestimated. It is manifestly unfair to any machine, and unfair to the capital invested in it, to harass its operation with a poor haulage system or an unfavorable method of development. Let us ever remember two things: First, that while machinery has utility it produces revenue only while it is at work, and second, that unless all underground activities operate in harmony, so that petty delays are avoided, no device can achieve the results rightfully to be expected from it.

Coal Mining Equipment in France

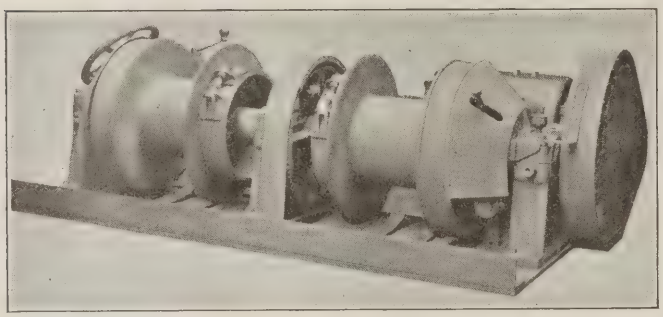
The secretary of the American commercial attaché office at Paris, France, reports as follows under date of Jan. 3: Regarding the matter of reconstruction of the French coal mines, Mr. Cuvelette, Director of the Coal Mine Group of the Comptoir Central, writes this office that all purchases of coal-mining equipment made in the United States will be handled through the Franco-American mission, directed by Mr. Tardieu in Paris and by Mr. De Billy in New York, and that American firms must ultimately address themselves to the office of the latter for the purpose of bidding on mining material.

Electric Winding Machine

By E. M. Mackie
Syracuse, N. Y.

The problem of economical loading of thin-bed coal for a long time has been awaiting a satisfactory solution. In this connection there has recently been under development in the anthracite fields systems of loading by pan and by scraper conveyor. In the bituminous field also some experiments have been made, but the development in these regions has been slow, chiefly because of the winding machines that have been employed.

The main idea in these systems is to eliminate as far as possible the manual handling of the coal, after it has



BACK VIEW OF ELECTRIC WINDING MACHINE, SHOWING WINDING DRUMS

been broken out of the seam. Either system above mentioned consists of a pan or a scraper having a cable attached to each end so that the device can be moved forward or backward as may be desired. To actuate the conveyor a winding machine with two drums is necessary, one drum to wind on and the other to reel off cable. Each drum must be so arranged that it will reel off or wind on the rope, depending on the direction in which it is desired to move the scraper or pan.

From the foregoing it will readily be seen that the winding machine is highly important to the successful operation of these systems. The first experimental trials using such standard makes of winding machines as were available satisfactorily demonstrated the possibilities of these new methods, provided a suitable machine could be developed. The most important requirements are as follows:

1. The highest possible rope speed consistent with safety.

2. A friction drive is necessary for the winding drums, and this drive must be so designed that the friction can be set for a wide range of loads. There must be no slippage when pulling, but slip must occur within a given per cent. of overload.

3. The engagement and release of the drum drives should be accomplished with one continuous movement of the engaging mechanism, in order to prevent locking of the drums and to make possible the instantaneous reversal of the conveyor at the instant of dumping. In loading from a room about 200 ft. deep, this feature of instantaneous reversal saves time equal to one-third of the total required for one round trip of the conveyor.

4. The engagement mechanism should have a neutral position; that is, a position in which both drums are disengaged and will turn freely on their bearings.

5. Each winding drum should be provided with a brake operated by a foot lever, so that in case of cutting off power to stop the hoist, or for any other reason, this foot-operated brake can be set on the reeling-off drum to stop it and thus prevent over-running and consequent fouling of the cable. Furthermore, the operating mechanism of the foot brakes should be so arranged that these brakes cannot be set on both drums at the same time. It should also have a neutral position in which both brakes are free of the drums.

6. The overall height of the winding machine should be not more than 30 in. from the bottom face of the base plate.

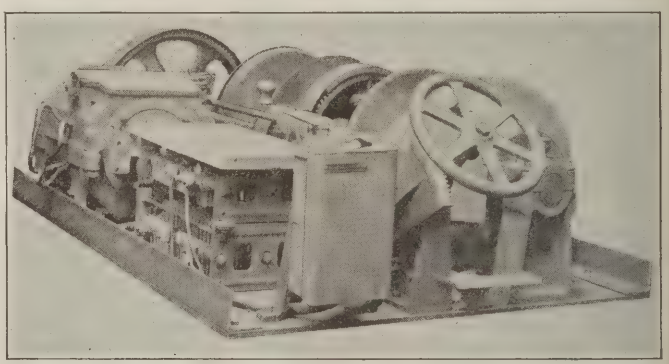
7. The whole arrangement should be as nearly foolproof as possible.

To meet the foregoing requirements the Pneumelectric Machine Co., of Syracuse, N. Y., designed and developed the winding machine illustrated. The machine is mounted on a heavy steel-plate base. No bolt heads, nuts or other projections protrude from the under face of this base plate. Thus there is a smooth, flat underface which facilitates the moving of the machine from one location to another.

Both drums are of the same dimensions and are interchangeable. Drum and intermediate shafts run in bronze bearings which have spherical seats in the housings, insuring free running of the shafts. The bearings are interchangeable on each shaft. The gears and pinions are of steel and the teeth are machine cut. The drum shaft gear is made in halves, thus providing for easy replacement when necessary.

The friction-clutch drive for the drum is of a design not heretofore used for this purpose. It embodies features that make it possible to handle the load in a manner highly essential to the successful operation of these systems, means being provided for automatic loading and unloading, so that the operator is relieved, by levers or otherwise, from regulating this part of the operation.

The elements employed for engaging or releasing the clutch permit the operator to maintain a natural position in a limited space while making the continuous motion in one direction necessary for the engagement of one clutch and the release of the other. This ac-



FRONT VIEW OF ELECTRIC WINDING MACHINE, SHOWING CONTROL EQUIPMENT

complishes the immediate reversal of the scoop at the instant of dumping.

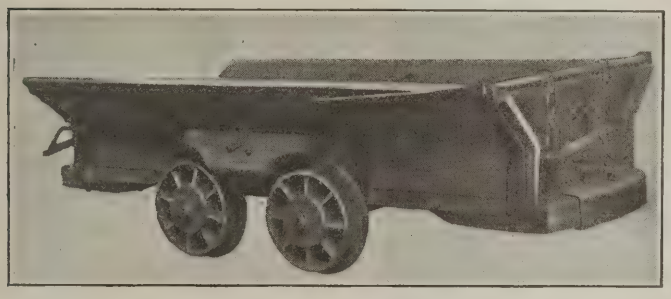
All bearings have ample provision for lubrication with grease, and the gears and clutches are protected by substantial guards. The machine shown is equipped with a 25-hp. motor for 220/250 volts, direct current, and weighs approximately 5000 lb. The overall dimensions are: width, 4 ft. 8 in.; length 7 ft., and height, 29 in. A number of these winding machines are now in successful operation.

Advantages of Standardization of Mine Cars

By H. V. Brown
Cherry Tree, Penn.

In times past, the design of mine cars for any particular operation was a matter that was put into the hands of the engineer, superintendent or foreman in charge of the mine. No thought was given to the importance of using a standardized mine car suited to local conditions, nor to the fact that it is practically impossible for one man, no matter how capable, to work out a new design that will incorporate every possible good feature and be entirely satisfactory in every respect.

We are now in a period of standardization in machinery of all kinds, and there is just as strong reason for maintaining standards in mine cars as in any other piece of mining equipment. The manufacturer who is regularly in the business of building mine cars and who has given careful thought to the development and improvement of his product can in practically every case propose a design to meet certain specified conditions that will be more advantageous than any that can be worked out by a single mining engineer. The reason for this is obvious because the manufacturer has the advantage of experience with different designs and is



THIS STANDARDIZED MINE CAR IS SUITABLE FOR USE IN THIN VEINS

able to eliminate bad features and incorporate those that are desirable.

There is, of course, a wide diversity of opinion between different mining engineers as to the proper dimensions of cars for a certain condition, also as to the proper weight of irons and other details. Many cars are built extreme, either as to lightness or as to weight. As an example, consider the average thin coal bed that will run from 30 to 48 in. in thickness. It is obvious that for this size of vein there are a few designs that are really practicable and efficient. Nevertheless, if one were to study the cars used in various mines operating this thickness of coal he would doubtless find a great number of designs, each embodying some good features, but many undesirable ones. It is here that the importance of standardization and coöperation with the mine-car builder is evident, because in practically all cases a more satisfactory design can be worked out and at a lower cost than if the user is to attempt to specify all the details of his car.

The Cherry Tree Machine Co. has been working along this line of standardization for the past two or three years and has been successful in standardizing several designs, one of the most important of which—a design suitable for thin veins and locomotive haulage—is illustrated. About 2000 of these cars have been placed in service and the design has been found practicable in over twenty mines, all of which have generally similar conditions and heights of coal ranging from 33 to 48 in. This particular car was designed after a careful study of a number of successful cars used in thin-bed work and incorporates every good feature that could be found. The car as built holds practically one net ton when levelful, and when full-loaded will carry 1¼ to 1½ tons, dependent upon the height to which it is topped. The over-all dimensions have been kept within reasonable limits and the iron sizes have been carefully worked out to give the greatest strength with the least weight. The car is admirably suited to locomotive haulage and at the same time is capable of being easily handled in the working place by the miner, as it weighs only 1500 lb. The truck construction is such that the alignment of the wheels and axles is preserved.

The most important advantage of standardization is, of course, that of securing an entirely satisfactory design, suited to the conditions; but there are other advantages to be gained which are well worth careful consideration. Some of these are as follows:

Standardized cars can be purchased at a lower price than special designs, because of the fact that the mine-car manufacturer has developed the production of such cars and has worked out the special dies and fixtures necessary to reduce construction costs; furthermore, he is in better position to purchase material to advantage, especially steel bars, since the item of waste in cutting, etc., can be greatly reduced.

The manufacturer building standardized cars can develop punching and drilling jigs, etc., which make it possible to construct these cars with interchangeable parts and in addition assure their proper assembly, so that the car will be true to gage, perfect in truck alignment and correct as to general dimensions.

Another point in this connection is that the small user who may desire to purchase only five or ten cars at a time is enabled to secure a standard design at a considerably lower cost than a special one, because of the fact that the manufacturer can build these cars on stock orders and is thus in position to sell them in small lots as other standardized machines are sold.

Spring Meeting of the Illinois Mining Institute

At a recent meeting of the executive committee of the Illinois Mining Institute it was agreed to hold the next regular meeting on May 22 to 24, inclusive. Later the Southern Illinois Superintendents' Association requested that this meeting be held on a steamboat on the Mississippi River. An option was secured on the steamer "Golden Eagle," which will expire on May 10. It was agreed to make the trip from St. Louis to Keokuk and return, the boat to leave St. Louis on Thursday, May 22, at 10 a.m. and return to St. Louis, Saturday afternoon, May 24; or, if desired, on Sunday morning the 25th. The price for the round trip per person is $27, which includes meals and berth for the continuous round trip and "Dutch lunch" to be served about 11:30 each evening. The boat will accommodate 150. If enough people signify their intention to take this trip to make it possible to secure the boat then a schedule will be arranged. It is said that the program of papers that is being arranged for this meeting is as good as any that has ever been prepared for the Institute.

Storage of Powder and Explosives at Coal Mines

By E. M. Kimball
Wilmington, Del.

EFFORTS have been made by powder manufacturers for a number of years to induce the miner to pay more attention to the proper storage of his explosives. It has been more or less assumed that any place was satisfactory, and explosives have been kept at any old out-of-the-way point, in a cheap building, or in an old abandoned shed around the property. Often they were stored in pits excavated in a hillside or in some abandoned tunnel. This is continually being noted, and has recently been brought forcibly to my attention in a visit to the coal fields of southern Indiana, West Virginia, western Pennsylvania and Kentucky. The operators, while neglecting their magazines, are at the same time spending large sums of money on their plants and machinery. The first point considered by the operator is, of course, one of economy, but improper storage is poor economy in connection with explosives. The first cost of the magazine is all that is considered in the majority of cases. It seems quite possible that the powder manufacturers themselves are partly responsible for this condition, because of their liberality in the matter of claims. If the explosives go bad, the operator makes claim and this is quite often allowed, even though the maker is reasonably satisfied that the cause of the trouble is not some fault of manufacture but the result of improper storing. On this account the operator does not always recognize his actual financial loss due to improper storage.



MAGAZINE BUILT ON A BRICK FOUNDATION

It should be appreciated that such improper storage brings about a more or less gradual deterioration in the explosives, and this deterioration results in a loss of power. Considerable loss of strength, therefore, may result without the operator becoming aware of it. These losses soon exceed the cost of a properly located and constructed magazine.

The most common fault with the average mine magazine is the lack of protection against moisture being absorbed by the powder. With dynamite excessive changes of temperature or moisture will cause leakage of the liquid base of the dynamite or permissible explosive, and just insofar as this liquid base leaks away or is concentrated in one portion of the cartridge just so far is there an actual financial loss to the operator.

Aside from the question of the proper type of magazine for the maintenance of the proper quality of the explosives themselves, there is the question of location of the magazines as a matter of safety. This point is also often ignored. The tendency is to put the storage house where it is most convenient and "take a chance." All magazines should be located so as to comply with the local and state laws and ordinances, but if laws do not exist they should be located in compliance with the American table of distances, a copy of which will be furnished by any powder manufacturer on request. This table of distances is based on past experience as to the effects of the detonation of various quantities of explosive at various distances, and a permissible distance from dwellings, public railroads and highways is given for all ordinary amounts of explosives. In considering a location for a magazine an operator has to obtain accessibility to the point of consumption, but the safety and suitability of the location should also be given careful thought. In regard to the latter point, low, damp or swampy places should be avoided if possible. It cannot be overemphasized that storage in a cave or tunnel is probably the most objectionable. The question of guarding the magazine against theft may or may not be important, depending upon the conditions at the mine. In the majority of cases, however, a substantial door and a proper lock are advisable, owing to the isolation of the magazine from the ordinary activities surrounding the operation. Good padlocks may be used, but a special magazine lock is by far the best for the purpose. It is believed that the majority of the large powder companies would be glad to quote prices on such locks.

It might be well to outline briefly satisfactory types of magazine construction for the benefit of those interested. If powder, caps or fuse are to be stored, the magazine may be of frame construction and should be fire-protected and ventilated to meet climatic conditions. The following is a brief outline of the construction:

The foundation may be of stone, concrete, brick or posts with enough ventilator holes built into it above the ground and below the floor joists to ventilate the magazine properly. These ventilator holes should have a grating in them to prevent rats and mice from entering and should be built so that an outside fire could not get through into the building. In other words, the holes should not be straight through the wall but have enough angles to stop a flame.

The joists and floor should be sufficiently heavy to hold the load. The floor should be of tongued and grooved boards blind-nailed; no-nail heads or other metal parts should project inside the magazine where it could come in contact with the packages.

Above the foundation the magazine may be of light con-

struction of necessary strength. The outside should be sheathed with ⅞-in. lumber and fire-protected with not less than 26 gage black or galvanized iron. Corrugated asbestos boards may be used. If black iron is used it should be painted and kept painted.

The studding should be sufficiently stiff to resist the load where piles of powder kegs rest against the wall. It is preferable to line the inside of the building with 1 x 6 strips spaced about 6 in. apart, nailed horizontally to the studding, with the nail heads countersunk.

Put sufficient ventilators in foundation and roof. Roof ventilators can be of any standard type, such as the Star or Globe ventilators.

The ground around the magazine should be sloped away from the building to provide proper drainage and to prevent the clogging of ventilator openings.

The door should be made of at least two thicknesses of tongued-and-grooved boards laid diagonally, covered with sheet iron.

If high explosives are to be stored in a magazine it should be bullet-proof, in addition to the requirements given in the foregoing. A bullet-proof high-explosive magazine of course is suitable for the storage of powder or blasting supplies, but blasting caps and electric blasting detonators should never be stored in the same magazine with other explosives. The bullet-proofing of a high-explosive magazine can be accomplished either by a frame magazine, sand-filled, or by building a brick magazine. The specifications for a sand-filled magazine should be about as follows:

Foundations, joists and floor same as specified for powder magazine.

Above the foundations the magazine should be sheathed on the outside and lined on the inside with not less than ⅞-in. tongued-and-grooved boards, the intervening space between to be filled with a weak mortar or with dry sand. If the dry sand is used, care must be taken to have the joists and the boards tight; the lower 6 in. should be filled with a cement mortar to prevent the sand from leaking away. If weak cement mortar is used throughout, a mixture of approximately one part cement to from 7 to 10 parts of sand has been found satisfactory. The thickness of the sand filling depends on the locality. If high-power rifles are in common use from 10 to 12 in. of sand-filling should be used; if such rifles are seldom found in the neighborhood, from 6 to 12 in. of sand will be sufficient. Studding should be placed closely together to carry the weight of the sand. For 6 in. of sand 2 ft. center to center will be satisfactory, where over 6 in. of sand is used spacing of studding should be not greater than 18 in. from center to center.

Where roof can be shot through from surrounding hills, it is well to bullet-proof it also. This can be done by putting in ceiling joists and nailing a second floor upon them, then building a 4-in. rim around this floor and covering it with 4 in. of sand. Where this danger is negligible a bullet-proof roof may be omitted. In warm climates, however, it is well to put in ceiling joists and seal the magazine to assist in keeping down the temperature. In building a bullet-proof roof care must be taken to set back the sand box 2 in. from the wall, in order to provide ventilation between the sand-filled roof and the wall of the magazine.

Specifications applying to a powder magazine in regard to ventilation and outside metal covering will apply to a high-explosive magazine also.

The door should be built of three thicknesses of ⅞-in. hardwood boards covered on the outside with not less than ⅜-in. of steel or boiler plate.

Specifications for a brick magazine are the same as those applying to the sand-filled magazine, with the following exceptions:

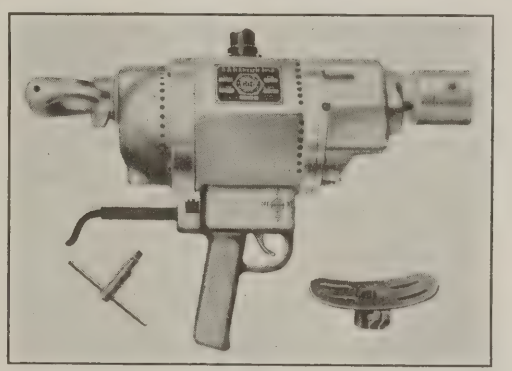
Post foundations, of course, should not be used. Sand-filled walls to be replaced by 9-in walls of medium soft brick laid in cement motar. Inside the brick wall 2 x 2-in. furring strips should be placed vertically, and to these should be nailed the 1 x 6-in. lattice lining such as described for the powder magazine.

All magazines should be built sufficiently large to allow ready access to all grades of the explosives stored, so that the oldest stocks can be used first. Any of the large powder manufacturers will be glad to furnish on request and free of cost plans of any of the types of magazines covered in this article. These have been studied by the manufacturer and developed after years of experience. It has been found that the providing of satisfactory storage is of the greatest value, and every effort is being made to assist the consumer to achieve this result.

New Portable Electric Drill Operated Like an Automatic Pistol

The Black & Decker ½-in. portable electric drill shown in the accompanying illustration is equipped with a ½-hp. motor. Its full-load current consumption is about 700 watts, and the no-load speed 600 r.p.m. The housing is of aluminum alloy, completely inclosing the motor and gears, and the total weight of the machine is 21½ pounds.

The most outstanding feature of this drill is its method of control, the "pistol grip and trigger switch," which makes it possible to handle it like an automatic pistol. One pull on the trigger turns the current on and



PORTABLE DRILL THAT CAN BE HANDLED LIKE AN AUTOMATIC PISTOL

the next pull turns it off. This arrangement enables the operator to control the drill practically automatically, without having to change the position of his hands in order to manipulate the switch. An indicator is provided for the purpose of showing when the switch is on and when it is off.

The electric motor is of the series compensated wound, interpolar type, and uses direct current or 25, 40 or 60 cycle alternating current, and will operate from any two wires of a three-phase circuit. The motor is air-cooled by means of a centrifugal fan mounted on the armature shaft, which draws air in at one end of the motor and expels it at the other.

The gears are cut from high-carbon steel, mounted on ground shafts, and operate in grease in a separate grease-tight compartment. The drill spindle runs in a long bronze bushing against a ball thrust bearing.

The commutator end cover is entirely separate from the armature shaft bearing, and is therefore easily removable for inspection and adjustment of brushes. This also eliminates the possibility of the armature shaft binding in its bearing, in case the end cover is accidentally distorted by dropping the drill or by exerting excess pressure on the feed screw.



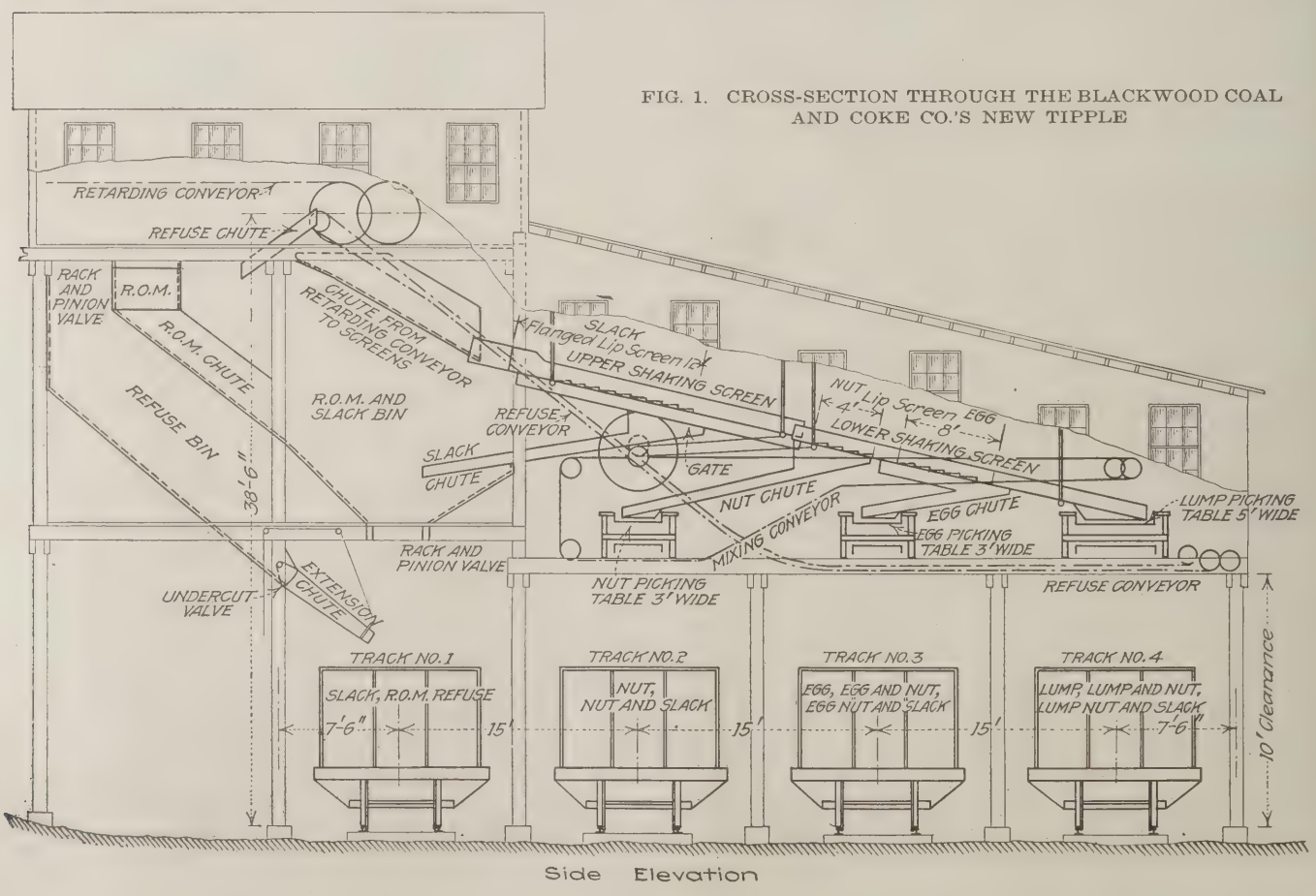
New Coal Tipple at a Virginia Operation

By C. Sharon
Scottdale, Penn.

SYNOPSIS—*Production has been the chief aim of mining companies in Virginia during the past few years. Many tipples have been remodeled while others have been abandoned and new ones built. The new tipple of the Blackwood Coal and Coke Co., here described, is compact yet secures good preparation and embodies means for obtaining almost any grade or mixture of grades the market may demand.*

THE coal fields of Virginia have been the scene of great activity during recent years and have contributed a goodly share of the bituminous coal that this country has been called upon to furnish in the great emergency just past. When the coal operators of the country were called upon to produce their maximum capacity, "Ol' Virginny" came to the front in no unmistakable manner. Surmounting every obstacle, the operators went about increasing their tonnage. They remodeled old tipples whenever they could, or abandoned old tipples and constructed new ones in order to cut down long hauls. The work done by the Blackwood Coal and Coke Co., of Blackwood, Wise County, is typical of this activity. The office of the Blackwood company is at Blackwood, about 5 miles west of Norton, Va., on the Louisville & Nashville and Interstate railroads. The company has coal mines in operation at Blackwood, but by far the greater part of its production comes from the mines at Roaring Fork and Pardee, situated on the Roaring Fork R.R., about 10 miles north of Blackwood.

FIG. 1. CROSS-SECTION THROUGH THE BLACKWOOD COAL AND COKE CO.'S NEW TIPPLE



Side Elevation

At Pardee there has recently been completed a modern plant, the upper headhouse, middle headhouse and a retarding conveyor which leads to the tipple being shown in the headpiece. Coal is loaded onto the retarding conveyor from an upper and lower bed. The equipment in the upper headhouse consists of a kickback dump, receiving hopper and reciprocating feeder. That in the middle headhouse includes a crossover dump, receiving hopper and reciprocating feeder. The retarding conveyor is 588 ft. long with a capacity of 300 tons of coal per hour. It is of the chain-and-scraper type, and consists of a double strand of 24-in. pitch chain, made up of $\frac{3}{8}$-in. steel side bars with 6-in. diameter cast-iron single-flanged rollers, steel bushings and steel pins $1\frac{1}{4}$ in. in diameter. Steel flights 12 x 36 in. are spaced at intervals of 3 ft. The conveyor trough is made up of $\frac{1}{4}$-in. steel plates. In Fig. 2 is shown a cross-section through the conveyor, while Fig. 3 shows the conveyor loaded with coal.

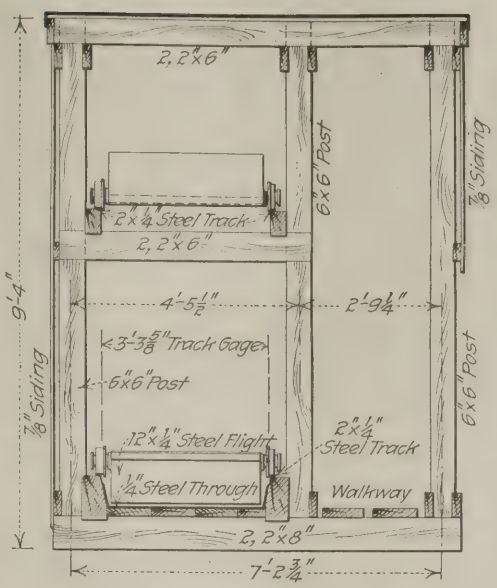


FIG. 2. CROSS-SECTION THROUGH CONVEYOR

The retarding conveyor and the feeder in the upper headhouse are driven by a 40-hp. electric motor. The feeder in the middle headhouse is driven by a 5-hp. motor.

A cross-section through the tipple proper is given in Fig. 1. Much time and attention was devoted to the design of the tipple so as to secure minimum breakage, easy and complete separation of coal and facilities for picking and cleaning. In general, the tipple equipment consists of a double set of shaking screens, picking tables and loading booms for lump and egg coal; picking table and loading chute for nut coal; a slack and run-of-mine bin; and mixing and refuse conveyors. Provision is made for loading run-of-mine coal without operating the screens by means of a valve actuated by rack and pinion placed in the trough of the retarding conveyor. From this opening run-of-mine coal is delivered by a chute to the slack and run-of-mine bin; thence to railroad cars on track No. 1. The upper shaking screen is 6 ft. wide by 21 ft. long and has a screening surface 12 ft. long for slack coal. By means of a fly valve slack coal can be either loaded direct to the slack bin or carried forward to the nut-coal chute on the lower shaking screen, thus securing the advantage of mixing slack with the nut coal. At the loading end of the nut conveyor, and running cross-wise of the tipple over the egg and lump tracks, is installed a conveyor of the drag-chain type. By means of this conveyor nut coal, or a mixture of slack and nut, can be carried over and mixed with either the egg or lump. A valve is also provided in the chute at the head of the nut conveyor so that nut coal can be loaded direct to railroad cars instead of into the mixing conveyor, as described above.

The mixing conveyor is of the drag-chain type and consists of a double strand of steel chain, with side bars 2 x $\frac{1}{2}$ in.; pins $\frac{7}{8}$ in. in diameter; and scraper bars spaced

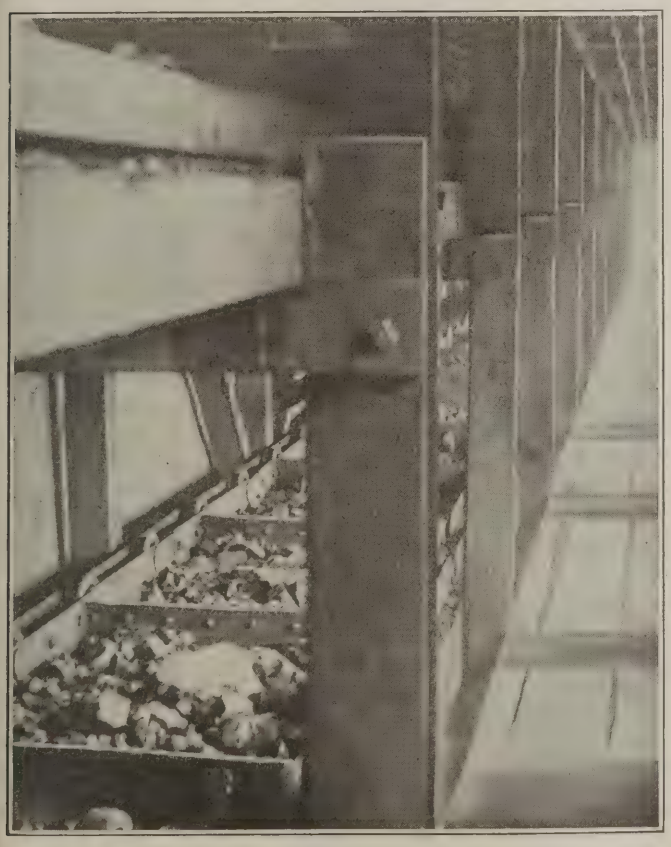


FIG. 3. VIEW OF CONVEYOR LOADED WITH COAL



FIG. 4. VIEW OF LOADING TRACKS



FIG. 5. SHAKING SCREENS (NOTE EQUAL DISTRIBUTION OF COAL

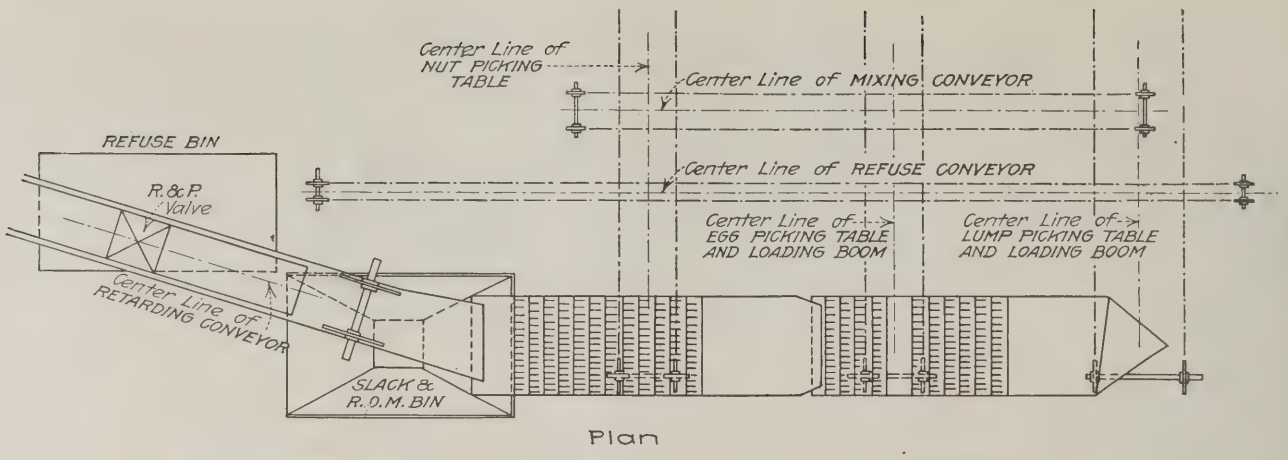


FIG. 6. PLAN, SHOWING SHAKING SCREENS AND CONVEYORS (SEE FIG. 1)

every 2 ft. The conveyor trough is built up of $\frac{3}{16}$-in. steel.

The lower shaking screen is 6 ft. wide by 23 ft. long, with a screening surface for nut coal 4 ft. long, composed of $1\frac{3}{4}$ x $1\frac{1}{2}$ x 12 in. flanged lip screen. The screen surface for egg coal is 8 ft. long, made of $3\frac{1}{2}$ x 3 x 8 in. flanged lip screen. The egg and lump coals are discharged to picking tables having a picking space 16 ft. long. The egg table is 3 ft. and the lump table 5 ft. wide. Fitted to both egg and lump tables, and forming an integral part thereof, are loading booms, each 26 ft. long, by means of which coal can be lowered into railroad cars with a minimum amount of breakage.



FIG. 7. LOADING BOOM LOADING COAL TO CAR

The chain for the nut conveyor, and the egg and lump picking tables, is 9 in. pitch with extended side bars 7 in. high. The steel pans are double-beaded and $\frac{1}{4}$ in. thick.

The refuse from the picking tables is thrown into a refuse conveyor. This runs under the picking tables, up an incline, and discharges into a refuse bin. From here the refuse is drawn at intervals into railroad cars.

The shaking screens and mixing and refuse conveyors are driven by a 35-hp. electric motor through a common countershaft. Friction clutches are provided so that either conveyor can be thrown out of gear if desired. Eccentric shaft for the screens is $4\frac{1}{2}$ in. in diameter. The eccentrics are of cast iron of the ball-and-socket type, while the eccentric rods are made of 6-in. channels placed back to back.

It will be apparent that although this equipment is compact and simple in every respect, yet all conditions are met to insure the production of coal and of nearly every mixture called for by the market. This installation was designed and manufactured by the Marion Machine, Foundry and Supply Co., of Scottdale, Penn. C. J. Creveling is general superintendent of the Blackwood Coal and Coke Co. in this region. Through his efforts the company has made marked progress in the Virginia coal fields.

Pittsburgh Coal Co. Sells Shares to Its Employees

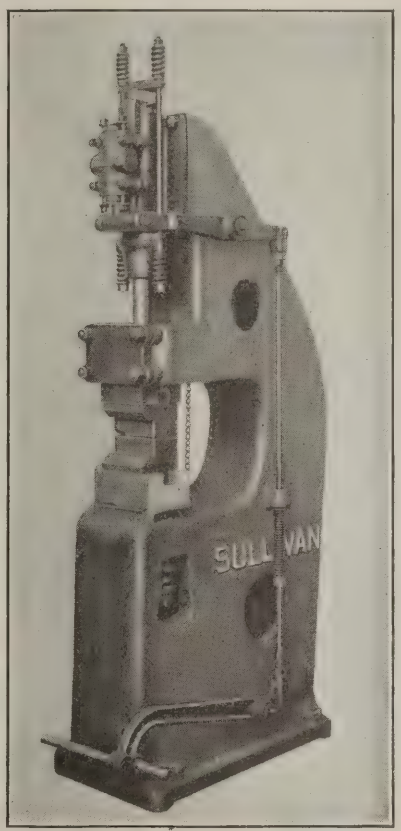
For many years the Pittsburgh Coal Co. has had an association to enable employees to purchase preferred and common stock of the company at the rate of $1 per share per month. When the association closed its books on Jan. 31, 1919, it had 1817 uncompleted contracts calling for the delivery of 16,961 shares. On these contracts $589,966.41 had been paid.

The completed contracts already cover 8748 shares. Thus the number of shares either delivered or to be delivered to the employees on association contracts totals 25,709. A 100 per cent. roll of honor has been started, and 13 different departments have qualified. In these departments every employee has stock. So far not a single mine has that distinction, the honor rolls being attained only by departments at Pittsburgh, Columbus, Buffalo, New York City, Akron and Youngstown, and by the Monongahela Saw and Planing Company.

A Mechanical Blacksmith

A mechanical blacksmith, called the "Utility Hammer," has been developed by the Sullivan Machinery Co., for doing by machine work previously done by hand. It is admirably adapted for rapidly making cutter bits (both pick and chisel point), chisels, wrenches and small tools of all kinds, straps, bolts, small levers, keys and wedges; for forging, welding and straightening rods and bolts; for sharpening miners' picks and crowbars; and for many odd jobs which arise frequently around the mine.

This hammer consists of a rigid cast-iron frame, supporting the guide block, and a vertical engine. Air is admitted to the engine through a pipe connected with some source of air supply, and live air is kept in the lower end of the cylinder at all times. When the foot lever is depressed by the blacksmith, the hammer begins to strike. A single blow may be struck by this hammer or many in succession, either light or heavy as required, and at the will of the operator. The machine has a wide throat, the distance from the center of the die to the frame being 15 in., so that large work can be handled. It takes pieces up to 2 in. in thickness.



SULLIVAN "UTILITY HAMMER"

The four chief advantages of the machine are as follows:

1. *The Vertical Hammer* — The engine is to all intents and purposes the Sullivan FF-12 rock drill—a highly developed machine, the product of many years of labor and experiment. The chief feature of this drill is its vicious slugging blow at full stroke. This can be throttled down by the valve action to a light tap.

2. *The Air Drive*—With a machine of this type, air would seem to be more advantageous as a motive power than belt, chiefly because of its flexibility and ease of lubrication. With air it is a simple matter to lubricate the vertical hammer properly by means of an automatic lubricator; and the air-thrown valve gives a wider range in striking power, and a greater sensitiveness of control than can possibly be obtained with belt drive. Moreover, with air drive the exhaust can be used to blow chips, scale, etc., from the face of the die. This is highly important when cut-out dies are being used, for unless the dies are kept clean scale cuts into them and eventually leads to their being discarded.

3. *The Foot Control*—The foot lever which controls the action of the hammer has a relatively long travel, whereas the valve travel is quite short. This results in close valve control and enables the operator to govern the force of the blow of the hammer absolutely, thereby allowing great flexibility (varying from a light tap to a heavy blow). The operator can feel the action of the valve with fair precision with this long travel of the foot lever for the relatively short movement of the valve.

4. *Rapidity of Stroke*—The hammer is capable of 600 blows per minute and is therefore unexcelled for rapid work.

This machine can be equipped to operate by steam power if desired. Dimensions, weights, etc., are as follows: net weight, 1675 lb.; overall height, 6 ft. 6 in.; depth of base, 29 in.; width of base, 16½ in.; hammer cylinder, diameter, 5⅜ in.; hammer cylinder, stroke, 5¾ in.; air pressure required, 80 to 100 lb.; air consumption at 90 lb., 93 cu.ft. per minute; total striking weight, 100 lb. (Any dies can be made up from blueprints or samples.)

The development of this hammer is the result of the tremendous quantity of chain coal-cutter bits required for mining machines. The hammer is merely the vertical member of the Sullivan drill sharpening machine—the horizontal hammer being omitted because of the lack of necessity for upsetting work in the making of cutter bits.

In the Chicago shops of the builders single hammers have sharpened as many as 2000 chain machine pick-point or chisel-point bits per 10-hour day.

Self-Dumping Cages Help Illinois Mine Make High Hoisting Record

The Orient mine of the Chicago, Wilmington & Franklin Coal Co. on Mar. 6 hoisted 6777 tons of coal from a depth of 600 ft. This is believed to be a new world's record for a shaft mine hoisting one car of coal at a time. To make such a record as this two pieces of apparatus must be thoroughly reliable—the hoist and the cage. Of course, other devices such as the rope, the sheaves, the cager and, in fact, all physical equipment must "stand up" under the stress of such rapid production. The organization also must function properly. Upon the two pieces of apparatus first mentioned, however, the brunt of the stress falls.

It is interesting, therefore, to note the kind and type of hoist and cages employed at this mine. The hoist here used is a Nordberg 28 x 54-in. engine with cylindro-conical drums 7 ft. in minimum and 11 ft. in maximum diameter. The maximum rope speed is about 4500 ft. per minute.

To cage, hoist and dump three or more cars per minute from a depth of 600 ft. requires a cage of great strength and reliability. The cages employed at the Orient mine are known as Olson self-dumping cages and were built by the Eagle Iron Works of Des Moines, Iowa. Their performance on Mar. 6 last speaks well for their reliability under the stress of rapid hoisting.

THE LATEST RECIPIENT of the John Fritz medal was J. Waldo Smith, for his most distinguished service in engineering and great achievement as engineer in providing the city of New York with a supply of water. Similar service is now recognized by the more progressive coal companies, among others, as being a good business move as well as an engineering achievement. Most mining towns tend to encourage unsanitary conditions by reason of many people, comparatively, living in a limited area. The health of such communities is maintained ordinarily by attention to water supply and sewage removal.

Automatic Reclosing Circuit Breakers in Mine Service

By E. C. Raney
Columbus, Ohio

SYNOPSIS — *The increasing use of electrical distribution of energy has brought many problems of economy in transmission and operation. Automatic control of various circuits not only protects those circuits and the machinery operating thereon, but also in no small degree lessens the expense of attendance.*

DURING the past few years coal mines have made some radical changes in the method employed for obtaining and distributing direct-current power for mining machines and motors. The old isolated steam plant has largely passed out of existence, and in its place has come the central station delivering current to the individual mines over high-tension alternating-current lines.

At the mines this high-tension alternating current is converted into direct current by means of rotary con-

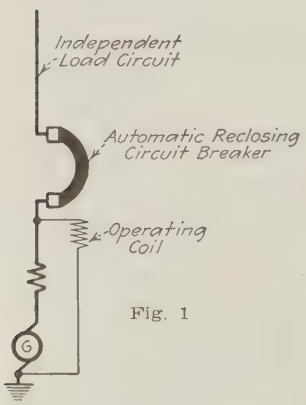


Fig. 1

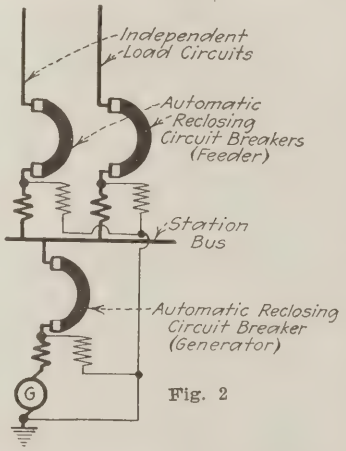


Fig. 2

FIGS. 1 AND 2. BREAKERS ON ONE AND TWO LOAD CIRCUITS

verters or motor-generators at a suitable voltage. The usual potentials for trolley use are 250 or 500 volts.

The many advantages of the central-station method of power generation and distribution are too well known to be taken up in this article. I wish, however, to enumerate two of the most important economic advantages to be gained by this arrangement, as a clear understanding of these together with a thorough knowledge of the application of the automatic reclosing circuit breaker to such installations makes possible the proper location and arrangement of equipment to obtain the best results at a minimum cost.

First, by obtaining central-station power for the mine the substation can be located near the load center. This saves a large amount of copper in the feeder lines, reduces power losses to a minimum and increases the output on account of better voltage being available at the motors.

Second, through the use of central-station power the cost of attendance at the substation can be practically eliminated, since it only requires an attendant to start the station in the morning and to shut it down at quitting time. It will be explained later in this paper how the shutting down can be accomplished automatically if so desired.

The operation of substations without an attendant has been made practical by the development of the automatic reclosing circuit breaker and other automatic

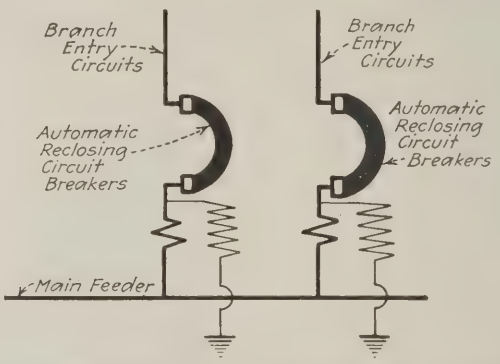


FIG. 3. BREAKERS ON INDEPENDENT CIRCUITS

protective devices. With a station properly protected by these instruments, operation without an attendant is much safer than it would be with an attendant, but with the automatic protective devices omitted. The elimination of the human element is always desirable where the same results can be obtained with certainty by automatic means.

There are four general classes of protection to which automatic reclosing circuit breakers are applied, each of these classes requiring a different arrangement of control circuits governing the breaker. These may be

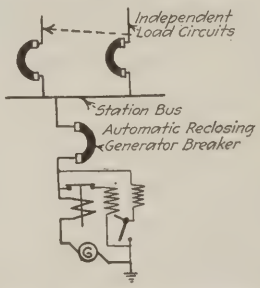


FIG. 4. AUTOMATIC BREAKER BETWEEN GENERATOR AND BUS BAR

enumerated as follows: (1) Protection of independent feeder circuits; (2) protection of generator circuits; (3) protection of feeders to a trolley that is also supplied by current from other stations; (4) the sectionalizing of circuits.

Taking up the foregoing classifications of control in their order, Figs. 1, 2 and 3 are simplified diagrams illustrating the application of automatic reclosing circuit breakers to the protection of independent feeder circuits.

Fig. 1 illustrates the most elementary case in which

a single generator is supplying a single outgoing load circuit and is protected by a plain automatic reclosing circuit breaker. Such an instrument for independent load circuits should have the following characteristics: (a) It should open in case of overload, short-circuit, or voltage failure; (b) it should remain open through a definite time interval; (c) it should reclose automatically at the expiration of the time interval provided the short-circuit has been removed; (d) it should remain open without any attempt to reclose so long as the short-circuit or overload exists.

Fig. 2 illustrates a station equipped with a single generator but having two independent load circuits. In

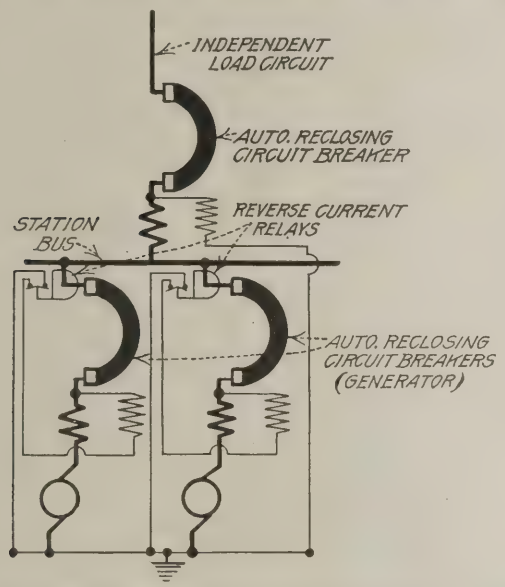


FIG. 5. TWO GENERATORS ON A COMMON BUS

this case an automatic reclosing circuit breaker should be used on each outgoing circuit so that in the event of overload or short-circuit on either section the other section will continue to supply power uninterruptedly.

Fig. 3 illustrates another application of breakers for independent feeder circuits. With this arrangement each important branch circuit is protected by an automatic breaker so that trouble on one section will not interrupt service on the remaining sections. This item is quite important in mines where much trouble is experienced on account of falling slate and other conditions which frequently cause short-circuits to occur on the various lines.

Figs. 4, 5 and 6 illustrate three typical arrangements of circuits wherein generator breakers are required between the generator and station bus. The generator breaker in its simplest arrangement has the following characteristics: (a) It should open in case of overload, reversal of current or voltage failure, and (b) it should reclose automatically at the expiration of a definite

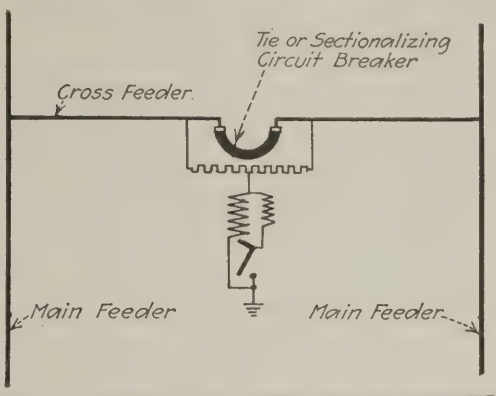


FIG. 8. TYING MAIN FEEDERS TOGETHER

time interval provided the voltage of the generator is at or above a certain predetermined value.

Fig. 4 illustrates an elementary arrangement where an automatic reclosing circuit breaker is used between the generator breaker and the busbar. Each independent load circuit is supposed to be properly protected with automatic circuit breakers.

Fig. 5 illustrates a case where two generators are operating in the same station feeding into a common bus. The outgoing load circuit is protected by an automatic circuit breaker, and each of the generator breakers is provided with overload protection and reverse current relay protection.

Fig. 6 illustrates a station where the generating equipment is protected by an automatic breaker, the operating coil of which is carried through contacts controlled by the alternating-current switch, through thermostats on the transformer and bearings, and through an overspeed device on the rotary converter shaft.

In this case a no-voltage relay is located just above the alternating-current handle so that in the event of the opening of any of the protective devices mentioned the armature of the no-voltage coil will be released and trip open the alternating-current switch. This action opens the direct-current circuit breaker permanently at the same time that the alternating-current switch is

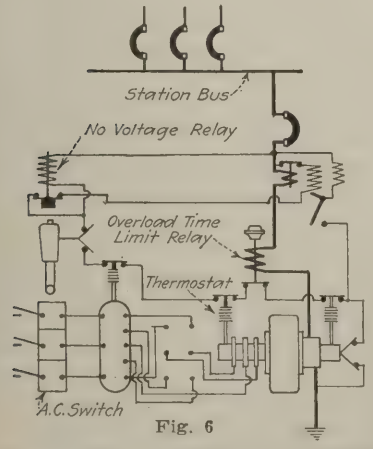


Fig. 6

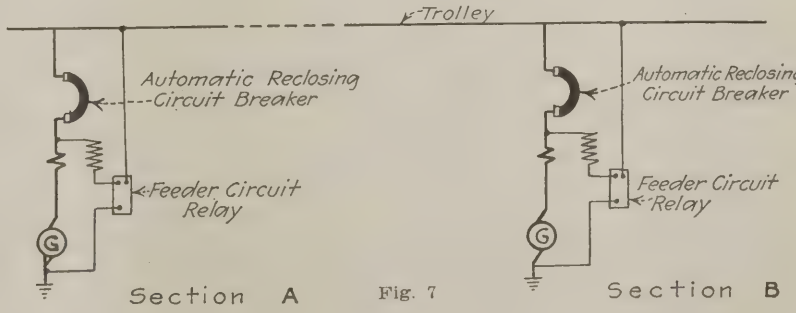


Fig. 7

FIG. 6. AUTOMATIC BREAKERS USED WITH OTHER PROTECTIVE DEVICES—FIG. 7. BREAKERS AT WIDELY SEPARATED SUBSTATIONS

opened. The generator will thus be completely protected in the event of overspeed, hot bearings, a hot transformer or an excessive overload on the alternating-current circuit. The generator breaker, however, will open and reclose automatically in case of a direct-current overload.

Any combination of the foregoing protective features may be used, or this scheme may be extended so as to provide protection against almost any conceivable contingency which would make it desirable to shut the station down. For instance, in some plants where the load demand continues until midnight or after, a time clock is provided which opens the circuit of the no-voltage relay, thus shutting down the station automatically at a predetermined hour without the necessity of an attendant being present.

Owing to the high power losses in transmitting low-voltage direct current it is not advisable to transmit current for power purposes more than one mile at 250 volts or more than four miles at 500 volts. Whenever these distances are exceeded it results either in excessive loss of power or it means that an excessive amount of copper must be used in the trolley circuits.

Where central-station current is available it is usually more economical to use smaller units in motor-generator stations and locate them at intervals of 1½ to 2 miles, as illustrated in Fig. 7. Where this arrangement is employed it is necessary to use a feeder-circuit relay with each automatic reclosing circuit breaker. The object of the feeder-circuit relay is to govern the reclosing of the breaker so that in case the trolley voltage is below a certain value opposite a given station, such as *B* while station *A* is still feeding the circuit, the breaker at station *B* will remain open until the voltage

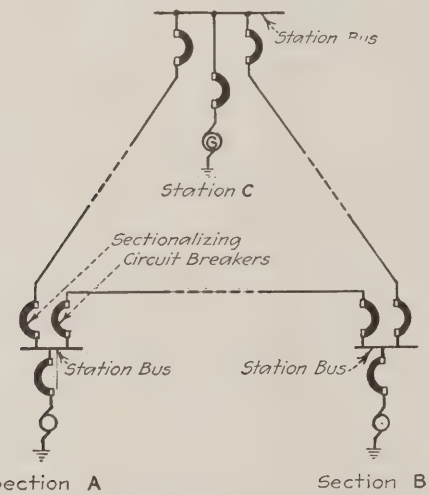


FIG. 9. TYING THREE STATIONS TOGETHER

has reached such a value opposite station *B* that the breaker there will not open immediately after reclosing.

In some instances considerable economy in transmission is effected by tying two main feeders together at some distant point in the mine by cross feeders, as illustrated in Fig. 8.

There is a serious objection, however, to this arrangement unless the cross feeder is protected by some automatic means, so that should a short-circuit occur on one of the main feeders the other will be disconnected during the time that the short-circuit remains effective, and will be reconnected automatically when conditions again have become normal.

In some cases three stations are tied together, feeding into a common network of trolleys and machine circuits, as illustrated in Fig. 9. This makes an ideal arrangement so far as economy of copper is concerned.

With this arrangement the generator at each station should be protected with an automatic reclosing circuit breaker between the generator and bus, and each outgoing feeder should be provided with a sectionalizing circuit breaker. When this plan is followed a short-cir-

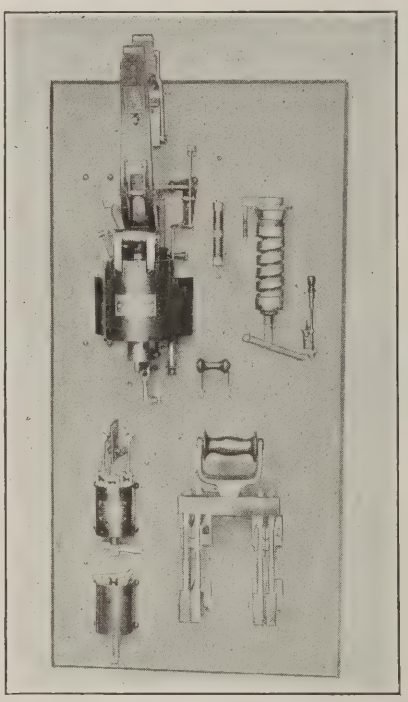


FIG. 10. SWITCHBOARD PANEL WITH AUTOMATIC RECLOSING CIRCUIT BREAKER

cuit between stations *A* and *C* will open the two breakers feeding this section, but operations on the remainder of the system will not be disturbed. Furthermore, with this arrangement it is possible to operate all stations *A*, *B* and *C* simultaneously when the load is heavy, while one or two stations may be shut down during the period when the load is light. The entire system will then be fed from one station.

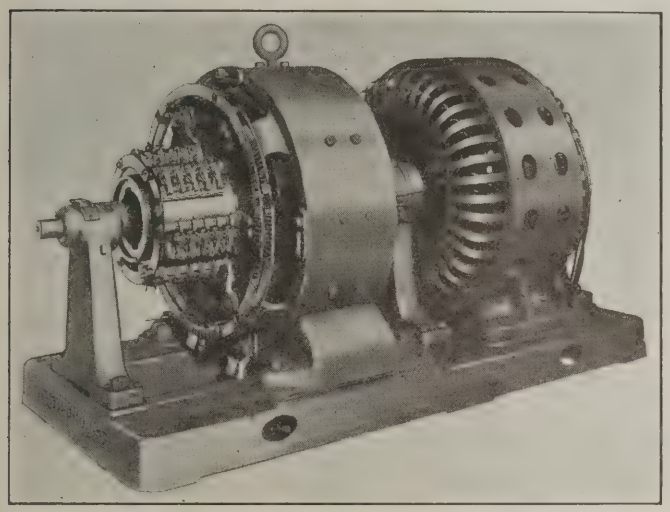
By the use of sectionalizing breakers, when station *A* is supplying the entire system with stations *B* and *C* shut down, current will be fed through the two breakers at station *B* and through the two at station *C*. When feeding in this manner the current in one breaker in each station will be fed in a reverse direction to what it is when all stations are running. This necessitates the use of automatic sectionalizing breakers which will operate equally well with current supplied from either direction. The application of sectionalizing breakers in this manner in a recent development and is one which is of considerable importance in the proper operation of systems of this character.

SOME IMPORTANT American business enterprises in considering plans for expanding their American activities into world-wide activities are concerned over the matter of an American merchant marine. Several of our large corporations, including coal producers, have found it of considerable advantage to own and operate their own vessels. The organization of ship lines by exporting interests and their operation by managements controlled by the exporters would possibly so tie together the commercial and the transportation interests as to make them pay.

New Motor-Generator for Mines

There are periods during the day when the electrical load of a coal mine is light, and then in an instant the demand for power may jump to several times the average. Such conditions occur with the starting or stopping of hoists and locomotives, and demand extra-good peak-load performance of the generating apparatus. This is especially true as regards synchronous motor-generator sets, for the generators are denied the relief afforded by the fall in speed of an engine-driven set, since they run at unvarying speed.

A new synchronous motor-generator set which embodies the continuous power-factor correction common to such sets with high overload and "peak" capacity has recently been put on the market by the Westinghouse Electric and Manufacturing Co. It consists of a type G three-phase, 60-cycle, synchronous motor driving a type SK, 275-volt compound generator. The machine has three bearings, the pedestals and field frames being mounted on a common bedplate. The full-load rating is based on continuous capacity with 35 deg. C. rise on the



EFFICIENT MOTOR-GENERATOR FOR MINE SUBSTATIONS

generator, 45 deg. C. on motor armature and 50 deg. C. rise on motor field, with 80 per cent. power factor. After a two hours' run at 50 per cent. overload, the generator and the motor temperature rise will not exceed 55 deg. C. On test, commutation was satisfactory at 250 per cent. load. The compound field is adjusted to give 10 per cent. increase in voltage from no load to full load.

In addition to commutating poles on the generator, there is a compensating winding placed in slots in the faces of the main poles. This considerably improves the efficiency and gives extremely good commutating characteristics. This winding consists of but one continuous coil per pole. Each coil is form-wound to exact dimensions, and is put into open slots in the pole faces, where it is held by wedges. This construction gives one joint per pole instead of two joints per conductor, as has been the custom in the past, where jumpers were used between bars. No difficulty is found in removing and replacing coils.

The motor is a six-pole, revolving-field machine, provided with squirrel-cage damper winding in the pole faces. This permits of starting the set from the alternating-current side and also insures its stability under sudden variation of load. The field may be overexcited to draw "leading" reactive current from the line, thus compensating for the "lagging" current of induction motors. This helps the voltage regulation, especially where a long transmission line is used. A voltage regulator may be employed, which will hold the alternating voltage constant within the range of the set.

The performance of this set is as follows: Efficiency at one-half load, 81.4 per cent.; three-quarter load, 85 per cent.; full load, 86.5 per cent.; one and a half load, 88 per cent.

Carbonization of Illinois Coals in Inclined Gas Retorts

Under the conditions existing in the winter of 1917-18 it was desirable to use as much as possible of the coal mined locally in order that long railroad hauls might be avoided and that the crowded transportation systems be lightened. Gas manufacturers of the middle west saw the importance of a local supply of coal because of the increasing difficulty of obtaining supplies of eastern gas coal, and many companies considered the possibility of using Illinois coal for at least part of their requirements. A high yield of gas of good quality is the result sought in the manufacture of illuminating gas in retorts. Coke, tar and ammonia are byproducts that are recovered in order to increase the economy of process. Coke is the chief of these byproducts, and its quality should be given consideration in selecting and carbonizing the coal.

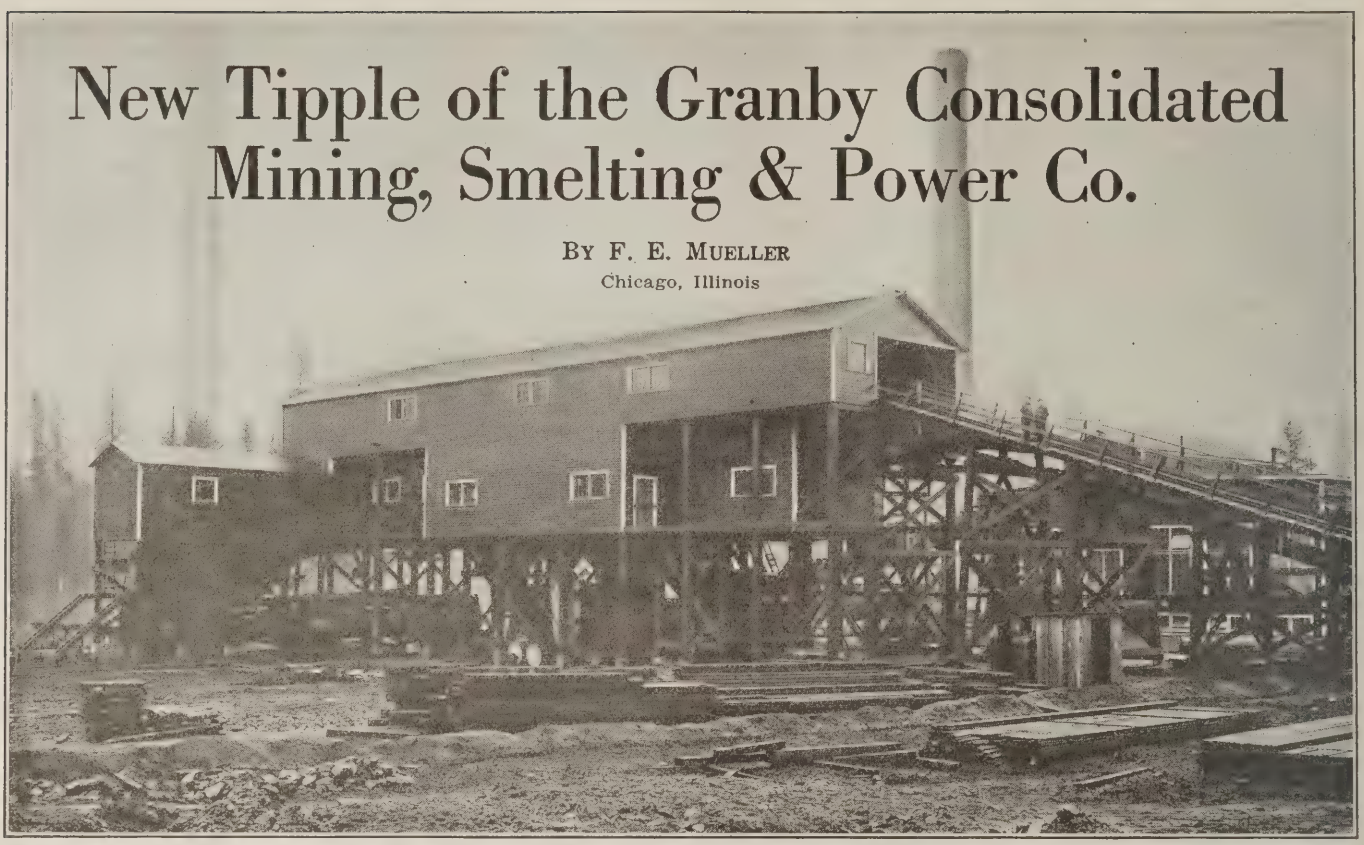
Tests were undertaken in an endeavor to obtain further information regarding the use of Illinois coals in gas retorts. These tests were made by the Bureau of Mines in coöperation with the Illinois State Geological Survey and the Engineering Experiment Station of the University of Illinois. It was desired to ascertain how the quality of the coke obtained was affected by mixing Illinois with eastern gas coal. Where Illinois coals have been used for gas making, the usual practice has been to charge a part of the retorts with Illinois coal alone and the rest with an eastern gas coal.

The coke from the two coals was sold separately; that from the eastern coals was sold for domestic purposes while that from the Illinois coal was consumed at the plant. Another object of the tests was to permit the use of better operating conditions than are possible when the two coals are coked separately. These tests are described in Coöperative Coal Mining Series—Bulletin No. 20—under the title of "Carbonization of Illinois Coals in Inclined Gas Retorts," by F. K. Ovitz.

In this bulletin the following summary of results and conclusions is given: Illinois coal mixed with Kentucky coal before charging yields better coke than Illinois coal alone. If all the retorts are charged with the same mixture, uniform operating conditions can be maintained to insure proper carbonization of all the charges. Coke from Illinois coal alone contained more ash and had more tendency to form clinker than coke from a mixture of Illinois and Kentucky coals. The yield of coke from mixtures was larger than from Illinois coals alone, and increased as the percentage of Kentucky coal was increased. The amount of breeze in the coke made from unmixed Illinois coal was greater than in coke from mixtures. Mixtures gave higher gas yields and consequently enabled greater production of gas with a given equipment than could be obtained from Illinois coal alone.

New Tipple of the Granby Consolidated Mining, Smelting & Power Co.

By F. E. Mueller
Chicago, Illinois



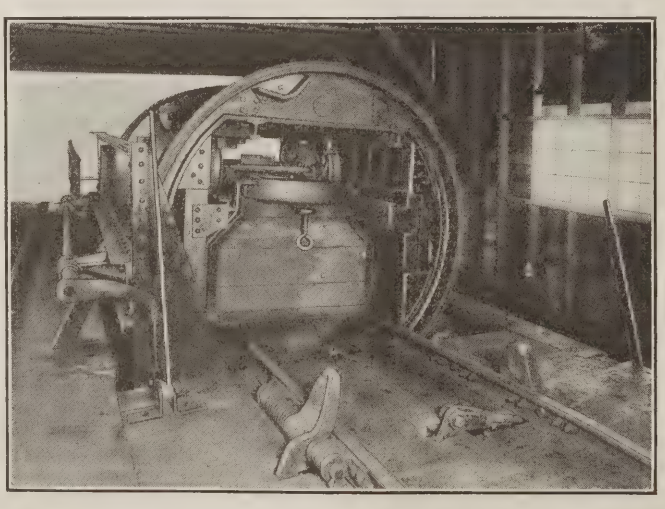
FROM time to time articles and photographs have been published showing coal measures and giving general data covering the new mining plant of the Granby Consolidated Mining, Smelting and Power Co., Ltd., at Cassidy Siding, near Nanaimo, on Vancouver Island. It is not the purpose here to go into details concerning the mine development or the surface plant. It is sufficient to state that the arrangement of the camp, housing facilities for the comfort of the employees, the shops, bathhouse and boiler equipment are second to none in the west, the entire arrangement lending itself readily to the ultimate development of this property.

The engineers entrusted to the Roberts & Schaefer Co., of Chicago, the development of the tipple. In view of the agitation against anything other than a solid body car, and consequently the use of rotary dumps, and also the careful consideration that must be given to the preparation of coal by picking or washing, a description of the general arrangement of this plant should prove of interest.

The general layout of mine car tracks, tipple and proposed washery, together with the location of slope with respect to the railroad tracks, is shown in one of the illustrations. It will be noticed that sufficient room has been provided for the storage of loaded cars pulled out of the slope, the loads being permitted, after passing over the knuckle to drift down grade at ground level to the loaded trip feeders, which push the cars one at a time onto the loaded car-haul.

Another illustration shows the mine car that is in use at this property. The loaded car-haul and tipple are of sufficient capacity to handle three cars per minute. The headpiece of this article shows the completed tipple, the Marcus house, and at the extreme left the loading boom shed.

After the cars have reached the top of the loaded car-haul they drift over a platform scale and then on toward the rotary dump, which is also illustrated. This rotary dump is of the Head-Wrightson type—the Canadian rights of which, together with those of the Marcus patent picking table screen, have been entrusted to the care of the Roberts & Schaefer Co. since the outbreak of the war. This type of rotary dump is not new to coal operators of western Canada, as it has been in successful use at a number of mines; but probably nowhere has it operated with a car of such large capacity as at Cassidy Siding.



VIEW OF THE ROTARY DUMP AND MINE CAR

Another feature of interest in connection with this dump is that it is provided with Mining Safety Device Co.'s feeders so that the feed of cars to the dump is automatically controlled, thereby avoiding delay and liability to wrecks which might occur if the cars were not regulated into the dump. All parts of the car feeders

and revolving dump are of substantial construction and are easily accessible in case repairs are necessary.

The empty cars standing in the revolving dump are started forward by the load entering, the arrangement of tipple tracks being such that empty cars run by gravity from the rotary dump to the kickback and thence to the empty track. From here they are lowered by means of a car-haul to the ground level, whence they can drift on to either of the empty storage tracks for making up trips preparatory to lowering into the slope.

Provision has been made for handling mine cars loaded with rock by taking them off at the head of the loaded car-haul and passing them over a rock track, which leads to a rock bin. This, however, is for future requirements, at which time a duplicate revolving dump will be placed over the rock bin. The empty rock cars will drift by gravity back to the empty mine car track of the tipple and thence on over the down haul to the empty yard.

For the early development of the mine the rock will be handled over the rotary coal dump. A bypass is provided in the chutes leading from the dump so that the rock can be diverted into a temporary rock bin from which it is disposed of by means of wagons. Provision is also made in connection with the rotary dump and chutes leading therefrom to handle local-trade (or house) coal.

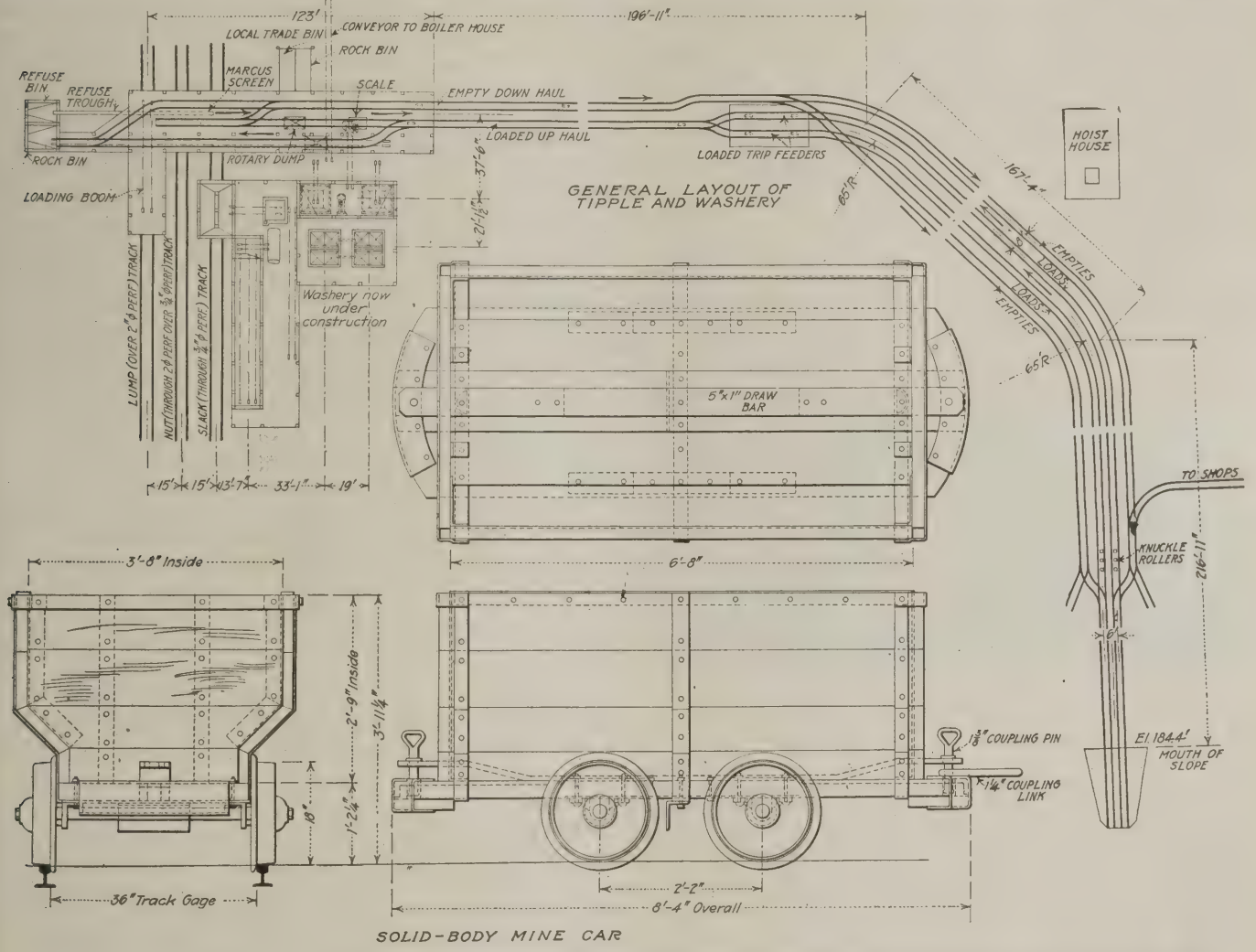
The coal from the rotary dump is delivered into a receiving hopper from which it is mechanically fed onto a Marcus horizontal screen 5 ft. wide, the upper deck of which is provided with perforated plate for producing lump, nut and slack coals on three tracks, or combinations of these sizes as may be desired.

Provision is also made in connection with the Marcus screen for diverting the nut and slack coals to a conveyor which delivers this mixture to the elevator of a washery which is now being installed, or the slack from the tipple can be diverted to the conveyor leading to the boiler house.

Pickings from the table are carried forward in a pickings trough which shakes with and is part of the screen proper. These pickings are delivered to a refuse bin built in conjunction with the rock bin. Provision is also made in the tipple for delivering bone coal to a crusher from which it is conveyed into the boiler house.

Ample facilities are provided in connection with the screen for thoroughly picking the lump coal. After passing over the lump perforations this is delivered without breakage onto an apron conveyor type of loading boom which lowers it into railroad cars.

With the arrangements provided for handling mine cars and the facilities for preparing and handling the finished coal products, the preparation here given should prove one that will permit of low-cost output. When the washery is built this mine will load a product onto railroad cars that will be among the best of the island coals.



GENERAL LAYOUT OF TRACKS, TIPPLE AND PROPOSED WASHERY, AND DETAILS OF SOLID-BODY MINE CAR IN USE AT THE PLANT

The Gasoline Locomotive Underground

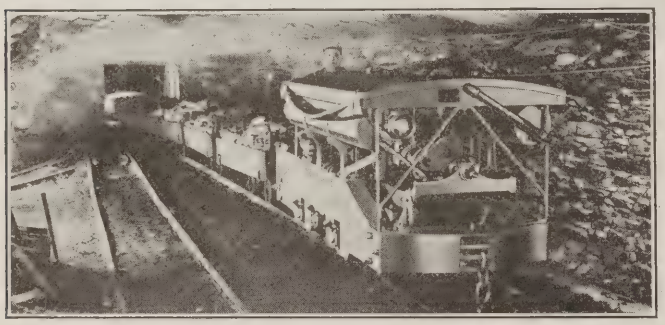
By Paul Teas
Cleveland, Ohio

The old mine mule has had his day, not alone in outdoor work but underground as well. Mine owners long ago accepted the gasoline haulage unit as a valuable investment for outside haulage, but many have been slow in discovering that its usefulness reaches underground also. The facts are that nearly all of the good qualities of the locomotive in open-air work apply equally within the mine. Among these are the following:

1. Ability to haul longer trains and to move a greater tonnage per hour than would be possible with all the animals that could be put on the job. A marked reduction in the per-ton cost of getting out the coal naturally follows.

2. Simplicity of construction and ease of operation make it possible to man the outfit with comparatively unskilled labor.

3. Low operating cost. Fuel consumption runs usually from 7 to 15 gal. of gasoline per day, depending, of course, on the tonnage handled, distance traveled and grades encountered; also, to a degree, on the quality



GASOLINE MOTOR OPERATING UNDERGROUND

of the fuel. Two men handle the outfit—one motorman and one brakeman.

Making a liberal allowance for fuel, lubrication, wages, and interest and depreciation, the operating cost of the mechanical unit, in proportion to what it does, drops far below that of animal haulage. Furthermore, the locomotive is always ready for service, works winter and summer alike, and requires little or no care when not running.

Makers of gasoline locomotives who have studied underground haulage assert that success depends largely upon the proper adjustment of the carburetor—to secure a "lean" mixture of gasoline vapor and prevent the production of carbon monoxide gas—and upon a fair condition of ventilation within the mine.

The average operator, checking up conditions at his own mine, is not likely to encounter any serious obstacle to the operation of a locomotive to the limits of his trackage. In this connection the experience of some prominent companies are interesting.

The Central Fairmont Coal Co., Clarksburg, W. Va., with a drift mine running back about 5760 ft., operates gasoline locomotives with entire success. This mine is ventilated with only one fan, and the locomotives have to pull against a stiff grade. This makes a strong case in favor of the locomotive, since the tendency to throw off heavy fumes naturally would be greater when pulling against heavy resistance than when running on the level or down grade. The owners consider this as convincing evidence that underground gasoline locomotive haulage is a particular success in this instance.

Another drift operation near Clarksburg also reports good results from a gasoline locomotive under similar conditions. The Francois Coal and Coke Co. operates about 500 ft. from the mine entrance and ventilates with one shaft. This company has used gasoline haulage for some years and is well pleased with the results secured.

At Reynoldsville, W. Va., the Hutchinson Coal Co. has placed its underground haulage upon gasoline locomotives with good results. Over in the Keystone State other concerns have shared this experience, among them the W. A. Stone Fuel Co., at Pt. Merion, and the Irwin Gas Coal Co., of Greensburg. Both firms state from experience that the gasoline locomotive when given a fair chance will work as well "down below" as in the open.

Supporting evidence comes from other mining fields. The American Gypsum Co., for example, had to "sell" the idea of gasoline haulage to the state inspector before he would sanction such an installation at the company's mine at Akron, N. Y. The haul here is approximately one-half mile underground. Ventilation is had through an airshaft about 3700 ft. back from the main shaft. The roof is quite low, and the locomotive pulls against a stiff grade under load. Not until the inspector had made personal investigation would he "O. K." the purchase of a gasoline outfit. Riding directly back of the locomotive—a Plymouth—he gave it a thorough trying-out. His report was conclusive—"combustion and air circulation thoroughly satisfactory." The Gypsum company has since purchased a second locomotive of the same kind.

The McKinney Steel Co. has several gasoline locomotives at work in its "gopher" mines at Virginia, Minn. These work back as far as 1000 ft. from the opening. The "85" Mining Co., operating a gold mine at Lordsburg, N. M., and the Southern California Edison Co., at Inyokern, Cal., both have reported good performance by gasoline locomotives underground. Ventilation in the former case is through a single air shaft, and the haulage zone extends back 800 ft. from the mine entrance. The Edison company is putting through a hydro-electric project that includes the driving of two tunnels. The haulage unit in this instance operates about a mile underground. Ventilation is provided through air pumped through pipes to the face of the work.

A reliable locomotive is cheaper in first cost than enough mules to do the same work; it will cost less to operate and keep up. It may be installed without making any important changes in tracks or other established equipment. Such a machine will start at a turn of the crank, will go nearly everywhere quickly and with big loads. When it stops, practically all the expense connected with it stops. These are the salient considerations in favor of gasoline locomotive haulage.

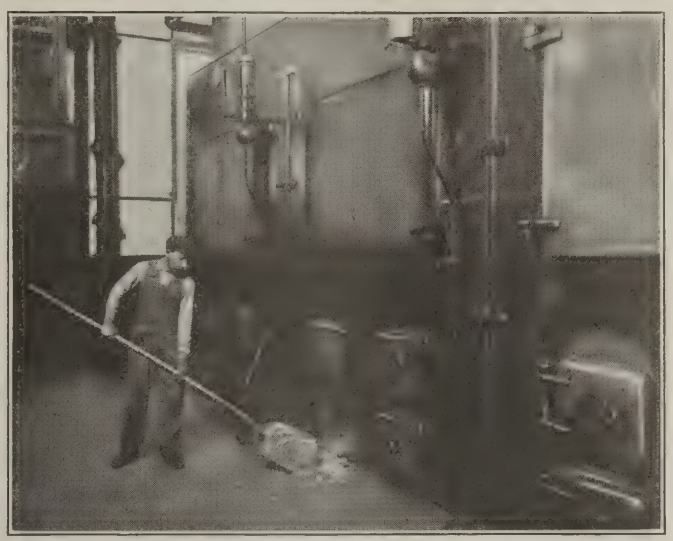
Only one mine in Ohio is operated by longwall, that of the La Belle Iron Works at Steubenville. The working face at the Rail and River mine in Belmont County, Ohio, is situated on an average 4¾ miles away from the entrance. The general trend in the Ohio coal field is a dip of about 27 ft. in the mile (or about a half of one per cent.) toward the southeast.

Money Saved by Use of Steam Jet Ash Conveyor

By Guy S. Hamilton
Chicago, Ill.

The Canada West Coal Co., Ltd., of Tabor, Alberta, has five 150-hp. boilers and one 500-hp. boiler installed in its boiler plant. The coal used is a fine dirty slack which has been stored on the open prairie. Owing to the inclusion of mining machine dirt, this contains about 25 per cent. of ash.

This percentage of ash is not greater than that used in many other coal-mine boiler plants, and the ash-handling problem encountered is paralleled by that of many other mines. How could the daily accumulation of ashes be quickly and economically conveyed from the boiler room to the disposal station some 250 ft. away?



INSTALLATION OF STEAM JET CONVEYOR RESULTED IN LARGE SAVING IN MANPOWER

The Canada West company was employing two ash wheelers whose sole duty was to wheel the ashes from the boilers to a dump wagon outside. Here the ashes were reshoveled into the wagon and the teamster hauled them to the dump pile or disposal station. Three men and a horse were kept constantly employed at this work. They were not used for any other purpose.

The officials of the mine felt that the scarcity of labor warranted the use of the men available at some more productive labor, and accordingly quietly cast about for some sort of mechanical equipment that would take the place of the ash handler. They finally decided to install the steam jet conveyor as a means of ash handling.

About a month ago J. R. Howard, the general manager, wrote to the manufacturers—the American Steam Conveyor Corporation, Chicago—concerning the economies effected by the use of this equipment, setting forth the following figures:

COST OF ASH DISPOSAL PREVIOUS TO INSTALLATION OF ASH CONVEYOR, PER 24-HOUR DAY	
2 Ash wheelers @ $5.44	$10.88
1 Teamster @ $4.08	4.08
1 Horse and feed @ $1.50	1.50
Total	$16.46
COST OF ASH DISPOSAL AFTER INSTALLATION OF CONVEYOR	
1 Laborer, 9 hr.	$4.08
Saving per 24-hr. day	$12.38

It will be noticed that no charge is here made for steam, but the laborer does not spend his entire time handling ashes. Between fire cleanings he acts as assistant fireman and boiler-room helper.

The conveyor installed in the plant consists of a line of pipe into which the ashes are fed and through which they are carried to a discharge point by current action. Thus this is not a mechanical conveyor. Nothing moves but the ashes and the current of air and steam. This current is created by the action of a jet of high-velocity steam in the direction of the travel of the ashes. This steam discharge tends to create a vacuum behind it, which in turn creates a current of air through the air intake in the line.

Ash intakes are located conveniently in front of the boiler ash pit door so that the firemen can rake the ashes into them with the least effort. The powerful suction pulls the ashes through the system toward the "steam unit fitting," or that point where the steam is introduced into the system. Here the force of the steam itself ejects the ashes through the remaining or "discharge line" of the system. All the ashes from a cleaning can be handled in about 7 min. The grade of the conveyor pipe line rises about 8 per cent. for 200 ft., then 45 per cent. for about 40 ft., discharging onto an open pile.

The upkeep of the system has been relatively small—less than 1 per cent. of the first cost of the equipment during the year it has been in service. During the 300 working days of the year this conveyer has saved for the Canada West Coal Co. a sum amounting to $3714, more by half than the first cost of the system. And every day it is paying a handsome percentage on the original investment.

The steam-jet ash conveyor has intrinsic merits of which saving money is but one. Boiler-room cleanliness, absence of dissatisfied labor, convenience of operation, are considerations that make it desirable.

Illinois Coals Supplant Eastern Coke in Gas Manufacture

Certain Illinois coals instead of eastern coke can be used for the manufacture of water gas and at a considerably decreased cost, according to experiments that have been made in the city gas plant at Streator, Ill. This means the utilization of nearby coals at water-gas plants in the central states instead of having to depend upon the coke from eastern coals that have to be transported some distance.

Last winter Governor Lowden of Illinois appointed a state technical committee on gas, byproducts and public utilities, and through the committee a coöperative experimental program on gas manufacture was outlined by the Illinois Geological Survey, the University of Illinois, the Illinois Gas Association and the Bureau of Mines, Department of the Interior. Engineers from the Bureau of Mines and the State Geological Survey obtained permission to make their experiments with the Streator gas plant, which supplies gas for the entire city of Streator. In these experiments the engineers were able to obtain the same capacity of the plant when using Illinois coal as formerly was obtained with eastern coke and at probably a decreased cost.

Coal Transportation by Aerial Tramway

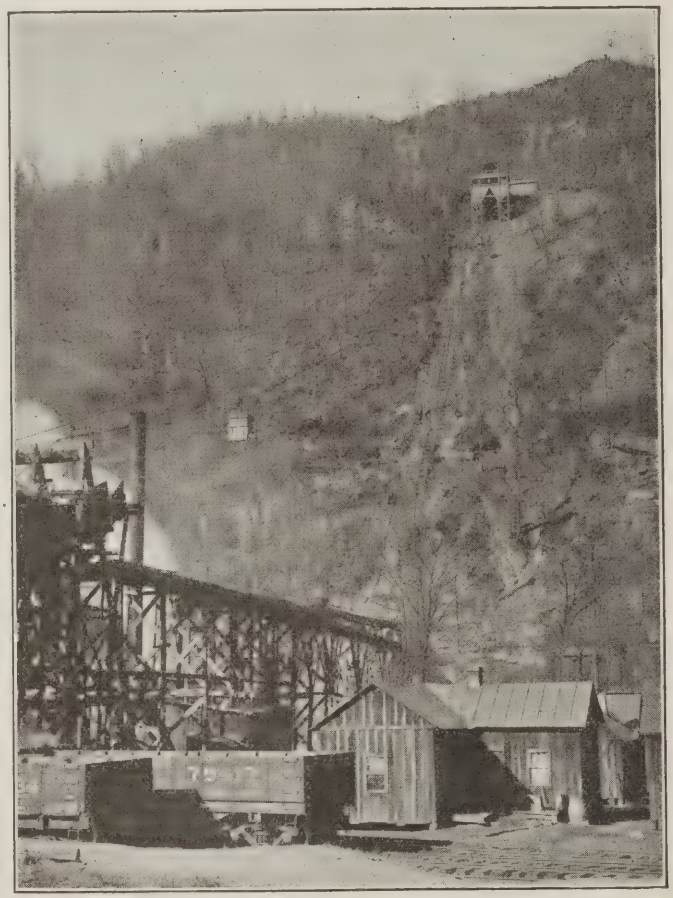
By F. W. Grice
St. Louis, Mo.

During the last few years the aërial wire rope tramway has played an important part in the development of the coal-mining industry. The wartime need for more coal created a demand for a simple and efficient method of transportation from mine to tipple, a method free from the usual delays and interruptions, and one that could be depended upon to perform its work day in and day out regardless of weather conditions.

The adoption of the aërial tramway, particularly in the mountainous sections and where streams had to be crossed, has proved satisfactory and has resulted in a considerable reduction in operating costs. In a number of instances inclines have been discarded and aërial tramways installed with good results. The number of attendants has been reduced, a higher capacity developed, and delays in operation practically eliminated.

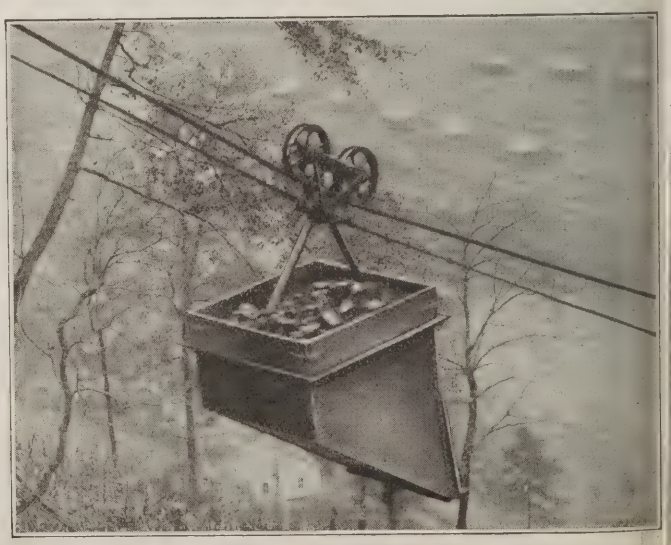
An example of an installation of this kind may be found at the plant of the Rex Coal Co., of Kitts, Ky. The mine of this company is located near the top of a steep mountain at the foot of which is a small river. The railroad and tipple are on opposite sides of this stream. Formerly an incline was used to bring the coal down the mountain side. The track thence led across a trestle to the tipple. When the need for greater capacity and efficiency arose with the outbreak of the war, the installation of an aërial wire rope tramway was decided upon. This installation was completed in the latter part of 1917 and has been in successful operation ever since. With the completion of the tramway the incline was abandoned.

This tramway is of the gravity, two-bucket or jig-back type, installed in a single span without intermediate supports. As the name implies, it consists of two buckets operating back and forth upon separate parallel track cables. These buckets are so spaced that when one is at the loading station at one extremity of the line the other is at the opposite extremity at the discharge station. They are controlled from the loading station by means of a small endless haulage rope. The coal is brought out of the mine in cars and dumped into a 50-ton bin at the loading station. One man loads the buckets and controls the entire operation of the line. At the tipple or discharge end the buckets dump the coal automatically into a chute leading to the shaker screens. Maintenance on this equipment has been low, the operation, adjustment and oiling being taken care of by the one attendant. Oiling of the track cables, over which the buckets run, is accomplished automatically by means of oiling devices mounted on the buckets themselves.



Another application of this method of transportation is at the mines of the White Star Coal Co., White Star, Ky., where two aërial tramways of the two-bucket type have been installed. The purchasers state that they





TYPICAL EXAMPLES OF AËRIAL TRAMWAY INSTALLATIONS AT KENTUCKY COAL MINES

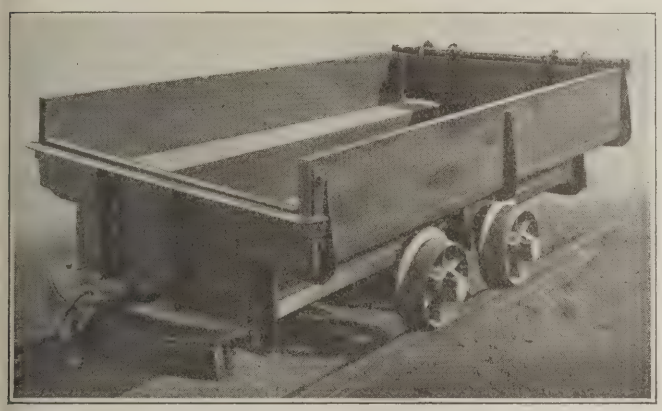
have been operating these tramways for over a year, have never experienced trouble of any kind with them and consider them superior to the incline. Inasmuch as this firm also operates two inclines, this statement carries considerable weight.

Details concerning the operation of these tramways may be secured by writing to H. H. Bennet, secretary and treasurer of the Rex Coal Co., Kitts, Ky., to W. L. Hammond, general manager of the White Star Coal Co., White Star, Ky., or to the Broderick & Bascom Rope Co., St. Louis, Mo., which furnished the installations.

New Type of Mine Car

The Anniston Steel Co., of Anniston, Ala., has recently produced a type of mine car that embodies several novel features in design. The specifications for this car are as follows: Capacity, 2000 lb.; inside length, 7 ft.; inside height, 18½ in.; height above rail, 30 in.; width at top, 4 ft.; diameter of wheels, 12 in.; track gage, 36 in.; wheel base, 20 inches.

All body irons are made of structural shapes formed to exact dimensions. Stiffening bars are made from Z-bar, 1¾ x 2 x 1½ in., all riveted to the body binders and bolted at each end to the bumper. This holds the



MINE CAR THAT POSSESSES MANY NEW FEATURES

car in perfect alignment. The drawbars are made from 2 x 3½ x ⅜-in. tees. Attached to the ends of this bar are electric cast steel drawbar hooks and eyes, with electric forged steel hitchings.

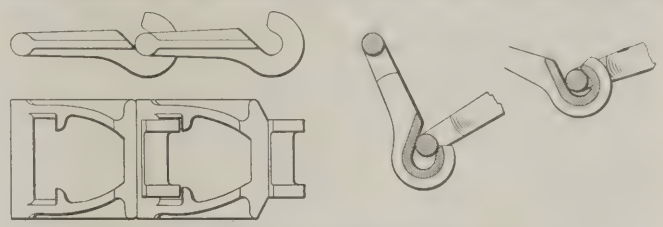
The assembly of the truck and its attachment to the bottom of the car is either by 3 x 3 x ⅜-in. angles or by 10-in. 15-lb. channels, as required. In either case these are riveted to the body irons as well as the drawbar and stiffening Z-bar. The wheels are provided with a ⅜-in. pipe plug for oiling purposes. The axle housings are bolted through the channels or angles, passing through the entire bottoms and inside washer plates.

The axles are made from sufficiently high carbon steel to permit turning and hardening to exact dimensions that portion used for a bearing surface. The wheels are of electric cast steel, cast in steel chillers to insure their being perfectly concentric, thus facilitating the machining and boring. These wheels are greased or oiled before assembling and are bored to a tolerance of 0.002 in. for application of the Hyatt shock absorber roller bearing. The housings are also electric steel castings, designed especially to prevent dust and other disintegrating substances from entering the bearings and are well packed with felt for this purpose. The oak used is the best grade found on the market.

A New Sprocket Chain

A new type of sprocket chain link has been invented by J. C. Law, of Carbondale, Penn. This chain is designed to obviate the shortcomings of the ordinary link belt, particularly in respect to the weak portion of the link where its side is notched to permit the attachment of one link to another.

A lug projects inward from either side of the link to bind against the hook of the next link and thus to pre-



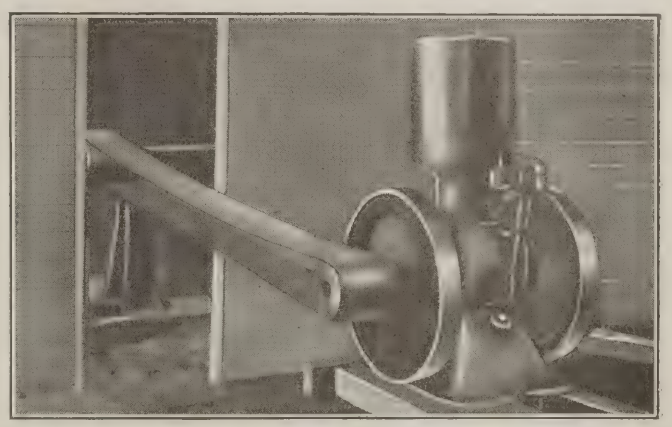
DETAILS OF SPROCKET CHAIN LINK

vent the two from becoming detached. In connecting links together they may be joined by simply placing them at right angles and slipping the end bar of one into the hook of the next. Adjacent links will not become detached in any position they normally assume.

This chain link is designed to work upon ordinary sprockets. The two chief advantages sought are greater ease of connection, link to link, and greater strength. It would appear that both of these objects had been accomplished. This type of chain will be placed upon the market in a few months.

Driving Fans by Means of Internal-Combustion Engines

Many medium-sized coal and metal mine owners have been installing gasoline and kerosene engines lately for operating their ventilating fans and blowers. As the air shaft is sometimes quite a distance from the main power plant, it has been found economical to operate the fans by internal-combustion engines. The cost of



THIS ENGINE DRIVES A FIVE-FOOT FAN

both installation and operation is small. Exact figures on this point are not available, but generally where air shafts are in out-of-the-way places that are hard to get at, a light compact engine makes the best power unit. The accompanying illustration shows a 6-hp. Novo engine driving a 5-ft. fan at a mine of the Kanawha Coal Co., Charleston, W. Va.

A mine owner should be careful in the selection of an engine. A reliable and simple machine that will stand the day-in-and-day-out grind is the only kind to buy.



PLANT OF THE DENVER COAL BYPRODUCTS CO., THE LARGEST LOW-TEMPERATURE COAL BYPR

G-L Low-Temperature Carbonizing Process

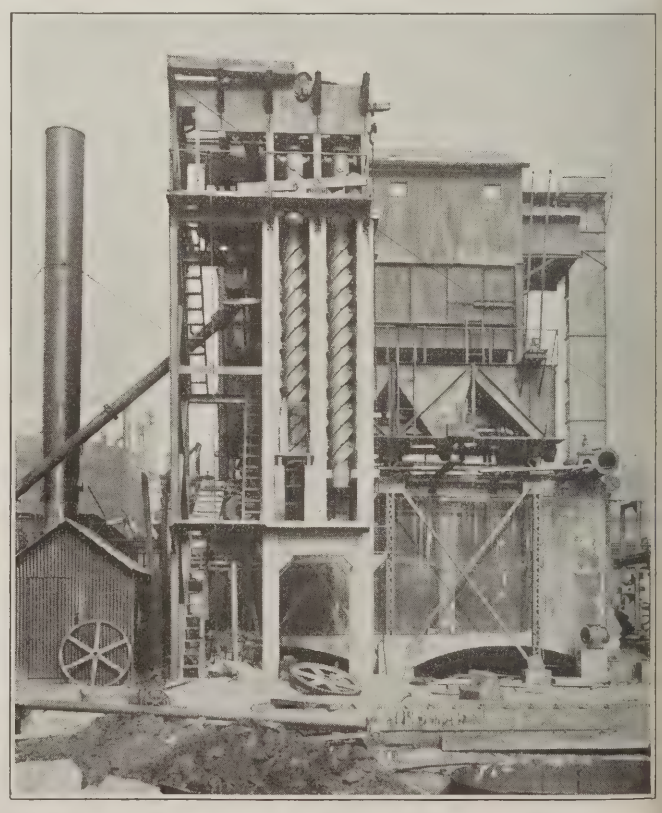
SPECIAL CORRESPONDENCE

SYNOPSIS — *Coal is now burned raw wastefully and inefficiently. The process here described reduces the amount of gas evolved by the usual processes of carbonizing and secures an increased output of oils. Fuel of any desired volatile content may be produced.*

COAL in most instances is burned today just as it was when first discovered hundreds or thousands of years ago—that is, it is burned raw. In its natural or raw state bituminous coal burns under ordinary circumstances and manipulation with ease and inefficiency, with smoke and incompleteness. It is difficult, except by means of special furnaces and careful manipulation, to burn raw bituminous coal under a boiler smokelessly; in the ordinary house furnace or the kitchen range it is next to impossible. While smoke —that is, the emission of minute particles of solid carbon from burning coal—does not in itself constitute any appreciable loss, it usually forms a good indication that other and far more serious losses are occurring. Dense black smoke is the telltale of incomplete combustion.

That the burning of raw bituminous coal is an expensive luxury has long been recognized—and the more "bituminous" the coal the more expensive the luxury. In other words, it has long been known that high-volatile coal contained other products of greater value than its heat. These substances are extractable only by distillation. This distillation ordinarily yields a solid residual fuel or coke of low-volatile content, a large volume of gas, a small amount of ammonia and a variable quantity of oils and pitch. There are thus made two major fuels, one solid and one gaseous, both of which may be readily burned, giving complete combustion and no smoke.

The ordinary byproduct coke oven operates at high temperature and yields large volumes of gas together with comparatively small quantities of oils. As a re-



VIEW OF TWO RETORTS, WITH BRICK SETTING REMOVED



N THE WORLD, PRODUCING HIGH YIELDS OF AROMATIC TAR OILS AND SMOKELESS FUELS

sult this process of coking has found most favor where large quantities of gas are or may be consumed in industrial processes such as steel manufacture, or where existing density of population entails a demand for gas for domestic purposes.

Many experiments have been made in low-temperature distillation processes, but these heretofore have presented many difficulties, chief of which has been the length of time required for heat to penetrate any considerable thickness of a coal charge.

The Denver Coal Byproducts Co., of Denver, Colo., a subsidiary of the American Coal Byproducts Co., 115 Broadway, New York City, has had a low-temperature carbonizing plant in commercial operation for some time, and the results obtained are so significant as to be almost boundless in scope both as to utility and possible financial return. The plant is operated under the Greene-Laucks patents, or on what is known as the G-L process. This differs in many respects quite radically from previous attempts at low-temperature coal carbonization.

The retorts used are arranged in groups, units or batteries of four. They are made of cast iron, about 18 in. in diameter and 18 ft. long, and are set on end. A spiral fin is cast on the outer surface of each retort, which is incased in a firebrick setting. This fin serves a double purpose. It breaks up the currents in the ascending heating gases and materially assists in absorbing the heat therefrom and conveying it to the contents of the retort.

Coal, ground to pass a 20-mesh screen, is fed continuously into the top of the retort. Centrally mounted within the retort is a hollow-stemmed worm. This is revolved slowly by machinery and both agitates the coal charge and forces it downward, thus maintaining an operation which is automatic and continuous. Gas burners external to the retort but within the firebrick setting furnish the requisite amount of heat necessary for the carbonizing process.

As has been stated, the worm in the center of the retort is hollow. The gases evolved in carbonizing escape through suitable openings into the interior of this worm. At the upper end of the retort the worm shaft passes through a stuffing-box, then through the driving gear that actuates the worm, and its end is finally connected to a piping system in which a vacuum of approximately 24 in. is maintained.

Everyone knows that the less pressure maintained on water the lower is the boiling point. The same rule appears to apply to coal; or, in other words, the higher the vacuum that is maintained in the coking chamber the lower will be the temperature that will induce complete carbonization. In the G-L process, which is closely analogous to boiling in a vacuum, the gases, oils and



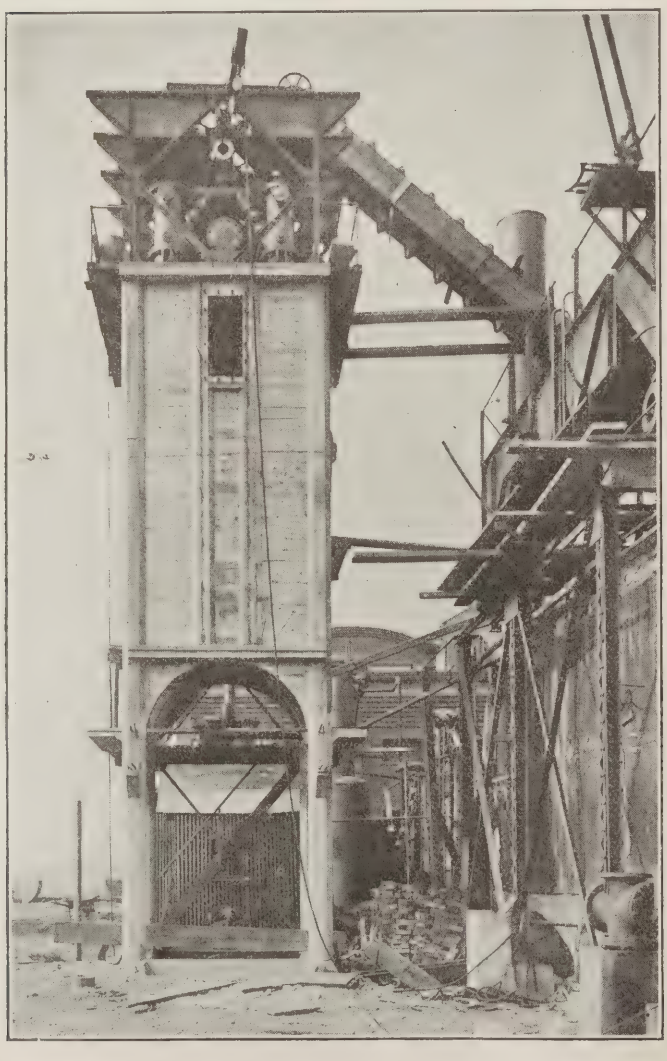
CRUSHING AND CHARGING PLANT, AND GROUP OF RETORTS

tars are liberated from the coal at a comparatively low temperature, the maximum within the retort seldom if ever exceeding 1200 deg. F. The oils are thus expelled as vapors without being broken down by heat into gases. Escaping as vapors they are readily condensible into liquid oils after their removal from the retort.

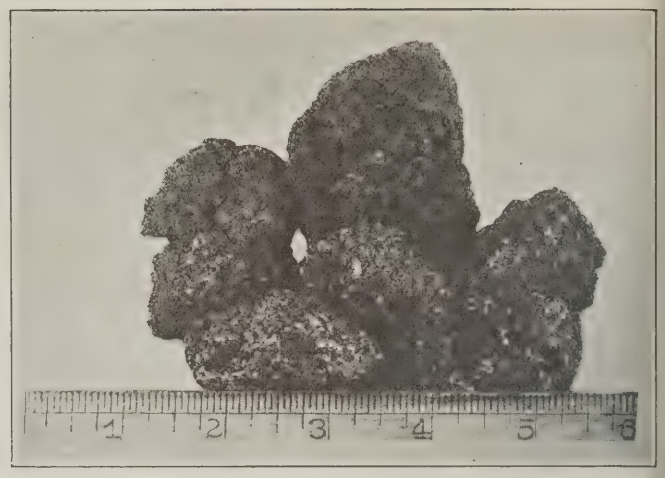
The gas evolved in this process amounts to about 4000 to 6000 cu.ft. per ton of coal treated. Approximately half of this is consumed in coking, leaving from 2000 to 3000 cu.ft. as an excess. This is high in calorific value, running about 700 B.t.u. per cubic foot.

The ammonium sulphate resulting from this process amounts to about 20 lb. per ton of coal treated. The amount of liquids extracted varies considerably with the kind of coal, a fair average for Colorado or Rocky Mountain varieties will show a yield of: Light oils, 3 gal.; carbolic oils, 6 gal.; creosote oils, 12 gal. Runs recently made at the Denver plant showed that 77 per cent. of the oils given off were what are termed aromatics—that is, they volatilize easily—while the creosote obtained was equal in quality to that secured from pine or pine tar.

This process of coking is continuous, with never more than 250 lb. of coal in any one retort at any one time. The capacity of each retort is about 25 tons of coal per 24-hour day, or 100 tons each 24 hours from each unit or battery of four retorts. The speed of the treatment is adjustable within limits permitting of a variation in the length of time that the coal within the retort is



SIDE VIEW OF A RETORT UNIT



DOMESTIC COKE MADE FROM LIGNITE

subjected to the action of the heat from without. The quality of the coke—that is, its volatile content—may thus be governed as requirements may dictate. It is thus possible to make either a metallurgical coke containing 2 per cent. volatile or a high-grade domestic fuel, one that is comparable to and that will behave almost exactly like anthracite, containing 10 per cent. volatile matter. The domestic fuel made by this process is of course lighter, volume for volume, than is anthracite coal. It ignites much more readily. Chemically the fuels are almost identical, and their actions in furnace or stove are exactly similar except that this fuel yields a fire somewhat more flexible—that is, one that will respond more quickly to a variation in drafting. Fuel of this kind made from western coals burns to a fine powdery white ash without the least suggestion of clinkering.

The cost of carbonizing by this process including labor, fixed charges, supplies, etc., is said to be about 50c. per ton of coal treated. The present market value of the products, considering the fuel as being worth $8 per ton and neglecting entirely the excess gas, but including oils, creosotes, ammonium sulphate, etc., is placed at $17.65 per ton of coal treated. The treatment thus reveals decided possibilities.

The installation at Denver, built originally as an experimental plant, has been in commercial operation for several months. Coals (carloads or more) have been tested from Utah, Wyoming, Colorado, Texas, Illinois and Ohio, while small samples from many other localities have been tried out in the laboratory. Oil shales have also been treated, showing results similar to those obtained from coal—that is, the recovery of high percentages of aromatic oils, or unsaturated hydrocarbons. No residual fuel is made from shale, however, the revenue from this treatment beginning and ending with the byproducts.

IT WAS LEARNED, during the construction of concrete ships, that hammering on the forms (by a mechanically operated hammer) produced a vibration which greatly assisted in settling the concrete and completely filling the forms. There is a tendency to use too wet a mixture when it is desired to have a concrete which will completely fill all space in forms, especially around steel reinforcing. Intelligently used, hammering on forms accomplishes the work of tamping with a concrete by no means wet and does the work better. However, concrete beginning to set should never be vibrated; also care should be used not to displace forms. It would seem that this method could be advantageously used in various kinds of concrete work.

Mental Equipment

WHEN considering the problem of new equipment, it is well to bear in mind that the mental equipment of an organization may also be studied with profit. In order to appreciate and desire new apparatus, it is obvious that the buyer must be mentally prepared with a vision and judgment sufficiently advanced to be in position to recognize the possibilities derivable from a change in a certain method of production. If a buyer is nonprogressive in ability, initiative and imagination, he naturally will be likewise in adopting new appliances for his plant. And it is just because there are so many people whose mental equipment disqualifies them from advancing beyond their present type of machinery that salesmen and sales literature must continually hammer at and besiege them.

Buyers as a rule have to be prevailed upon to install new equipment. This process is like hitching the wagon before the horse. The natural and Utopian way, of course, is no other than that of every buyer eagerly adopting on the moment the latest and most improved type of equipment in his line. This is as it should and would be were it not that the mental equipment of the buying public lags behind like a stubborn mule, and in turn places a checkrein upon inventive genius. Mechanical equipment is limited by the mental equipment of the prospective user.

The bituminous coal industry is a rich field for men who possess a mental equipment that is not content with merely keeping pace with competitors. Coal mining is influenced so widely by geographical and local conditions that the proper equipping of a mine is an individual problem and not a matter of duplication. Devices that may show excellent results in one mine may prove a disastrous experiment in another. Invariably the mechanical equipment is blamed in these instances, whereas it is the mental attitude of the purchaser that is at fault. Such mistakes could be avoided if buyers would familiarize themselves with the growth of improvements.

Necessarily this will not mean the adoption of every piece of new machinery placed upon the market. On the contrary, it will assist in an efficient selection of the practical from the chaff, and particularly in choosing new equipment that will be compatible with the physical conditions of any one mine. Mental equipment is as much a matter of knowing what new appliances to reject as what to buy. Not only this, but in order to be really efficient it should anticipate and demand better equipment, and not be satisfied to adopt new mechanical devices until after their worth has been fully proved by universal acceptance.

This kind of mental equipment is rare and invaluable, although there is no real reason why it should be unusual. Just as the progressive man, in order to keep abreast of the times, scans the daily newspapers for the latest news, so is it necessary that the trade papers be reviewed by the buyer if he wishes to keep in the foreground of his profession. The contents and advertising of the trade journals are the common meeting ground of the buyer and seller, and as such demand more than cursory attention. They supply and stimulate interest and investigation. Real information always has to be sought, seldom, if ever, coming via a golden spoon.

To be taken in conjunction with information—and quite as important—is the buyer's ability to use his imagination. Modern business has not yet fully recognized the great value of this ability, the faculty of looking ahead for any length of time. This is the privilege of individuals in planning their careers. Once in a great while, however, a man with imagination comes to the top in a large organization, and if he is not curbed, imbues and directs the business in such a spirit. To secure such mental equipment for an organization is as important as a careful consideration of the mechanical equipment. Neglecting the human element is a short-sighted policy.

Finishing the Job

In thinking of reasons for subscribing to the Victory Liberty Loan, let Americans who remained at home consider the case of Sergeant Burr.

He went out into the open, a slip of a lad, just elevated to his sergeantcy, on a hurry order to take his patrol inside the German line, and establish communications preparatory to the attack. And, finally, his voice came in youthful treble over the wire to headquarters.

In quick, jerky sentences he outlined his location, the lay of the land, the number of machine guns—eighteen—bristling directly ahead, and then he was ordered to leave one man at the post, and to seek cover.

After a long wait the same voice came trailing in over the hidden wire;

"Sergeant Burr speaking, Sir——."

"That kid again!" muttered the officer, and, aloud; "What's keeping you? You were ordered to get to cover and leave the wire in charge of ———.

"Yes, sir," interrupted Sergeant Burr, "I couldn't think of ordering any of my men to stay in such a place. I'm staying myself!"

Thus, out there under the French sky, Sergeant Burr of the A. E. F. carried on—in range of a dozen and a half machine guns, on a shell-swept terrain. He guards a bridgehead on the Rhine border today, the Distinguished Service Cross upon his heart.

Sergeant Burr is finishing his job! It is a very splendid and gallant way of finishing it. For his fellow citizens the obligation to finish the job must certainly be as binding! Our Victory Notes will make us all feel a little more qualified to welcome back the Sergeant Burrs of the American Army.

Steel Mine Ties

By R. B. Woodworth
Pittsburgh, Penn.

A SHORT time after it had been proved conclusively that steel was the most practical form of mine timbering, the use of steel for mine ties rapidly developed. During the years 1909 to 1917, the Carnegie Steel Co. sold 317,174 tons of steel cross ties, a large percentage of which were used in mines.

The steel tie is no longer an experiment. The success attending its use has established its superiority over the wooden tie. During the last few years their output has been restricted because of the difficulty of securing the steel, but a more normal stage is approaching, an age when steel will be plentiful and an age of reconstruction, when only the best equipped collieries can compete for the world trade demanding American coal.

The fundamental considerations on which the advantages of the steel tie over those of wood rest are the following:

1. *Headroom*---One of the most important features of the steel tie is the headroom gained through its use. These ties are only ½ in. in thickness, representing a gain of 2½ in. over the wooden tie. They are especially adapted for low beds of coal, permitting larger cars and

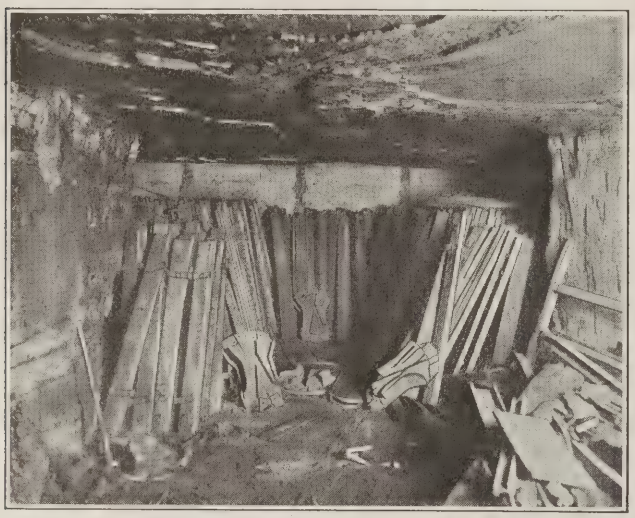


FIG. 1. UNDERGROUND STOREROOM FOR STEEL TIES

heavier topping. No excavations are needed to lay the ties, and they can be spaced much farther apart as their shallow depth permits the track to rest on the ground. They are so light and compact that great numbers can be stored in a small space. Fig. 1 shows one of the stockrooms of the Majestic Coal and Coke Co., Duquoin, Ill., where hundreds of Carnegie steel mine ties are stored ready for instant use.

The following is an extract from a paper entitled "War Economies," by George B. Pryde, general superintendent of the Union Pacific Coal Co., read before the Rocky Mountain Coal Mining Institute at Colorado Springs, Sept. 5, 1918:

> The use of steel ties has been experimented with to some extent for several years, and these experiments have reached the stage where their use is recommended, especially in low seams. They are particularly adapted for this kind of work, for they provide a good rigid track and give greater headroom than the ordinary wooden tie, thus cutting down the taking up of bottom to provide sufficient

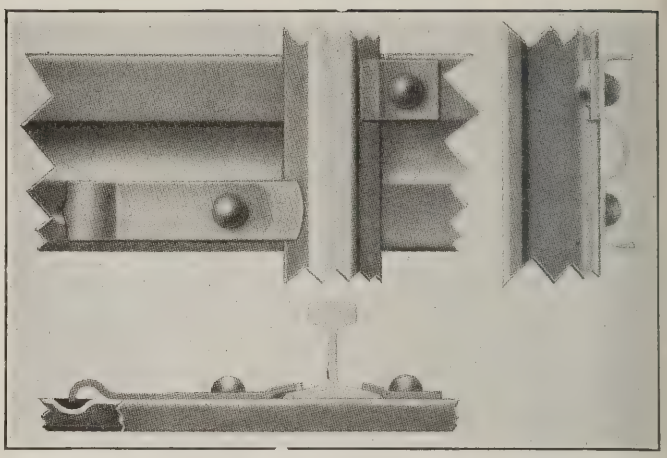


FIG. 2. TIE FOR GATHERING TRACKS IN MINES

height for haulage purposes. They are easily and quickly laid, and while they cost more than the wooden tie their longer life and adaptability as a labor saver recommend their more general use in mining low seams of coal.

2. *Endurance*—In mining it is frequently necessary that the track be exposed to excessive moisture, and that it be moved frequently. These have resulted in one of the most important advantages of the steel tie. The life of a wood tie under these conditions is short at best. Even when specially treated such ties can seldom be moved more than twice. On the other hand, steel ties under the same conditions give many times the service rendered by wood ties and can be moved repeatedly and easily. A few complaints have been made of their rapid corrosion when placed on damp floors, but this seems in no way to shorten their service. However, it can be easily overcome by a treatment in coal tar or asphaltum. Furthermore, when a sufficient quantity of such ties are desired, steel can be furnished with a certain admixture or alloy of copper, which has the effect of making the steel noncorrosive.

3. *Fire Risk*—The presence of wood in the mine always increases the possibility of fire and is a continual menace both to life and property. We can easily recall

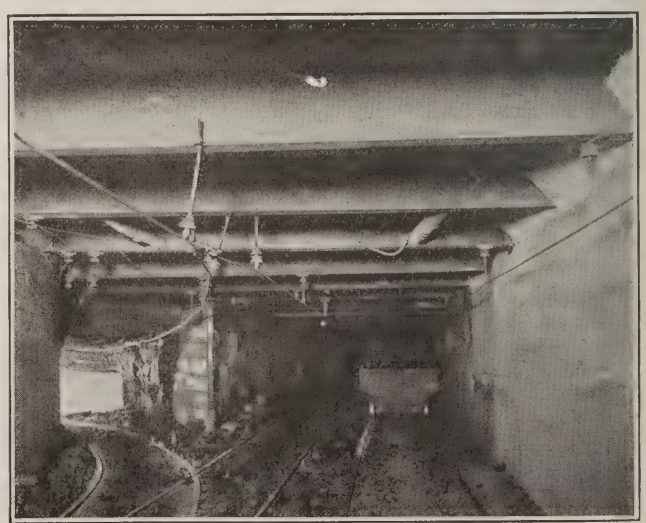


FIG. 3. STEEL CROSS TIES ARE REPLACING WOOD TIES IN THIS ENTRY

disastrous fires and the great toll of life taken thereby which would not have occurred had it not been for the large amount of combustible material present. The use of steel within the mines is fire insurance—an elimination of fire risk. Why should we not have fireproof construction below ground as well as above?

4. *Scrap Value*—At the end of their period of usefulness steel mine ties have a scrap value of approximately one-third their original cost. Wood after a short period of service in the mines has no value whatever, but becomes a continual menace to life and property. The first cost of steel is a trifle more than that of wood, but its longer and better service and its scrap value make it the more economical.

5. *Simplicity*—The design of steel mine ties is simple. The Carnegie steel mine tie, one type of which is shown in Fig. 2, is so constructed that one blow of the hammer firmly and rigidly holds the rail in place, and accurately to gage, preventing derailments and saving time. There are no loose bolts or fastenings, nothing to get lost, as these are part of the tie. One simple turn of the attached clip is all that is necessary. This



FIG. 4. SHAFT BOTTOM LAID WITH STEEL TIES

simplicity of construction and lightness make the use of steel ties a great economy in time, money and labor.

Considering the lateness of the use of steel cross ties for mining operations their utilization is widespread. The Union Pacific Coal Co. has installed steel mine ties in its mines located at Reliance, Superior, Hanna, Rock Springs and Cumberland, Wyo. They doubtless have had much to do with increasing the output of these mines, the total yearly production of which amounts to 3,600,000 tons of bituminous coal.

In Mine No. 9 of the Old Ben Coal Corporation at West Frankfort, Ill., both steel mine ties and steel timbers have been installed. As the average thickness of the bed is 8 ft. 6 in. these ties and timbers were not installed for the purpose of gaining headroom but because they have been demonstrated to be economical in every respect. The daily capacity of this mine averages 4500 to 5000 tons. This represents quite an increase over the output when wooden ties and timbers were employed.

Fig. 3 shows the main entry of Mine No. 9. About 1600 ft. of this entry has been timbered with steel I-beams resting on concrete walls. The roof has been lagged with wood. Steel cross ties are replacing the wood ties in the track. About four steel ties are now



FIG. 5. LOOKING TOWARD MAIN SHAFT IN ILLINOIS MINE

used per rail, and as the wooden ones decay they will gradually be replaced by steel.

Fig. 4 shows the shaft bottom of the south entry of this same mine. The shaft bottom is a highly strategic point at a high-production plant. Through it passes the tonnage of the mine. The capacity of the shaft is greatly increased by the facilities at and around the bottom itself. Conditions here have been wonderfully improved by the use of steel—a middle line of props has been eliminated by the use of steel timbers and much headroom is saved by steel ties, thus permitting larger cars with heavy loads.

The mine of the Majestic Coal and Coke Co., at Duquoin, Ill., is shown in Fig. 5, looking toward the main shaft. About 800 ft., of the entry is timbered with steel and the track is laid partly with steel and partly with wooden ties. Fig. 6 is a good illustration of the use of cross ties in low beds of coal. Their many advantages are obvious. The photograph was taken in the Wenonah mine of the Turkey Gap Coal and Coke Co., Wenonah, W. Va., where steel cross ties are used extensively. This company also uses the steel cross ties in its Modoc mine at Springton, W. Va. The Pocahontas Fuel Co., Inc., is using steel cross ties in the Jenkinjones mine, at Jenkinjones, W. Va., and in the Boissevain mine, Boissevain, Virginia.

In the 1918 mining catalog published by the Consolidated Keystone Publishing Co., Inc., page 466, is shown a comparison of installation and maintenance



FIG. 6. SHOWS USE OF CROSS TIES IN LOW BEDS

costs between wood ties and steel ties for room work in mines. The following is a summary:

Based on rooms 280 ft. long with steel ties spaced 4 ft. center to center and wood ties 2 ft. center to center, this estimate contemplates using each wood tie in two consecutive rooms and after the second year renewing annually 15 per cent. of steel ties, or ten new ties per year per room. The total cost at the end of life of first room for steel is $22.40; for wood, $19.60. The total cost at the end of life of second room for steel is $24.50; for wood, $28., or a saving of $3.50 when steel was used. The total cost at the end of life of third room for steel, $29; for wood, $47.60, or a saving of $18.60 in favor of steel. The total cost at the end of life of fourth room for steel, $33.50; for wood, $56, or a saving per room in favor of steel ties of $22.50.

The miners themselves prefer the steel ties because they entail much less work. If given their choice they will take steel any time. By using wood they are decreasing their production, as the time and labor involved in laying wooden ties is greater. Wood is becoming more and more difficult to secure, and the large sales and widespread adoption of steel ties are proving their utility.

Back Up Efficient Coal-Mining Apparatus with Efficient Office Equipment

By G. W. Laine, Jr.
New York City

After several years of intense wartime activity, a breathing spell is being experienced. This gives opportunity for a comparison of operation, under the pressing conditions of the past, with standard economical practice and the adjustment of certain factors that will lead to more efficient methods for the future.

It is highly essential for everyone interested in economical production and operation to study past conditions, for unless the lessons of the past are used as stepping stones, the pressure of competition and unforeseen circumstances ahead will be likely to cause difficulties.

During the pressure of war and the accompanying high prices, it was possible for many inefficient systems to be used without serious losses; but with readjustment there must be investigation of every means at our disposal that will promote economy of operation.

Many large concerns are reorganizing their departments, giving particular attention to their accounting work and making studies with the view of installing those mechanical aids best suited to such work. Not only is it necessary that consideration be given to efficient accounting equipment, but it is now realized by many that there is to be a more serious shortage of labor than was anticipated.

Unless the equipment for calculating and preparing data necessary to the operation of mines and other industries is secured, difficulty will be experienced in getting promptly, in suitable form, the vital facts essential to the maintenance and operation of a successful plant.

It is well that improved mine equipment is being studied at this time with a view to securing the most up-to-date devices and methods. Whatever equipment is considered, whatever is found to be most applicable, and whatever is adopted, there is all the more reason that the efficiency of operation, that the economy of mechanical appliances, should continue into the office where facts are compiled, where the records are kept and where the information necessary to the welfare of the whole organization is at hand for those who administer the affairs.

The efficiency of office equipment affects that of all other equipment. Machines may do good work in the mine, power distribution may be of the best, but unless the calculation of costs is efficient, the economy is not complete. Economy of operation also means economy in office methods. The days of paper and pencil for handling the "figure work" of the mill, the mine or the office are passed, and today machines are assuming part or all of the burden.

A careful investigation should be made of equipment of this kind, for when there are machines for adding and listing, machines for adding and upon which other calculations can also be performed, and also calculating machines which handle multiplication and division as easily as addition, and upon which subtraction can be performed directly, it is desirable to obtain the instrument that fills the need most completely.

The difference between the old methods of figuring and the modern calculating machines is so great that many opportunities where the old methods are employed exist for waste. Even the difference between machines is sufficient to cause enough loss to be appreciable.

No machine for handling figures is properly a calculating machine unless it will multiply, divide and subtract as readily and directly as it will add. These features are all available in the Monroe calculating machine, which has many advantages in the preparation of the intricate data involved in coal-mine accounting.

Considering only the cost report required of bituminous coal production by the Federal Trade Commission, so extensive is the work involved in computing the data required in the different subdivisions of the report, such as mining, ventilation, drainage, stripping, haulage, power, overhead, general expense, besides the various accounts and the cost figures which are necessary in the management of mines, that a considerable force must be maintained to handle this work. Intricate calculations are also necessary in the engineering department. Here the adding feature of calculating machines plays a much less important part, but the ability of a machine to extract square and cube roots is of great assistance.

It is remarkable the savings that may be accomplished by even one machine of this kind, and many concerns are adopting them in all departments because of their adaptability to all kinds of calculations. Some concerns

with this machine have reduced to hours work which formerly required days to perform. One which I have in mind, by using the Monroe 45 min. every morning, was able to prepare reports daily which formerly could not be pepared at greater frequency than once a week, but which were necessary to the quality of the product and were desired as often as possible.

One of the coal operators in western Pennsylvania says of the machines used in its offices, that "without a doubt the little machine is a valuable asset in any line where accurate figures are required; but on the A-1 sheets direct from the mine, where the tonnage is figured both gross and net, from pounds through the proper channels to final invoice totals, it is indispensable. Especially is this true since the Government requirements are so strict in regard to commissions and specific prices. Again, on the cost sheet—the most vital and necessary organ between mine and head office, and no doubt the most dreaded work of the payroll clerk, where the itemized distribution of cost is averaged to a final total—its accuracy and rapidity has cut the work more than 50 per cent. and pulled the thorn from previously abhorred and ofttimes neglected labor."

Just how these machines handle calculations will be interesting when such devices are being considered on their merits for handling the burden of figures. Perhaps the greatest saving is due to the absolute accuracy of the machine and the fact that because of a visible check it is not necessary to repeat any operation in order to have a positive proof of accuracy. There are only three simple parts to be considered in the operation of the Monroe machine. These consist of the keyboard and two dials; the upper dial having a capacity of 8 figures and the lower dial with 16 figures.

In a simple problem of multiplication, the figure to be multiplied is placed on the keyboard, where it remains until the work is finished. The number by which this is multiplied is turned into the upper dial by means of an operating crank at the side of the machine. This is easily turned and registers the figures of the multiplier in the upper dial. Simultaneously with the registration of the figure in the upper dial, the result of the multiplication of the factor on the keyboard by the number on the upper dial appears on the lower dial. The visibility of the three factors on the machine is sufficient proof that the result on the lower dial is correct.

The comparison might be made that writing the figure on the keyboard by depressing the keys requires approximately the same or less time than writing the number on paper. Writing the multiplier on the upper dial by turning the operating crank is approximately the same as writing the multiplier on paper. With paper and pencil, we are only ready to start multiplication, with the machine the result has already appeared on the lower dial.

Work involving the multiplication of large numbers, such for instance as those of six or seven digits, by numbers of six digits, which would require approximately 6 min. by paper and pencil without any assurance of accuracy—that is, multiplied but not checked—would require only about 45 sec. with this machine, and the machine results would be correct. This is a saving of over 88 per cent. in time, and if the comparison were made with pencil and paper work, including the time for verification, nearly 100 per cent. of the time would be saved.

To make a comparison in a different way, it might be stated with absolute veracity that the multiplication of seven digits by six digits would require ninety times as long by paper and pencil as with this machine, and we would not be sure of our results if accomplished by the long way.

Simplicity and accuracy are not the only features which make this device an economical factor in business arithmetic. The flexibility of the machine makes possible the continued multiplication of one factor by several others with much fewer operations than would be required for separate multiplications. If we have one number to be multiplied by several others, as would be the case in the distribution of a given amount over several accounts, according to percentages, we would set the constant factor, or the number to be multiplied, on the keyboard and turn the first multiplier into the upper dial. The product appears on the lower dial.

Now, in multiplying by the second number it is only necessary to change the number on the upper dial from the first multiplier to the second multiplier, and the result is changed accordingly. The number on the upper dial is changed from one number to another by forward or reverse rotation of the operating crank in the proper position; for example, if a number on the upper dial was 23 and we desired to multiply by 52, we would make one reverse turn of the crank in the units position, which would change the 3 to a 2, and then shift to the 10's position, and by three forward turns of the crank change the 2 to 5. We would then have the result on the lower dial as the product of the number on the keyboard by the number on the upper dial.

Results Can Be Determined Rapidly

In this way, no matter how many multiplications are to be performed of a given number by others, the results can be determined rapidly. It will readily be seen that in work of this kind a much larger percentage of the time can be saved than even in the case of multiplications, where different numbers are involved.

Addition is a simple process. The numbers to be added are set on the keyboard, and by a forward turn of the crank the number is added to that appearing on the lower dial, the keyboard being cleared with each stroke of the crank and made ready for the set-up of the next number.

Subtraction is equally as simple. The first number is turned into the lower dial by a forward turn of the crank, and the number to be subtracted is set on the keyboard and deducted from the figure in the lower dial by a reverse turn of the crank. It will be noticed that no mental work, whatever, is involved in these computations—it being merely necessary to place the figures on the keyboard and add them to those in the lower dial by a forward turn or subtract them by a reverse turn.

As division is merely a series of subtractions of the divisor or multiple of the divisor from the dividend or number to be divided, the process on this machine is no more complicated than any of the other operations. Reverse turns of the operating crank register red figures on the upper dial of the machine. Division is performed by turning the number to be divided into the lower dial and then setting the divisor on the keyboard. There are no complicated rules to learn, for the work is done in the same sequence as with paper and pencil.

Arithmetic as found in business, regardless of whether it is concerned with extending invoices, figur-

ing analyses of products, computing costs or solving complicated formulas involving square or cube roots, is after all only a combination of four simple processes —addition, subtraction, multiplication and division. The machine which will do these four things and save from 60 to 95 per cent. of the time and effort required by the usual processes is a benefactor to the cause of economy.

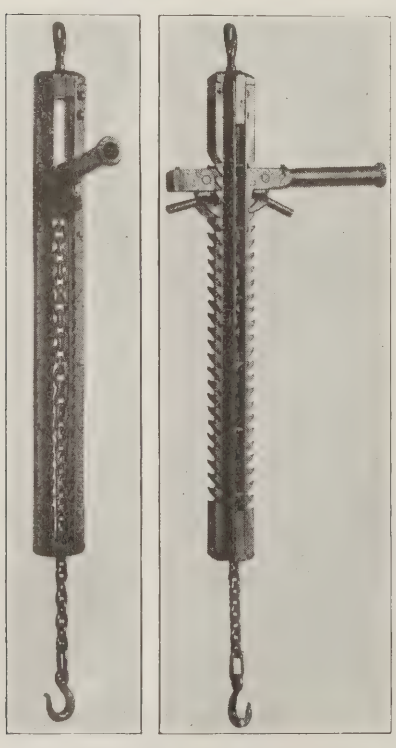
Because of the direct operating feature, the two-way mechanism, making possible addition and subtraction by simple forward or reverse turns of the crank, may be decidedly curtailed. For example, if it was desired to multiply by 98 it would only be necessary to multiply by 100, by a forward turn of the crank in the 100's position and two reverse turns of the crank in the units position; or in other words, to add the number 100 times and to subtract it twice.

No difficulty is experienced in understanding any of the operations or "shortcuts" on this machine, and anyone can operate it after a few minutes' instruction. This is a feature which should also be considered when investigating calculating-machine equipment, for if an experienced operator is necessary, much depends on the capability of the operator and also on his attention and goodwill.

The last, but one of the most important factors governing the selection of equipment to facilitate economical operation, should be its durability, the repairs which may be necessary and the costs and delays incidental to any trouble which may develop. The construction of the Monroe and the service departments available without charge to the user are in keeping with the standards of the organization of its manufacturer.

Universal Lifting and Pulling Jack

The Elk Engineering Works, of St. Mary's Penn., is placing on the market what it has termed the "Universal lifting and pulling jack." This is shown in the accompanying illustration. The body of the device is built of steel angles with malleable iron end pieces. The hook at the upper end is drop-forged. The chain travel is equal to 3 ft., and a movement of the lever either up or down causes a pulling action on the chain. There are no gears or attachments, and the entire device weighs 70 lb. It is well adapted for moving mine timber or for other work where a powerful pulling or lifting apparatus is desired. Its simplicity and ease of operation will appeal to mining men.

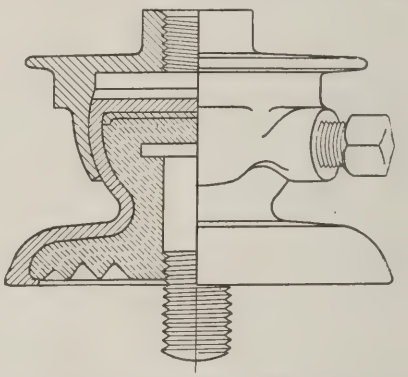


POWERFUL PULLING JACK

New Hanger Aligns and Plumbs Trolley Wire

Every man who has strung trolley wire in a mine knows the difficulty of keeping the trolley wire free from kinks at every suspension point. The Ohio Brass Co. has now produced a trolley hanger (Types SH and SK) which overcomes this difficulty.

The insulating member of the Type S hanger has a half ball top over which is clinched the socket casting. Although the two pieces cannot become separated the lower half of the hanger is free to turn or be tilted in any direction after the hanger has been attached to the roof or timber.



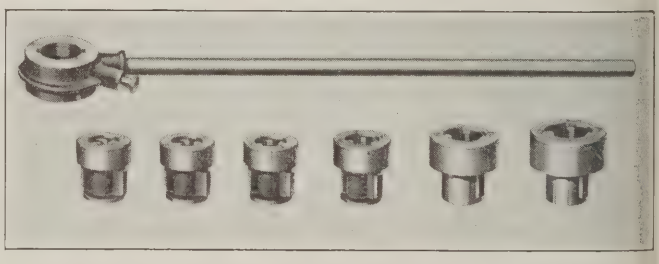
THIS HANGER KEEPS WIRE FREE FROM KINKS

With the set screw loose, the hanger is screwed on the expansion bolt or lagged to the timber. The clamp is then tightened on wire and hanger. The lower part of the hanger is twisted and rotated until the wire is true and straight. Each of the three set screws is turned up, which makes a rigid unit of the suspension.

Types SH and SK are identical in principle. The SH is designed for lagging to timber, while the SK is screwed onto an expansion bolt driven into the roof.

New Ratchet Pipe Threader

The Borden Co., of Warren, Ohio, has placed on the market a new pipe-threading tool known as the No. 3 Beaver, Jr. This is a ratchet tool with various sizes of cutting heads, these heads being made for pipe from $\frac{1}{8}$ to 1 in. in diameter. The ratcheting feature of this tool is one of importance. It permits the threading of pipe in places that would otherwise be inaccessible, such as in narrow trenches or ditches, between the studding or rafters of buildings, or in cramped quarters generally. Of course, the ratchet does not prevent the tool from being used like an ordinary pipe threader at the bench vise. Even here the ratcheting device has its advantages, since it permits the operator to move the lever through the arc that is most convenient.



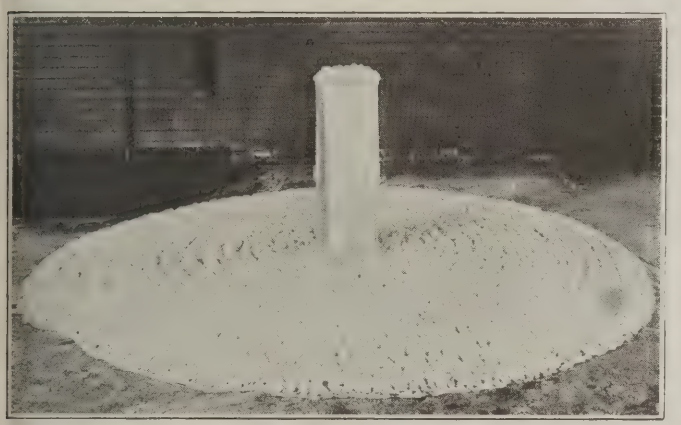
RATCHET TOOL WITH VARIOUS SIZES OF CUTTERS

Firefoam Extinguishers

The ordinary means of extinguishing a fire is to isolate it from its supply of oxygen or cool the fuel below the combustion temperature. As a general rule this isolation or cooling is accomplished by a coating of water. When water is thrown upon a fire it forms a thin film over the surface of combustible material, excluding the atmospheric oxygen. This cools and extinguishes the fire. A similar result may be accomplished by an inert gas—that is, one that will not support combustion—such as carbon dioxide.

One of the chief difficulties experienced with the ordinary so-called chemical extinguisher is that the gas evolved, although heavier than air, is soon dissipated either by diffusion, by air currents or both. The full quenching effect of the nonsupporter of combustion is thus either lost or is at best only temporary.

In order to overcome this difficulty the Foamite Firefoam Co. has developed and placed upon the market an extinguisher that in outward appearance is similar to ordinary chemical extiguishers, but which possesses different qualities when in action. The chemicals employed in this device generate roughly eight times their volume of carbon dioxide gas and imprison this gas





THE FIRE-SMOTHERING "PANCAKE" THAT RESULTS WHEN THE CHEMICALS ARE MIXED IN AN OPEN CONTAINER, AND A STAIRCASE THAT WAS SAVED FROM FIRE BY AN APPLICATION OF THE MIXTURE

within a vast number of minute bubbles. The nonsupporter of combustion is thus confined in a thick blanket of lather tough enough to last for several hours, and one that will adhere tenaciously to any surface that it strikes.

The two liquids employed are held in separate compartments of the container and are not mingled until ejected from the nozzle of the hose. Once mingled they promptly react upon each other, forming carbon dioxide. One of the illustrations shows the effect of mixing the chemicals in a can and allowing the resulting spume to run over the top. A "pancake" of fire-smothering carbon-dioxide lather is the result.

Another illustration shows a stairway that was drenched with gasoline. This was then set on fire and extinguished with one of these extinguishers. The resultant fire-smothering blanket may plainly be seen coating the surfaces of the stairway and brick wall back of it.

This coating, as has been said, is sufficiently tenacious to remain in place for a long time. If it is desired to remove it from the surfaces coated before it is dry, this may be done by sweeping or by shoveling if the thickness is great enough to warrant this method. It eventually dries to a fine white powder that may be readily swept from building surfaces with a broom or brushed from clothing with an ordinary clothes brush.

This fire-fighting apparatus is now manufactured in sizes ranging from a 3-gal. fire pail and a 2½-gal. hand extinguisher up to 500 and 800 gal. engines mounted on wheels, skids or trucks. Special apparatus or engines of special design or size may also be built. This means of fire protection possesses one peculiar advantage—it may be rated and installed upon a strictly scientific or engineering basis. If a given surface area is to be protected the amount of chemicals necessary therefor may be calculated with exactitude.

This method of arresting combustion, although applicable to any fire, is particularly effective in combating fires in oil tanks, reservoirs or storage places where water (on account of its greater specific gravity) would be useless. Some of the largest of oil tank fires have been promptly extinguished by this means.

For work inside the mine it seems to possess great possibilities, in that the extinguishing gases are permanently held in the retaining bubble blanket and cannot readily diffuse and foul the air.

Increasing Use of Gate Valves

Gate valves are finding increasing favor among mining men, and for certain classes of work are taking the place formerly held by globe valves entirely. For water lines they give a quick, sure opening which is not so likely to clog as is the case when the globe valve seat is to be passed. For slushing work where the water is of high acid strength, an iron body valve, extra heavy type, with brass gate is used. On breaker, shaker and loading gallery lines a wood-lined iron body gate valve of special design, the patent of Isaac Beaver, is giving long-time service. Some foremen are inclined to use gate valves for steam lines also, but the number thus employed is small. The "ground seat" valves still have the preference for this kind of work at present.



Overstocked Condition of Coal Market Does Not Make for Maximum Output

Stocks of bituminous coal, as displayed by the survey recently completed by the Fuel Administration, and which is given on page 839 of this issue, are larger than was generally supposed, and it is the opinion of officials having to do with coal that no important increase in production will take place before August. Even then it is predicted that production will climb only slowly. The stimulation to production which usually comes in August is due to a considerable extent to the fact that the Lakes are in a position to handle maximum tonnage. Owing to the large stocks in the Northwest, it is anticipated that this stimulation to increased output will not be so great this year as has been the case formerly.

Rumors of contracts being made at low prices continue to reach Washington, but the unsettling effect of such rumors are expected to be discounted to a considerable extent by the publicity which now is to be given contracts for railroad fuel. At the request of J. D. A. Morrow, general secretary of the National Coal Association, the Director General of Railroads has sent out instructions that the publicity is to cover current orders as well as contracts.

Whether the situation is to be aided by the Industrial Board of the Department of Commerce probably will be decided in the near future. Secretary Redfield has put the issue squarely up to Director General Hines and has indicated that the board will be dissolved at once if Mr. Hines will not give it his support.

In a report on the business situation issued by the Committee on Statistics and Standards of the Chamber of Commerce of the United States, the following reference is made to coal:

"There has been a failing off in the demand for coal and a consequent decrease in production. Last fall bituminous coal was produced at the rate of twelve million tons per month. Today it is seven million tons. The mild weather and early spring also were factors in decreased demand. Mines are running from three to four days a week.

In normal times there is always a slackening in demand but during the war production was at the maximum all the time and the present slackening is more in evidence than normally. Prices have not varied since the restrictions were removed. High grades have increased slightly and low grades have fallen off. The coal operators have shown reluctance to reduce prices. There is a heavy export demand but ships cannot be had to move coal wanted abroad. Production of anthracite coal is about normal."

Railroad Administration To Take Over Coal Traffic Bureaus

It now is practically certain that the Illinois-Indiana and Ohio coal traffic bureaus will be taken over by the Railroad Administration. These bureaus formerly were conducted by the railroads to gather coal statistics and were turned over to the Fuel Administration. The Fuel Administration soon will be a thing of the past, and some apprehension has been felt as to the future of these bureaus. It is understood, however, that the Railroad Administration has been impressed with their value and that they will be permitted to go ahead with their work without any interruption.

Coming Annual Convention of National Coal Association

Every effort is being made by the National Coal Association to make its annual convention of more than average service to the coal operators of the country. The meeting is to be held in Chicago, May 21, 22 and 23. Since there is an unusual number of uncertainties besetting the coal trade at this time, it is believed the exchange of ideas at this meeting will be of more than ordinary value. Work on the program has not been completed, but Dr. H. A. Garfield, the Federal Fuel Administrator, and other prominent figures having to do with the coal industry will be heard.

Several important amendments to the Association's charter will be voted upon. Officers and members of the board of directors will be chosen for next year. The members of the board will recommend that J. D. A. Morrow, now the general secretary of the Association, be made a vice president. Mr. Morrow will continue to direct the activities of the Association. Since his duties largely are executive, and not secretarial, it is the idea of the board of directors to authorize the selection of a secretary who can relieve Mr. Morrow of some of the secretarial details.

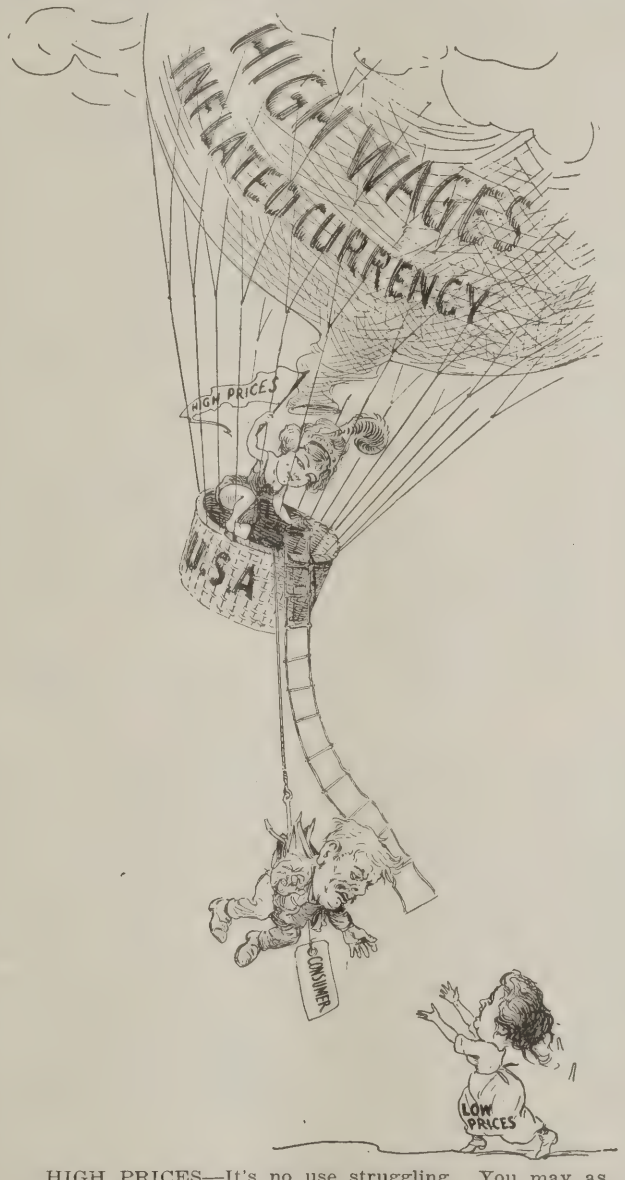
Advantage will be taken of the gathering of so many coal operators to demonstrate at the convention the details of the work of the open-price trade bureaus.

The coal division of the Geological Survey is much gratified as a result of the success of its plan wherein the local trade associations submit statistics. While the data from these sources are not so complete as are those furnished during the war by the district representatives of the Fuel Administration, it is certain that no other plan could be devised to secure such information without large appropriations being available.

EDITORIALS

At Least One Commodity Is Cheaper—Money

SPEAKING generally wages have not risen appreciably when measured in the goods for which wages are exchangeable. They cannot rise figured in goods, because there is only a certain amount of goods in the world to divide. The prices of any given goods have not increased much when measured in the commodities for which the goods in question may be exchanged. Some wages measured in goods are a little higher than they ought to be. Some prices measured by the prices of other goods would have to be lowered to produce perfect justice. But on the whole, goods are goods, and the price of all of them cannot be too high as measured in terms of one another. Wages are really nothing but goods; they can only be made high by a plethora of goods; they can only be made low by a scarcity of product. They are only high in comparison with money. We can always increase the quantity of money, and make wages and prices rise proportionately to the quantity of money in circulation. But the goods will only *appear* to be dearer and the wages will only *appear* to be higher. It is not dollars we work for; we labor for goods or for the power to buy goods when we will, and goods are none too plentiful just now. So high prices and high wages do not help or hinder us, unless the changes in price and wages are unequally distributed. That is usually the case when there is a readjustment of these items. Some persons profit and other persons suffer. The profiting of one and the losing of another, the bettering of John and the injuring of Jack, balance each other. The only safe bet is in large production. That is a joy that we can experience without having a headache in the morning.



HIGH PRICES—It's no use struggling. You may as well go up with the basket, for with high wages and inflated currency in the balloon it can't do otherwise than ascend.

They tell the story of a farmer who complained that he had been charged too much for a buggy. He had bought one some years before, and he remembered that it did not cost anything like as much as the new one. The hardware merchant looked up his old accounts and found that the farmer had not paid for the first buggy in money but in wheat. So he wrote to the farmer and told him he would refund him his money, let him keep the new buggy, deliver him a good piece of household furniture and a good kitchen stove if only the farmer would bring him as many bushels of wheat as he delivered to him for the first buggy. The buggy was cheap, not dear, as measured in commodities. Like the farmer we need to learn that prices are *not* high in commodity values while all commodities *are* high as compared with money. The unions and the Government printing presses of the world have made money low in commodity value. There is no hope that the prices in the United States will go down while the unions hold their own and the volume of currency remains unchanged or even increases (for bonds are still being sold) so what is the use of waiting for low prices? We shall see higher prices before very long.

Somehow the public believes itself independent of a little item like inflated currency. It is ready to believe that its own psychological condition, its own thoughts about the prospects of business cannot be changed; but it holds that the inflation of the currency can be overlooked if only one will squint really hard or hold a hand over one eye. The public is partly right, however. The inflation of the currency can be in a degree minimized. For instance, in India there has been at all times a wonderful absorption of silver money. The people make it into ornaments. In America there has been an influx of gold and an increase in credit instruments (as for instance Liberty Bonds). They don't depress the value of the dollar as much as they well might, having in consideration their overwhelming volume. The reason is because the people are not circulating either, as freely as they might, nor as freely as they will when prosperous times come, when every one will seek to make the most of coin and credit.

Low-Temperature Carbonization

WE PRINT on page 810 of this issue a description of the low-temperature coal-carbonization process employed by the Denver Coal Byproducts Co., of Denver, Colo. This process, known as the Greene-Laucks, or G-L, has, we are informed, attained no small measure of commercial success.

Coal Age holds no brief for the Greene-Laucks or any other coal-carbonizing process that was ever conceived or perfected. It would appear, however, that the time is now ripe to make all possible improvements in our methods of abstracting the benefits contained in nature's storehouse of energy. The farmer who under any but exceptional circumstances would feed unthreshed wheat into the furnace of his straw-burning boiler would rightly be considered foolish. Yet American industry annually feeds millions and hundreds of millions of tons of raw coal into its furnaces, fully aware meanwhile that this coal contains byproducts of much greater value than the heat liberated by its combustion.

This yearly waste is a sin rather of omission than of commission. In the past coal has been coal; it has meant to the public, at least, only heat and the comfort that may result from or be induced by it. The perfection and commercial application of some means for abstracting the valuable byproducts from raw coal before it is burned will be welcomed by heat-users generally. Especially will this be the case if the resulting solid fuel will be more efficient in use than the substance from which it is made.

The McGraw-Hill Co. is expressing its unqualified faith in the correctness of its prognostications that prices will increase or at least remain at the present level by adding a story to its present structure. It desires to complete the work before wages and prices are higher and before labor and materials are hard to obtain.

What Is Wrong with Anthracite Pea Coal?

PEA coal is a drug on the domestic market, and operators are realizing that the situation is fast becoming serious. All the other sizes of anthracite are absorbed as quickly as they are produced, with many orders for stove coal going unfilled, but pea coal continues to accumulate. Probably the lack of demand for this size is more troublesome to the independent operators, who because they have no storage facilities for the accommodation of their surplus output are confronted with heavy demurrage bills on the coal before it can be moved from the mines. As a result much of it is usually sold at a loss. Of course, it is possible for the larger companies to run their surplus into storage yards; but this proves to be an expensive proceeding, as the cost for the extra handling to and from the yard mounts up rapidly.

There are two main reasons for the existence of the present condition. First, the operators themselves have spoiled, if not ruined, the pea-coal market by shipping during the past two years a size that more nearly resembled buckwheat than pea. Of course, it may be said that during the war they were encouraged by the fuel authorities to increase the percentage of buckwheat, but now that the war is over the operators should at least size the coal on the pre-war basis. Dealers report that their trade will simply not have the coal in its present condition. The operators spent much time in building up a domestic trade on pea coal, as for many years it was considered nothing more than a steam size and was sold at a low price for that purpose. In order to take up the surplus production of this size a domestic trade was built up in the eastern market.

The second reason for the objections coming from consumers is that the difference in price between pea and nut, the next larger size, is so small that the consumer, from the standpoint of economy alone, is coming more and more to prefer the larger size.

The market is rapidly approaching a break on pea coal, and the dealers are holding off in the anticipation of being able to procure this coal for storage at a much lower price than now prevails. Inasmuch as the mines cannot operate without producing this size, it would seem that the wisest course for the operators to pursue would be to reduce the price of pea coal from $4.80 to, say, $4.20 per ton, which would establish a ratio of $2 between that size and nut coal, and thus make it more attractive to the consumer. We know that the operators have been viewing the pea-coal situation with much alarm, and it would not be at all surprising if some action were taken soon; but at the same time the operators should see to it that the old-time preparation, so far as size is concerned, is restored.

Price reductionists have delayed house construction so that it is doubtful whether this winter we will have shelter for the public and schools for our scholars. "He kept us out of excess prices" is a slogan like "He kept us out of war." We pay for it sooner or later. When we pay we pay double for the delay.

Were They Fools or Wise?

TOO MUCH has been said of the services of labor and capital during the World War. No sacrifice of effort and of resources can compare with the sacrifices—financial as well as personal—of those who fought for a dollar a day and, while risking their lives, also during the period of conflict, surrendered their chances to lay by a competence for old age and wedded responsibilities. Labor and capital have again an opportunity in the Fifth Loan to prove that the war in a degree was won not alone by the heroic soldiers, but by the provident sacrifice of those who stayed at home. By refusing to place on the altar a money sacrifice to meet the greater offering that our boys so unhesitatingly made, we are in effect saying that they were fools to surrender so much for liberty and justice.

A living wage cannot be guaranteed. One might as well determine arbitrarily how much an acre of ground should produce by inquiring how much the owner of the land needs to get from it in order to make a living. Given, however, efficiency of labor and capital and steady work, there is absolute assurance that a living wage and more than a living wage for every normal person can be obtained even without guarantees. What the worker really wants is not as much as will enable him to live, but as much as he can earn.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

In the anthracite region the old pressure to induce the mine workers to work on holidays and holy days is being resumed. Naturally the men resent it after a period of idleness and colliery closing. The operators will, of course, receive what blame is to be borne, though the really guilty party is the buyer of coal. He talked lower price and waited for it and at the last moment put in his orders.

He has a righteous indignation that the orders are not filled as soon as filed. He cannot see why he should pay the extra dime, seeing that his order was put in before the increased price went into effect. The very purpose of the differential is to spread buying and to promote a steadying of the labor demand. Why should he expect that a delayed order should be given the concession granted to one delivered more promptly?

If there had been no advantage this year in placing the order before Apr. 30 all the orders would have come in on that date, and the mine workers would have been idle throughout the month of April except where some individual might have been compelled to buy coal to finish out the winter. The differential is of value only as it serves to maintain steady work, and it should always be interpreted so as to promote that result.

WHY SHORTEN HOURS WHEN ORDERS ARE UNFILLED?

The rush of orders, let us hope, will end, in the anthracite region, the agitation for shorter days and shorter weeks. The plan never had any applicability to the anthracite region, where, working steadily, it is barely possible to get out the coal the nation demands. It is to be expected that soon a rush will begin in the bituminous region also, for the slow time worked hitherto makes the possibility of future activity quite bright.

The Philadelphia & Reading Coal and Iron Co. has notified the miners that, as serious accidents have arisen from gas being set off by smokers, no smoking in their mines will be allowed.

A number of apprentice boys and several machinists employed in the Drifton shops of the Lehigh Valley Coal Co. were recently "suspended indefinitely" for their part in organizing a shop union.

At the mines of the Potter Coal Co., Coral, Indiana County, Pennsylvania, the mine workers have been on strike for some time to enforce the recognition of the union, despite the fact that the wages in effect at the Potter Coal Co.'s mines are higher than union wages.

MILITIA QUELLING MINE RIOT AT LINTON, IND.

On Apr. 28 the authorities of Linton, Greene County, Indiana, appealed to the Governor for troops to quell a riot said to have been the outcome of a strike of workers at that place. He dispatched one company of militia. Another company is being mobilized at Terre Haute for similar service.

The strike of the coal workers in Kansas, Arkansas and Oklahoma fields was extended by Alexander Howat, president of District No. 14, into Missouri, on Apr. 18, when that labor leader declared a strike in the mine of the Liberty Coal Co. at Appleton City, Mo. About 6000 men are now involved.

The mine workers in Nova Scotia were to vote on the five-day week on Apr. 22. The result of the vote is not yet known. The executive board voted $500 for the relief of unemployed mine workers in Cumberland, where three mines are closed down. The board also passed a resolution at the Glace Bay meeting calling on the Federal Government of Canada to provide ships to replace those commandeered for the use of Great Britain. According to the mine leaders Great Britain has 20 or 30 coal carriers built by the Canadian Government. The use of these ships by the British Shipping Board interferes with the shipment of coal from Nova Scotia. The board advocates the payment of subsidies to Canadian shipping interests engaged in such coal trade, if that be necessary to reëstablish the St. Lawrence market or to transport the coal to New England or South America.

The mine workers of Nova Scotia are not yet members of the United Mine Workers of America but the transfer from the Amalgamated Mine Workers of Nova Scotia to the international union will soon be effected. The New Brunswick mine workers have also applied for permission to join the United Mine Workers of America. It is expected that Nova Scotia and New Brunswick will form together District No. 26.

In Upper Silesia the mine workers have decided, as a result of the prerogatives given them, to oust a half a dozen of the managers and directors of some of the largest Silesian mines. Among those thus summarily removed are Herr Vogl, one of Germany's wealthiest men. He is a director of Prince Henkel Bon Donnermark's properties.

Anthracite Region—"Full Speed Ahead"

Mine managers in the anthracite region are much concerned over the coming labor shortage. Many foreigners are planning to return to Europe. The conditions obtaining in the mother countries seem in no way to abate their ardor to return. The departure of these men from the anthracite region will result in a shortage of inside labor next winter when labor is usually extremely hard to get.

Nearly all the collieries of the Lehigh region were idle on Good Friday and Easter Monday. The Lehigh Valley Coal Co., which has just resumed a full-time schedule, requested their men to work on the Easter holidays, but the request was unheeded.

Short Strike at Vesta Coal Co's Mines

Some time ago the miners at Vesta Mine No. 5, Vestaburg, Washington County, Pennsylvania, went out on strike, the ostensible reason being that a one-legged man was refused a house. He had lost his leg in the employ of the company, had received compensation, had left the employment of the company, and accepted a job elsewhere. When he returned, he thought he was entitled to rent a house of the company. In that field houses are very scarce, and persons may consider themselves fortunate if they are able to secure a passable good boarding place, a private house not being procurable. Besides this reason a number of other reasons were given for excluding him. Probably the real reason was the strength of Bolshevism among the Russian miners at that mine. They are very active and not as well educated as they might be. Many of them really believed that the time had arrived for them to take over the active working of the mine. However the trouble was amicably settled, and the men returned to work.

When pay day arrived their statements showed that they were fined a dollar a day for each day they were on strike, or four dollars each. All the mines of the company then went on a sympathy strike for the return of the four dollars which each man had been fined.

They did this against the direct warning of the district officers of the union. After staying out about ten days they voted to return to work. Neither the district officers, nor the international would support the strike. They openly declared that the men were in the wrong. The strikers concluded they did not want to fight the district, the inter-

national officers of the United Mine Workers of America, as well as the coal company, and they went back to work.

It was unofficially stated that the men who went out on the sympathy strike would be fined only two dollars, as that was all the mines would have worked in the religious season during which the strike occurred. The conservative, and English-speaking miners were opposed to the strike from the start, but were outvoted by the foreigners. The company had plenty of coal in stock, the miners wanted a holiday, the strike has been amicably settled, so probably everybody is well satisfied.

Struck to Have Two Men Ousted

About 100 miners employed in the mines at Kaymoor, in the New River field, Fayette County, West Virginia, were on strike for a few days last week, quitting work when the company by whom they are employed refused to discharge two of their fellow workers, whose discharge the miners insisted upon. Not deeming there was sufficient cause for the discharge of the two employees, the company refused to accede to the request for their discharge. After being out on strike for a few days the miners were ordered back to work by international officials of the United Mine Workers' organization.

Bower, W. Va., Field Is Organized

The Bower field in Braxton County, West Virginia, has been organized by the United Mine Workers of America and will be included within the jurisdiction of District No. 17, of which F. C. Keeney is president and Fred Mooney, secretary. Locals have been organized in this field at Bower, Copen, and Copen Creek by Board Member Nick Aeill. A wage scale has been agreed upon and contracts between the companies and the mine workers have been signed. The mines at Copen and Bower are operated by the West Virginia Coal & Coke Company. The Bower field is on the Coal and Coke Railroad and is sometimes placed in the Fairmont field. It lies about midway between Charleston and Fairmont.

The union made an effort during the summer of 1917 to organize all the mines in that field, but the coal companies which were operating the mines in that region at that time resisted the efforts of the organization. At one point in the field several shooting affrays occurred, and for a time bad blood existed between the organization officials and those of the company, it being necessary to call out three members of the special deputy sheriff's force to preserve order. The story printed a few days ago in a labor paper to the effect that the first attempt to organize the field was a failure because of the interference of state guards is wholly untrue, as the state police were at all times neutral.

Unwilling To Hear Unsubstantiated Claims

Further hearings have been held in the New River field by Judge Allison O. Smith, representing the United States Fuel Administration, for the purpose of adjudicating claims made by a large number of mine workers in connection with the advance of $1.40 allowed to monthly men. The hearings were held by Judge Smith at Stamford on Apr. 7 and 8. In all there were about 66 cases for Judge Smith to settle when the hearing commenced.

Even Mine Workers' Commissioner Dwyer, representing the operators, declares that a large number of mine workers have filed claims for back pay without first comprehending the terms of the advance and that consequently there is no ground for some of the claims, but nevertheless it has been necessary to look into all of them.

However, in order to expedite further consideration of claims, Umpire Smith has directed Commissioner T. L. Lewis, representing the operators, and Commissioner Dwyer, representing the miners, to investigate all claims in the New River and Winding Gulf districts not heretofore adjudicated, submitting to him only such claims as cannot otherwise be agreed upon.

Miners Insist on Fair Coal Prices

Declaring that the wages of the miner are too low and that a cut in the price of coal at the present time would further affect the wage scale, the executive board of District 11, United Mine Workers of America, has taken steps to oppose the reduction of the price of coal to railroads, and a letter announcing the board's stand has been sent to W. D. Hines, director general of railroads. The board declared that a reduction to railroads would prompt the public to ask also for lower rates, which, it is said, would affect the miners' pay.

A joint statement was made by President Ed Stewart and Secretary William Mitch of the board, as follows:

"At the board meeting, the question of the reduction in the price of coal to the Railroad Administration was brought before that body. A stand was taken that this board would oppose a reduction in the price of coal brought by the railroads, and a letter announcing this was sent to Director General Hines.

"The wage scale of the miners is absolutely too low. If the railroads get a reduction in the price of coal the public will be prompted to ask for a lower price than the operators are in a position to give. If a lower rate is granted, it would mean that the miner would suffer. By this, it should not be taken to mean that the miners are encouraging profiteering. They favor only a fair price for coal, but it is a fact that many mines are merely breaking even and not making a profit."

The mine workers are determined that fair prices shall be conceded to the operators, for they well know that there is no advantage to them to deal with a bankrupt, or near bankrupt, concern. Such a corporation must inevitably take risks in the safety and treatment of its employees or go out of business. The mine worker recently has been noting that his union is formed not so much to deal with the operator as with the consumer. He is beginning to realize and acknowledge that his interests are identical with those of the operator. In consequence a new alignment is insensibly forming.

Miners Question "One Big Canadian Union"

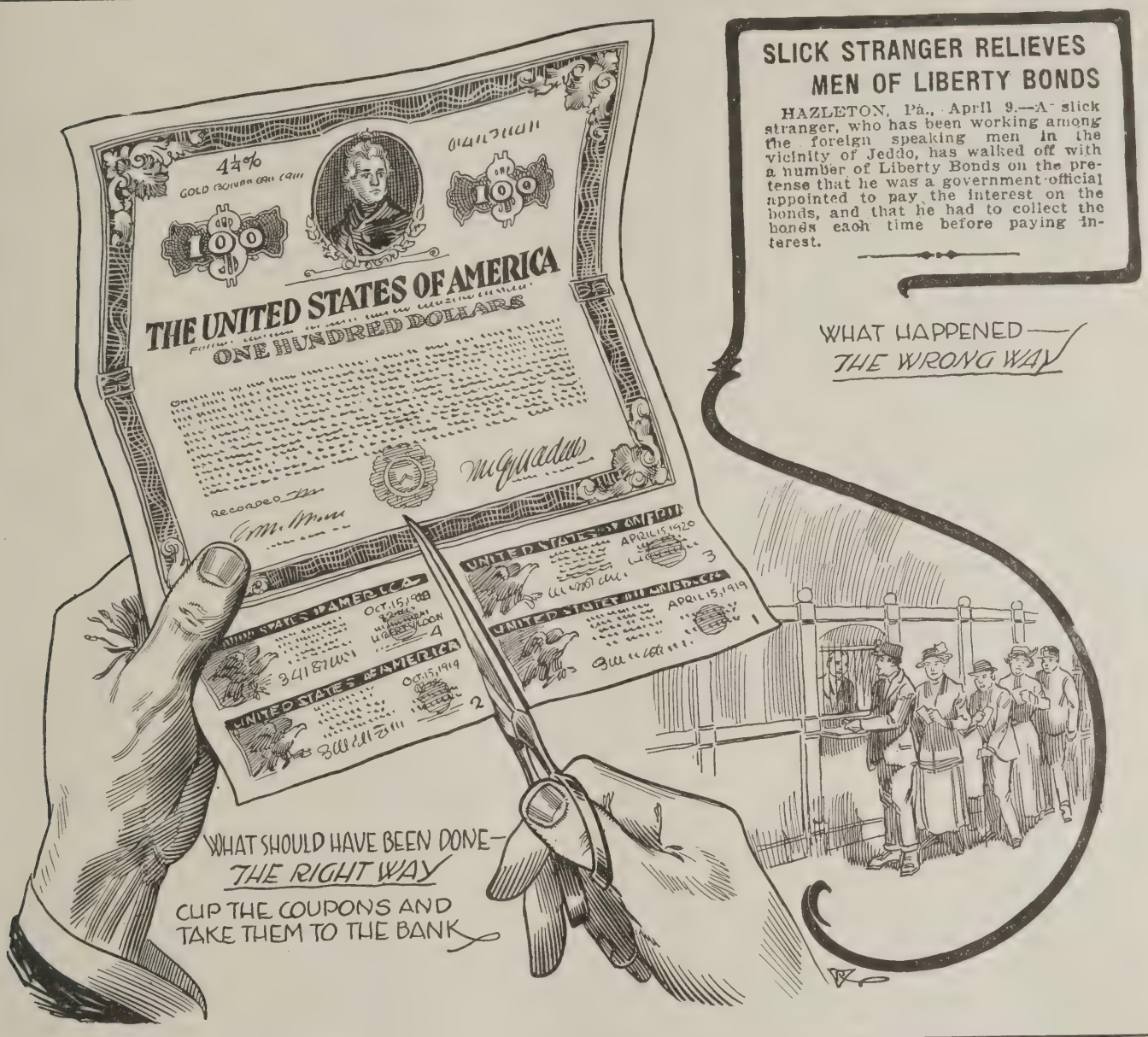
At a recent labor convention held at Calgary, Alberta, the approval of that province was registered in favor of the proposal that Canadian workmen should organize "One Big Canadian Union" and withdraw from affiliation with the American Federation of Labor, which has its headquarters and the bulk of its membership in the United States.

The idea is not meeting with complete endorsement, as is evidenced by the observations of David Rees, international organizer of the United Mine Workers of America, who is an old coal miner and closely in touch with the coal miners' unions in British Columbia and Alberta. He says, in part:

"There is no doubt in my mind that the Western Conference should have done that for which it was called together—that is, it should have outlined a more progressive policy for the Trades and Labor Council of Canada. We find that in centers like Toronto, Montreal and in other parts of the East the labor people are clamoring for a change. Consequently, had the Western Congress outlined its policy it could well have hoped to have had the Eastern labor men working unitedly with it on the occasion of the next Trades Congress at Hamilton, Ont., next September."

Recently an Industrial Commission was appointed to investigate the relations between capital and labor throughout the Dominion of Canada. G. D. Robertson, the Minister of Labor, has announced that the question of the labor situation in the mines of British Columbia will be tackled first. The coal-mine workers are bitterly opposed to the appointment of T. Moore, president of the Trades and Labor Congress, and I. W. Bruce as members of the commission representing labor. The Fernie mine workers' leaders have been telegraphing the Minister of Labor and Dr. Bonnell, the member of Parliament for the district, demanding that these appointments be reconsidered.

Simplest Thing in the World To Cut Your Liberty Bond Coupons



CUT OFF your coupons as they become due and get your money for them from the bank or from the company for which you work. Each coupon shows when the payment of your interest is due from the Government and how much the interest is. Keep hold of your bond, don't part with it till you sell it. Cut off only such coupons as are due. If you can't tell which are due, ask a banker or the clerk at the company store. Don't do business with complete strangers from outside your home town, no matter how smoothly they talk.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Calculating Depth of Shaft

The following algebraic solution has been offered by two contributors, regarding the problem presented in *Coal Age*, Mar. 6, p. 464, in which the depth of the shaft is calculated from its width and the amount a plumb-bob rises when swung from one side to the opposite side of the shaft.

In the case mentioned, the width of the shaft was 20 ft. and the plumb-bob rose 6 ft. when swung to the opposite side. In the solutions offered, x = depth of shaft. Then,

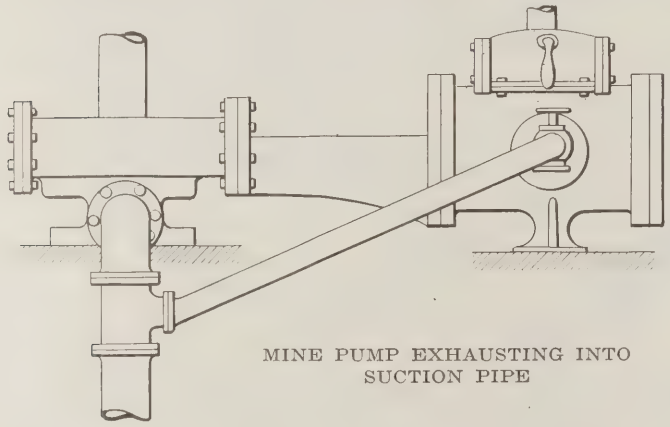
$$x^2 = (x - 6)^2 + 20^2$$
$$x^2 = x^2 - 12x + 36 \times 400$$
$$12x = 436$$
$$x = 36\tfrac{1}{3} \text{ ft., or } 36 \text{ ft. } 4 \text{ in.}$$

West Pittston, Penn. RICHARD BOWEN.
Terre Haute, Ind. V. SRAJN.

Exhaust from Steam Pump

Letter No. 1—In answer to the inquiry of "Assistant Superintendent," *Coal Age*, Mar. 20, p. 549, in regard to turning the exhaust steam from a mine pump into the suction or the discharge line of the pump, let me say that my experience has taught me that much benefit can be derived from exhausting into the suction pipe.

In my own practice, I have adopted this plan many times, and it has not only made it possible to get rid



MINE PUMP EXHAUSTING INTO SUCTION PIPE

of the annoyance of the steam exhausted into the mine entries, but I have found that it decreases the back pressure on the steam-end of the pump, and the same amount of water can be pumped with a lower steam pressure than when exhausting into the atmosphere.

On the other hand, I can see nothing but trouble ahead should the exhaust be turned into the discharge pipe. I have never seen that done or tried to do it myself, but the plan does not appeal to me as being practical, while the other scheme has always worked successfully.

One precaution, however, it is always necessary to observe. The engine must never be permitted to exhaust into the suction pipe, until after the pump is in full operation. Should the exhaust be turned into the empty suction pipe, before the pump has commenced to draw its water, the pipe would become heated and the pump would not start. A three-way valve must be provided that will permit the engine to exhaust into the atmosphere when starting the pump. Then, after the pump is running, this valve should be turned so that the engine will exhaust into the suction pipe, where the steam will be immediately condensed and pumped to the surface as water.

I have attempted to show in the accompanying sketch the connection between the steam end of the pump and the suction pipe. As shown in the figure, the three-way valve is located on the horizontal arm of the pipe attached to the exhaust nozzle of the pump. There is also provided a short nozzle for exhausting into the atmosphere when starting a pump.

SAMUEL MCKAY, Supt.,
Burgettstown, Penn. Harmon Creek Coal Co.

Letter No. 2—Kindly permit me to present a few comments, in addition to what has already been offered in reply to the inquiry regarding the proper disposal of the steam exhausted from a mine pump.

The inquiry does not state the size of the Cameron pump in question; but, judging from the fact that mention is made of exhausting the steam into a barrel, I would assume that the pump is a small one. This being the case, it is not to be expected that it would be desirable to go into great expense, in the way of making alterations required to produce any material change in operation. If no change is to be made in the piping arrangements about the best plan that could be adopted would be to conduct the exhaust directly into the sump.

EXHAUSTING INTO THE COLUMN PIPE WOULD CERTAINLY PROVE A FAILURE

In regard to exhausting into the column pipe into which the pump is discharging, it can be stated with certainty that this would not be successful when pumping against a head of 25 or 30 ft. or more, as the back pressure opposing the exhaust would effectually counterbalance any advantage that would arise by reason of getting rid of the exhaust steam.

On the other hand, assuming that it is worth while to make changes in the installation, I would advise conducting the exhaust steam directly into the suction line of the pump. In doing this, let me suggest that the matter should be referred to some reliable pump manufacturer for their advice. In that case, all necessary details should be submitted, in order to permit him to act intelligently. Preferably, the proposition should be submitted to the manufacturer of the pump in question, who will be more familiar with its construction and requirements.

The arrangement will differ with almost every type of pump; but, in general, it may be stated that the exhaust steam entering the suction line will result in a condensing action and give a higher vacuum gage, whereby the speed and capacity of the pump will be in-

creased, the pump then discharging a larger quantity of water, per pound of steam consumed. With a properly designed nozzle, the efficiency of the pump will be increased.

In this connection, however, it should be remembered that the temperature of the water entering the pump will be raised somewhat, which will increase the corrosive action if the water is at all acid. The effect of this corrosive action on the pump barrel, plungers, valve seats, valves and column lines must be carefully noted to ascertain if the advantage to be gained will offset the injury that will be done to the equipment.

Turning the water into the sump will produce the same effect, as far as getting rid of the steam is concerned, but will not give the increased advantage due to the higher vacuum gage produced when exhausting into the suction pipe. Where the mine water is very acid I would not recommend the plan of exhausting into the suction pipe. If possible, in such case, turn the exhaust into the sump, or into some abandoned airway or conduct it at once to the surface.

Scranton, Penn. SUPERINTENDENT.

Gravity-Plane Haulage

Letter No. 2—Referring to the letter by "Wire Rope," *Coal Age*, Mar. 6, p. 459, responding to an inquiry regarding a proposed gravity-plane haulage, which appeared in the issue of Jan. 2, p. 32, allow me to suggest that it would be interesting if the writer of that letter would adduce figures to prove the superiority of the aërial tramway that he advises installing in place of the gravity incline proposed in the inquiry. His reference to the cost of the wire rope required for the operation of the incline seems to point to that factor as determining his choice. It would be instructive if he would give us some idea as to the probable cost of rope for his aërial tramway.

Regarding the question of space available for landing 25-car trips, since no mention is made in the inquiry of any unfavorable conditions, it is natural to assume that this question has been duly considered by the superintendent making the inquiry and that proper landing space can be provided. Let me add, also, that in remarking favorably on this proposed aërial tramway (p. 459), the editor should have gone more fully into the matter than he did and explained the reason for his conclusions in respect to the proposition.

Gravity Tramroad vs. Aerial Tram or Cableway

Although the inquiry does not state what tonnage it is desired to handle from the mine to the tipple, it would be further interesting to know what tonnage it would be possible to handle over an aërial tramway; and it is to be hoped that "Wire Rope" will give us his estimate of the capacity of such an equipment. Knowledge of the experience of one or two individuals, with this means of transportation, makes me skeptical, to a degree, of its advisability.

Personally, I can see no reason why it should be impossible to operate a tramroad such as was proposed in the inquiry of this superintendent, if ample provision is made in the original plant, in respect to factors of safety in hoisting and in relation to rope, drawbars, couplings, shackles, etc. Even if it can be shown to be impracticable to run 25-car trips on this incline, I believe it can be successfully operated by the use of a gunboat or monitor.

The reply of the editor, following the inquiry (page 32) suggests the use of a "barney" to counterbalance the weight of the descending loaded trip, the weight of the barney being yet sufficient to draw an empty trip of the same number of cars up the incline. May I inquire what advantage would be derived from the use of this barney, and ask to know the experience on which his suggestion is based.

Long and Steep Gravity Plane Controlled by Water-Cooled Air Brake

Referring to the statement of "wire rope," who says he has never seen an incline operated by gravity on as large a scale as the one proposed in this inquiry, let me say that this fact does not prove the proposition to be impracticable. I have in mind a gravity tramway that is 5800 ft. long and contains about 2500 ft. of 20 per cent. grade. Trips of 17 cars are operated by gravity on this tramway. The empty cars weigh 3250 lb., each, and carry an average of 3.6 tons of coal. Occasionally, a car will be loaded with 5 tons of coal.

Taking the first figure given, which is a fair average capacity for these cars, a loaded trip of 17 cars will carry 122,400 lb. of coal and have a total weight of 177,650 lb. A 1½-in., 6-strand, 19-wire Roebling, blue-center, rope is used on this incline. Tandem, slip-ring drums are installed at the head of the incline to lower the cars. The drums are equipped with internal water-cooled brakes actuated by air compressed by the operation of the machine.

This incline has handled an average of 2300 tons of coal per day, month in and month out. I know of several other gravity trams where the conditions are probably as severe as those involved in this inquiry. Also, allow me to ask why the editor suggested a 1¼-in. cast-steel, 6-strand, 7-wire, haulage rope for this tramway.

R. M. MAGRAW, Gen. Supt.,
Hiawatha, Utah. United States Fuel Co.

In the experience of the editor, the advisability of installing an aërial cableway, for the transportation of minerals from a mine opening located at a considerable elevation above the tipple where the output is to be loaded for shipment, is based on the following items: Ease and rapidity of installation and lower first-cost of equipment; continuous and uniform transportation of output from mine to tipple; liability to delays caused by derailment, making up of trips, weather conditions, etc., reduced to a minimum; minimum cost of upkeep by reason of eliminating track repairs; avoidance of risks due to runaway cars on incline; and less wear and tear of mine cars, due to hoisting on steep inclines. Where the arrangements for loading the buckets are made automatic, no system of inclined-plane haulage can equal the tonnage capacity of an aërial cableway, and nothing is more convenient or safer in its operation.

The suggestion of employing a barney is made for the purpose of reducing the margin between the weight of the descending loaded and ascending empty trips and thereby lessening the duty of the brake required to control the speed of the drum sufficiently to insure safety. This is based on an experience had in the operation of a gravity plane in the far west (1884) and the later observation of the working of steep inclines in the middle Anthracite Valley (Penn.).

Regarding the suggested 1¼-in., cast-steel, 6-strand, 7-wire, haulage rope (page 459), it will be noted that,

making allowance for the added weight of the rope, the estimated diameter of this rope was finally increased to $1\frac{3}{8}$ inches.

Mining practice assumes that a 6-strand 7-wire haulage rope gives better service on an incline than a 6-strand, 19-wire, hoisting rope, owing to its greater resistance to abrasion, the individual wires of the former being larger than those of the latter, which also gives greater rigidity to the rope for haulage purposes.

It should be stated, here, that it is, of course, possible to lower any weight of loaded trip on an incline having any steep grade whatsoever, provided that it is possible to control the descent of the loaded cars with safety. Numerous instances are on record, however, of steep inclines operated by gravity that have been the scene of serious and fatal accidents, owing to the failure of the brake to control the descent of the loaded trip. For this reason, it is always practicable to govern the number of cars hauled on such an incline, so as to avoid this risk by establishing a safe margin between the weight of the loaded and empty trips; or by employing a barney as a go-between on such inclines.

Correct Accounting

Letter No. 2—Referring to the letter of Thomas T. Brewster, which appearedin *Coal Age*, Mar. 13, p. 501, it appears to me that the view he takes of the proper accounting of mine equipment and supplies is radically wrong. While it may be admitted that there would result a slight saving in the matter of accounting, if such minor items as fall under the head of supplies for immediate use were to be charged at once to operating expense, the same rule will not apply to actual equipment and to many other supplies that must be carried in stock in order to avoid the delay that would result if it was necessary to send for such supplies every time they were needed.

Let me illustrate by assuming that the inventory for the year 1918 showed, say three locomotives, five pumps, 20,000 ft. copper wire, eac., and the following year, there sis purchased one locomotive, two pumps, 2000 ft. of wire, or other similar equipment. It stands to reason that the inventory for 1919 will then show four locomotives, seven pumps, 22,000 ft. copper wire, etc. Now, as stated in the editorial note that follows Mr. Brewster's letter, a suitable valuation should be attached to each item of the inventory, and these values will decrease year by year, according to the life of each article of equipment. The total valuation, however, shown by the inventory may be much increased by the purchases for that year.

Equipment and Stock Supplies Not Expense

My idea is that much of the equipment and material purchased for the operation of a mine will last for 10, 15 or 20 years and be a part of the entire plant. Evidently, it would be wrong to charge the cost of such items to the operating expense of the single year when they were purchased. It is my opinion that all new material, such as wire, tee rails, motors, pumps and other machinery, should be charged either to the equipment or the stock account. Then, when supplies are taken from the supply room for use in the mine, they should be charged to operating expense. Only in this way can a correct account of the expense of running a mine be kept for each year.

When a piece of equipment has become so badly worn that it is no longer of use and is discarded, it is cast aside or, as we say, "scrapped," but the balance sheet for the year will show the net loss or gain. At the end of each fiscal year, the balance of the equipment account must be made to conform to the inventoried valuation of equipment by crediting the former account with an entry that is then charged to the profit-and-loss account, on the ledger. In closing, let me say that I would be very sorry to have my operating expense account charged with material that was not used in the operation of the mine for that year and which my son or grandson might use in years to come.

Burgettstown, Penn. ACCOUNTANT.

A Modified Longwall System

Letter No. 2—Referring to the interesting article of F. A. Pocock, *Coal Age*, Feb. 27, p. 395, regarding the 5-entry, panel-longwall system he has presented for the working of a 3-ft. seam of coal such as the Freeport or Kittanning series, let me say that it would seem that the author of the article has concentrated his entire thought on producing a method that would insure the largest possible output in the shortest possible time. Whether or not this plan can be worked out in detail, in practice, remains to be seen.

There are, to my mind, some objectionable features respecting the details given by Mr. Pocock, in the working out of the system he presents. These objections suggest themselves to me as the result of a long experience in longwall mining, in Scotland and England and, later, in Pennsylvania, where I had to contend with strata and conditions similar to those he has described.

Brief Survey of the Proposition

If I understand the proposition correctly, it is proposed to start the development by driving a five-entry system of main headings, and turn five-entry crossheadings to the right and left of these, leaving 600-ft. pillars between each set of crossheadings. As the work proceeds, the plan appears to be to work out each alternate pillar on each side of the main heading, on the advancing system, by starting a longwall conveyor face, after leaving a solid pillar of coal 300 ft. thick for the protection of the main headings.

It is proposed to use two conveyors on each face, the length of each conveyor being 100 yd. As each advancing longwall face reaches the boundary, the succeeding alternate pillars are then to be drawn back in a similar manner, on the retreating system. The coal is to be undercut to a depth of 10 ft., using an arcwall machine for that purpose.

My first objection refers to the proper support of the roof, which is described as not being self-supporting over a considerable area. Let me assume, for instance, that the conveyor requires a space of 2 ft. 6 in., and the cutting machine, another 3 ft., while the depth of undercut is 10 ft. The best support that can be given, in that case, is to set posts within a foot of the coal and immediately behind the machine as it moves along the face.

Now, when the machine has finished one cut across the face, the area of roof left unsupported over the coal that is undercut will be, at the least, $(10 \times 600) \div 9 = 666$ sq.yd. The fact that this roof must remain unsupported until the coal has been loaded out makes

it a question in my mind if a very serious collapse of the roof will not take place. It seems to me that it would be a miracle if an accident did not follow.

Another objection that occurs to me relates to the proposed deep undercutting of the coal. I believe that any person who has had much experience in longwall machine mining will agree with me that at least some of this coal will be wedged practically solid and will have to be blasted before it can be loaded out.

It is also a question whether all of the coal from a 10-ft. mining can be cleared from the face, each day, in time to allow packs being formed at each end of the face and the necessary chocks built and the conveyor moved forward. Mr. Pocock has even suggested three shifts a day, the machine making a 10-ft. cut in each shift, which is practically impossible of accomplishment.

Ten-foot Cut Not Safe in Longwall Work

Again, it is my belief that it will require twice the manual labor to load a 10-ft. cut onto the conveyor than would be required with a 5-ft. cut; and the results will not show the same tonnage per man. After the first 5 ft. of the 10-ft. undercut has been loaded out, the difficulty of handling the remaining 5 ft. would suggest the necessity of, first, moving the conveyor forward and drawing and resetting posts and cribs, all of which would increase the time for the roof to settle and bind the coal that remains unloaded.

I do not wish to be understood, however, as holding that the proposed method has no good features, as my objections relate only to the details of working. Let me say that, in my opinion, better results would be obtained by pushing the development until a number of sections can be opened that would give the same output with a 5-ft. undercut in the longwall faces.

Such a plan would certainly be more favorable to the support of the roof and avoid the risk of the undermined coal being held fast by the settlement that will naturally take place when a 10-ft. cut is made in the face. Let me suggest, further, that special care must be taken to insure the complete withdrawal of all props and other timber supports in the waste, always leaving three rows of staggered props behind the conveyor.

The idea of securing a large output in the shortest possible time is all right if the method adopted is such as to insure the safety of the men and the property. Too great haste in gaining a large output, in coal mining, will generally involve future loss, as was the case when I assumed charge as general superintendent of a mine in Derbyshire, England, where my predecessor had worked out the coal too close to the outcrop and brought on a heavy squeeze, besides permitting the surface water to enter the mine.

McKeesport, Penn. Andrew Orr Bain.

Efficiency in Firebossing

Letter No. 14—A long experience in firebossing in mines, followed by a period of mine foremanship and a later service as state mine inspector, has interested me deeply in the discussion of the development of the highest efficiency in our firebosses.

I have come to realize to the fullest extent that all of these official positions carry with them great responsibilities. However, in respect to the safety and protection of life, I am convinced that the greatest responsibilities rest on every fireboss who attempts to discharge his duties faithfully to the state and to the men employed in the mine.

There are many qualifications that an efficient fireboss must possess, but the most essental are: practical experience, habits of industry, honesty and faithfulness in the performance of duty. He must also be resourceful and calculating, taking nothing for granted, but investigating every situation for himself and to his own satisfaction.

It is a matter of regret that too many miners who hold fireboss certificates, or mine-foreman certificates with fireboss privileges, seem to think that these certificates are the only qualifications they need, and make no further effort to increase their efficiency by diligent study. They forget or do not realize that the knowledge gained by such study will not only fit them for the better performance of their work, but will give them a quicker perception and enable them to grasp a situation more promptly and act more quickly and judiciously in an emergency.

Every fireboss must have a high estimate of human life. He must realize that the lives of the men employed in the mine are in his keeping. He should be fully awake to the great responsibility resting on him in his official position, and his attitude and bearing should be such that he will command the highest respect and confidence, both of the men in his charge and the company who employs him.

Full Control of Ventilation with Fireboss

Referring to the excellent letter of W. H. Luxton, *Coal Age*, Mar. 27, p. 590, I want to indorse the suggestion he makes that "the ventilation of the mine should be entirely in the charge of the fireboss." In my opinion, the fireboss should be the final judge as to whether or not the ventilation is sufficient or adequate in the section of the mine of which he has charge.

Personally, I would not accept the position of fireboss in a gassy mine, unless I was given full control of the ventilation. Neither would I undertake to perform the duties of that position in a mine where the fireboss was regarded as a "necessary evil," and made subordinate to the foreman in every respect.

For a number of years, I was employed as fireboss in a very gassy and dusty mine where I had full charge of the ventilation and gave such instructions to the foreman and bratticemen as, in my opinion, were required to conduct the air to those parts of the mine where it was most needed for the safety of the men. I ranked as foreman, in the absence of that official. If a slate fall occurred on a haulage road, at a time when the foreman was in some remote part of the mine, I at once assumed charge of the situation and started men to clear up the fall.

In that mine, when making my morning rounds it was my habit to note down any slate falls on the roads, stating how the slate would have to be handled—whether gobbed or loaded out, and how much time would be required for the work. I would give the number, size and length of timbers needed and report these items to the foreman. Besides that, I was able to inform him what was the prospect for a good day's run, stating where loose coal was plentiful and where shots had failed to break down the coal.

This information always enabled the foreman to properly distribute the drivers, and greatly expedited the work in the mine. It appears to me that any effi-

cient fireboss will do the same, reporting where dangerous conditions exist on the roads or in the rooms, and stating what is required to make such places safe. In fact, all unusual conditions should be reported to the foreman, by the fireboss on his return to the shaft bottom or the mine entrance.

Allow me to conclude this letter by saying that a fireboss should work in harmony and in conjunction with the mine foreman in every instance, having in view the safety of the men and the successful operation of the mine. At the same time, it is my belief that the line should be drawn when it comes to making it a part of the duty of a fireboss, even in small mines, to busy himself with pumps, tracklaying, setting timbers, and various things of a similar nature, as was suggested by Edward H. Coxe, in his letter, Jan. 23, p. 199. Mr. Coxe might just as well have used his imagination farther, and, perhaps, he would have found that mine foremen and superintendents of little mines have about as much time to devote to such work and the laying of track, as firebosses.

JOHN ROSE,
Dayton, Tenn. Former District Mine Inspector.

Letter No. 15—So many good points have been brought out in the discussion regarding "efficiency in firebossing," that it is difficult to say which is of the greatest importance. However, the most salient point that has developed appears to be the question of whether the fireboss, in addition to the duties required of him in making the examination of the mine in the morning and looking after the safety of the men and giving them needed instruction while at work in their places, shall do such other work as digging coal, ditching, tracklaying, timbering and cleaning up falls.

While I believe the disposition of a good fireboss should be such as to make him generally useful (and this would certainly add to his efficiency in most mines) too much depends on the need of his keeping in close touch with the conditions existing in the mine to enable him to do much else besides, particularly if the mine is generating gas. It must be remembered that conditions, in most mines, are not so favorable that the safety of the mine, respecting gases and proper ventilation, is assured when the fireboss has completed his rounds in the morning.

In addition to making the examination of the working places, roadways and travelingways, the fireboss must often do much work in the way of putting up brattice that a shot has dislodged, before he can clear a place of gas. At times, it may happen that he is obliged to hang canvas that should have been put up by the bratticemen the day before; and, it is safe to say, that the morning examination will often prove a busy half-shift.

The Second Round of the Fireboss

The second half of a fireboss' shift will generally have to be devoted to a closer inspection of the working places, in order to see that bad roof and other dangerous conditions are removed, necessary timbers set, breakthroughs made in compliance with the law, and air-courses and travelingways cleared of all obstructions. The proper performance of these duties will generally leave him little time for the other work mentioned.

In the event of a fall blocking the track, wires down, or cars derailed, it is of course the duty of both the mine foreman and the fireboss to lend a hand and do everything possible to restore conditions and prevent delays. I have seen many good firebosses help their foremen in a way that has increased the production of the mine. Such firebosses are doing far more efficient service than when directed to perform some manual labor that can be done as well or better by other men.

There are, undoubtedly, a large number of firebosses who are responsible and dependable in respect to the reported condition of the mine as being safe for work, but the number who prove their efficiency by assisting the foreman in a way that increases the production of the mine, I believe, is not so great. Firebosses of the latter type are a valuable asset to the foreman and the company who employ them. It should not be expected, however, as some of the remarks that have been made would seem to intimate, that a mine foreman should hand over the keys of his authority to his fireboss.

Two Types of Efficiency in Firebossing

No good foreman will fail to appreciate the service rendered by a truly efficient fireboss and give him due credit for his work; but he will not waste much time with a fireboss who lacks ambition and possesses no qualifications for a higher position. A foreman is apt, at times, to keep such a fireboss busy and ask him to perform tasks that will not interfere with his regular duties in looking after the safety of the mine. Such firebosses represent one grade of efficiency. They are faithful, reliable and trusted by everyone in the mine.

Another type of efficiency is represented by the fireboss who, while just as qualified for his own particular work, possesses the knack of proving himself useful in other ways, by his success in the handling of men, expediting the work and increasing the output of coal. It is this class of men that are not satisfied to remain in the position of fireboss. Their peculiar ability is recognized, sooner or later, if not by their own company, then by others. Good men cannot be kept down.

An Example of Good Firebossing

The following incident, which I recall, illustrates exactly my idea of *efficiency in firebossing:* A young fireboss came suddenly on a gang of men cleaning up a fall. His unexpected approach interrupted their moments of leisure and the men jumped for their tools, only to discover that, as they said, "We thought you were the boss," whereupon they again resumed their pipes and attitude of leisure.

As the fall blocked off one section of the mine from which much coal was hauled, the young fireboss promptly threw off his coat and started to break some of the slate, saying as he did so, "Do you want me to tell the boss that you fellows quit?" The men were quick to observe that he made no attempt to display his authority or to assume that he was a boss, and the result was that they started at once to work and indulged in no more foolishness.

The foreman was never told of the incident; but the fireboss, it should be stated, gained the reputation of being efficient, which he richly deserved. It is a common thing for some firebosses to air their supposed grievances, but such are not the ones who are in line for promotion.

ESSEX.
Thomas, W. Va.

[This letter will close the discussion on "Efficiency in Firebossing."—Editor.]

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Dew Point in Mine Air

Kindly explain, in the columns of *Coal Age*, at what temperature air will deposit its moisture on the roof, floor and sides of an airway in a mine. Also, please state at what temperature air will begin to absorb moisture from the mine workings. STUDENT.

Thompson, Penn.

The capacity of air to carry moisture depends on its temperature. In other words, the weight of water vapor required to saturate a cubic foot of air increases as the temperature of the air rises, but not in the same ratio. When the point of saturation of air, at any given temperature, is reached the weight of vapor contained in a cubic foot of the air is a fixed quantity. It is evident, then, that any fall of temperature when the air is saturated will result in some of the vapor being deposited as moisture. The point at which moisture begins to be deposited is called the "dew point," which varies with the temperature. The pressure or tension of vapor also changes with the temperature and must be taken from a table of saturated-vapor pressures.

Now, applying these facts to the conditions existing in mine workings, we will assume the temperature of the mine is, say 60 deg. F. The vapor pressure, at that temperature, is 0.2545 lb. per sq.in., and the corresponding absolute temperature 460 + 60 = 520 deg. F. Knowing these data, the weight of vapor saturating a cubic foot of air or space is calculated by the formula

$$w = \frac{5793 p_v}{460 + t} = \frac{5793 \times 0.2545}{520} = 2.8 \text{ gr. per cu.ft.}$$

But the outside air blowing into the mine may not be saturated and its temperature may be such that it may hold a greater or a less weight of moisture than this amount. For example, suppose the outside air has a temperature of 80 deg. F. and 60 per cent. humidity. That is to say, the air is only carrying 60 per cent. of the weight of moisture that would saturate it.

Now, when this air enters the mine and its temperature has fallen to that of the mine atmosphere (60 deg. F.), its capacity for carrying moisture is greatly lessened. The weight of moisture taken into the mine is

$$w = 0.60\left(\frac{5793 \times 0.5027}{460 + 80}\right) = 3.2 \text{ gr. per cu.ft.}$$

In making these calculations, it is necessary to refer to a table giving the saturated vapor pressures corresponding to different temperatures ("Mine Gases and Ventilation"—Beard, p. 62. Notice the saturated vapor pressure, for a temperature of 60 deg. F., is 0.2545 lb. per sq.in., while that for a pressure of 80 deg. F. is 0.5027 lb. per square inch.

In the case just cited, it is evident that the intake current, which was *dry*, on entering the mine at a temperature of 80 deg. F., carries 0.4 gr. per cu.ft. more moisture than is required for saturation at 60 deg., or the temperature of the mine workings. Assuming a current of 100,000 cu.ft. of air per min., under these conditions, the weight of water deposited in the mine as moisture would be (100,000 × 0.4) ÷ 7000 = 5.7 lb. per min., or nearly ¾ gal. a minute.

It is evident that the answer to the question—"At what temperature will moisture be deposited in a mine air?"—depends largely on the temperature and humidity of the intake air. When the intake current carries a greater weight of misture than will saturate the air at the mine temperature, the excess moisture will be deposited in the mine, but not otherwise. Air is said to be "dry" when it carries less moisture than is required for its saturation, and "wet" when any decrease of its temperature will cause a deposit of moisture; or, in other words, when the dew point is reached.

In answer to the second question, it can only be said that *dry air* will always absorb moisture from moist bodies with which it is in contact. Here, also, the temperature at which this will take place depends on the conditions previously mentioned.

Efficiency of Mine Hoist

The card taken from an engine when hoisting at a certain shaft mine showed that the indicated horsepower, or the power developed in the cylinder of the engine was 60 hp. At the time the card was taken, the engine was hoisting a load of three tons. The depth of the shaft was 148.5 ft. and it required just 30 sec. to make the hoist.

Now, neglecting the friction of the hoist, what is the efficiency of the engine? Also, what is meant by the term "compression," and what is its object?

Divernon, Ill. HOISTING ENGINEER.

To answer the first question, from the data given, it would be necessary to make no allowance for acceleration or retardation when starting and stopping the hoist, and assume that the speed of winding was 148.5 ÷ 30 = 4.95 ft. per sec. In that case, the work performed in the shaft is (3 × 2000) 4.95 × 60 = 1,728,000 ft.-lb. per min. On that basis, the efficiency of the engine is

$$\frac{1{,}728{,}000 \times 100}{60 \times 33{,}000} = 90 \text{ per cent.}$$

However, while this method gives what may be called the *average efficiency* of the hoist it is well to remember that the work in hoisting is not uniform; but, starting from zero, at the beginning of the hoist, the power expended increases to a maximum during acceleration; and decreases when retardation begins, till it again becomes zero when the hoist is finished. To estimate the efficiency of the engine under full load at maximum speed it is necessary to know the time of acceleration and retardation.

The term "compression," in engine practice, refers to the compression of the steam in the cylinder of the engine from the time the valve closes the exhaust port to the end of the stroke. The object sought is to assist in bringing the piston to rest and starting it forward on the next stroke.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Miscellaneous Questions

(Answered by Request)

Ques.—How can you tell whether or not any obstruction is in an airway or air-course that you have not passed through?

Ans.—Any unusual obstruction in an airway would be indicated by a decrease in the quantity of air passing, or an increase in the water gage, or both, for that airway or section of the mine. Assuming the power on the air remains unchanged, any obstruction in an air-course decreases the quantity of air passing and produces, at the same time, a rise in the water gage, the quantity of air varying inversely as the water gage.

Ques.—What is the rubbing surface in an airway 4 ft. high, 9 ft. wide and 1000 ft. long?

Ans.—The rubbing surface in this airway is $1000 \times 2(4 + 9) = 26{,}000$ sq.ft.

Ques.—What is the capacity of a double-acting plunger pump if the plunger is 20 in. in diameter, the stroke 40 in., and the pump is making 25 r.p.m.?

Ans.—The sectional area of a 20-in. plunger is $a = 0.7854\left(\frac{20}{12}\right)^2 = 2.182$ sq.ft. At a speed of 25 r.p.m., a single plunger makes 50 strokes a minute, and the length of stroke being 40 in. or $3\frac{1}{3}$ ft., the plunger displacement is $2.182 \times 3\frac{1}{3} \times 50 = 363\frac{2}{3}$ cu.ft. per min. Unless otherwise stated, it is customary to assume the efficiency of the water-end of a good pump as 85 per cent. of the plunger displacement, which would make the capacity $0.85 \times 363\frac{2}{3}\left(\frac{1728}{231}\right) = 2720$ gal. per min.

Ques.—What equipment is required to be kept at the mine, for the care of the injured?

Ans.—The bituminous mine law of Pennsylvania (1911), Art. 13, requires that one ambulance and at least two stretchers, together with woolen and waterproof blankets, bandages, splints, and other medical supplies shall be kept on hand and ready for immediate use in time of need, at every mine in which 50 or more persons are employed inside. The law further provides that where 90 per cent. of the workmen live within a radius of a mile from the mine, no ambulance will be required; and where two or more mines are located within a mile of each other a single ambulance is sufficient for such mines.

Ques.—What must be the sectional area of a square airway that is required to pass 50,000 cu.ft. of air per min., under a 1-in. water gage, the length of the airway, including the return, being 1 mile?

Ans.—First, write the formula expressing the pressure required to pass a given quantity of air through a given airway. Thus,

$$p = \frac{kloQ^2}{a^3}$$

For a square airway, the perimeter is four times the square root of the area; thus, $o = 4\sqrt{a}$. Then, substituting this value for the perimeter of the square airway, in the formula just given, and solving with respect to the sectional area (a), gives

$$a = \sqrt[5]{\left(\frac{4klQ^2}{5.2w.g.}\right)^2}$$

Now, substituting the values $k = 0.00000002$; $l = 5280$; $Q = 50{,}000$; $w.\ g. = 1$, we find, for the sectional area of a square airway required to pass 50,000 cu.ft. of air per min. under a water gage of 1 in.

$$a = \sqrt[5]{\left(\frac{4 \times 0.00000002 \times 5280 \times 50{,}000^2}{5.2 \times 1}\right)^2}$$

$$= 132.77 \text{ sq. ft.}$$

Each side of this airway is $\sqrt{132.77} = 11.52$ feet.

Ques.—From what source is the greatest number of accidents at the working face, and how would you endeavor to lessen or prevent them?

Ans.—The latest report of the bituminous district of Pennsylvania, states that of the 412 lives lost, in the year 1916, in the bituminous mines of the state, 227, or 55.1 per cent. of these were due to "falls of coal, slate and roof." Of this number, 159, or 70.05 per cent., were killed at the faces of rooms; 37, or 16.3 per cent., while drawing pillars; and the remaining 31, or 13.65 per cent., on the entries, airways or travelingways in the mines.

Ques.—Ignoring friction, what quantity of water will be discharged from a borehole 22 in. in diameter and 4 yd. long, under a head of 150 ft.?

Ans.—The theoretical velocity due to a head of 150 ft. is $v = \sqrt{2gh} = \sqrt{2 \times 32.16 \times 150} = 98.22$ ft. per sec., and the area of a 2-in. hole being $(0.7854 \times 2^2) \div 144 = 0.0218$ sq.ft., the quantity of water flowing from the hole will be $60 \times 98.22 \times 0.0218 \times 7.48 = 962$ gal. per min., there being 7.48 gal. in a cubic foot.

Ques.—A certain fan is running at a speed of 75 r.p.m. and producing 50,000 cu.ft. of air per min. The air current travels 10,000 ft. in its passage through the mine. Now, if the air is short-circuited so as to reduce the distance the air must travel to 500 ft., would the speed of the fan be increased or decreased? Explain why.

Ans.—Reducing the length of air travel reduces the mine resistance in the same proportion. When the resistance against which a fan is operating is reduced, the result is that a larger quantity of air will flow through the fan. But, the frictional resistance within the fan itself increases as the square of the quantity of air passing. This means a large increase in the work absorbed within the fan and lost. The result is that less power is available for turning the fan, which will run a little slower under the same steam pressure at the throttle, than it did before the air was short-circuited.

In other words, the rush of air through the fan when the mine resistance is reduced or cut out causes a loss in the power available for turning the fan, because a larger proportion of that power is absorbed in passing the air through the fan itself. The power then turning the fan being less, the speed of turning is decreased.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Italian Coal Situation

An article in the *Corriere della Sera*, Milan, Mar. 16, 1919, states that the problem of obtaining an adequate coal supply in Italy has continued to become more serious since the armistice, although it was believed that with the suspension of hostilities the solution would gradually become easier. In order that the actual state of affairs may be well understood, it seems opportune to furnish certain data regarding the year preceding the war.

In 1913 Italy imported on the average 900,000 tons of coal per month, equal to 10,800,000 tons annually—2,200,000 tons for the state railways, 200,000 for the other railways and steam trams, 700,000 for the navy and merchant marine, 1,200,000 for the gas works, and the remainder for private industry.

During the war the consumption of coal by private industry increased in some branches, such as metallurgy, and decreased in others. The total shows a progressive decrease in accordance with the decrease in the total imports of coal, due to the shortage of tonnage and to diminished production. During the war the Italian government informed the allies that the requirements of Italy should be placed at 740,000 tons, which was later reduced to 690,000 tons. There was allotted a monthly supply of only 600,000 tons, but it was only an allotment, for there was always furnished a smaller quantity—5,280,000, equal to a monthly average of 440,000 tons in 1917; 6,400,000, equal to a monthly average of about 530,000 tons in 1918. The most critical month was February, 1918, during which Italy received only 328,000 tons of coal.

Before the war, of the total exports of coal to Italy about 9,000,000 tons came from England, about 1,000,000 from Germany and Austria, about 160,000 from France, and about 90,000 from the United States. America increased its exports of coal to Italy to 300,000 tons in 1914, and to 1,742,000 in 1915. In 1916 they were 1,056,000 tons, but in 1917 they dropped to 451,000 tons. In the last period of the war they ceased almost entirely, because, in their desire to save tonnage, the allied powers decided that Italy should be supplied with coal from England in preference to America.

The armistice having come, the Italian government had the assurance of a monthly average of 800,000 tons for two months and of 1,000,000 for the succeeding months, but instead of improving the situation has become steadily worse. In November Italy received 647,000 tons of coal; in December, 472,000; in January, 439,000; in February, 502,000. In March, in all probability, Italy will not receive more than 375,000 tons.

Temporary Supplies from France

Hon. Crespi recently obtained from the interallied economic commission the concession, without any assurance for the succeeding months, of 100,000 tons of coal from the Saar Basin, from St. Etienne and Salon. This 100,000 tons will arrive naturally, by land. It is a long-flame coal, not suitable for locomotives, and will serve for other uses.

With reference to the furnishing of coal by France, it may be said that this was carried on actively from January, 1918, to January, 1919. It was agreed to by the allies, always with a view to conserving tonnage, that France should ship its coal by land and replenish its supply from England.

In 1918 Italy received 2,000,000 tons of French coal out of total imports of 6,400,000. The balance was all English. Italy only received 42,000 tons from France in January and February. All the rest was English coal.

The Importation of American Coal

A favorable prospect for the solution of the difficult problem is contained in the possibility of sending American coal to Italy. England leaves Italy entirely free to obtain supplies from this country. Some time ago we tried to establish a regular service of supply to Italy. As yet, however, the great obstacle has been the lack of ships. It was necessary that Italy should send for the coal herself, and such ships as were available were not sufficient to actually establish a regular importation. It was an absolute impossibility to do so, and it must be borne in mind that 75 per cent. of the coal exported to Italy is handled by British ships and only 25 per cent. by neutral or Italian vessels. With regard to prices, owing to the increased cost of transportation, American coal is more expensive than the English. It appears, however, that we are preparing to make considerable reductions, which will facilitate the fulfillment of the desire which exists both in Italy and America to establish a regular service of supply.

Requirements of Certain Industries

The requirements of the Italian brick manufacturers are 60,000 tons per month even for a moderate activity in the industry; the metallurgical establishments are now renewing their activity after some months of depression; the steamship lines again in operation need 30,000 tons per month; the railroads now use 240,000 tons per month, but if Italy is to restore the service as it was before the war she will need at least 300,000 tons for her railroads. The gas works, at a reasonable estimate, use 76,000 tons per month, and in the end it will be necessary to let them have 100,000 tons, without calculating the needs of the recovered territory.

Ships Will Soon Be Available For Foreign Trade

The next thirty days will find our ships available for the world's foreign markets, according to a statement given to the American Manufacturers' Export Association by John H. Rosseter, Director of Operations of the United States Shipping Board.

Mr. Rosseter, in replying to a request of the Association for information regarding the recent report to the effect that the European civilian relief program would take a great many vessels away from export trade, gave assurances that the Shipping Board is making every effort to fairly meet the extraordinary demand for American ships.

"Until the economic policies that will control international commercial interests are actually declared by the Peace Conference," said Mr. Rosseter, "America's business interest must mark time in the march the country is to take into the markets of the world. The action of the Government as far as its present shipping policy is concerned has been taken, "asserted Mr. Rosseter," for the purpose of clearing away as rapidly as possible the clouds of uncertainty that now hang over the foreign markets of the world.

"If economic reconstruction and readjustment in international affairs is to be rapid," Mr. Rosseter continued, "the business and commercial interests of the country must for a very short time continue to evidence the remarkable spirit of patience so splendidly displayed throughout the months of the war. The situation in Europe today is exceedingly precarious. It is plainly the duty of the United States to aid in removing these conditions which are impeding a rapid and quick return to normal in the country's foreign commercial affairs. With this as a guiding purpose, the Government is sending one hundred million dollars worth of foodstuffs for distribution among the starving peoples of Europe. The completion of this food program is most important. The proper solution of the great questions now before the Peace Conference depends upon its successful completion. To successfully complete it, the Government has found it absolutely necessary to devote practically every ton of its available shipping to that end. Ships that are essential in regular foreign trade routes have been assigned to the food program. The Government realizes fully what this kind of disruption to ordinary and routine trade means, but I can give the business interests of the country the utmost assurance that this condition is only temporary.

"The Shipping Board has provided not less than 1,390,000 deadweight tons of steamers for European relief during a period of three months.

"The foreign business interests of the United States," Mr. Rosseter points out, "are giving precedence to two programs—the Government's food program on the one hand and the Army program on the other. The food program is being carried out for the purpose of infusing new life into the markets of Europe, Russia and the Balkans; the Army program, which is all-important, has to do with the bringing home of our boys within the shortest possible time. Ships play an important part in both these programs. Until they are completed, America's commercial interests must make the most of a difficult situation."

When asked specifically whether the Government was withdrawing ships from commercial purposes to assign them to the two programs mentioned, Mr. Rosseter replied:

"The fact is, that the commercial interests of the country have not been given the opportunity to utilize America's new merchant fleet. Conditions from the time we entered the war up to the present moment have been such that sacrifice was the watchword of America's business men as far as foreign markets have been concerned.

"I personally believe that the next thirty days will find our ships available for the world's foreign markets, and the industries of the country will no longer be obstructed for want of tonnage. Of course, as I have pointed out, we are now taking the first real and definite step toward that object—the completion of the two shipping programs now before the Government.

"Today I can happily say we see our way clearing to carrying in United States ships the total of all the European relief demands, and we can now turn our attention and our surplus ships to commercial needs."

Foreign Coal Trade Opportunity

An American consular officer reports that a man in Switzerland wishes to represent an American coal firm. References are furnished. Those interested may obtain the name and address by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its branches. Refer to Number 29180.

Increased Cost of Fuel in Argentina

Supplies of all kinds have increased tremendously in price in Argentina since the beginning of the war and have been hard to obtain at any price; but the increase in price and scarcity of fuel has contributed more directly than any other factor in increasing the cost and difficulty of operating the railways. Coal has risen in price from about $7 before the war to something like $50 in 1918; in 1916-17 the average price was about $25 or $30 a ton. In normal times the Central Argentine Ry. consumes annually about 400,000 tons; the Great Southern, 380,000; the Pacific, 280,000; the Western, 190,000; and other companies in proportion to their mileage and traffic. Not only has coal increased in price but the supply has been so limited that the railways have been forced to burn large quantities of wood.

It is estimated that the Great Southern, the Buenos Aires Pacific, the Buenos Aires Western, and the Central Argentine together use approximately 3,000,000 tons of wood annually under the present abnormal conditions. In addition, the industrial enterprises burn 8,000,000 tons, and all this fuel must be brought down from a restricted area in the northern part of the

republic. The carrying capacities of the lines serving this region are wholly inadequate, with the result that the Southern and some of the other systems having no wooded districts of their own to draw from have been unable to obtain sufficient wood at any price.

Coal Mining Development in Belgian Kongo

(British and South African Export Gazette)

Coal, and above all, good coking coal, is the one great essential to the adequate development of Katanga's vast mineral and other industrial resources. Had the great coal field, discovered some seven years ago in the region traversed by the Lukuga River, produced coal suitable for the manufacture of coke, it would doubtless have been exploited long ere this and despite the war, but we believe the small amount of development work originally attempted by the Societe Geologique et Miniere des Industriels Belges has long been at a standstill. Now, however, interest in the subject is revived in connection with the recent discovery—in which the concern mentioned participated—of important coal measures situated on the main railway line some distance north of Elisabethville. Whether these, unlike those in the region of Lake Tanganyika, will afford an early supply of coking coal remains to be seen. From the scanty evidence before us we are inclined to regard both fields as of very similar character, and, therefore, not likely to produce the class of coal required—at least, not until it becomes possible to carry the workings to a greater depth than has hitherto been reached.

In spite of this, there is good ground for anticipating a revival of practical work on the coal fields of Katanga, both in view of the great opening offering for bunker coal at Dar-es-Salaam, Zanzibar, and even Mombasa and Beira, and the advisability of converting the railway locomotives and lake steamboats of Katanga itself from the use of wood fuel to coal. With such large areas of coal measures already assured, it is unthinkable that a policy of inertia should be continued now that that incubus of war conditions is lifting, and especially in view of the possibility of striking coal suitable for the production of coke, for which the great local copper-smelting industry offers a market already large and capable of unlimited expansion. At present Katanga imports coal and coke from Rhodesia, mainly for the service of the copper-smelting industry to an annual value of, roughly, $262,500; but the country's actual requirements, in order to do away with the use of wood fuel and eventually to keep pace with the extension of the Cape to Cairo line northward, must far exceed this figure.

Abbreviations in Foreign Correspondence

American coal exporters, in corresponding with foreign firms, make frequent use of trade abbreviations and commercial terms which are not understood and cause considerable embarrassment. When an abbreviation is first used its meaning should be explained fully, as commercial terms, and particularly technical abbreviations, although familiar enough in business circles in the United States, may be entirely unknown abroad. Fluctuation in exchange and different systems of measurement cause sufficient perplexity to foreign merchants without this additional handicap of trade abbreviations or technical terms so often misunderstood or unintelligible.

Coal Mining in Coahuila, Mexico

The effects of the reëstablishment of the coal-mining industry in Coahuila, reports Vice Counsul Blocker from Piedras Negras, Mexico, under date of Feb. 20, have been very far-reaching, because other industries have been benefited. It is the opinion of well-informed persons that the development has reached a point where about 40,000 tons of coal (steam and railroad) and about 18,000 tons of coke are produced and marketed monthly, this being something like one-half and one-third, respectively, of normal production. The producers have now reached the point in their improvements and developments whereby the aggregate output could be rapidly and permanently increased to nearly normal, provided the market were in a condition to absorb the increase.

Owing to difficulties and peculiarities of the geographical and transportation conditions, it is economically impossible to market this coal south of Mexico City, on the west coast, in Sonora, Cananea, etc. To these districts fuels are imported, principally from the United States.

The recent great decline in the prices of metals, such as copper, lead and zinc, and the lack of a market for these ores, has affected the coal-mining industry. Several smelters have suspended operations entirely, and all have curtailed their work. This means a decrease in consumption of coal and coke.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Apr. 12	Amer. S.S. Roy H. Beattie	Pernambuco, Brazil	2,876	318
Apr. 14	Amer. S.S. Ulysses	Cristobal, C. Z.	12,035	992
Apr. 14	Nor. S.S. Eika III	Port Antonio, Jamaica	1,576	256
Apr. 15	Amer. S.S. Lake Lesa	Barbados, B. W. I.	2,908	724
Apr. 16	Nor. S.S. Nepos	Barbados, B. W. I.	4,094	414
Apr. 19	Ital. S.S. Veniero	Gibraltar (Italy)	7,000	700
Sewalls Point				
Apr. 15	Amer. S.S. Noord Brabant	Rio de Janeiro, Brazil	3,317	552
Apr. 19	Amer. S.S. Lake Champlain	Havana, Cuba	1,787	295
Newport News				
Apr. 14	Nor. Bk. Charles Racine	Rio de Janeiro, Brazil	2,490	....
Apr. 14	Amer. S.S. Lake Orange	Antilla, Cuba	2,452	274
Apr. 15	Amer. S.S. Lake Arline	Havana, Cuba	2,806	329
Apr. 16	Am. Sch. Geneva Kathleen	Santos, Brazil	934	....
Apr. 16	Amer. S.S. Lake Fondulac	Havana, Cuba	3,279	373
Apr. 17	Amer. S.S. Lakeside	Rio de Janeiro, Brazil	1,988	665
Apr. 18	Brit. S.S. Paparoa	Wellington, N. Z.	3,483	2,100
Apr. 18	Am. Sch. Jennie Flood Kreger	Rio de Janeiro, Brazil	2,628	....
Apr. 19	Amer. S.S. Craycroft	Cienfuegos, Cuba	2,678	400

Increase in Price of German Coal

Since Sept. 1, 1918, the price of coal and coke in Germany has doubled, reports the *Berliner Tageblatt* of Mar. 21, in printing the list of the basic rates effective Apr. 1, announced by the Rhenish Westphalian Coal Syndicate. Under the new schedule, the price of anthracite ranges from about $17 to $18 a metric ton (2200 lb.), coke brings from $20 to $22, and briquets from $15 to $16.50. This represents an advance since Jan. 1 of $5 a ton for coal and briquets, and $7.50 for coke. How much more than these prices is paid by the ultimate consumer is not noted.

The *Tageblatt*, while admitting that there is a certain justification for the rise because of the many strikes, which have kept down production and caused material increases in wages, laments bitterly over the decision of the coal barons, and declares that the high prices are dealing a heavy blow to German industry and constitute a real national calamity. It points out that the iron and steel men are likely again to increase the prices of their products as a result of the rise of the cost of fuel, and that the prospects for a resumption of German domestic and foreign trade are gloomy indeed. Before the war coal in Germany sold at from $4 to $5 a ton.

To Form Coal Export Association Under Webb Law

J. H. Wheelwright, of Baltimore, president of the National Coal Association, at a meeting of the Board of Directors of the association held at Cleveland, Ohio, on Apr. 23, told the directors that the Government had invited him to request the bituminous operators to form an export association, under the Webb law, somewhat similar to the organization of textile importers.

Mr. Wheelwright said Government officials had decided that assistance should be given to coal exporters in obtaining ships and in other ways, in order that conditions abroad might be alleviated by American coal and a permanent foreign trade in coal be established. Appointment of a committee to proceed with the formation of a coal exporters' association was authorized.

Coal for St. Lawrence Ports

The coal trade between Nova Scotia mines and St. Lawrence River ports, which was interrupted through an incident of the war, will likely be restored at an early date in consequence of a decision in the English courts in a suit brought by the Dominion Steel Corporation against a number of vessel owners. When war was declared the owners took the stand that their charters with the Corporation for carrying their coal were canceled, and sent the vessels on more lucrative business elsewhere for the past four years.

The value of this trade may be gathered from the enormous increase in imports of bituminous coal from the United States. During the year ending March 31, 1918, these imports of American bituminous coal to Montreal and Quebec amounted to $8,331,021, as compared with $2,418,169 for the year ending March 31, 1914. The difference, amounting to about $6,000,000 a year, will represent the amount of Nova Scotia coal trade to St. Lawrence ports which was lost through the action of these vessel owners. The courts have ruled that the vessels must be returned to the Dominion Steel Corporation until the expiration of their charters, which are on favorable terms for a long period of years, just as soon as they are released from Government service. The corporation will also claim heavy damages from the vessel owners for failure to carry out their contracts.

Coal in Maracaibo

Hard coal of good quality is found to the west of Maracaibo, in abundance on a concession owned by the Caribbean Coal Co., an American corporation. As yet no coal has been exported from this region, but it is expected that in a few years a railroad from the mines to deep water of the Gulf of Venezuela will be completed and that as much as 500,000 tons of coal can be exported from that mine annually.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Apr. 28 states that freight conditions are practically the same as a week ago, and that the few charters effected during this period were at the Chartering Committee's maximum rates. The demand for tonnage to carry coals to the River Plate has decreased considerably, and the report states that English firms are now selling Cardiff coal there at figures which American shippers cannot compete. Consequently American exporters are losing their share of the River Plate coal business.

The Chartering Committee's rates are as quoted below:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50; 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons dis. Rio, $19.50 net, 1000 tons dis.; Santos, $19.50 net, 1000 tons dis., or $21 net, 600 tons dis.; Buenos Aires, $18.50 net, 600 tons dis.; Montevideo, $19.50 net, 750 tons dis.; Pernambuco, $18.50 net, 500 tons dis.; Bahia, $18.50 net. To Nitrate Range, $165.50 gross, prepaid.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Rio Grande do Sul, $20.50 net, 400 tons dis.; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. To Nitrate Range, $16.50 gross, prepaid.

COAL AND COKE NEWS

EDITED BY ALEX MOSS

Harrisburg, Penn.

Representatives of some of the largest producers of anthracite and bituminous coal in Pennsylvania on Apr. 22 entered protest against any increase in rates for workmen's compensation at the second conference on the suggested amendments held at the Capitol.

B. M. Clark, of Punxsutawney, representing the Central Bituminous Operators' Association, and James E. Eichenauer, of Pittsburgh, speaking for the Pittsburgh Coal Operators' Association, said that any legislation for an increase would be ill-advised at this time, as conditions are abnormal, costs are at the peak, the market is depressed, and the mines of the state are facing serious competition from other states. Mr. Clark made an extended argument, saying that sales are now made at a loss and that he does not see any immediate betterment.

John Brophy, representing the central Pennsylvania miners, of which he is the president, said that the mine workers did not expect the industry to be at a low ebb always, and that "the coal companies can afford this increase and should be made to afford it; the miners expect it and feel that it is due them." Mr. Brophy said that the market conditions were bad now, but looked for an improvement.

Thomas Kennedy, president of District No. 9 of the anthracite mine workers, said he could not reconcile the statements of the anthracite operators' representatives in agreement with those of the men from the bituminous field, because the conditions in the hard and soft coal fields are entirely different. In the anthracite region the mines are working six days a week with an advance in price coming. The miners, he said, were promised an increase in compensation and have been patient. He said that faith should be kept with them and reminded his hearers that in western states farmers organized politically. In Pennsylvania, he said, the miners are organized.

Brownsville, Penn.

In the central Pennsylvania bituminous field the mines producing the United States Navy preferred grades of smokeless coal are faring well and working better than in the recent past. In the western Pennsylvania field there is little change. In the Connellsville coke region the reduction in output keeps steadily on, but there is a feeling among many that the bottom must soon be reached notwithstanding the controversy over steel prices.

The proxy committee of the United Coal Corporation has notified stockholders that since sending out the proxies for the annual meeting a proposition has been received from the J. H. Hillman & Sons Co., and approved by the board of directors of the United Coal Corporation, for the mutual operation of these and other properties, and that the name of the latter company be changed to "Hillman Coal and Coke Co." The proposition will be submitted for the approval of stockholders of the United Coal Corporation at the annual meeting to be held May 5.

There would not seem to be much doubt as to how this proposition will be received, as Mr. Hillman is the majority stockholder of the United Coal Corporation. The "other properties" will presumably include the Hecla Coal and Coke Co., of which Mr. Hillman is principal owner and president, and possibly the Thompson-Connellsville Coke Co., of which Mr. Hillman will soon obtain control.

Charleston, W. Va.

High rates to lake points from West Virginia's producing regions were impeding the fullest development of lake business during the third week of April, in addition, of course, to the fact that there was much coal still on hand in lake territory. Despite such conditions a slightly larger volume of coal was being moved from West Virginia to lake points than had been the case earlier in the month, but such increases were limited to one or two districts, tending, of course, to increase production in such districts.

Coal is moving to tidewater in about the same proportion as it had been in preceding weeks. Export orders are becoming somewhat more plentiful, some coal having been purchased for delivery to points in Sweden. The fullest development of export business has been greatly retarded insofar as West Virginia coal is concerned by a shortage of vessels. Such export orders as have been received, however, have given impetus to production at some mines in the state.

Strict adherence to the imposition of penalties for demurrage is tending to make tidewater embargoes no longer necessary. Shipments of coal for railroad use during the week ending April 19 see-sawed considerably. During part of the week railroad fuel constituted one-third of the total shipments from certain regions. By the middle of the week such shipments had materially decreased. Railroads are not purchasing West Virginia fuel on long-time contracts.

The large amount of coal it has been necessary to screen in getting out prepared sizes has had its effect on the price of slack, which being accumulated in large quantities, has declined to some extent.

Production at the most was not over 45 per cent. during the third week of April in West Virginia.

There are in the southern part of West Virginia a total of 767 mines, or rather mining properties. This is shown in geographical mining maps prepared by Secretary Walter H. Cunningham, of the West Virginia Coal Association, who resides at Huntington. Such properties are located on the Virginian, Chesapeake & Ohio, Norfolk & Western, Kanawha & Michigan, Coal & Coke and Kanawha & West Virginia railroads.

After May and June no further examinations to determine the fitness of miners to hold mine foremen's certificates will be given, but during May and June seven examinations will be held under the auspices of the State Department of Mines on the following dates and at the following places: Fairmont, May 13; Wheeling, May 20; Charleston, May 27; Mt. Hope, June 3; Thomas, June 10; Logan, June 17; Welch, June 24. Another examination will be held for the benefit of those taking the miner's short course, at the end of that course at the State University.

Huntington, W. Va.

In connection with the announcement recently made as to the plans of the Main Island Creek Coal Company at Sterrett, it is also stated that within a short time the company will be able to begin the operation of six new mines at that point, working in the Island Creek seam. Through the operation of those new mines the company will be able to increase its total product to the extent of 6000 tons a day at least. This will place the Main Island Co. among the large producers of the state, as the company has already an annual production of 846,696 tons. Opening of the new mines will relieve the unemployment situation in the Logan field, as many miners will be given work. In planning for the extension of operations the company is also giving much consideration to the advancement of living conditions among employees and is providing adequate recreational facilities.

Coal from the mines of the Island Creek Coal Co. operating in the Logan field, filling 23 barges, left Huntington on Saturday, Apr. 19 in one coal tow, the largest ever shipped by water from Huntington in one tow. Had the coal been loaded in average capacity railway cars it would have required 322 cars to transport the coal.

Fairmont, W. Va.

A number of mines in the northern part of the state, and particularly in the Fairmont region, are working on export orders, some of the coal so mined being for consumption in Sweden and some for consumption in Italy. Undoubtedly such a class of business has tended to prevent greater idleness among the mines in northern West Virginia. There would have been, and there would be now, a large volume of such business if only the vessel space could be secured for the transportation of such coal.

There was, to some extent, a diminution of lake shipments from the Fairmont region during the week ending Apr. 19. Coal was being moved to lake points at the rate of about 50 or 60 cars a day. Coal for tidewater was moved at the rate of about 40 or 50 cars a day; that is, from the Monongah division of the Baltimore & Ohio. While the shipment of railroad fuel started off with a flourish, it gradually diminished during the week, being at the rate of about 135 cars a day during the latter half of the week.

It is regarded as certain that over half the mines in the northern part of the state were idle during the week and that production on the whole was not over 45 per cent., if that much. Contrasted with previous weeks, the demand for coal is livelier.

Louisville, Ky.

The Northeastern Kentucky Coal Operators' Association, in session at Paintsville, Ky., recently decided to undertake welfare work on a much larger scale, in an effort to provide better roads, schools, churches, and homes for their employees, of whom there are about 20,000 in all. A committee was named which will investigate conditions in the best fields, and endeavor to go them one better in an effort to make the miners more satisfied.

A legislative committee was named to advise the members of all pending legislative enactments, either Federal or state, and to coöperate fully with the National Coal Association, American Mining Congress and Kentucky Mine Owners' Association in preventing antagonistic legislation, and for the purpose of having enforced good state and Federal laws relative to mineral rights, liquor, compensation matters, etc.

The Community Welfare and Publicity Committee will endeavor to bring about better relations between miners and mine owners, promote common interest between producers, employees, consumers and carriers, to the end that mines may be operated on a fuller and better schedule.

Victoria, B. C.

An action is in progress in the courts of British Columbia in which the Canadian Colliers (D), Ltd., are the plaintiffs and the Pacific Coast Coal Mines, Ltd., the defendants, the suit being for damages for trespass and for an accounting and payment for coal alleged to have been taken from the Alexandre mine property, South Wellington, in 1911. The plaintiffs maintain that the coal was taken without their knowledge or consent, and it is understood to be the plea of the defendants that whatever was done by them was with the consent of the plaintiff company's officials.

With further reference to the Settlers' Rights Act of British Columbia, which was disallowed by the Dominion government in 1917 and on being re-enacted by the Province last year was refused the signature of the Lieutenant-Governor, it is interesting to note that the Vancouver Island settlers interested are making a concerted move to bring their case directly to the attention of the Federal Government. Meetings of those who have property without the coal rights therein have been held, and it is probable that a delegation will leave the Pacific coast shortly to carry the grievances to the ears of those in control at the Canadian capital.

The Merritt Collieries, Ltd., is opening up a new No. 3 slope. It is the Diamond Vale field and when completed is expected to result in a material increase in the coal production of that section.

A distinct improvement is apparent in the coal production of British Columbia during the month of March in comparison with that of February, there being a difference of approximately 28,000 tons. The total for March is about 223,000 tons. The reason definite figures are not given is that

returns have not been received from one or more of the smaller of the Province's producing mines. In March the Crow's Nest Pass Collieries were working at least five days a week, which is better than was done in February. It may be observed incidentally, in connection with the Vancouver Island output, that the new Wakesiah mine of the Canadian Western Fuel Co., which was expected to be in operation by this date, is still in the development stage, the work of opening up the property having ceased some weeks ago.

New York, N. Y.

Charles S. Allen, secretary of The Wholesale Coal Trade Association of New York, representing that organization and a number of individual producers and shippers, has filed with the Interstate Commerce Commission the complaint authorized by the Association, against Walker D. Hines, Director-General of Railroads, and 23 railroad companies as defendants with a view of having the Commission establish new demurrage regulations and also to issue an order to prevent the collection of any unlawful demurrage charges which have been assessed against the complainants since Dec. 1, 1918, and which remain unpaid at the present time.

These charges, Mr. Allen estimates already amount to $500,000 on bituminous shipments in the New York harbor alone, and to $1,000,000 on shipments of anthracite and bituminous in the ports of New York, Baltimore and Philadelphia.

Mr. Allen in his complaint charges discrimination against the tidewater ports in that Mr. Hines or his agents, the railroads, maintain at the so-called lake ports a demurrage rate or charge of $1 per car per day in excess of five days, or other number of days, or free time averaged over periods of six months, or any other periods exceeding one month, while contemporaneously maintaining at the so-called tidewater ports of New York, Philadelphia, Hampton Roads and Baltimore a demurrage rate of $2 per car per day in excess of five days' free time average over a period of one calendar month, which he says "results in an undue and unreasonable preference and advantage to said 'lake ports' and an undue and unreasonable prejudice and disadvantage to the said 'tidewater ports' and to the other consuming centers to which coal is shipped through such ports; and also results in undue and unreasonable preference and advantage to buyers in the coal fields shipping to or through the lake ports as against buyers shipping to or through the tidewater ports; that if due consideration be given all the facts, circumstances and conditions surrounding the transportation, delivery and handling of coal to the tidewater ports as compared with the lake ports, a longer free time, averaged over a longer period and with no higher demurrage charge or penalty would be justified at the tidewater ports than at the lake ports."

On and after today (May 1) the office of J. W. Howe, Commissioner of the Tidewater Coal Exchange, will be located in this city instead of in Washington, D. C. At the same time it was announced that J. W. Searles, the Deputy Commissioner at New York, had resigned and would return to his former position as sales manager of the Pennsylvania Coal and Coke Corporation in the Whitehall Building, and that A. D. Thompson, who was assistant to Mr. Searles, had also resigned and had accepted a position with the Wittenberg Coal Co., 11 Broadway. R. A. Magruder, who was chief clerk in the Washington office of the Exchange, will continue to occupy the same position in the New York office.

Bids were opened in the New York War Department offices on Apr. 22 for furnishing and delivering 5500 tons of bituminous coal, deliveries to be made between May 1 and June 30 to places designated by the Quartermaster's Corp. Bids were based on net tons f.o.b. mines, and were as follows: Alden Coal Mining Co., Pool 10, $2.38; Pool 11, $2.24. Whitney Coal Mining Co., Philadelphia, Pool 11, $2.10. Cortright Coal Co., Philadelphia, Pool 4, $2.75; Pool 9, $3.10; Pool 10, $2.95; Pool 11, $2.60. E. P. Bavlo, Hampton, N. J., Pool 10, $2.09½. Dickerman & Englis, Pool 10, $2.65. Salem Coal & Coke Co., Clearfield, Penn., Pool 14, $2.49. Curry Coal Mining Co., Expedit, Penn., Pool 10, $2.60. Huskin Coal Mining Co., Windber, Penn., Pool 10, $2.75. Midland Mining Co., Cumberland, Md., Pool 10, $2.65. Seaboard Coal Co., New York, Pool 11, $2.60. Indiana Smokeless Coal Co., Pool 11, $2.09. Barnes & Tucker, Philadelphia, Pool 10, $2.55. Operators' Coal Mining Co., Johnstown, Penn., Pool 10, $2.65; Pool 11, $2.65. Campbell, Peacock & Kinzer, Philadelphia, Pool 10, $2.13.

PENNSYLVANIA

Anthracite

Middleport—The Kaska colliery of the Alliance Coal Co., near here, will be placed in operation soon. The dewatering of the workings is a big job and is causing the delay in resuming mining at this time.

Harrisburg—President John Brophy, of the central Pennsylvania or No. 2 district of the United Mine Workers of America, with a large delegation of union men on Apr. 9, made a strong protest against the terms of the anti-sedition bill.

Wilkes-Barre—As soon as an adjustment is made of the assessment valuations on its property in Dauphin County, the M. A. Hanna interests intend to electrify their collieries. It is declared that the proposed change will cost between $1,250,000 and $1,500,000. Steam is now being used for power.

Berwick—Coal dredging in the Susquehanna River between Berwick and Bloomsburg has already begun with excellent prospects of securing large quantities of coal at a profitable producing cost. Several ambitious Columbia County coal dredgers make more than a comfortable living in this business.

Hazleton—Engineers employed by Weston Dodson & Co. at their Locust Mountain colliery are now engaged in making a survey of the G. B. Markle Co. operations, with a view to applying more efficient mining plans. The presence of these men on the Markle property gave rise to a rumor that the Dodson company would acquire the Markle holdings, which rumor was promptly denied by the latter company.

McAdoo—A corps of engineers has been busy between this point and Rush Valley during the past few weeks, but its mission is a mystery. The work of proving for anthracite is under way on the Kinkie tract, at Quakake, and it is thought that the survey is in connection with this activity. Miners who were employed at Silver Brook years ago declare that there is plenty of coal in the basin which lies between Hazleton and Tamaqua.

Carbondale—The Lackawanna County Coal Co. has opened an office in this city. The new concern owns in fee the West Mountain Coal Co.'s property at Jermyn and will operate on a fee-simple lease the property of the Falls Mining Co. and on lease terms the Northeast colliery at Simpson. About two million tons of coal are said to be available for mining at the three holdings just enumerated. In the near future all the coal from the three workings will be prepared for market at the Northeast breaker. The breakers at the Falls and Jermyn plants will be dismantled. It is planned to spend about $50,000 in modernizing the Northeast colliery, and operations at the collieries will be enlarged. Electric equipment is being installed at all the plants. Coal-cutting machines are also to be provided.

Bituminous

Indiana—Pleasant Valley, a village a short distance from Lovejoy is to be the location of a new coal plant to be built by the Clearfield Bituminous Corporation. Lumber is already on the ground.

Altoona—Thirty miners presented themselves for examination here, Apr. 8, when the examining board for the tenth bituminous district met to inquire into their fitness for the offices of mine foreman and fireboss.

Portage—Alexander Brown, of Portage, a mine foreman, died at the Memorial Hospital, Johnstown, of injuries sustained on Apr. 12 in the Brown and Ghroke coal mines at Portage when he was caught under a fall of rock, the rock crushing his chest.

Webster—The United Coal Corporation is changing its Ella mine, near here, from making its own power, to power purchased from the West Penn Power Co. The rope haulage and fan, which are now steam-driven, are also being changed to electric drive.

Savan—The new mines of the Dor-Mar Coal Co. here have been closed for a period of two weeks on account of the installation of new machinery. Boilers and a haulage engine have been added to the equipment and the mines resumed work a week ago Monday.

Brownsville—The Snowdon Coke Co., operating near this place, has purchased seven acres of surface about halfway between its operation and Brownsville, on the Pittsburgh-Brownsville paved road, and will build thereon a number of houses for their employees during the spring and coming summer.

It is reported that an agreement has been reached between J. Harte Hillman, Jr., of Pittsburgh, Penn., president of the Hecla Coal and Coke Co. and William H. Brennan, of Uniontown, Penn., president of the Thompson-Connellsville Coke Co., whereby Mr. Hillman will take over the control and management of the Thompson-Connellsville Coke Co. May 1 instead of waiting till July 1, as previously arranged.

Waterman—The store of the Traders' Supply Co. at the Coy mines near here was destroyed by fire recently. Upon investigation it has developed that it is the work of some dissatisfied workmen in this vicinity. The loss is placed at several thousand dollars as the building and stock was a total loss.

Johnstown—Almost one hundred applicants appeared before the examining boards of the sixth, twenty-fourth and thirtieth districts at the examination held here last week. All the boards held the examination in the same room. The thirtieth district board had the largest number, with 44 applicants for mine foreman.

Indiana—One of the landmarks of Indiana, Library Hall, is being torn down. Library Hall stood on the large plot of ground on Church St., which was purchased by the Rochester & Pittsburgh Coal and Iron Company as a site for their new office building here. Work will probably be started on the new building at once.

Homer City—The tipple of the Homer City Coal Co. at the Tearing Run mine was partially destroyed recently by a charge of dynamite being exploded under one of the tipple piers. There has been considerable trouble with some of the miners in this vicinity lately, and this is thought to have been a plot by the miners to get even for the coal companies in closing down some of the mines here. The company has offered a reward of $500 for the arrest of the dynamiters.

DuBois—The fourth bituminous district had only 29 applicants for certificates when the inquisitorial board met under the leadership of J. I. Thomas, the inspector of the district.

Consolidated Coal Co. officials inspected nearly all the mines of that company in West Virginia on Friday, Apr. 11, the party including Carl R. Gray of Baltimore, president of the Western Maryland Ry. and a director of the coal company; Geo. T. Watson, assistant to the president; Frank Lyon of Fairmont, general manager of operations; A. Brooks Fleming, Jr., Assistant general manager of operations; C. H. Tarleton, manager of the West Virginia division; A. T. Watson, purchasing agent; F. K. Day, district superintendent; L. A. Riggs, division engineer; F. R. Raeder, district engineer; H. R. Pratt, of Baltimore, chief engineer of the Western Maryland Ry.

Pittsburgh—The Pittsburgh Coal Co. has nearly completed a three-mile connection to its Montour-Clairton branch in the southern part of Allegheny County and the northern part of Washington County in order to develop over 4000 acres of the finest coal in these two counties. The officials regard the construction of this new branch and the development of the new mine, which will be known as "Montour No. 10," as the most important work undertaken by the organization in several years, both in size and immediate results. The output will run about 5000 tons a day. Most of the miners who will work the mine will come from the Lick Run mines of the company on the Baltimore & Ohio Railroad, a few miles below the new development.

WEST VIRGINIA

Elkins—The Elkins Coal and Coke Co. has recently completed the entire electrification of its local plant. Power for operation is furnished by the West Virginia Traction and Electric Company.

Logan—Impetus has been given to the production of coal at the Logan mines of the Hutchinson Coal Co. by the receipt of orders for coal for lake delivery, such orders insuring operations on a full-time basis for the present.

Fairmont—So as to provide for additional railroad facilities the Connellsville & Dawson Coal Co. is planning for the construction of a double side track from its mines to the Baltimore & Ohio R.R. at Westchester, W. Va.

Fayette—The new power plant of the Ajax Coal Co. will be ready for operation June 1. The buildings are of stone and the equipment consists of two 150-hp. boilers, one 136-hp. engine, 96 kw. The work is being looked after by J. H. Belcher, of Cedar Grove, W. Va.

Wheeling—The Wheeling & Lake Erie Coal Co., a subsidiary of the M. A. Hanna Co., has completed negotiations for the acquirement of the three mines of the Pittsburg-Belmont Coal Co., located in Belmont

County, Ohio. It is understood that the consideration was about $1,500,000.

Thomas—For the time being, work has been suspended at the Elk Garden, West Virginia Junction and Davis plants of the Davis Coal and Coke Co. This suspension is of course only of a temporary nature. The company is operating its mines elsewhere on a basis of four days a week.

Alton—The Huston-Ziler Coal Co., which recently filed articles of incorporation with a capital of $100,000, is understood to be arranging plans for the commencement of work at an early date for the development of a tract of about 200 acres of coal properties acquired. It is expected to have an initial daily capacity of about 1½ cars.

Macdonald—The question of building new tipples at its plant at Whipple, Summerlee and Lochgelly, W. Va., is under consideration by the New River Co., operating in the New River field, the company having in mind an increase in the capacity of its mines, which now produce coal at the rate of 12,000 tons a day when in full operation.

Benwood—Announcement has been made that operations have been suspended indefinitely at the local plant of the Semet-Solvay Co., manufacturer of coke, effective Apr. 12, to allow for extensive improvements, etc. It is understood that the coal-mining industry in local sections will be effected by the suspension, as they furnish thousands of tons of coal to this plant monthly. This is the first time that the company has suspended operations in the past three years.

Fairmont—The Federal Government paid over to the owners of the land on which the plant of the Domestic Coke Corporation is being built the sum of $64,000. This was in payment for about 60 acres of land. The price paid per acre varied from $1000 to $1700. The number of men now engaged in construction work on the by-product plant is now in the neighborhood of 300. Work is also being pushed on a connecting track with the line of the Baltimore & Ohio Railroad.

Wheeling—With $1,500,000 said to have been the price paid, the Pittsburgh Belmont Coal Co., operating in the Eastern Ohio field, has come under the control of the Pittsburgh & Lake Erie Coal Co., one of the properties of M. A. Hanna & Co. This deal exceeds in magnitude any of recent months in eastern Ohio territory and involves a change in the ownership of three mines—No. 1 and No. 2 at Neff's and the No. 3 at Lafferty—making eight mines in all which will be operated by the Pittsburgh & Lake Erie Co. Acquisition of three additional mines will give the Hanna interests a greatly increased production in eastern Ohio. It is said, in fact, to be their intention to make their operations the largest in that field. Alexander Neff, president of the Pittsburgh Belmont Co., and Franklin Neff, vice president of that company, will probably remain with the new owners of their mines.

ALABAMA

Birmingham—Incomplete reports in the hands of Chief Mine Inspector C. H. Nesbitt, indicate a total coal production of approximately 18,000,000 net tons in Alabama during 1918. The output for 1917, the largest on record, was 20,413,811 tons. It is estimated that the coke production will fall short around 500,000 net tons, the make for 1917 being 4,868,598 tons.

OHIO

Zanesville—Realty deeds filed recently for record show the sale of the Harold Robertson farm, 385 acres in Washington Township, to Edward A. Laugenbach, of Canton.

ILLINOIS

Nokomis—The Nokomis mine, the Kortkamp mine, the Taylor Springs mine and the two Witt mines, which have been in the hands of T. C. Keller, receiver, were recently sold and bought in by the bondholders and will hereafter be operated as the Illinois Coal Properties Co., with Keller as superintendent.

Springfield—The Capitol Mine of the Springfield District Coal Mining Co. has been closed down and will remain closed several weeks while repairs are being made. The Nadrews and Woodside mines are also closed temporarily.

A bill has been introduced in the house providing for the inspection of coal mines every six months by inspectors employed by the Department of Mines and Mining. It has been referred to the Committee on Industrial Affairs.

Auburn—Two miners, Harry H. Sanders and Edward Smith, were recently killed by an explosion in Panther Creek mine, four miles north of here, attributed to a windy shot. Two mules also were killed. The two men were the only miners in the part of the mine where the explosion occurred. The accident occurred at 5 o'clock, just after the night shift had ceased work. The mine is a new one, about 300 ft. deep, owned by Solomon Brothers, of Auburn, and employs about 140 men.

Hillsboro—Drill tests of the quantity and quality of the coal field between Bunker Hill and Shipman are so satisfactory that A. W. Crawford, of this place, who represents a syndicate, announces that the coal rights of 15,000 acres will be paid for as soon as the titles can be secured. What interest is behind the proposed new development has not been made known, but J. D. Hurd, of Los Angeles, Cal., has been conferring with Crawford. The latter states that the field will not be developed, probably, for two years.

INDIANA

Terre Haute—Strikes affecting 840 miners in three mines are reported in the Terre Haute region. About 300 men are out at the Hall-Zimmerman Black Bettie mine. The trouble is said to be due to division of daywork. About 300 more men are out at Fayette mine, where the same kind of trouble exists. The Vandalia mine No. 28 has also closed for the same cause.

Du Quoin—Drilling has recently been completed on a tract of land 1½ miles south of town, owned by H. C. Miller, of the First National Bank of this city. The results of the test have not yet been made public and it is not known how soon steps to develop will begin.

It is reported that the Federal mine near Carterville, southeast of here, formerly known as the Burr mine and owned by the Peabody Coal Co., Chicago, is to begin hoisting coal again next week after being shut down since last November. According to Superintendent C. L. Rudder, the mine is to operate steadily from now on for an indefinite period. It is understood that the company has secured a large contract which will keep the mine working five days a week.

De Soto—The De Soto Coal and Mining Co., of which Frank Dickie is superintendent, is sinking its shaft down into a second vein of coal which was found to be of good quality coal from 3 to 4 ft. thick and good roof over it.

The E. J. Scott Coal Co., operating a strip mine at the southern edge of the city limits, is steadily increasing its daily output. The stripping is being done with a Bucyrus shovel which is said to be one of the largest in use. At the present time coal is being produced every day and one day's output fills from 30 to 35 railroad cars. The vein, which lies from 40 to 50 ft. underground, is an excellent grade of coal and is clean, as it is mined without special preparation. After the large Bucyrus shovel has uncovered the coal it is then loosened with dynamite and loaded into railroad cars by a smaller-sized caterpillar-type shovel.

Personals

James O'Donnell, a former mine inspector, is now superintendent of the new Raven Run Coal Co. at Raven Run, Penn.

Edgar E. Pike, who in civil life is president of the Marion County Coal Co. at Centralia, Illinois, is now in the U. S. Army service in the recently opened Army Hospital at St. Louis.

G. A. Murphy has severed his connections with the Independence Coal and Coke Co., Salt Lake City, Utah, to accept the superintendency of the Spring Canyon Coal Co. operations at Storrs, Utah.

W. H. Williams has resigned the vice presidency of the Hudson Coal Co., Scranton, Penn., to become president of the Wabash R.R., with offices in New York. **Charles Dorrance, Jr.**, general manager, has been named to succeed Mr. Williams.

Edward M. Fuller, construction engineer of the Utah Fuel Co., Salt Lake City, Utah, has tendered his resignation, to take effect May 1. Mr. Fuller will enter into a partnership with J. J. Coan, their business being engineering and contracting, under the firm name of Coan & Fuller, with offices at Salt Lake City, Utah.

Harold E. Bissell, a well known coal man, holding, for a number of years past, the positions of secretary-treasurer of the Black Diamond Coal Co., and secretary of the Benoit Coal Co., affiliated interests at Birmingham, Ala., has severed his connection with the above companies and purchased the business of the W. W. Phelps Motors Co., distributors for the Reo and Marmon cars in the Birmingham district.

G. C. Weitzell, who was president of the New Pittsburgh Coal Co., of Columbus, Ohio, when it was absorbed by the Pittsburgh Coal Co., has been made vice president of the late company in charge of Ohio and Kentucky mining properties and operations. **J. B. L. Horsberger** has been made vice president and comptroller in charge of taxes and insurance, with headquarters in Pittsburgh.

Capt. Le Roy Aikman, a member of the Alaska Fuel Commission, has been ordered to report for duty in Alaska and has departed for the Pacific Coast after a few days' visit with relatives in southern Illinois. Capt. Aikman was stationed in Alaska in 1912 at the time the Navy was making investigations of the fuel situation in that territory, and the return trip is to complete this work. The first experiment made by the Government showed that the Alaska coal was not equal to the West Virginia Pacahontas coal, while the second test from another field showed but a fraction of one per cent. difference in heat units between the two coals.

Coming Meetings

American Wholesale Coal Association will meet on June 3 at Cleveland, Ohio. Secretary, L. Romanski, Chicago, Ill.

Illinois Mining Institute will hold its annual meeting May 22, 23 and 24. Secretary, Martin Bolt, Springfield, Ill.

National Coal Association will meet May 21, 22 and 23, at Congress Hotel, Chicago, Ill. Secretary, J. D. A. Morrow, Washington, D. C.

Illinois and Wisconsin Retail Coal Dealers' Association will meet at Hotel Nelson, Rockford, Ill., June 4 and 5. Secretary, I. L. Runyan, Chicago, Ill.

International Railway Fuel Association will hold its annual meeting May 19-22 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

Retail Coal Dealers' Association of Texas will hold its annual meeting on May 19 and 20 at Fort Worth, Tex. Secretary, C. R. Goldman, Dallas, Tex.

Central Pennsylvania Producers' Association will hold its annual meeting May 15 at Chamber of Commerce Building, Altoona, Penn. Secretary, Charles O'Neill, Altoona, Penn.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 10 in the Keith and Perry Building, Kansas City, Mo. Secretary, C. N. Fish, Leavenworth, Kans.

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind., subject to ratification of executive committee. Secretary, J. W. Paul, Pittsburgh, Penn.

National Retail Coal Merchants' Association will hold its annual convention at Buffalo, N. Y., May 14-16, with headquarters at Lafayette Hotel. Secretary-Manager, E. B. Gordon, 1727 Pennsylvania Ave., Washington, D. C.

Kentucky Mining Institute after having skipped two years, one on account of the war and the other due to the influenza epidemic, expects to hold its annual meeting this year. While the date and place of meeting have not definitely been set, it will probably be held on May 30 and 31 at Lexington, Ky. Secretary, C. W. Strickland, Huntington, W. Va.

Trade Catalogs

Stowage of Ship Cargoes. Compiled by the Division of Tabulation and Statistics. War Trade Board, Bureau of Research and Statistics. Unillustrated; pp. 69; 5¾ x 9½ inches.

Vulcan Soot Cleaners for Return Tubular Boilers. Vulcan Soot Cleaner Co., Dubois, Penn. Bulletin. Pp. 4; 8½ x 11 in.; illustrated. Describes the Model M front-end type and the Model R rear-end type. Illustrations show the cleaner installed in typical settings.

Use of Shoveling Machines in Underground Mining. Myers-Whaley Co., Inc., Knoxville, Tenn. Catalog. Pp. 20; 10½ x 8¼ in.; illustrated. An interesting compilation of data concerning the general

construction of shoveling machine. Many applications of the machine in actual practice are given.

The Strong Arm of Industry. Electric Hoist Manufacturers' Association, New York, N. Y. Booklet. Pp., 12; 8½ x 11 in.; illustrated. Issued for the purpose of affording the reader some conception of the large field of usefulness for overhead electric hoists. Twenty-two different hoist applications are pictured.

Steamobile Road Truck. Winslow Boiler and Engineering Co., Chicago, Ill. Catalog. Pp., 16; 8x 10½ in.; illustrated. Introduces the application of the steam power plant in the automobile field. The boiler and engine comprising the power plant are described and pictured, and the specifications given for a five-ton steamobile truck.

Publications Received

The Inflammability of Aluminum Dust. By Alan Leighton. Technical Paper 152. Department of the Interior, Bureau of Mines. Unillustrated, pp. 15, 5¾ x 9¼ inches.

Seventh Annual Report of the Bureau of Labor. Department of Agriculture of the Province of Saskatchewan. For the twelve months ended Apr. 30, 1918. Unillustrated, 30 pp. 6¾ x 10 inches.

The Economical Use of Coal in Railway Locomotives. University of Illinois Bulletin; Vol. XVI., No. 2. Circular No. 8. Engineering Experiment Station. Illustrated, 76 pp., 6 x 9 inches.

California Mining Statutes Annotated. By J. W. Thompson. (Includes all California mining laws.) Bulletin 161, Law Serial 13. Department of the Interior, Bureau of Mines. Unillustrated, pp. 311, 5¾ x 9 inches.

Fume and Other Losses in Condensing Quicksilver from Furnace Bases. By L. H. Duschak and C. N. Schuette. Department of the Interior, Bureau of Mines. Technical Paper 96. Illustrated, 28 pp., 6 x 9 inches.

Coal South of Mancos, Montezuma County, Colorado. By A. J. Collier. Department of the Interior, U. S. Geological Survey. Bulletin 691-K. Contributions to economic geology, pages 293-310; illustrated; 6 x 9 inches.

Saving Coal in Steam Power Plants. Reprint of Engineering Bulletin No. 2, prepared by the United States Fuel Administration in collaboration with the Bureau of Mines. Technical Paper 217. Illustrated, 8 pp., 6 x 9 inches.

Preliminary Report of the Mineral Production of Canada During the Calendar Year 1918. Prepared by John McLeish, B. A., Chief of the Division of Mineral Resources and Statistics. Canada Department of Mines, Mines Branch. Unillustrated, 24 pp., 6½ x 10 inches.

Recent Coal and Coke Patents

Dump Car. H. S. Hart, Chicago, Ill., 1,289,035. Dec. 24, 1918. Filed Sept. 3, 1918. Serial No. 252,317.

Ash Sifter. R. Le Mond, Plainfield, N. J., 1,288,062. Dec. 17, 1918. Filed Dec. 18, 1916. Serial No. 137,630.

Coal Jigger. J. F. Wagner, Tamaqua, Penn., 1,288,311. Dec. 17, 1918. Filed Apr. 23, 1918. Serial No. 230,331.

Shield for Furnaces. J. R. Rishebegar, Braddock, Penn., 1,287,104. Dec. 10, 1918. Filed Apr. 17, 1918. Serial No. 229,116.

Coke Wharf. C. K. Baldwin, assignor to Robins Belt Co., Passaic, N. J., 1,287,179. Dec. 10, 1918. Filed May 12, 1915. Serial No. 27,663.

Furnace. A. Nilson, assignor to Eureka Smokeless Furnace Co., Chicago, Ill., 1,287,-081. Dec. 10, 1918. Filed Jan. 19, 1917. Serial No. 143,228.

Method of Forming Baffle Walls in Boilers. F. J. Jewell, Rome, N. Y., 1,288,-014. Dec. 17, 1918. Filed Oct. 17, 1918. Serial No. 258,662.

Apparatus for Handling Coal. R. M. Bickley, assignor to Heyl & Patterson, Inc., Pittsburgh, Penn., 1,288,375. Dec. 17, 1918. Filed Mar. 20, 1915. Serial No. 15,833.

Rotary Mine Car Dump. J. H. D. Petersen and A. J. Sayers, assignors to Link-Belt Co., Chicago, Ill., 1,286,580. Dec. 10, 1918. Filed Jan. 7, 1918. Serial No. 210,767.

Industrial News

Tiffin, Ohio—The Schaffer Engineering and Equipment Co. announces that it has changed the location of its offices from Tiffin, Ohio, to the Peoples Bank Building, Pittsburgh, Penn.

Pittsburgh, Penn.—The Concordia Safety Lamp Co. announces its removal from 420 Fulton Building to 317 Highland Building, Penn and Highland Aves., East End, Pittsburgh, Penn.

Charleston, W. Va.—No time will be lost by the Tolbert Smokeless Coal Co. in rebuilding the tipple and store building of the company. These structures were burned down in a fire a few weeks ago.

Morgantown, W. Va.—The West Virginia Traction and Electric Co. has recently completed the installation of a quantity of new coal-handling apparatus in the Morgantown power plant, to facilitate operations.

St. Louis, Mo.—The two-story frame coal chute of the Terminal Railway Association of St. Louis at Brooklyn, Ill., was destroyed by fire recently, with a loss on building, equipment and contents of about $100,000. The cause is not known.

Newcomer, Penn.—The Continental No. 3 mine of the H. C. Frick Coke Co., at this place intends erecting a belt conveyor from the bottom of the slope to the mine entrance, the coal being dumped into a railroad tipple without further transportation.

Wenonah, N. J.—A community coal yard is maintained by this village. When coal arrives citizens who have filed orders are notified to send check or cash to cover cost plus a slight margin for operating expenses. The borough teams then deliver the coal.

Charleston, W. Va.—With a capital of $25,000 the Curtis Branch Coal Co. has been formed, this company intending to establish operations at Ashford on Coal River, E. E. Huddleston of this city and others being the prime movers in the organization of the new company.

Columbus, Ohio—The Columbus Board of Education will soon advertise for bids for approximately 6000 tons of coal for the various school buildings of the city. Several dealers are urging the board to buy early in order that better service in the way of delivery can be rendered.

St. Clairsville, Ohio—The Pittsburg Belmont Coal Co., which has been operating three mines in Belmont County, has sold its holdings to the Wheeling & Lake Erie Coal Co. at a price about $1,500,000. The first-named company was controlled by Columbus and St. Clairsville men.

New York, N. Y.—There was carried by the Lehigh Valley R.R. Co. during the year ended Dec. 31, 1918, 15,522,953 tons of anthracite and 4,826,049 tons of bituminous coal and coke, according to the annual report of the company. In 1917 the road carried 14,916,894 tons of anthracite and 3,784,672 tons of bituminous coal and coke.

Boston, Mass.—The Bailey Meter Co. will move its main office and works from Boston to Cleveland, Ohio, effective May 1. The Boston office, with H. D. Fisher as manager, is retained to handle sales and engineering service work in the New England district. For the present, New York and Philadelphia districts will be covered from Boston and all other districts will be covered from Cleveland.

New York, N. Y.—The newly organized S K F Industries, Inc., held a sales convention at Hotel Traymore, Atlantic City, Apr. 29, 30 and May 1. The sales policies and methods of the new company, which is a consolidation of S K F Ball Bearing Co., the Hess-Bright Manufacturing Co., Atlas Ball Co. and Hubbard Machine Co., were discussed. About 45 salesmen and executives were present.

Allentown, Penn.—The Traylor Engineering and Manufacturing Co., by means of an attractive four-page folder, extends to those interested an invitation to visit its shops during the week of Apr. 28 and view the 60-in. Traylor "Bulldog" gyratory crusher built for the Michigan Limestone and Chemical Co. This is said to be the largest stone crusher in the world, having two receiving openings, each 60 x 190 in., and a capacity of 2500 tons of crushed stone per hour.

Columbus, Ohio—The Sunday Creek Coal Co., recently formed by a consolidation of the properties of the Sunday Creek Coal Co., of New Jersey, the Buckeye Coal and Railway Co. and the Ohio Land and Railway Co., has opened branch offices in Grand Rapids, Chicago, Toledo, Findlay and Ft. Wayne. The Toledo office will be under the charge of M. D. Kinsey, the Grand Rapids office under the charge of R. D. Teele, and the Findlay office in charge of F. J. Kelly. Other managers will be named later.

Cleveland, Ohio—Bituminous operators producing three-fourths of the country's soft coal rejected a proposal made by Fuel Administrator Garfield to the end that the Government continue to direct the affairs of the industry after the proclamation of peace. The plan, which had been submitted to operators and miners for ratification or rejection, came before the directors of the National Coal Association at a meeting held Apr. 23 on a referendum vote from approximately 2500 operators. Directors had been instructed by the various producing fields as to how they should vote.

Marion, Ill.—The White Ash mine at Marion, southeast of Duquoin, has been closed down in order to render it possible to make extensive repairs. A new dynamo is being installed, the tipple rebuilt and automatic loaders provided. No. 8 mine, at Clifford, owned by the Big Muddy Coal and Iron Co., started operating again Tuesday, Apr. 15, after being closed down since last November. During the intervening time extensive improvements have been made, a new wash house has been built and much money expended in repairing and replacing equipment.

New York, N. Y.—Of interest to all users of bearings is the recently announced reorganization, effective May 1, whereby the products of the Hess-Bright Manufacturing Co., the S K F Ball Bearing Co., the Atlas Ball Co. and the Hubbard Machine Co. will be sold through one central organization. The new company will be under the direction of B. G. Prytz, president; W. L. Batt, vice president; J. P. Walsh, comptroller, and S. B. Taylor, sales manager. The principal office will be at 165 Broadway, New York City, with branches at Boston, Philadelphia, Atlanta, Buffalo, Cleveland, Detroit, Cincinnati, Chicago and San Francisco.

Charleston, W. Va.—There were only 18 fatalities in and around West Virginia mines during March, the lowest number recorded in some time. It seems to be impossible to guard falling roof slate, etc., that still being the largest single cause of fatal accidents in the mines, as, for instance, the total number of fatal accidents from that cause in March was 18—66⅔ per cent. of the entire number. Two deaths followed mine car accidents within the mines and a mine machine accident was responsible for another death. Mine car accidents on the outside of the mines cost the lives of two men. There were six fatal accidents in McDowell County and five in Fayette. Of the total number of mine fatalities in March, 11 were among Americans, the remaining seven being foreigners.

Columbus, Ohio—Ohio produced 47,849,-236 tons of coal in 1918, states George F. Miles, chief statistician of the Ohio Industrial Commission, in a bulletin issued Apr. 19. This showing exceeds by 6,000,000 tons that of any previous year, and was made under the impulse of speeding-up measures incident to war needs. Belmont County, in the eastern Ohio field, is credited with 12,165,253 tons, or about one-fourth the total for the entire state. Jefferson County ranks next, with 7,226,314 tons, and Athens County, in the Hocking district, is third with 6,654,682 tons. the other seven of the ten leading coal-producing counties had the following production: Guernsey, 4,493,718 tons; Perry, 3,542,338; Hocking, 2,347,657; Tuscarawas, 2,102,419; Harrison, 1,817,730; Meigs, 1,372,468; Noble, 994,889. The state's output was contributed to by 31 counties. Five-sixths of the mining was done by machinery.

Huntington, W. Va.—The Ohio Valley Mine Car and Manufacturing Co. has been organized principally through the efforts of Huntington business men with an authorized capital of $400,000. The company will manufacture mine cars and other mine equipment for sale to mines in West Virginia and Kentucky, but its plant—yet to be built—will be at Ironton, Ohio, the site for buildings having been provided by the Chamber of Commerce of that community. Pending completion of the new plant, the buildings of the Ohio Valley Machine Works, which have been purchased by the new company, will be utilized, this company having been engaged in the manufacture of mine cars. The new company was organized mainly through the efforts of M. E. Brown, of the Nuller Supply Co., John W. Herron, president of the Ohio Valley Bank, and M. Ferguson, vice president of that institution. The company will employ 150 men or more.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Soft Coal Market Still Unsettled—Operators Do Not Want Federal Control to Continue After Peace Is Signed—Prices Being Maintained—Production Decreasing—Anthracite Industry in Full Swing—Steam Coal Prices a Little Higher

MARKET conditions in bituminous coal are still unsteady, and production is still falling off. A survey of the situation discloses that large stocks of soft coal are still in the bins of dealers and consumers, and the eagerly awaited buying movement must of necessity wait on the depletion of these reserves.

A plan for the continued Federal control of the bituminous industry after the signing of the peace treaty was opposed by the membership of the National Coal Association at a meeting held in Cleveland recently. The general sentiment of the soft coal operators seems to be that, while a plan of adjustment could have been worked out between representatives of the industry and the Government at one time, the attitude of the Railroad Administration in respect to its coal and steel purchases has made it virtually impossible to reach any agreement at this time. To put it concisely, the soft coal industry has absolutely no faith in the Railroad Administration.

The idea that prices of soft coal would suffer a considerable drop has about disappeared from the minds of many consumers, though there are yet a few who are buying only for their immediate needs in the hope that something will happen to repay them for waiting. These gentry are doomed to disappointment. There is no concerted cutting of prices. Small tonnages may be picked up here and there at figures below the former Government levels, but the better grades of soft coal are bringing even higher prices than were in effect during the fixed-price period.

During the week ended Apr. 19 the bituminous coal mines shipped 7,403,000 net tons, a decrease of 143,000 net tons compared with the output of the week ended Apr. 12. Mines are still working short time, the chief reason being that there is no market for a maximum output.

Anthracite mines, in the main, are working full time. Many operators have booked orders that will carry them well along into June, and retail dealers are delivering coal as fast as they receive it, to meet the call from household consumers. The situation in the hard coal market is almost the reverse of what it was a few weeks ago.

Steam coal is tightening. Instead of price reductions, some of the better grades of buckwheat produced by the so-called independent companies have been quoted at slight increases over what is known as the company schedule. Rice coal is in better demand than either buckwheat or barley. The production of anthracite during the week ended Apr. 19 is estimated at 1,568,000 net tons, a falling off of 182,000 net tons compared to the week preceding.

Consumption and Stocks of Coal in the United States During the First Quarter of 1919

STOCKS of bituminous coal in the hands of industrial concerns, the iron and steel industry and public utilities, gas and electric, declined 25 per cent. or about 8,000,000 tons in the three months from Jan. 1 to Apr. 1, 1919, according to information collected by the Bureau of Statistics and made public by the United States Fuel Administration. Stocks of bituminous coal in the yards of retail coal dealers were 40 per cent. less on Apr. 1 than on Jan. 1, but dealers had on hand Apr. 1 a quantity of bituminous coal one fourth as great as was sold and distributed in the first three months of this year. Such stocks in retailers' yards are considered large for April and are the result of the large accumulations last summer and fall, and of lack of demand the past few months of open winter weather.

The decrease in stocks of bituminous coal in the hands of consumers, including the railroads, in the United States the past three months probably did not exceed 16,000,000 tons. The drop in production of bituminous coal in the same period was 31,000,000 tons compared with January, February and March of 1918.

In proportion to his needs, the small consumer last year was the most successful in accumulating a supply of coal, and by the first of last November every nook and corner of the country was piled with bituminous coal. The small user, industrials using a car of coal or less a month, represents in number 75 per cent. of the total and but 11 per cent. of the consumption. These consumers had on hand last fall 1 per cent. of the bituminous coal in storage, on the average twenty weeks' supply, as compared with the largest users with seven weeks' supply.

With a large supply on hand and the fear of a coal shortage removed, and because of the let-down in manufacturing activity following the armistice and the mild winter, this class of user has been out of the market and will not again seek coal until next fall. Contributing also to the decline in demand has been a decrease in the rate of consumption of coal for industrials other than the iron and steel. The decline is indicated by a drop of 10 per cent. in the average weekly consumption of bituminous coal in January, February and March compared with the latter part of December.

As indicating the sections of the country where abnormally large stocks were accumulated it is noted that the storage piles of industrial plants in Delaware, Texas, Mississippi, South Dakota, Wyoming and Nevada were reduced more than 50 per cent. from Jan. 1 to Apr. 1. More significant, however, is the decrease of from 40 to 50 per cent. in stocks in the region about the Lakes, Wisconsin, Minnesota, Michigan, both upper and lower, Texas, Missouri and Ohio. The same decrease is reported from Georgia, Maryland and Oregon.

Decreases in stocks of from 30 to 40 per cent. are reported for New England and New York in the northeastern section of the country, in South Carolina, Kentucky, Illinois and Arkansas in the Southern and Central States, and in North Dakota. Decreases of from 20 to 30 per cent. are recorded in Pennsylvania, New Jersey, West Virginia, Indiana, Louisiana, Montana, Utah and Washington.

Virginia, North Carolina, Tennessee, Alabama, Florida in the south and Nebraska, Kansas, Oklahoma, Colorado, New Mexico and California in the western part of the United States report decreases in stocks of bituminous coal from 10 to 20 per cent. In Idaho and Oregon the quantity of bituminous coal in storage was not materially changed.

From Pennsylvania and Maryland in the east to Kansas and Nebraska in the west, and in the Mississippi Valley south to the Gulf, excluding the State of Mississippi, but including Florida, stocks in the hands of industrials are sufficient for from three to five weeks. New England reports from 11 to 15 weeks, except New Hampshire with 20 weeks, New York 9 weeks, New Jersey 8 weeks and Delaware 7 weeks. Stocks in the South Atlantic section range from 6 weeks supply in Virginia to 9 weeks in North Carolina, Georgia and South Carolina having 7 and 8 weeks respectively.

The lower peninsula of Michigan has 7 weeks supply, Wisconsin 6 weeks and Minnesota 10 weeks. West of the Mississippi stocks range from 3 weeks in Washington to 14 weeks in Oklahoma.

In about one-third of the states east of the Mississippi the stocks of steam coal in the hands of public utilities increased from Jan. 1 to Apr. 1. Georgia in the south, with an increase of 20 per cent., and Indiana, Kentucky, Ohio, West Virginia, Virginia, Maryland, Delaware and Pennsylvania in the central-eastern section, with increases in stocks ranging from 10 per cent. in Kentucky to 126 per cent. in Delaware, were the states reporting the increases. In the northeastern part of the country the decreases in New York and New England were small, from 3 to 20 per cent.; in the south the largest decrease was 44 per cent. in North Carolina. The largest decreases, more than 50 per cent., were in Wisconsin, Minnesota and South Dakota.

In the aggregate the stocks of bituminous coal held by public utilities decreased but 3 per cent., the decreases in some states having been offset by increases in others.

Coal for gas making in the hands of city gas plants decreased 16 per cent. in the three months ended Apr. 1. Increases in stocks of gas coal were reported in New Jersey, Pennsylvania, Maryland, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Indiana, Michigan and Washington.

Retail Dealers' Stocks of Coal

Stocks of anthracite in dealers' yards were greater on Apr. 1 than on Jan. 1 in four of the New England States, Maine, New Hampshire, Massachusetts and Rhode Island, also in Ohio, in all states south of the Ohio River and east of the Mississippi in Illinois, Iowa, Missouri and North Dakota. The only states east of the Mississippi to report decreased stocks of anthracite in dealers' yards are Vermont, Connecticut, New York, Pennsylvania, Maryland, Delaware, Indiana, Wisconsin and Minnesota. New Jersey and West Virginia report no change in quantity on hand.

Excepting only Alabama, Montana and Idaho, every state reported decreases in stocks of bituminous coal in dealers' yards. Notwithstanding this, the quantity of bituminous coal on hand Apr. 1 was equal to one-quarter the total sold and distributed in the three months preceding.

Stocks of bituminous coal held by plants engaged in the manufacture of iron and steel decreased 24 per cent. from Jan. 1 to Apr. 1. The largest decreases were in coal for use in byproduct coke ovens, 31 per cent. decrease in stocks of high-volatile and 33 per cent. in stocks of low-volatile. Gas-coal stocks decreased but 5 per cent. and steam-coal stocks 17 per cent. The stocks of high-volatile byproduct coal on Apr. 1 were sufficient for nearly three weeks' operation, those of low-volatile for four weeks Stocks of gas coal were sufficient for six weeks and of steam coal for seven weeks

Stocks of gas coal at steel plants in Pennsylvania were increased from January to April by 250 per cent., but in all other states were decreased. Excepting Alabama, stocks of steam coal were decreased in all states. New York, Pennsylvania, Michigan and West Virginia reported slight increases in stocks of high-volatile byproduct coal but decreases in low volatile; in other states reductions in storage of both grades of byproduct coal were the general rule.

The production of coke, both byproduct and beehive in January, February and March, 1919, is estimated at 12,738,700 net tons, an increase of 307,000 tons or 2.5 per cent. compared with the first quarter of 1918. Byproduct coal increased from 5,321,600 tons in the first quarter of 1918 to 6,779,500 tons in the first quarter of 1919, a gain of 27 per cent. Beehive coke recorded a decrease from 7,110,500 tons in the first quarter of 1918 to 5,959,100 tons the past quarter, a drop of 16 per cent. The transition from beehive to byproduct is indicated by the increase in the capacity of byproduct ovens completed, from 6,793,251 tons on Apr. 1, 1918, to 8,576,489 tons on Apr. 1, 1919, an increase of 26 per cent. Since April, 1918, production of byproduct coke has been begun in Colorado and in Rhode Island, and considerable increases in capacity have been made in Maryland, New York, Ohio, Pennsylvania, Tennessee, West Virginia, Wisconsin, Alabama, Illinois, Indiana and Kentucky.

The decrease in the production of beehive coke in the first quarter of 1919 compared with 1918 in Pennsylvania was 5 per cent., as against a decrease of 40 per cent. in all other states.

WEEKLY COAL PRODUCTION

The production of bituminous coal in the United States during the week ended Apr. 19 is estimated at 7,403,000 net tons, and is a decrease of 143,000 net tons compared with the output during the week ended Apr. 12, estimated at 7,546,000 net tons. During the same week of 1918 the operators of the country produced 11,044,000 net tons, and in comparison the current week's output is 3,641,000 net tons, or 33 per cent. lower. For the calendar year to date the output is now estimated at 128,389,000 net tons, as against 166,352,000 net tons during the corresponding period of last year, a decrease of 37,963,000 net tons. This tremendous falling off is better illustrated by comparison of the daily average production—1919 to date, 1,366,000 net tons, and for the same period of last year 1,770,000 net tons. During the current week the daily average is estimated at 1,234,000 net tons, showing that production is continually on the downward grade.

The production of anthracite in the United States during the week ended Apr. 19 is estimated at 1,568,000 net tons, as compared with 1,750,000 net tons during the week ended Apr. 12 and 1,870,000 net tons during the corresponding week of 1918. The daily average per working day during the current week is estimated at 261,000 net tons, as compared with 237,000 net tons for the calendar year to date and 312,000 net tons for the same period of 1918. The total production for the period Jan. 1 to Apr. 19 is estimated at 22,261,000 net tons, as against 29,304,000 net tons during the corresponding period of last year.

Bituminous coal shipped from tidewater harbors to all points during the week ended Apr. 19 is estimated at 405,117 net tons and falls behind the tonnage shipped during the week ended Apr. 12 by approximately 79,000 net tons. Shipments during the current week were but 50 per cent. of those in the corresponding week of last year, 800,312 net tons. A falling off occurred in the tonnage loaded at all the harbors during the current week, with Hampton Roads falling behind the most—40,000 net tons.

Shipments of bituminous coal to New England by tidewater during the week ended Apr. 19 are estimated at 79,491 net tons, as compared with 117,478 net tons during the week ended Apr. 12 and 232,458 net tons during the corresponding week of 1918. The decrease during the current week is due to a falling off in the tonnage loaded at both New York and Hampton Roads. In New York the decrease amounted to approximately 12,000 net tons, and Hampton Roads to 28,000 net tons.

The production of beehive coke in the United States during the week ended Apr. 19 is estimated at 394,912 net tons, and while but slightly less than the 318,630 net tons produced during the week ended Apr. 12, was approximately 200,000 net tons below the output of the corresponding week of 1918. Decreased production occurred in all states during the week of Apr. 19, and in Pennsylvania the current week's output was but slightly more than 50 per cent. of the production during the week of Apr. 20 of last year. All other coke-producing states are far behind the records of the spring of 1918, and for the calendar year to date the output in the United States is 1,900,000 net tons below the output of the same period of last year, recorded at 8,835,956 net tons. The daily average per working day during the current week is estimated at 49,152 net tons, as against 73,824 net tons for the period Apr. 1 to date.

The production of byproduct coke in January, February and March, 1919, was 5,321,600 net tons, an increase compared with the same period of 1918 of 1,457,800 tons, or 27 per cent. In the same periods the production of beehive coke decreased 16 per cent., the net result being an increase in total coke output of 306,500 tons, or 2.5 percent. In the year from Apr. 1, 1918, to Apr. 1, 1919, many new byproduct ovens were completed, the increase in capacity having been 26 per cent. Production of byproduct coke began in Colorado in July, 1918, and in Rhode Island in February, 1919. New ovens were completed in Maryland and New York, beginning in March, 1918; in Ohio the plant of the American Steel and Wire Co. began operation in May, 1918; the National Tube Co. at Lorain and the Ironton plant of the Solvay Co. began to produce in August, 1918; increases in capacity were made during the year at the Portsmouth plant of the Solvay Co., the Toledo Furnace Co. at Toledo, and the Youngstown Sheet and Tube Co. at Youngstown, Ohio. The plant of the Hamilton-Otto Coke Co. suspended about Feb. 1, 1919.

In Pennsylvania the Clairton plant of the Carnegie Steel Co. began operation in June, 1918, and the Steelton plant of the Bethlehem Steel Co. was enlarged. The plant at Chattanooga, Tenn., was enlarged, likewise the Follansbee, W. Va., plant of the La Belle Iron Works and the Benwood, W. Va., plant of the Solvay Co. Plants at Milwaukee and Mayville, Wis., were enlarged, the number of ovens at the Ensley, Ala., plant of the Solvay Co. was increased. Additions were also made at the plants of the Solvay Co. at South Chicago, the Gary, Ind., plant, the Indiana Harbor plant of the Inland Steel Co. and the Ashland, Ky., plant of the Solvay Company.

It is significant of changed conditions that the percentage of capacity attained in production was about the same in the first quarter of 1918 and 1919, but that the losses in 1918 were due to lack of coal and in 1919 to lack of market

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running slightly less compared with the same week last year. Many merchants were in the market and all report a continuance of excellent retail business. The firm tendency of the market has stimulated road business and orders for both immediate and future delivery were in considerably larger volume than same period last year. Collections are satisfactory.

Dry Goods Economist—The labor situation is far from satisfactory. Some of the strikes that have threatened to interfere with the country's business have been called off. On the other hand, certain organizations of workers are presenting new demands which, unless modified bid fair to cause disruption of present producing plans, and prominent among these are the unions of coat and suit operatives in New York. Where strikes have been settled the shorter hours granted to the workers have resulted in curtailed output.

American Wool and Cotton Reporter—Prospects of prices for wool in the West seem to constitute the principal interest in the wool trade at present, other than that manifested in the wool auctions. It is reported that 50c. is being paid the grower for the higher grades of staple wools in Michigan. Prices which are paid in the West are high, compared with those paid at the auction for similar grades of wool. There is no special new feature in the cotton market at the present time, except that if anything it is in a more favorable position.

The Iron Age—The open market that has existed recently in steel products has not been generally recognized because it did not show widespread and sensational price cutting. The industry, without any concert, has been limiting operations to the business coming in. In the past week that has meant further shutting down of blast furnaces and curtailment of working time at steel works. Generally a 50 per cent. operation or somewhat less is indicated among independent companies. The Steel Corporation is on a 70 per cent. basis in the Chicago district and is nearer to 60 per cent. in Pittsburgh and the Valleys.

Atlantic Seaboard

BOSTON

No perceptible improvement. Prices all-rail and at tidewater unchanged. Railroads have not yet made purchases. Low prices rumored on inferior grades. Quality coals being firmly held, except for spot orders. Steamers attracted by high rates offshore. All-rail shippers optimistic. Hampton Roads factors have little business in sight. The few orders in the market are eagerly sought. Anthracite demand strong. Shipments very little better than in 1918. Retail trade brisk.

Bituminous—The past week has been without any notable development in steam coal. It is hard to find signs of improvement in a market such as we are now struggling through, but undoubtedly each week sees some progress made. Heavy accumulated stocks are gradually being worked down and there are still consumers who will be obliged to enter the market before many weeks for more or less comprehensive tonnages. The whole territory is being as closely canvassed as at any period in the trade, and the few buyers who seem interested are quickly made to feel that spot orders are highly prized.

Prices have lately shown almost no variation. For contract all-rail the higher grades are held right around $2.95 per net ton at the mines, but a large number of coals from the South Fork district in central Pennsylvania are being offered at $2.75 @ 2.85. On coal from the Fairmont district there has been a wide range of price, but most of the low figures quoted are because of the restricted outlet here for coals of that region. Except on the New Haven road all-rail rates are against them, and aside from locomotive fuel the demand is relatively small for high volatiles. At tidewater there has been no change in coastwise freights, and except for some oscillation as to f.o.b. mine prices the Pocahontas and New River shippers find their situation practically unaltered. Under the peculiar conditions that prevail this year they find their market closely confined to plants within a short radius of distributing points like Providence, Boston and Portland. Their on-car basis is so high that when the rail charge inland is added the differential in favor of all-rail coals is so pronounced that little room is left for argument.

Contrary to expectation, the last of April has arrived without any contracts of large tonnage being made by the railroads. In nearly every case the New England railroad buyers have invited bidders to revise their proposals, and as yet no action has been announced. It is understood that several shippers have not changed their bids, and it is doubtful whether the Government management has accomplished anything by these moves. The trade continues to be much interested in railroad fuel developments, for in this section of the country it almost seems as if these orders were about the only ones left to worry about. With these long-deferred purchases out of the way it is felt there would be more stability to the market, even if current demand is light.

Rumors of low prices submitted to the railroads have of course had their effect upon the spot market. Scattering sales have been made by middle houses at $2.25 per net ton, but such quotations are on coals that can be used with automatic stokers, and where the saving of 10@15 per cent. in price alone is a consideration. There is less low-priced coal offering over the New York piers than was the case a month ago, due doubtless to the costly experience of many of the smaller shippers during February and March.

The fancy coals, however, are being firmly held, especially for contract. A two to three day a week basis of mining leads some of the operators to make concessions for May and June delivery, but seldom is more than 15c. considered necessary. The higher grades are making inroads on Pocahontas and New River trade, and their worth is being demonstrated. Buyers who have long been consistent users of West Virginia smokeless coals are trying out several of the quality coals from Pennsylvania and the tonnage of the latter is going to show relatively a large increase.

Coastwise freights from Hampton Roads have apparently struck their level, at least for the present. The rates of $1@1.15 from New York to ports on Long Island Sound will have a strong tendency to keep barge freights from Norfolk on the present $2 range, while for steamers there are very attractive offers being made offshore. On a monthly basis charters to South America and elsewhere are such as to leave the present coastwise rate of $2 wholly in the shade. It is hard to say, therefore, what would be the state of things should there suddenly develop a demand in New England for the smokeless coals. The fact is, however, that the market here is not likely to be any broader than it is at present and offshore business will continue to absorb bottoms that were built for the New England coal trade.

Bituminous prices at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net ton as designated:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@$2.75	$2.80@$3.35
Philadelphia, gross tons	4.20@ 4.90	5.00@ 5.40
New York, gross tons	4.50@ 5.25	5.35@ 5.80
Alongside Boston (water coal), gross tons	6.10@ 6.85	6.90@ 7.65

Georges Creek is quoted at $3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at $4.69@5.14 f.o.b. Norfolk and Newport News, Va., both for spot coal and for contract. Alongside Boston the present gross ton range would be $6.85@7.50. Season prices have been made at $7.90 on cars, Boston, for inland delivery, but with few sales reported.

Anthracite—The demand for domestic sizes is very strong, with no indication of any easing up for months to come. All the shippers seem well supplied with orders, and for stove and chestnut especially there is an insistent call. The transfer of the Reading fleet of barges and tugs to Port Richmond, Philadelphia, has at last been accomplished, and it is very much hoped that all the delays that were incident to the movement of these barges from Port Reading are now things of the past. Retail dealers along the coast are now hopeful that this long-awaited move will speed up the movement, and that in May coal will come forward in much better volume. While April figures are not yet in hand, it is apparent that receipts here are little, if any, better than in April, 1918, although dealers have been able to secure better assorted cargoes.

From all directions reports are very favorable as to retail trade. The public seems ready to accept present prices, and dealers are being flooded with orders.

NEW YORK

Anthracite moving rapidly. There is much activity in all branches and dealers look for a busy season. All sizes bringing full prices, with some shippers asking slight premiums for some of the steam sizes. Bituminous situation unsettled, because of slow buying and belief that lower prices will prevail.. Anthracite domestic sizes advance 10c. per ton.

Anthracite—With the mines, in the main, operating nearly full time, many operators having sufficient orders ahead to carry them into June and the retail dealers delivering coal as fast as they receive it, the industry is doing nearly all that can be expected of it at this season of the year.

The present condition of the trade is almost the reverse of what it was a few weeks ago. At that time the dealers were doing almost nothing and expected a dull season for the early summer, to be followed by a rush. However, the public suddenly awoke to the fact that the producing companies were not going to make the usual spring reduction, but that in its place there would be a monthly increase of 10c. per ton for five months, which in itself will make the wholesale price of coal 50c. a ton more on Sept. 1 than it was during April. In addition there is likely to be a further increase due to the advance in wages given the harbor boatmen, which will have to be met by the retail trade so far as it affects coal deliveries.

The public is buying on a good basis, but not as heavy as it did a year ago, which is due to the mild winter. The weather conditions during April resulted in heavy consumption and there were many one- and two-ton orders. The dealers are hopeful that the public will take advantage of the present state of the industry and place its orders for next winter's supply early.

The trend of the improvement can be seen in the record of dumpings at the local docks during the week ended Apr. 25, 5288 cars having been dumped as compared with 4595 cars the previous week, an increase of 693 cars.

The ending of the strike of harbor boatmen caused a flurry in shipments for a few days, but conditions soon became normal. There has been an increase made in water freight rates and boat-owners are as a rule asking 50c. per ton for deliveries in the harbor limits.

Reports from inland dealers show that in this vicinity they are carrying smaller stocks than they had in the early part of January, while throughout New England conditions are just the reverse.

Inquiries from Canadian dealers are numerous. Supplies are badly wanted and orders are generally accompanied by a request that the coal be hurried forward.

The anthracite steam coal maket is gaining strength. Demand is heavy, and instead of an easy price situation some of the better grades of the so-called "independent" buckwheat coal are said to have been quoted at slight advances over the regular company schedule. Rice is in better demand than either buckwheat or barley.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports are as follows:

	Mine	Company Circular
Broken	$6.05	$7.90
Egg	5.95	7.80
Stove	6.20	8.05
Chestnut	6.30	8.15
Pea	4.90	6.65
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The market is unsteady due to the disposition of some buyers to delay stocking up. There is a belief among many buyers that there is going to be a drop in prices, and at any rate they are willing to take a chance on being able to pick up sufficient coal in the open market at lower than present prices to keep them supplied.

The settlement of the harbor strike did not improve delivery conditions to any extent. There was considerable congestion at the docks following the ending of the strike because of the apparent desire of every dealer to get his boat loaded first, with the result that there was more or less delay in getting boats loaded and then towed.

Bunker coals are in better demand than the commercial coals. Many ships come and go daily, and producers and shippers with a heavy bunkering business find themselves rushed with orders for immediate delivery. In many instances ships were loaded on Sunday, so strong was the demand for immediate coaling.

The lack of demand is attributed to the fullness of many consumers' bins, even though local shipments were slackened for several weeks. The local piers are well stocked with coal, due to the lifting of embargoes followed by increased shipments from the mines.

Stocks in the hands of consumers in the northeastern section of New York State are said to show a heavy reduction from the early part of January, but even at that it is estimated that the stocks on hand are sufficient to last for from 7 to 9 weeks. Much better reports come from New England, where large consumers are carrying heavier stocks.

There has been a slight decrease in quotations for loaded boats alongside, these ranging from $5.75 to $6.75 in some instances. Quotations covering the general range of coals show a slight decline for some grades, but they are small and of little consequence.

The report of dumpings of bituminous coal at this harbor for the week ended Apr. 25 shows an increase of 851 cars over the number for the previous week.

Quotations for the various grades of bituminous coal for spot delivery or on contract range about as follows:

	Spot	Contract
South Forks	$2.90 to $3.25	$2.95 to $3.50
Cambria County (good grades)	2.80 to 3.10	2.95 to 3.25
Clearfield County (good grades)	2.65 to 2.95	2.80 to 2.95
Reynoldsville	2.50 to 2.75	2.75 to 2.95
Quemahoming	2.75 to 2.95	2.95 to 3.10
Somerset County (best grades)	2.75 to 2.95	2.95 to 3.10
Somerset County (poorer grades)	2.25 to 2.50	2.50 to 2.75
Western Maryland	2.25 to 2.75	2.50 to 2.75
Fairmont	2.10 to 2.35	2.35 to 2.50
Latrobe	2.10 to 2.25	2.25 to 2.40
Greensburg	2.35 to 2.40	2.35 to 2.60
Westmoreland ¾ in.	2.60 to 2.75	2.60 to 2.75
Westmoreland run-of-mine	2.35 to 2.60	2.35 to 2.65

PHILADELPHIA

Anthracite activity continues. Heavy orders booked by all shippers. Stove in greatest demand, with nut close second. Pea improves, but still plentiful and troublesome. Strong advertising campaign helps trade. Retail price situation fairly firm and improving. Steam sizes in fair shape only. Some shadings on the smaller sizes. Mine prices on family coal up 10c. Bituminous unimproved. Consumption light. Condition fair at tide. Rail price still in abeyance.

Anthracite—A continuation of the great activity that began two weeks ago is reported from the offices of all the big shippers. Several individual shippers report that they are booked for heavy tonnages two months in advance. It is a fact that no operation of any reputation seems to be lacking in orders for egg, stove and chestnut. From some of the larger shippers it is learned they are practically sold up for May, and that no new business is being taken except subject to a delay of at least thirty days.

All shippers report that many orders for stove, and quite a few for chestnut, will remain unfilled for April. Pea, too, is stronger, but it can still be shipped fairly promptly, and some of the smaller operators are said to be offering it at less than company price. It is believed also that a few of the individual shippers are insisting that their customers, for stove coal particularly, also take a certain quantity of pea.

It is quite apparent that the shippers are assuming a more cheerful attitude, particularly the large operators, and the good demand for coal is general throughout the country and it is becoming evident that good business will continue much later than anticipated during the dull days of March. The demand for family sizes continues unabated from the West where the consumers seem bent upon making up for the coal that was denied them last year.

Retail prices can be said to be held quite firmly, and the cutters have had no increase to their number. In fact a number of the lower-priced dealers are expected to advance their rates any day, especially as their stocks of pea coal run down and they begin purchasing at the new figure. It will be remembered that the principal drive of the cutters has been on this size, most of which was purchased at a lower figure than the new circular. All representative dealers continue to charge $10.30 for egg, $10.55 for stove, $10.65 for chestnut, and $9.05 for pea, per ton of 2240 pounds.

As business improves so do collections, and as the retailers are enjoying a fair margin at the above rates, the shippers are again growing more particular about extending credits.

With the larger sizes in such active demand, it is to be regretted the spurt has not as yet reached the steam trade. The big companies continue to store buckwheat, but it is the opinion of at least some of the shippers that industrial conditions are sure to improve before this size is produced in excess of the demand and the capacity of the storage yards. Certain it is there are bound to be very serious difficulties if the demand for egg, stove and nut keeps up, with no corresponding demand for pea and smaller sizes. As to prices some of the smaller shippers continue to offer buckwheat around $3, and we have heard of some sales as low as $2.85. Rice is actually reported by some shippers as stronger than buckwheat, but is still selling for $2.25 to $2.50. The latter is probably close to the average. No one reports barley except as being in less demand than either buckwheat or rice, and we are told that sales are recorded $1 per ton less than the circular, or $1.25.

As announced when the spring price circular was issued, the mines prices advanced 10c. per ton on May 1, making the prices per gross ton for line shipment and f.o.b. Port Richmond for tide as follows.

	Line	Tide		Line	Tide
Broken	$5.95	$7.80	Buckwheat	$3.40	$4.45
Egg	5.95	7.80	Rice	2.75	3.65
Stove	6.20	8.05	Boiler	2.50	3.50
Nut	6.30	8.15	Barley	2.25	3.15
Pea	4.90	6.50			

Bituminous—Practically no one in the trade is willing to admit that there is any real improvement in business. Production is off as compared to last year at this time, and few operations are working more than half their capacity. The market is simply unable to take any more than a moderate tonnage. While in ordinary years most plants were storing coal at this time, now most of them are anxious to reduce stocks on hand.

At tide there is a fair volume of business, but principally bunker trade. Even this is not as heavy as in the past, as the ships are gradually resuming the practice of bunkering only for one way instead of for a round trip as became the custom during the war. The coastwise trade remains quiet, with rates still high.

There has been no adjustment of the railway fuel controversy and it looks like a waiting game on both sides. The operators seem to have reached their limit in submitting prices to the railroads only to have them rejected.

Despite the rather inactive market, prices continue to rule fairly firm. The following are fairly representative of the figures ruling lately:

Georges Creek Big Vein	$3.00 @ $3.10
South Fork Miller Vein	2.90 @ 3.10
Clearfield (ordinary)	2.75 @ 2.90
Somerset (ordinary)	2.55 @ 2.70
Fairmont lump (ordinary)	2.40 @ 2.50
Fairmont mine-run	2.20 @ 2.35
Fairmont slack	2.05 @ 2.20

BALTIMORE

Market slowly settling into more normal condition. Inquiries increasing. Hard-coal schedule for April to be continued through May for retail purchasers. The export situation.

Bituminous—The government departments, including the Railroad Administration, are now seeking contracts on both yearly and monthly deliveries. A number of the larger industries in this and nearby sections are also sending out contract inquiries, and the general situation as to soft coal seems to be shaking down to normal. More contracts are being made now, and there is a growing inclination to get under cover.

For best grade coals the contract prices are still being held firm at the old Government maximum rates, or better; for the less desirable coals there is more of an inclination to shade, and some of those who had announced that they would not let go of their product below the Government schedule are now making contracts to supply customers at from 25c. to 50c. off the figures they first set. This inducement is bringing consumers under cover where they held out when the spot prices benefit was probably double that of the latest cuts on contracts. Within a few weeks it is predicted that the spot prices will have come up about level of the present contract prices, and that many more contracts will be recorded.

The trade believes that later in the summer both the spot and contract prices will be decidedly higher than the offerings to consumers at present. The export movement the past week was but fair, dropping considerably behind the week previous. There was exported in four bottoms a total of 12,840 tons of cargo bituminous; 908 tons for bunker use, and 90 tons of anthracite for cargo.

Anthracite—Announcement is made here that the April schedule for hard coal at retail, which was 40c. off the last winter prices, in addition to an allowance of 25c. per ton for cash within ten days of delivery, is to be continued throughout May. The same schedule may be held until July 1, if there is no freight rate or other unexpected increase. The retail trade is taking orders at the existing price where consumers tell them bins are ready for coal at once; and at the price at time of delivery if the order is placed now subject to later notice as to delivery. The supplies here were not enough to meet the rush of orders that followed the April price cut, and the dealers expect to be pretty busy all through May.

Lake Markets

PITTSBURGH

Sentiment somewhat improved. Reduction in stocks. Decreasing consumption by steel industry.

Sentiment as to market prospects is much improved in Pittsburgh coal-producing circles. While there has been but little improvement in actual demand, there is progressive diminution in stocks in the hands of consumers, and the heavy part of the lake shipping season is neared by another week. In connection with stocks, there has been considerable discussion of the Fuel Administration's statement as to reduction in stocks during the first quarter of the year. Stocks of bituminous coal in the hands of industrial concerns, the iron and steel industry and gas and electric public utilities, decreased by 25 per cent. or by 8,000,000 tons.

Such a statement may be regarded as favorable or unfavorable according to the viewpoint. If the objective were the elimination of such stocks, little progress was made if the reduction in three months, winter months at that, was only 25 per cent. On the other hand, however, it is pointed out in the trade that practically all these consumers carry stocks, and the iron and steel industry, when facing a period of activity, particularly in the fall, counts upon having large stocks.

A feature of the situation encouraging to operators is the manner in which prices are being maintained. Such shading as occurs is confined almost entirely to spot lots or short term deliveries, say to July 1 at the outside. Even spot lots do not evince much softness. Steam coal has sold down to $2 of $1.90, but only in special cases, and many of these are of operators who but recently entered the ranks of producers and for financial reasons must maintain production.

The steel industry's coal consumption is decreasing, with lighter steel production each week. The leading independent in the Pittsburgh district is operating at only 45 per cent., while the independents in the Youngstown district are running 50 to 65 per cent. The Steel Corporation subsidiaries in the two districts are operating at 65 to 70 per cent. The tin plate industry, a large coal consumer in proportion to its tonnage output, is doing only about 55 per cent., but will probably be running full in the summer.

There is a little more activity in byproduct coal. Sales running from spot to deliveries over a few weeks have been made at down to $2.10, but it is doubted whether $2.35 could be shaded materially on a year contract. Disregarding occasional cut-price transactions the market is quotable as follows: Byproduct, largely nominal, mine-run, $2.35; high-grade gas coal, slack, $2.10@2.20; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $2.60@2.70; steam, slack, $1.90@2; mine-run, $2@2.35, all per net ton at mine, Pittsburgh district.

TORONTO

Dealers very busy. Domestic consumers rushing orders before price goes up. Stocks in yards light. Fears of a coal famine next winter. "Coal Club" cannot buy at wholesale prices. Bituminous still quiet.

Dealers are very busy, as the consumers of anthracite, who have for some time been withholding orders in the vain expectation of some reduction in price, are now buying freely. A touch of chilly weather, combined with the prospect of an increase

in price, has stimulated the movement; and something like a rush has set in. Stocks in the yards are low and shipments from the mines comparatively light since the setting in of navigation, much of the supply being diverted to the upper lakes

H. A. Harrington, Deputy Fuel Controller for Ontario, has issued a warning to the public that the province may expect a coal famine next fall and winter unless people lay in their supplies at once. He further gives figures to show that not only will consumers have difficulty in getting coal, but that the price next fall will go up to about $14 per ton, as at present there is an actual shortage of coal. A number of citizens organized a "Coal Club" with the object of buying their coal for the winter in carload lots at wholesale prices in Buffalo, paying their own freight and haulage charges here. Their representative visited Buffalo and interviewed the dealers who refused to sell to him, saying that they had agents in Toronto and would not deal with private individuals.

The demand for bituminous continues light, as there is little change in the industrial situation with a slight reduction in wholesale prices.

Quotations for short tons are as follows:

Retail:	
Anthracite egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	8.25
Slack	7.25
Domestic lump	10.00
Cannel	11.50
Wholesale f.o.b. cars at destination:	
Three-quarter lump	6.00
Slack	4.75@5.00

BUFFALO

Bituminous decidedly quiet. Car shortage in grain trade looks ominous. Settling the freight prepayment demand. Anthracite moving steadily.

Bituminous—The surplus of slack still vexes the market. This condition was not unexpected, as it happens regularly when the lake trade opens; but now it comes at a time when the trade is staggering under the load of over-production and adds another strain to the market.

A sudden shortage of cars in the grain trade is attracting attention, as it is something that might easily happen in the coal trade; and when it does the market will stiffen rapidly. Jobbers have warned consumers that something of the sort is about due, but no attention is paid to their statements.

The railroads are fixing up the new rule obliging the prepayment of the freight on slack coal going into Canada. A meeting has been held at the office of the Michigan Central R.R., which was attended by coal shippers. The plan is to establish some regular guaranty or insist on full prepayment.

Bituminous prices are not very strong, but figures are the same as last week: $4.65 for Allegheny Valley, except slack; $4.45 for Pittsburgh and No. 8 lump; $4.20 for mine-run, same, and $3.80 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The movement is good. Some shipping agents are behind with their orders for Canadian and rail shipment west, and the supply for lake loading has been cut down materially. The consumer does not want to pay the advance in price and the demand is said to be heavy eastward. If the Canadian retailers were not handicapped with substitute fuel there would be quite a rush for anthracite there.

Lake clearances for the week are 48,000 net tons to Duluth and Superior, 31,700 tons to Milwaukee, 13,574 tons to Sheboygan, 11,917 tons to Fort William and 6600 tons to Chicago. Freight rates are 42½c. to Duluth and Fort William, 50c. to Milwaukee and Sheboygan, 60c. to Chicago.

CLEVELAND

Activity in the lake trade has completely overshadowed the local steam-coal market. Strong in the belief that bituminous coal will be scarce later, operators are crowding shipments forward. Pocahontas has been marked up 25c. by all dealers and 50c. by some. Present prices are believed to be plumbing bottom for this spring.

Bituminous—No. 8 mine-run is to be had here in any tonnage at $2, No. 8 three-quarter inch at $2.10 and slack all the way up from $1.75. But even these attractive prices—attractive, comparatively—are not stimulating business. Nor are No. 8 district operators putting forth very strenuous efforts to sell, for the lake trade is making heavy inroads into production. Generally speaking, the upper-lake dock coal interests stand ready now to take all the bituminous coal operators can forward. While many lake shipments are going forward with the price to be determined later, this business looks alluring to both operators and the dock interests, and the arrangement is mutually satisfactory.

Without exception, all dealers have pushed Pocahontas prices up 25c. a ton, while a few of the larger ones have made the advance 50c. Dealers complain that offers of $3.50 for Pocahontas are spurned, whereas $2.60 before and $2.95 during the war were the market levels. Difficulty of disposing of the slack is making the coarser grades of Pocahontas higher, it is said. Dealers are warning consumers to lay in next winter's supply, and quite fair results are reported. Anthracite is somewhat difficult to move despite the certainty of a 10c. increase May 1 and further advances throughout the summer.

Many No. 8 district mines are reporting labor shortages, a condition just the reverse of that obtaining in eastern Ohio not more than five weeks ago. Belief that the coming summer will see mines operating at close to 100 per cent. is gaining ground. Mine workers who were growing restive have neither the time nor the inclination now, and indeed not the audience, for their dissensions. With the resumption of activity the labor situation has improved greatly.

Lake Trade—Authoritative carrying rates for coal on the Great Lakes this summer finally have been determined. The rate from Lake Erie ports to the head of the lakes—Superior and Duluth—will be 42½c. a ton, compared with 48c. last season. This was the first price arrived at. But instead of a rate of 50c. to Lake Michigan, coal from Lake Erie will be charged 47½c., as against 55c. in the season of 1918. The big lake fuel interests have announced this season's fuel coal will cost $4.35 from car dumpers and $4.85 from lighters, both prices applying at Ohio ports. The charge in the Detroit River and at Lime Island will be $5.50.

Not only do the lake coal interests believe that coal will be scarcer later in the summer, but that cargo space also will be more difficult to get. The iron ore trade is opening up quite slowly, and the end of the season is likely to find ore carriers rushed back to the head of the lakes light. No contracting below $2.35 is reported, with $2.40 still being held up as nearer the correct figure.

DETROIT

Lack of interest among Detroit buyers causes jobbers to fear their efforts to get bituminous coal later may be hindered by shortage of supply.

Bituminous—While a small amount of encouragement is derived by Detroit jobbers and wholesalers from reports that several of the large users of steam coal are cutting down their reserves more rapidly than a few weeks ago, there seems little tangible present improvement in the market. The larger proportion of buyers is exhibiting no interest. A few scattering inquiries appear, but these come principally from the smaller buyers.

Jobbers say that the Fuel Administration prices are being quoted to inquirers considering contract negotiations. These prices also are said to be generally maintained on sales of lump and prepared sizes. Mine-run and slack are proving more difficult to place, and the Government prices have been shaded materially in a number of instances, the reduction on slack amounting to as much as $1 a ton. Price reductions, however, do not seem to stimulate buying. It is the contention of some of the jobbers that the buyers do not so much desire cheaper coal as they do the assurance of stability of prices, to guard against some of their competitors gaining an advantage by placing orders at some later time.

Anthracite—Diligent attempts are being made by Detroit retailers to stimulate an early buying campaign among household consumers. The movement is supported by advertisements placed by the Detroit Coal Exchange. The supply of anthracite now seems plentiful, and buyers are warned that the prices on prepared sizes will be advanced May 1.

COLUMBUS

A slight improvement is noted in the Ohio coal trade. There is a better feeling in steam circles, although the larger purchasers are still holding off on contracts, because of price uncertainty. The lake trade is showing signs of starting.

The steam trade in Ohio territory is more active as a result of some orders and a greater number of inquiries. Though a majority of the larger consumers are still waiting to see the outcome of price developments, some of the smaller users are buying considerable for current needs. The demand for spot shipments is slightly better, and this is reflected on the entire trade. The railroad situation is still unsettled and little railroad contracting is reported. Producers are only mining what their orders call for, and consequently there is practically no overproduction. The worst feature is the slowness of industrial conditions to improve, and consequently there is no increase in fuel requisitions.

The lake situation is slow in clearing up as it is connected with the steam situation so closely. Lake prices are still unsettled, and as a result there is little contracting for lake tonnage. Some agreements have been entered into leaving the price question to be settled at a later date. Some vessels are being loaded and a small movement will start about May 1.

The domestic trade is quiet, and this is one of the drawbacks to the market. There is a good demand for the better grades, such as Pocahontas and splints, but the usual run of domestic tonnage is not moving. Retailers have sufficient stocks for the present and they are waiting, like steam users, to see the price question settled. Little domestic tonnage is moving from Ohio mines. Retailers are urging the public to buy early, but their campaign is not meeting with results.

CINCINNATI

No activity in market at present. All hopes based on future. Board of Education asks for bids on coal.

Leaders in the coal industry here are anticipating a tremendous business boom following three or four months of readjustment, and are making such arrangements as are possible under the unfortunate condititions existing to furnish a greatly increased demand which, coming with a rush as it is expected to do, will in all probability cause a serious coal shortage and consequently higher prices. Wages of the coal miners are very high, and are not expected to be adjusted until peace has finally been declared, when there is more likely to be an increase rather than a reduction.

The Board of Education of Cincinnati will receive bids for coal of the following description: 10,000 tons more or less smokeless run-of-mine coal; 4500 tons more or less nut and slack bituminous coal; 2500 tons more or less lump bituminous coal; 75 tons more or less run-of-mine (bituminous) coal. The specifications for this large contract are on file at the Chief Engineer's Office, at 511 Court St., Cincinnati, Ohio. Each proposal must contain the name of every person interested therein, and must be accompanied by surety company's bond in an amount equal to 30 per cent. of the amount of the bid, as a guarantee that the bid is bona fide, and the bond of the successful bidder or bidders approved and held until final settlement is made. The Board of Education reserves the right to reject any part of any or all bids.

LOUISVILLE

Conditions in the mining regions about the same. Retailers of Louisville reduce prices in order to increase summer stocking. General demand quiet.

The principal feature of the market in Louisville is the action taken by the Louisville retailers following a get-together meeting at the Board of Trade on Apr. 21, when it was decided to reduce May prices in order to stimulate spring and summer stocking. Reductions averaged from 30 to 60c. a ton retail. The retailers adopted the following prices:

	Eastern Kentucky	Smokeless	Western Kentucky
Block and egg	$6.50	$7.50	$5.60
Mine-run	6.25	7.25	5.35
Nut and slack	6.00	7.00	5.10

Anthracite, which is not handled to any extent on this market, was placed on a basis of $12.50 a ton. Eastern Kentucky coal included Harlan, Hazard, Jellico, Straight Creek, Elkhorn, West Virginia river or rail, and all of the high grades from the Cumberland mountain district. On a lump basis Harlan had been selling at $6.75; Jellico and Straight Creek, $7.10; Hazard, $6.65, and western Kentucky, $5.90.

While some objection was raised to the decrease in view of the fact that the mines are making no reductions, still it was believed that it would be much better to get the consumers started on summer stocking, even at a reduction in values, and objections were quickly overruled. However, in the few days since the new prices were announced there has been no material im-

provement in retail demand; but this may be due to the fact that it is near the end of the month.

Mines are holding prices firmly. The mines of the Jellico district are asking $3.25 for block and egg at mine, although some are selling on the same basis as other eastern Kentucky coals. The average range of prices are as follows.

	Eastern Kentucky	Western Kentucky
Block and egg	$2.85@$3.00	$2.60
Run-of-mine	2.30@ 2.50	2.35
Nut and slack	1.90@ 2.10	2.05

While western Kentucky is not doing much price cutting, and is endeavoring to hold prices firmly, a number of the mines are meeting eastern Kentucky competition openly. Some of the eastern Kentucky mines have been slashing prices considerably on mine-run and nut and slack. Most of the mine-run cutting has been done on low grades of badly mined coal, while on nut and slack many mines have been selling at low figures in order to unload it. There has been some spot coal from all of the fields on the market at low prices, but as a whole there has been less price cutting done than had been anticipated.

BIRMINGHAM

Good undertone apparently pervades the market, but material improvement in the steam trade is not noticeable. Domestic contracts have absorbed the anticipated output of many of the operations producing the best grades through March, 1920. Production from commercial mines slightly improves while furnace companies reduce their output.

While there is no noticeable improvement in the steam trade, basic conditions are favorable to a strong demand when the tide does turn, is the way in which well posted coal men sum up the local situation. Prices are reported as firm on the basis of the last Government schedule.

Domestic coal is in strong demand and there is need for every lump that is being produced. Some mines have sold their estimated output through March, 1920; that is, the better grades of fuel, while some companies are not selling to their anticipated capacity. Carbon Hill and Corona, cheaper grades, are also being eagerly sought and a heavy tonnage has been sold. Sales are based on a price increase of 10c. per ton per month through September added to the schedules effective Apr. 1.

Commercial companies are operating on about the same basis as they have been for several weeks past, but furnace companies have closed down many of their largest mines, as iron production is cut down to almost the lowest possible notch.

Coke

CONNELLSVILLE

Market fairly steady. Production better adjusted to consumption. Byproduct coal offered.

There is rather stubborn resistance to further price declines in Connellsville coke. The program of curtailing coke production to fit the circumstances is working out better than a few weeks ago, when operators could not keep track of furnaces about to blow out. Furnaces are still blowing out, but the notice is not so sudden. Conditions are also helped by the exhaustion of stocks at most furnaces and shipments are more regular in proportion to actual consumption.

Many of the coke operators would like to sell coal for by-product purposes, but the opportunities are limited. The regular asking price is $2.35, but many operators would be willing to shade this price by 10 or 15c., in some cases by 25c. In the case of operators with the lightest production it is not a case of choosing which is more profitable, to sell coal or to sell coke, because most operators consider it essential to maintain organizations. Even at $2.10 for coal, the value of the coal for a ton of coke would be $3.15, and when coke is sold at $3.60 there is represented a margin of only 45c., and even with $2.75 coke the 60c. margin is not sufficient to cover the cost of coking. Sales of coke at such prices are made only for special reasons. Operators with a fair rate of operation would not sell at under $4 or $4.25.

Spot and prompt lots of furnace coke have been going at $3.60 to $3.75, the latter being rather a high price on such business, commanded only by the best brands. Brokers assert that they could buy fair grade at $3.50 if they had definite orders to offer, and it is stated that bids at this price have been solicited by a few operators. The regular value, as an adjustment price under contracts, is held to be $4 to $4.25. Foundry coke has softened, ordinary brands that were commanding $4.50 in carload lots now being available at $4.25. One maker of a well-known brand has reduced from $5.25 to $4.75, but some are still holding to $6, in order to protect contract shipments. The spot and prompt market generally is quotable at $3.60@3.75 for furnace and at $4.25@6 for foundry, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Apr. 19 at 148,825 tons, a decrease of 1590 tons.

Middle Western

GENERAL REVIEW

Situation shows improvement. Export of large tonnage of Eastern coal will benefit Illinois and Indiana mines.

The situation in the Middle West market for the past week shows more improvement, and it is being freely predicted that within the next sixty days conditions will become normal, or perhaps a little better than normal. Mines are working more and are recovering slowly from the inactive period they were faced with two or three weeks ago.

News from the East is very encouraring, especially the news to the effect that the Government is going to get behind the exportation of coal, and do all possible toward opening up a market for our eastern coals in Europe, South America and North Africa.

The buying public are becoming more alive to the coal situation, and there has been a decided tendency, within the past two weeks, toward placing contracts. Some steam coal has been moving on the open market, and we understand at very fair prices.

CHICAGO

Activity in shipments and contracts. Domestic movement slowing up, with exception of coal from the East.

There has been some activity in the Chicago market, both on current shipments and on contract. The big news of the week is that the Universal Portland Cement Co., of Gary, Ind., has closed its contract with one of the big operators down in Franklin County. This business heretofore has been handled through the Consumers' company, but this year the Universal people decided to deal direct with the producer. This contract, which has just been closed, is one of and may be taken as a fair indication of the general attitude of the purchasing agents in Chicago.

The domestic situation is lagging a bit, with the exception of the movement of Eastern coals. The dealers believe that if they wish an Eastern coal, they had better purchase it now, and for this reason there is a brisk demand for all Eastern coals, while the demand for Illinois and Indiana coals is dull in the extreme. The Illinois and Indiana miles will come into their market a little later, along about July 15 and after.

MILWAUKEE

Business continues quiet, with everybody waiting for the promised new schedule of prices. First cargoes of the season being unloaded at the docks.

The coal market at Milwaukee has reached a waiting stage. Dealers announce that a new schedule of prices is due May 1 and consumers are holding off till that time. Naturally business is at a standstill. Some dealers think that anthracite will be shaded slightly at the opening, but that the monthly advance of 10c. per ton until September will carry the winter rate to a higher point than that which prevailed in the fall last year. Others hold that anthracite will open higher than present prices. It is hard to comprehend how bituminous coal can be stiffened any, as stocks on hand are fairly liberal and new consignments are arriving. Four good-sized cargoes have reached port since Apr. 20, and daily arrivals can be expected from now on. Coke is held at top figures, but stock piles are increasing.

ST. LOUIS

Nothing unusual to change the aspect of the local situation. Practically no contracts being signed up or arranged for, and an exceptionally small tonnage moving on all kinds of business.

The situation in the St. Louis territory continues exceedingly quiet. This is usually the season of contracting, but up to the present few contracts have been made for either carload or wagonload coal in St. Louis.

The local demand is extremely easy. There is a little coal of the cheaper grades for domestic business in small lots. It is so small, however, that it has no effect on the market.

In a steam way, the market is much quieter than is usual in this season. Manufacturing seems to be almost at a standstill judging from the condition of the screening market, which ordinarily would cause an unusual demand for screenings at this time. It is true that screenings are in good demand right now, but not to the extent that it has brought about any marked change in the price. This pertains to all fields.

There is a little anthracite moving for domestic storage and a little coke, but nothing in the way of smokeless or Arkansas.

Some mines are working a day or two a week and others are idle. The movement of coal as far as transportation is concerned is good. There are plenty of empties.

In a general way the districts are not any worse than is to be expected in view of the business situation all over the country.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Apr. 28, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com	(BB)	161½	163
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	...
Central Coal & Coke, Pfd	(CK)	63	...
Colorado Fuel & Iron, Com	(CF)	43	43½
Colorado Fuel & Iron, Pfd	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com	(EH)	27½	28
Elk Horn Coal, Pfd	(EH)	...	47
Island Creek Coal, Com	(ICR)	99	...
Island Creek Coal, Pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	50½	50¾
Pittsburgh Coal, Pfd	(PC)	86½	87
Pond Creek Coal	(PD)	14½	15
Virginia Iron, Coal & Coke	(VK)	57½	59

* Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	89½	91
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74	74½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	91
Lehigh Valley Coal, 1st Gtd. 5s, 1933	98	101
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	98½	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	97½	...
Pleasant Valley Coal, 1st S. F. 5s, 1928	90	...
Pocahontas Coal & Coke, Joint 4s, 1941	80½	85
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	83½	88
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	87½	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	98	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	80	95½
Utah Fuel, 1st Sinking Fund 5s, 1931	92	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	87	70
Virginia Iron, Coal & Coke 1st 5s, 1949	55	...
	85	85½

COAL AGE

Volume 15 New York, May 8, 1919 Number 19

Four Instead of Two

By Floyd W. Parsons



N the days before the war, the business men of America were noted for their initiative. Individuality was the common virtue of most of our citizens. After we entered the fight, it was soon apparent that to be most effective as a people we must act as an organized unit, giving strict obedience to the Nation's leaders.

The result was that we formed the habit of looking toward Washington for all guidance; and the trouble is that we continue to seek marching orders in the Nation's capital. If we are to again go forward as of old, something must be done to restore in part the spirit of personal adventure. The individual must again be encouraged to think and act for himself.

To believe that we will return to the prewar days of selfish indifference is a false conclusion. There will never again be such independence of action. But extreme parental control is a condition no better than extreme individualism.

One of the chief troubles today is that so many people believe humanity can be governed by the application of doctrines that are logical. But this is a false premise. Germany's ruin was caused by her endeavor to base her future on a course of procedure founded on logic. Teuton leaders have learned too late that there is a difference between machines and men. Common sense is far better than logic in the treatment of problems that deal with the impulses and passions of human beings.

It is this same common sense that will save us in these serious days, when the chief impulse of man is to critically examine all human institutions. In Russia the mistake was made of rejecting the traditions that had survived the fires of scores of centuries. Property, religion and marriage—oldest of institutions—were set aside, and we know now better than ever before that such traditions cannot be broken down without at the same time leveling all other institutions on which civilization is founded.

This does not mean, however, that present systems are wholly correct. We must have greater elimination of caste. Even here, in this free country, where there are no kings and princes to annoy us, we might add still more encouragement to the plan of awarding recognition to men in proportion to the services they render. In the coming years the definite tendency must be to further and further restrict the advantages that come to individuals simply because they are smart, not because they are able.

No future government can succeed unless it is based upon a system in which brains are pre-eminent over capital. More and more will we standardize the return from invested money. More and more will we regulate the margin above interest that is allowed as insurance to those who undertake ventures that are attended by risk. Once capital was the prime party to industry; now there are three others —labor, management and the public, or rather the state. The day is not far away when we will abandon the idea that capital and labor are the only parties concerned.

Just what machinery can be devised to satisfy the combined interests of this quadruple alliance is not now known. Only by careful experiment can we find the answer. Capital must be safeguarded, financial adventures encouraged, labor fully recognized and permitted self-expression, brains adequately rewarded and the public protected. Let us not have patience any longer with talk about fights between capital and labor, as if they were the only parties interested.

IDEAS AND SUGGESTIONS

Hot Air for Pumping

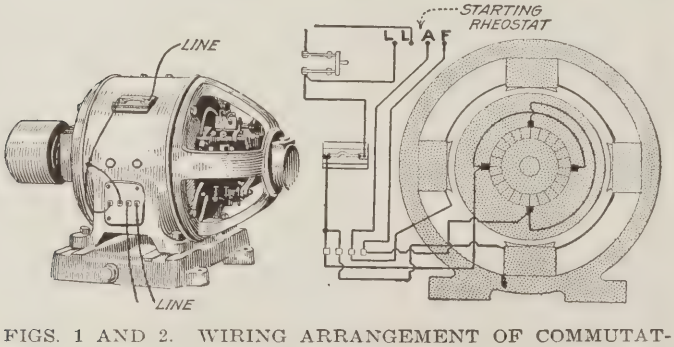
It is correct practice to cool air as it comes from the compressor and so deposit much of the moisture which may be in it. Moreover, the cold air occupies less space and so goes more readily through the air lines. It is going to be cooled on the journey, and the sooner it is cooled the better. For this reason, it is customary to cool it at the receiver even when the purpose is to reheat it before use.

When, however, the air is only to be taken a short distance, say, a few hundred feet, it is well to put nonconducting material around the pipe, taking the air off the discharge line before it is cooled. At its high discharge temperature it is quite dry and can be used economically in the pump or other air cylinder. This will sometimes save a reheater where the pump is in a place where the cold normally causes freezing. If the air is taken to a receiver and so allowed to cool, it is of course no use to spend money to protect the line except, perhaps, the expense for burying the pipe.

Protecting Small Motors

By J. J. Nolan
Linton, Ind.

The difficulty encountered in protecting small motors in remote parts of coal mines with some suitable and yet not too expensive or elaborate device to prevent burnouts of armature or fields, or sometimes both, has



FIGS. 1 AND 2. WIRING ARRANGEMENT OF COMMUTATING-POLE MOTORS

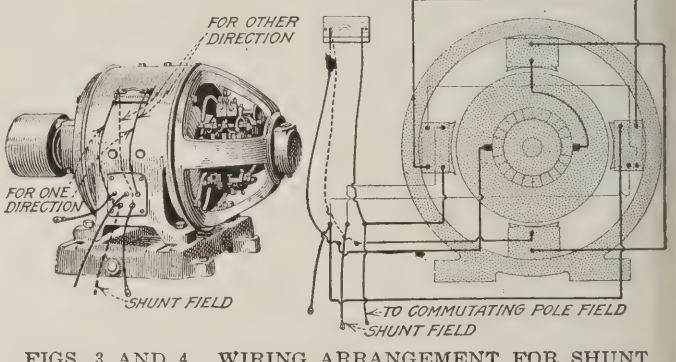
led the company with which I am connected to equip 200 motors, ranging from 5 to 15 hp., with fuse blocks of a type similar to those pictured in Figs. 1 to 5.

When being overhauled in the repair shop each motor is equipped with a block, as shown, and ten extra fuses are fastened securely on the motor for future replacements. A reserve supply of each size is kept on hand, to be sent out as ordered.

Fuse blocks have been installed on most of the motors remaining at the mines by getting a list of different sizes and sending or taking out the number and sizes required. The work then requires only the drilling and tapping of four holes; the block is fastened on and connected as shown.

I have noticed a decrease in the number of serious burnouts since this plan has been in effect. Those in charge of motors in the mine often pay too little attention to this important equipment by trusting in Providence and a little oil once in a while. The company, of course, foots the bill, and occurrences like those mentioned above usually excite no comment.

The wiring arrangement on the commutating pole types of motors shown in Figs. 1 and 2, if properly



FIGS. 3 AND 4. WIRING ARRANGEMENT FOR SHUNT TYPE OF MOTOR

connected, causes the current to pass through the fuse. The reversing connections are easily made (see the dotted lines) should it be desired to reverse the direction of rotation. The wiring arrangement for the simple shunt types shown in Figs. 3 and 4 are somewhat different, as the terminal of the fuse block is reversed for the line wire. Reversing is done below, as shown.

Should the oiling of a motor be neglected, and hot bearings develop that might cause it to stop, the fuse should protect it from serious damage as well as other troubles that might cause heavy overload.

The length, width and thickness of ribbon to use were

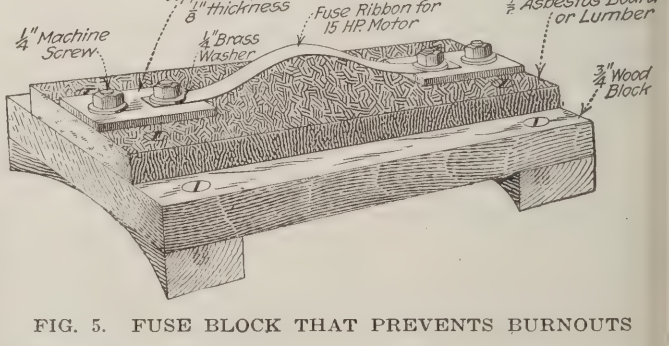


FIG. 5. FUSE BLOCK THAT PREVENTS BURNOUTS

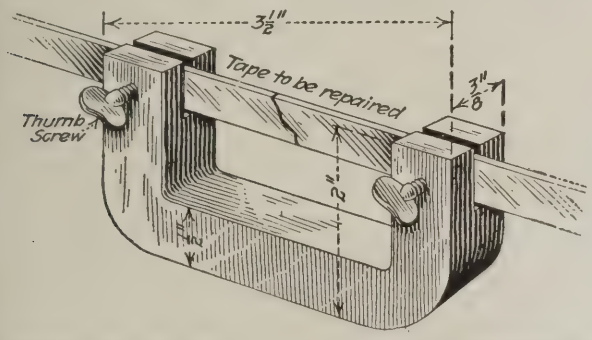
all decided after thorough tests were made for each size of motor. The ribbons employed allow the motor to start under load without blowing the fuse and yet offer protection on any undue continued overload. The connecting and reversing arrangement of connections shown was worked out with a view to its being of assistance to anyone who might be connecting or have

occasion to reverse one of these motors instead of making the wiring more complicated.

The suggestions given above, however, will not prevent some from attaching a piece of copper wire in place of the fuse ribbon, and those in charge should make periodical visits to each motor to see that the proper sized fuses are in use and that extras are kept on hand. If the sizes of fuses given will not carry the load the motor is either developing trouble, is already in trouble, or is too small for the load required. In this event a larger sized motor should be used.

Frame for Repair of Steel Tapes

Breaks in steel tapes are unfortunate but inevitable, and it is important that a surveyor be able to repair them accurately. The accompanying illustration shows a contrivance which may be used to hold the two ends of a broken tape while a sleeve is being soldered on the break. The device is rectangular in shape, and is made of $\frac{3}{8}$ x $\frac{1}{2}$-in. iron. Longitudinally across each



DEVICE HOLDS ENDS OF TAPE WHILE SLEEVE IS BEING SOLDERED ON

end a hacksaw cut is made $\frac{1}{2}$ in. deep, and near each end a $\frac{3}{16}$-in. hole is drilled one-half way through the frame, and tapped to receive a thumbscrew. The two ends of the broken tape are passed through the saw cuts in the ends of the frame, the ends being brought exactly together, and then the thumbscrews are set down tight. The surveyor can then proceed to clamp and solder a sleeve over the broken parts. The frame illustrated was made by E. B. Mills, surveyor for the Mason Valley Mines Co., Mason, Nevada.—*Engineering and Mining Journal.*

How a Western Coal Company Solved Its Labor Problem

By George C. McFarlane
Denver, Colo.

The coal industry is now passing through a depression that will strain the resources of many operating concerns. Of course, everyone felt that the erratic war-time prosperity would end some time, but scarcely anyone expected a slump in the middle of the present season.

Practically every mine in the country is in first-class shape physically, as all operators prepared for a tremendous rush of business which, however, did not materialize. Now, in the transition period between war and peace, is a good time to make a concerted effort to stabilize our industry.

The war has shown that public sentiment is the real ruling power, not only in this but in all countries. There is nothing to be gained by disguising the fact that the coal industry is in distinct public disfavor in the United States. The legislatures of the different coal states are continually passing harassing laws, and they are upheld by the public. In all wage controversies the demands of the coal miners are backed by the press of the nation. The coal industry as a whole must win the confidence of the public, and the operators must establish friendlier relations with their own employees, as other great industries are endeavoring to do. While some coal miners appear to be misanthropes, the majority of our mine workers possess great natural intelligence. As a rule, they dislike to be patronized, and much of the elaborate welfare work instituted by large coal operators is unappreciated. What the miner wants most is a chance to earn big money, and he will cross the continent to make a little larger wage.

Much of the bickering over wages which has periodically disturbed the public mind is caused by the semi-idleness of a large percentage of our coal miners. Coal mining is subject to seasonal and other factors that produce wide fluctuations in the volume of business throughout the year, and I believe it should be the aim of the operators and mine workers to gradually reduce the number of men who follow coal mining as a permanent vocation and increase the number of farmers, farm laborers, etc., who follow it as a seasonal occupation. If the surplus mine workers could be diverted to other lines of work, coal miners could be given practically continuous employment.

During the war period, with its insistent threat of a labor shortage, my company's mines were operated on the following basis, and despite the fact that our force was cut 40 per cent., we maintained our normal daily output:

We decided it would be better to concentrate our working force in five or six panels of a mine, and therefore we sealed off unused and worked-out parts of the mine with concrete stoppings. Our coal readily absorbs oxygen, and after an air current passes through a mile or two of workings miners cannot load as much coal on the return as on the intake. The timber in the return airways and in the upcast shafts decays rapidly, owing to fungus growths which thrive in air deficient in oxygen. Shortening the air travel caused such a marked inprovement in the return air that in a few weeks the fungus which was destroying our timber nearly disappeared.

During the slack summer period, we kept our day hands busy grading the haulage roads and putting the track and switches in first-class shape. The roads used by the gathering mules were surfaced with burnt rock and made as smooth as a macadamized road. When the winter rush of business came, we put those diggers who could never get enough cars on runs where the grades were favorable, together with crack drivers and the fastest mules. On runs where the grade was adverse to the loads, slower mules were used and the places were given to diggers who did not care to hit up a fast pace. So far as possible, diggers of nearly equal ability were placed on a run. Normally they were given cars as fast as they could load them, and an average of 12 tons per man was easily maintained.

For years we followed the policy of encouraging the farmers of the neighborhood to take up coal mining as their winter occupation, and with the addition of these men to our force we were able to produce our quota by increasing the output of each miner instead of putting on an army of "floating diggers."

Recovery of Pyrite from Washery Refuse*

By E. A. Holbrook
Urbana, Ill.

SYNOPSIS — *The utilization of coal washery refuse is frequently a perplexing problem. This waste product, however, often contains pyrite in commercially recoverable quantities. An efficiency of recovery of about 70 per cent. can often be realized by the installation and operation of comparatively simple and inexpensive crushing, screening, jigging and sometimes tabling apparatus.*

CAN coal washery refuse be utilized commercially? This question has occurred to every official connected with any coal company operating a washery. The great refuse heaps accumulating near every plant are not only a source of increasing expense because of their ever increasing size, but the fact that they are frequently on fire makes them disagreeable and sometimes dangerous.

Washery refuse is a mixture of pieces of shale, bony coal, and generally iron pyrites or "sulphur." Often

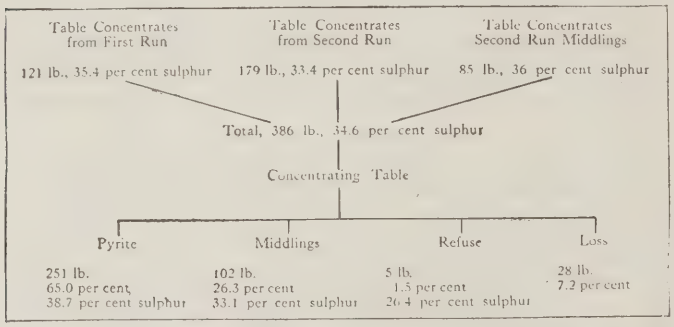


FIG. 1. FLOW SHEET—RERUN OF TABLE CONCENTRATES

some good coal is present. It is the iron pyrite content that offers commercial possibilities through its removal from the refuse, after which the remainder of the dump material can be discharged again in a size and shape that makes its handling easier and its storage safer. The market for iron pyrite is represented by the sulphuric acid plants, situated mostly east of the Mississippi River. The pyrite is the raw material which is burned or roasted for the production of sulphur dioxide, which in turn is converted into sulphuric acid. Pyrite thus becomes a necessary material for the manufacture of explosives and other so-called essentials in war times, as well as fertilizers.

It is impossible to tell by the eye or even by handling how much pyrite is contained in any washery refuse. In general, pyrite when prepared as a separate product for the market should contain a minimum of 40 per cent. sulphur. When absolutely pure pyrite contains about 53.4 per cent. sulphur and 46.6 per cent. of iron. The pyrite lumps found in washery refuse, when cleaned of adhering coal or shale, analyze as high as 48 per cent. sulphur. When it is considered that imported Spanish pyrite only analyzes from 46 to 48 per cent. sulphur, the purity of this material obtained from the best washery refuse pyrite is apparent.

It is true that much of the washery pyrite is dull grey or black in color and often has a stony amorphous structure, while the ordinary pyrite is bright, brassy yellow and shows an attractive crystalline formation. Nevertheless much of the washery product is high grade in sulphur, and the dull color often comes from a minute percentage of impurity, such as carbon, acting as a coloring material.

During the war, as a shortage of pyrite was threatened, the Bureau of Mines in coöperation with different state organizations conducted a survey of the different coal fields to learn their pyrite-producing possibilities. This work included a survey of coal mines and material dumped as refuse from many washeries. The utilization of the pyrite on a large scale from the coal mines may not be a commercial venture under peace-time conditions, but the pyrite in washery refuse is in many cases probably profitable of recovery even in normal markets. The following factors must be considered:

1. How much pyrite is there in the washery refuse? Roughly this is arrived at by determining the sulphur content of the refuse material and multiplying by 2. For example, a refuse analyzing 12 per cent. sulphur would have about 25 per cent. pyrite present. At many washeries the refuse examined contained so little pyrite as to be worthless; for example, one refuse analyzed only

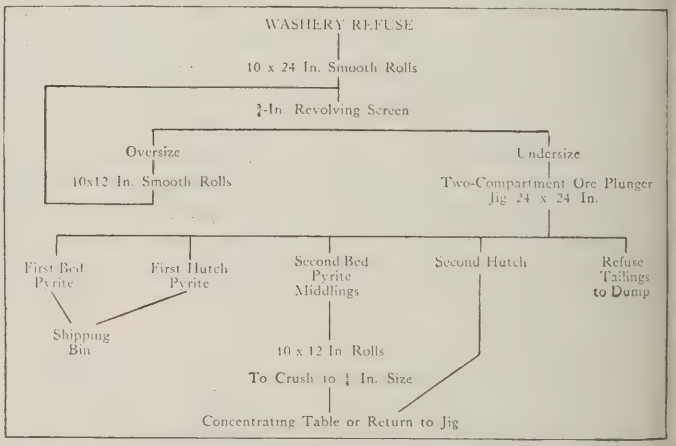


FIG. 2. FLOW SHEET—WASHERY PYRITE RECOVERY PLANT

4 per cent. sulphur or 8 per cent. pyrite. On the other hand, one refuse examined contained 25 per cent. sulphur or 50 per cent. of pyrite. These were the extreme cases. As the pyrite is about three times as heavy as the rest of the refuse, a small mass of it makes an astonishingly large proportion by weight.

2. In what condition is the pyrite? A small amount of the sulphur in the refuse may be combined organically and not be in the pyrite form. In some cases the pyrite is present mostly as small, bright, shiny scales, looking almost like colored fish scales. This form of pyrite is light in weight and generally of low sulphur

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content, in spite of its glistening appearance. Unless the refuse contains a large proportion of the pyrite in a lumpy, stony, hard form of a size equal to the rest of the refuse, its recovery probably is not inviting commercially.

3. What is the purity of the pyrite itself? Attention has been called to the varying purity of different samples. Chemical analysis for sulphur is the only reliable indication. In some cases the apparently pure pyrite was found to contain so much carbonate of lime or iron as to be below commercial grade, even as a cleaned product.

If the foregoing three factors are favorable in a washery refuse, attention should be given to its possible commercial recovery because such recovery involves only the addition to the existing washery of a crushing plant and a suitable jig. It also means easier disposal of the crushed refuse after the pyrite is extracted, as this fine material may be pumped or sluiced easily to the dump.

laboratory on washery refuse from Pennsylvania, and brings out the peculiarities of the pyrite in washery refuse and indicates that a simple plant would make a satisfactory saving. The plant already in operation makes a slightly higher grade of pyrite than was indicated by similar preliminary tests.

Report on Tests of Washery Refuse

Early in September, 1918, at the laboratory of the U. S. Bureau of Mines at the University of Illinois, about a ton of washery refuse was received from the Cascade Coal and Coke Co., Tyler, Penn. As this material contained pyrite, or "sulphur," it was desired to learn if this pyrite could be mechanically extracted from the refuse on a commercial basis. Tests of crushing, jigging and tabling the material were made as follows:

The material consisted of a mixture of pieces of pyrite, shale and bony coal of all sizes up to about 2 in. in greatest dimension. Many of the larger pieces

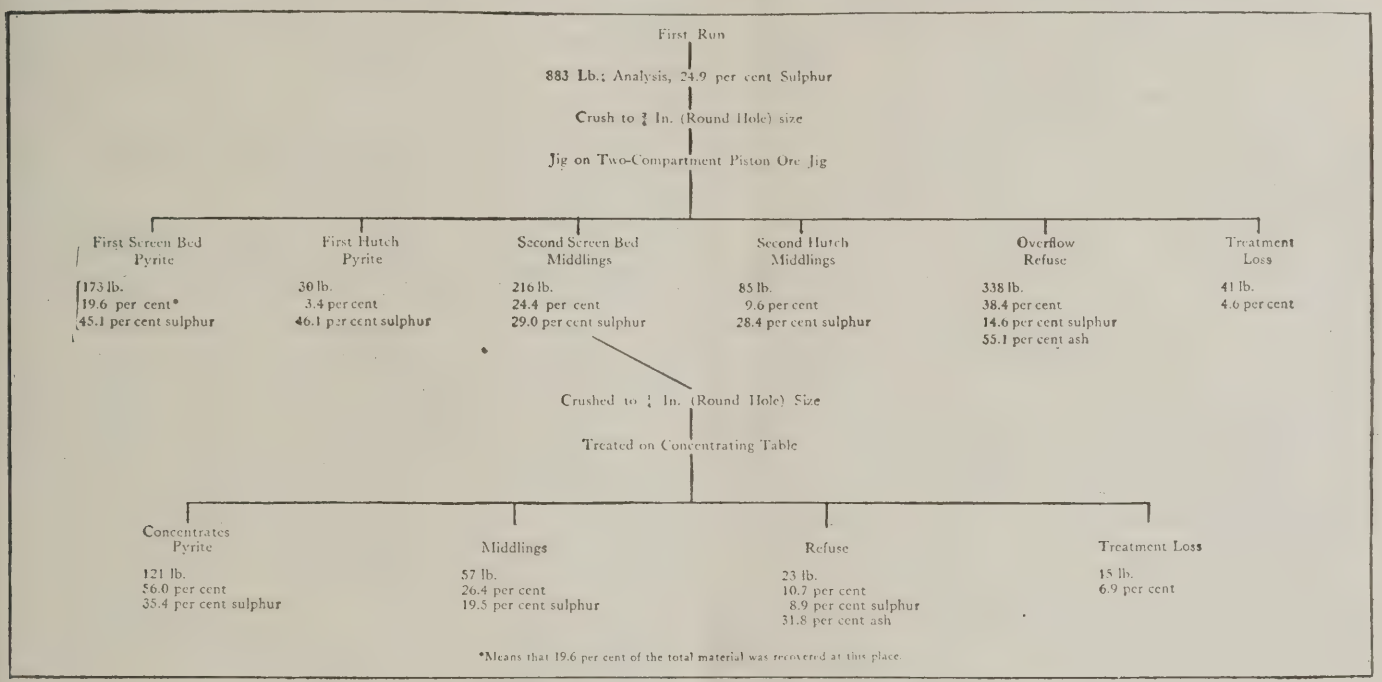


FIG. 3. FLOW SHEET OF FINAL TEST RUN OF WASHERY REFUSE

Furthermore, this reduces the danger of fires in the refuse pile.

The value of the recovered pyrite varies according to its purity and to market conditions, but an index is that the quoted price of Spanish pyrite at the Atlantic seaboard before the war was about $5 per ton. It should be remembered that pyrite treatment at a washery involves no cost for raw materials and only an operating expense and an interest charge for the plant. Moreover, it provides a use for a present worthless product.

Within the past year at least one large coal washery in the United States has installed a pyrite-saving plant, and this is reported to be running successfully. The preliminary tests on this plant and on material from several other washeries have been carried out by the Bureau of Mines in the coal-washing laboratory of the Mining Department of the University of Illinois, Urbana, Ill. No specific rules can be laid down to govern every plant, but individual experiments are necessary in every case in order to secure satisfactory results. The following report details the tests made at the

were a mixture of shale and pyrite. Graded crushing was tried, and samples were crushed to various sizes and examined to learn if the larger pyrite pieces were free from shale. In this way it was determined that crushing all the material to a maximum size of ¾ in. (round hole) would unlock a large percentage of clean pyrite. Consequently this size was chosen as the proper one before treatment.

In crushing, the pyrite showed but slight tendency to crumble and break into fine sizes. This is important because it simplifies the treatment. If, on crushing, the valuable mineral tends to crumble, it makes necessary an expensive treatment of fine material. In this test the pyrite seems stony and the fine sizes contain less pyrite than the coarse.

In testing material of this character it is possibre by fine crushing and complicated treatment to recover nearly all the pyrite. Commercially, on account of the moderate value of the product, it is better to simplify the treatment, at the expense of losing a little pyrite. Consequently after the preliminary tests, plans were

outlined for two final tests on the material as follows:

The first provided that after crushing to ¾-in. size the whole material should be treated on a two-compartment jig with the hope of recovering the coarse pyrite on the jig beds, and of saving the fine pyrite as hutch products in the bottom of the machine.

The second contemplated that after crushing the material to ¾ in. it be rescreened on a ¼-in. screen, and the material between ¼- and ¾-in. size be treated on a jig and the material under ¼ in. in size on a concentrating table. After crushing to ¾ in. the material was treated on a jig according to the first plan mentioned.

The accompanying flow sheet (Fig. 1), called the "Flow Sheet of First Test Run," outlines the work done and the results. The material jigged weighed 883 lb.

RESUME S HEET—FIRST RUN—WASHERY REFUSE FROM CASCADE COAL AND COKE CO., TYLER, PENN.

Original weight, 883 lb.; analysis, 24.9 per cent. sulphur

Product	Pyrite—Weight, Lb.	Pyrite—Sulphur Analysis, Per Cent.	Middlings—Weight, Lb.	Middlings—Sulphur Analysis, Per Cent.	Tailings—Weight, Lb.	Tailings—Analysis, Per Cent.	Loss
First bed pyrite	173	45.1	....	....	.....	.....	...
First hutch pyrite	30	46.1	....	....	.....	.....	...
Second bed middlings			See Table Products				
Second hutch middlings	....	....	85	28.4	.....	.....	...
Jig refuse	....	....	....	....	338	14.6 sulphur 55.1 ash	...
Table pyrite	121	35.4	....	....	.....	.....	...
Table middlings	....	....	57	19.5	.....	.....	...
Table refuse	....	....	....	....	23	8.9 sulphur 31.8 ash	...
Jig loss	....	....	....	....	.....	.....	41
Table loss	....	....	....	....	.....	.....	15
Totals	324	41.6	142	24.9	361	14.2 sulphur 53.6 ash	56
Percentages	36.6	....	16.1	....	40.9	.....	6.4

From 883 lb. of washery refuse, 324 lb. of pyrite were recovered or 36.6 per cent. by weight. This analyzed an average of 41.6 per cent. sulphur.

The middlings product of 142 lb., or 16.1 per cent., analyzed 24.9 per cent. sulphur. If commercially profitable, this middlings could be treated for the recovery of part of its contained pyrite.

The refuse tailings, 40.9 per cent. of the material by weight, contained 14.2 per cent. sulphur and 53.6 per cent. ash.

Expressed in another way, from 219.9 lb. of sulphur in the original refuse there was recovered 134.8 lb., or 61.3 per cent.

and contained 24.9 per cent. of sulphur, or roughly 49 per cent. of pyrite by weight. Clean, coarse pyrite was recovered from the first screen bed, and clean fine pyrite was recovered from the first hutch. The second screen bed gave a middlings product, or one composed of pieces still containing a mixture of shale and pyrite, which must be crushed finer before unlocking the pyrite. The flow sheet shows these middlings were recrushed to ¼-in. size and treated on a concentrating table with fair results. The overflow refuse was a shale low in pyrite and a bony shale.

The résumé sheet of the first run lists all the products obtained and shows the recovery of pyrite to be 36.6 per cent. by weight of all the material treated. Expressed as sulphur, 61.3 per cent. of all the sulphur was recovered as pyrite by two simple operations—jigging, followed by tabling the recrushed middlings. In a small plant the table could be eliminated and the recrushed middlings fed back to the jig.

The fine pyrite recovered from the table is of lower grade than the coarse pyrite recovered on the jig, the respective amounts of sulphur being 35.4 per cent. and 45.1 per cent. This was contrary to the results obtained on most pyrite which has been tested in the laboratory. The reasons for this will be discussed later. However, since 40 per cent. sulphur in pyrite may be taken as the minimum desirable percentage, if the lower grade pyrite from the table is mixed with the high grade pyrite from the jigs, the mixture has a grade of 41.6 per cent. sulphur, which is satisfactory.

In the second test, after crushing to ¾ in. the material was passed over a ¼-in. screen and the ¼- to ¾-in. size was treated on a jig, while the size smaller than ¼ in. was treated directly on a concentrating table, according to the second plan previously mentioned. The flow sheet of this second test is shown herewith (see Fig. 3) as is also the resumé sheet.

Comparison of the Two Tests

The two tests just described were run under the same conditions. The first was the more simple method and gave the purest pyrite. However, the second method gave a recovery of 72.4 per cent. of the total sulphur as against 61.3 per cent. by the first method.

In both tests the pyrite recovered on the concentrating table contained less than 40 per cent. of sulphur. This was probably caused by the fact that there is a small amount of carbonate of iron in the fine material, and this stays with the pyrite and cannot be removed by concentration.

To test whether or not these fine table concentrates could be improved by further treatment, all the table concentrates from all the runs were united and again

RESUME SHEET—SECOND RUN—WASHERY REFUSE FROM CASCADE COAL AND COKE CO., TYLER, PENN.

Original weight, 878 lb.; analysis,; 24.9 per cent. sulphur

Product	Pyrite—Weight, Lb.	Pyrite—Sulphur Analysis, Per Cent.	Middlings—Weight, Lb.	Middlings—Sulphur Analysis, Per Cent.	Refuse—Weight, Lb.	Tailings—Analysis, Per Cent.	Loss
First jig bed pyrite	144	40.7	...	....	.....	.....	...
First jig hutch pyrite	20	43.9	...	....	.....	.....	...
Second jig bed middlings			See Recrushed Products				
Second jig hutch middlings	....	....	11	11.3	.....	.....	...
Jig refuse	....	....	...	....	114	14.3 sulphur 57.9 ash	...
Table pyrite	179	33.4	...	....	.....	.....	...
Table middlings	....	....	129	17.0	.....	.....	...
Table refuse	....	....	...	....	83	8.5 sulphur 24.7 ash	...
Recrushed middlings pyrite	86	36.0	...	....	.....	.....	...
Recrushed middlings middling	....	....	34	20.9	.....	.....	...
Recrushed middlings refuse	....	....	...	....	15	14.3 sulphur 44.7 ash	...
Jig loss	....	....	...	....	.....	.....	3
Table loss	....	....	...	....	.....	.....	48
Recrushed middlings loss	....	....	...	....	.....	.....	12
Totals	429	36.9	174	17.3	212	12.0 sulphur 44.0 ash	63
Percentages	48.9	....	...	19.9	24.1	.....	7.1

From 878 lb. of washery refuse, 429 lb. of pyrite were recovered, or 48.9 per cent. by weight. This analyzed an average of 36.9 per cent. sulphur.

The middlings product of 142 lb., or 16.1 per cent., analyzed 17.3 per cent. sulphur. If commercially profitable, this middlings could be treated for the recovery of part of its contained pyrite.

The refuse tailings, 24.1 per cent. of the material by weight, contained 12 per cent. of sulphur and 44 per cent. ash.

Expressed in another way, from 218.6 lb. of sulphur in the original refuse, there was recovered 158.3 lb. or 72.4 per cent.

concentrated. The result is shown in the flow sheet called the "Rerun of the Table Concentrates."

The second run shows that it is not commercially possible to greatly improve the grade of the fine pyrite from this washery.

Conclusions

The washery refuse from Tyler, Penn., is rich in pyrite. Practically and commercially about 70 per cent. of this material can be saved in the form of pyrite of a grade containing at least 40 per cent. of sulphur.

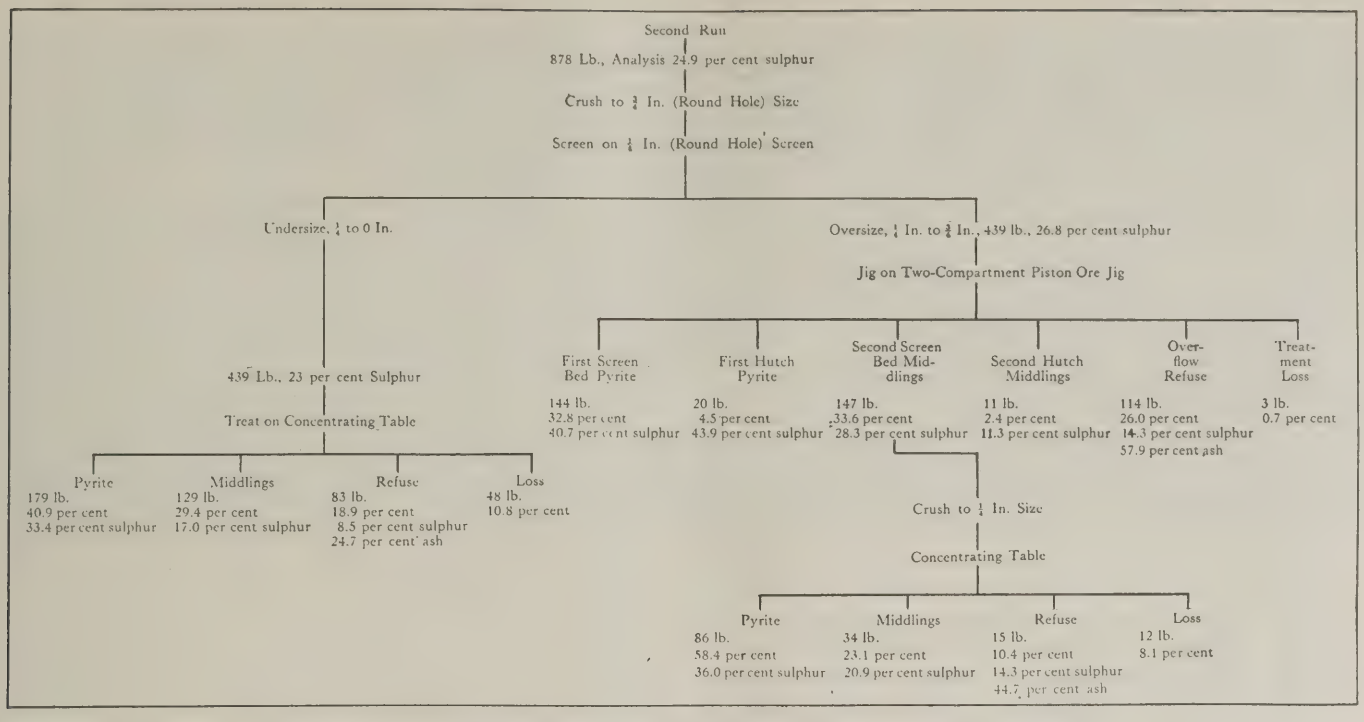


FIG. 4. FLOW SHEET OF SECOND TEST RUN OF WASHERY REFUSE

The refuse from this treatment is a bony shale, of about 13 per cent. sulphur existing in a very finely divided form, and it also contains about 50 per cent. ash. It is worthless as coal. Its high content shows that the coal washing carried out at the Cascade plant is efficient; that is, if the refuse as received at the laboratory at Urbana had contained much good coal, this would have accumulated at the jig overflow and revealed itself in a low ash analysis.

If the Cascade washery furnishes 30 or more tons of refuse per day, a simple pyrite treatment plant should be built to handle the refuse. This should produce, from 30 tons of refuse, at least 12 tons of pyrite containing 40 per cent. of sulphur. A flow sheet of the proposed plant is shown in Fig. 2.

If more capacity is needed, a concentrating table to handle the second bed pyrite middlings after recrushing is recommended. The machinery needed consists of three sets of smooth rolls, one revolving screen, one 2- to 4-compartment ore jig and a shipping bin. Of course water pumps and power are necessary. The cost of machinery and installation should not exceed $8000 to $10,000.

An Episode in the Recent History of the Coal Mines of France

An interesting bit of history is connected with the coal mines about the famous former French city of Lens. At present it is a heap of ruins. The German army of occupation established itself during the first year of the war in a line of trenches squarely across the coal basin of Valenciennes in the neighborhood of Lens, in the north of France. This position was held by the enemy throughout the greater part of the war, and the greatest destruction to the coal mines and surface plants is evident in this section. There were three zones in this coal basin during the war—one along the battle line and the others on either side of this territory. To better understand what followed the German invasion, it should be realized that about 90 per cent. of all the coal production of France was controlled by the Comité Central des Houilleres (Central Coal Operators' Association). The mines of this combination are all connected underground, and poisonous gases tended to circulate through the workings to the west of the battle zone from grenades and shells thrown down shafts by the Germans.

The French worked the mines in the territory west of Lens and it soon became necessary to build concrete dams in the mine entries and other openings both to keep the Germans out and preclude the possibility of their sending gas through onto the French miners. As the water rose in the workings to the east, these dams assumed an increasing importance as it was evident that the enemy aimed to stop French mining operations by every means in its power. The task of building these dams was attended with considerable risk. A Canadian officer was in charge, and he kept his men at work in the face of the many dangers surrounding them. Thus the workings were saved and in recognition of his notable achievement, the Canadian was awarded the war cross of honor. Pierce Williams, of the United States Consular Service, is the authority for this information, and he regrets his inability to state the name of the officer who so distinguished himself. As the Germans made good use of the opportunity to mine coal in the workings to the east of the line of trenches at Lens, it is thought that they also kept the mines in their territory from being flooded by a similar method.

To the east of the battle line the damage to the mines was less and less as the distance increased from Lens, until in Belgium the injury in the mine workings was negligible—there was little accumulation of water in the Belgium mines. However all removable metal and machinery was confiscated and sent to Germany.

The coal plants to the east of Lens in France and extending into Belgium were operated at all times by the Germans practically during the whole war—to the extent of their ability in obtaining men to work in the mines.

The New Pittsburgh Station of the Bureau of Mines—III

By George W. Harris
Editorial Staff, *Coal Age*

THE war greatly disorganized both the personnel and the work of the Bureau of Mines. During the last few years, however, much of value has been accomplished in the laboratories—of value at the time of need and for the future. In that period we progressed in conservation and standardization, and also in elimination of waste. The Bureau of Mines is especially interested in investigations looking to the increase of health, safety and efficiency in the mineral and metallurgical industries. But on the outbreak of war the work of the Bureau was concentrated on those problems whose solution would most increase national efficiency in war. This brought about many changes in the Bureau's organization. Many investigations were temporarily suspended and others were started and vigorously prosecuted.

The Pittsburgh station took a leading part in the work of the Bureau. The administrative affairs of this station were placed in the hands of D. A. Lyon, with the title of Supervisor of Stations, and with headquarters at Pittsburgh. He is the supervisor of all the field mining experiment stations.

The Pittsburgh station of the Bureau moved from its old location in the city arsenal into its new building on Forbes Street in October, 1917. At this time O. P. Hood, the chief mechanical engineer of the Bureau, was in charge, but owing to the necessity of his frequent absence from the plant W. R. Talbot was made acting superintendent. This arrangement was continued until Mr. Lyon arrived in Pittsburgh in September, 1918, as supervisor of all stations. At that time Mr. Talbot resumed his former duties as chief clerk, in charge of the personnel of clerical, purchasing, stockroom, filing, library and similar service. The work of moving the station into its new quarters was attended with difficulty and inconvenience, but it was managed so as to interrupt the work of the station as little as possible. The main part of the new building was available early in the fall of 1917, and at that time was occupied by the administrative offices and the various mining sections. Later the new chemical laboratories were occupied one by one, but the fuels section remained at the arsenal during the winter of 1917-18, as the power plant at the new site was not completed. A number of makeshifts were necessitated. Electric current was obtained from the city lines and steam from the nearby plant of the Carnegie Institute of Technology. H. A. Dent is now mechanical superintendent and has charge of the power plant, machinists, other mechanics and laborers. Special mention was made of the power plant in the first installment of this article, in the Apr. 17, 1919, issue of *Coal Age*.

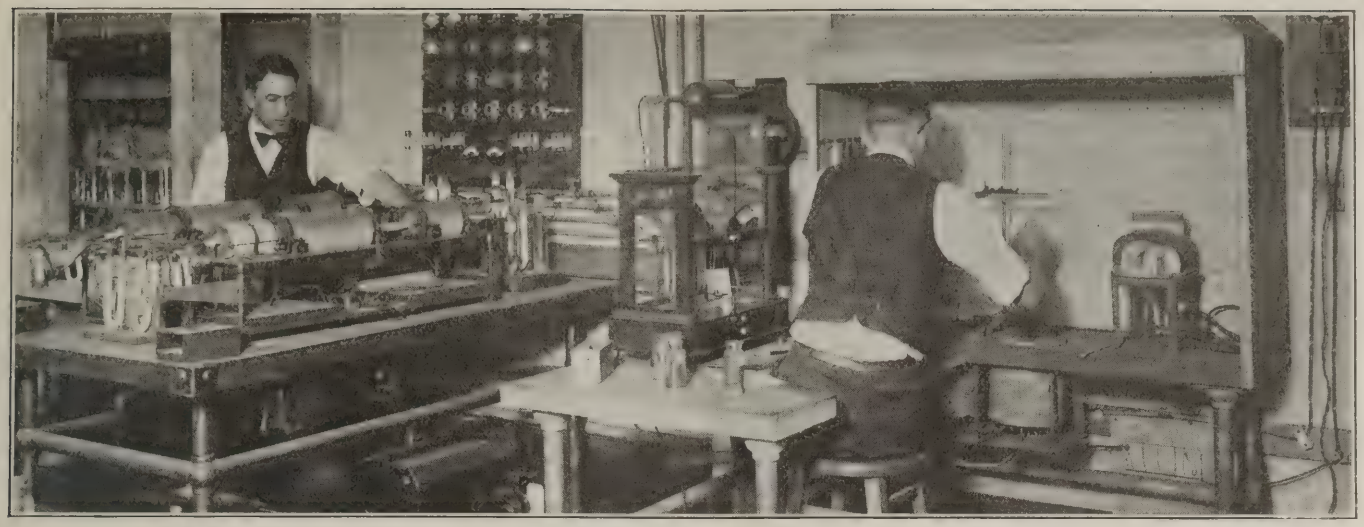
The transference of the station's departments and equipment was conducted under most trying circumstances, and it was extremely inconvenient to carry on the work of the station under such adverse conditions. But the new quarters are a most welcome change from the accommodations of the old arsenal. Here was a chance to correct and improve on old practice and equipment, and full advantage was taken of this opportunity wherever practicable. Considerable time was given to the moving and to the instalment of chemical equipment in the new building. The supervising field chemist of these chemical research laboratories is A. C. Fieldner.

These laboratories occupy practically an entire wing of the station and the work done here is quite diversified. A large amount of routine and investigational work is done by the various divisions. For example, during the last fiscal year over 2000 samples of coal and miscellaneous materials were analyzed, involving 17,477 determinations. Another line of investigation was the determination of the fusing point of coal ash of the coals of a number of states. The results of fusing tests made on the ash of the coals of West Virginia were completed and published, an account of which was reprinted in the Jan. 2, 1919, issue of *Coal Age*, under the title "Fusibility of West Virginia Coal Ash." The results of similar investigations were published in the Apr. 17, 1919, issue of *Coal Age* under the title of "Fusibility of Ash from Coals Found in the Interior Province." The routine analysis and the investigation of mine and natural gases have progressed; also, physical



GROUP OF PITTSBURGH STATION SECTION CHIEFS

Left to Right—W. R. Talbot, chief clerk; A. C. Fieldner, supervising chemist, chemical research laboratories; J. W. Paul, chief coal-mining engineer; D. J. Parker, mine safety engineer; H. A. Dent, mechanical superintendent



ANALYTICAL APPARATUS IN CHEMICAL LABORATORY USED IN ANALYSES OF COAL
Apparatus at the right is used in the determination of volatile matter; the apparatus at the left is used for the determination of carbon and hydrogen

apparatus and measuring instruments have been tested and calibrated. The work of the Bureau requires apparatus not usually found in laboratories.

All research work is apt to appeal to those interested in technical and scientific matters, but space does not permit an account here of the many activities at the Pittsburgh station. However, one such research stands out of peculiar interest to coal men. That is the work being done on the constitution of coal by Dr. Rheinhardt Thiessen, microscopist of the station. A bulletin entitled "Structure in Palæozoic Bituminous Coals," by Dr. R. Thiessen, in press, gives the results of the author's work on the subject during the last ten years. It will be copiously illustrated by photographs of microscopic vertical and horizontal sections of coal. A free translation of the title of this bulletin might be "the origin, composition and general nature of coal"; its woody structure was thoroughly investigated and minutely analyzed. In addition to establishing the theory of the vegetable origin of coal, Dr. Thiessen also presents his evidence as to an index by means of which he correlates the different coal seams.

The chief coal-mining engineer of the Bureau of Mines—J. W. Paul—makes his headquarters at the Pittsburgh station. He has charge of all field investigations and all work at the Experimental Mine, near Bruceton, Penn., pertaining to coal mining. The mine safety engineer of the Bureau—D. J. Parker—also makes his headquarters at the Pittsburgh station. He has charge of mine-rescue operations, the testing of mine-rescue apparatus, the training of miners in first aid and rescue methods, and the conduct of rescue and first-aid contests.

A glance at Table I would leave little doubt as to why the principal field station of the Bureau is located at Pittsburgh. This city is practically the center of a district which includes about 57 per cent. of all the miners in the country. Neither is it strange that the Pittsburgh station is headquarters for those in charge of field investigations and mine rescue operations connected almost entirely with coal mining. The Pittsburgh, or North Appalachian mining, district registers nearly 67 per cent. of the coal miners of the whole country; the next important district—the Eastern Interior—includes only 19 per cent. of the whole number of coal miners in the United States.

The work of the mining section is done chiefly in the field, but it also includes special testing work in laboratories at experimental stations. Engineers are stationed at different coal centers and carry on investigations in mining practice and methods. They also cover safety features. Furthermore, attention is given to the conservation of coal with an idea of obtaining the largest percentage of yield. It is found that in some sections old methods are still used and that the recovery of coal is not what it should be. In such an event a study is made of conditions with an idea of offering

TABLE I. FIELD DISTRICTS OF RESCUE STATIONS AND CARS *

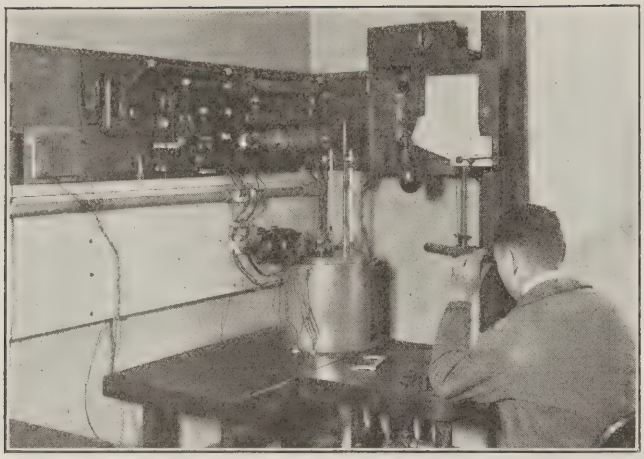
Mining Districts	Coal Miners †	Metal Miners	Totals
A or North Appalachian	483,023	7,589	490,612
B or South Appalachian	34,930	10,923	45,853
C or Lake Superior	.....	43,051	43,051
D or Eastern Interior	135,586	8,526	144,112
E or Southwestern	29,885	5,622	35,507
F or Southern Rocky Mountain	26,196	14,890	41,086
G or North Rocky Mountain	5,990	21,025	27,015
H or Northern Pacific	4,903	1,785	6,688
I or Southern Pcific	18	30,184	30,202
Totals	720,531	143,595	864,126

* Taken from Eighth Annual Report of Bureau of Mines for year ended June 30, 1918.

† Data as to miners of year 1914.

suggestions; possibly recommending a modification of practice to try to bring about a larger yield of coal.

Special investigations are undertaken by the Bureau of Mines in the various coal fields of the country. However, it is distinctly understood that such work is not done for an individual but for a general class in a district. Then the particulars about such investigations are published and in this way all operators throughout the country receive the benefit of the Bureau's suggestions. In the case of an investigation of the circumstances attending mine explosions and of conditions in the mine after the accident, samples of coal, road and rib dust and of mine air are taken for analysis and examination. In some instances as much as five tons of coal are obtained. This is reduced to dust to approximate as nearly as possible the same dust conditions as existed in the mine at the time of the explosion. Then a test is made at the experimental mine near Bruceton, Penn., under Mr. Paul's direction. Here it is determined what amount of moisture and inert matter or rock dust are necessary to add to the coal dust to prevent a coal dust explosion; or what conditions



COAL CALORIMETER IN CHEMICAL LABORATORY
Apparatus is used in testing the heating value of coal

are necessary to limit an explosion. Finally the operator of the mine in question is furnished with a copy of the report of the whole matter, this report giving recommendations which will tend to prevent further explosions in the mine.

Foreign governments carried on certain investigations similar to the work of the United States Bureau of Mines at present, before this Bureau was in the field. England, France, Belgium, Germany and Austria all made investigations. These countries were visited by officials from the United States, in some cases more than once. The testing galleries were above ground and consisted of steel or wood tubes. We have reproduced their steel tubes here and have gone in advance of any of the foreign countries in the development of an actual coal mine in which to conduct experiments. In our experimental work we have had the benefit of the advice of foreign engineers engaged in experimental work. The result is that we have the most advanced coal mine experimental station in the world.

It is the policy of the more progressive coal companies to send their engineers to other fields to investigate mining methods and the handling and preparation of coal. Last year a delegation from one of the prominent Illinois coal fields visited the Pittsburgh station and the experimental mine. Since the return of these coal men, one of the largest of the Illinois companies has spent several thousand dollars in installing certain safety features in its mines. For example, at the experimental mine near Bruceton certain devices are used to control or limit explosions. The Illinois company adopted similar control devices. An account of the Bureau's investigations in regard to explosions can be found in the Aug. 11, 18 and 25, 1917, issues respectively of *Coal Age,* under the title of "Coal Mine Investigations." As a substitute for rock dust with which to combat explosions some of the western mines are using adobe. It his been analyzed and it is known to be well adapted for the purpose.

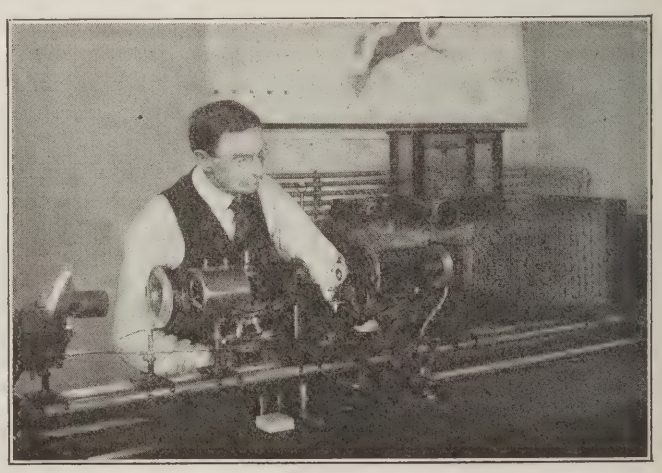
The action of mine explosions has received considerable attention from the officials of the Pittsburgh station mining section. They have learned just what happens and when it takes place. A sample of mine air has been taken before, at and after an explosion at the Experimental Mine for the purpose of investigation. It is also known if there was any vibration of air backward or forward during the explosion. The direction of the force of an explosion and the location of coked coal dust are matters of considerable interest.

The French engineers claim that the surest indication of the direction of an explosion is indicated by the location of coked coal dust, it always being on points opposite to the direction the explosion takes. For example, in passing props or corners of ribs, eddy currents are formed and coke deposits are found at points where there is a slowing up of the explosion; a strong current blows the coked dust away. The Pittsburgh station is still investigating this French theory. As the experimental mine develops and a greater opening is secured, it is hoped to learn something definite about it. Already from observations made in this country it has been found that where there is an accumulation of coked dust there is evidence of a slowing up of the explosion. This is shown in rooms at the point where the room widens out.

The Pittsburgh mining section has given much attention to mining methods, investigating plans followed, noting the percentage of coal recovered and advising as to better systems. In connection with the Bureau's efforts to secure greater efficiency in mining it should be stated that the various methods are being studied with reference to the effect on the surface. This is notably true in the case of Illinois, where the surface is valuable and numerous suits have been brought against the coal companies for damages. Some of the coal companies here are only getting out 50 per cent. of coal and say that they cannot do better under the present conditions. It is hoped that the investigations will result in real benefit to the operators and the owners of the surface alike.

Another important activity of the mining section is coal sampling. When the Bureau started in, it was found that there was no standard method for sampling coal. Therefore the Bureau was obliged to establish a standard method, and that method has not changed. A sufficiently large sample should be taken to have it representative of the seam. It also requires some judgment in excluding or including impurities. Impurities are not included in the sample when they are rejected in mining or in the preparation of the coal at the tipple. This requires a nice balance of conditions. A sample should show the average quality of coal a mine loads on cars or makes into coke.

If the coal on cars analyzes high in ash or sulphur, then there would be no use considering that coal for special purposes, unless it was found to be due to impurities which could be reduced in amount by more



DR. R. THIESSEN, MICROSCOPIST, TAKING A PHOTOMICROGRAPH OF A THIN COAL SECTION

careful mining or preparation. Sometimes the coal itself is high in ash or sulphur. Some think sampling is severe, but it often corrects bad practice of operators or miners. Samples of impurities themselves are taken in the mines for analysis to note the effect on a shipment should they be included in it.

If a miner is alive to the dangers of his occupation and understands how to meet them successfully the battle is half won. This is the attitude of the mine safety section of the Bureau of Mines, under the charge of D. J. Parker, mine safety engineer, with headquarters at the Pittsburgh station. The work of the mine safety section consists primarily in providing for the education of the miner with a view first of preventing mine accidents, second of enabling miners to take care of injuries, and third, attention to sanitation, both in the miner's home and underground. In other words, the work of the section is for the purpose of conserving the life and limb of the miner. In order to conduct the mine safety work to the best advantage, the mining regions of the country are grouped into eight districts. An indication of the territory included in these districts is given in Table I, which also shows the number of miners in each. The districts are planned with special reference to mine safety and rescue work, hence



PITTSBURGH STATION TRAINING GALLERY
Crew at work wearing Gibbs breathing apparatus.

they are grouped around the respective rescue stations and headquarters of the rescue or mine safety cars—the fixed and movable stations. Both classes of stations are scattered throughout the country. The movable stations include eight rescue cars and four auto trucks. Three of the cars are of steel and three more of similar construction are building. There are seven fixed stations.

The field work of those connected with the mine safety section, in the event of mine explosions, is well known. Thirty-eight mine accidents were investigated by the Bureau during the last fiscal year, and of these 30 were in coal mines. This is one of the most important functions of the Bureau and the primary influence in creating the department. Valuable assistance is also given in the inspection of rescue apparatus owned by the mining companies themselves. Advice is given when requested as to the conditions of such apparatus and also to repairs when necessary. It is quite essential that a warning be sounded as to defective apparatus and the need of having all apparatus tested regularly and often by those qualified to judge as to its condition.

In addition to giving aid at mine disasters, the Bureau trains miners in first-aid and mine-rescue work, and organizes field contests in first-aid and mine-rescue work. The success of the Bureau's efforts in this direction is attested to by the interest the miners take



CREW AT WORK IN TRAINING GALLERY

in such matters. The Bureau reports that during the last fiscal year 36,274 miners visited the rescue cars, stations and trucks; 33,629 attended lectures and safety demonstrations and 8851 were given training. A special service by the Bureau last year was the training of soldiers at military camps in rescue and safety work, and also in the use of breathing apparatus in atmospheres containing poisonous gases.

During the recent influenza epidemic which caused so many fatalities among miners and such serious interruption at times to the operation of coal mines, an unusual opportunity was afforded the car employees to be of service. The crews of several of the cars devoted much time to aiding the hard-pressed people and hospitals; in a number of instances the car supply of oxygen and oxygen inhalators was brought into good use where the use of oxygen was prescribed by the proper authorities. The surgeons detailed for service with the Bureau rescue cars were put on special duty by the United States Public Health Department with a view to abating the epidemic and relieving the sufferers. Their work with the Bureau cars is ordinarily to investigate sanitary conditions at localities visited, give lectures on the hygiene of the home and on mine sanitation and how to prevent the spread of communicable diseases.

(To be concluded)

Comparison of Bituminous and Anthracite Statistics—1918

In the article "Comparison of Bituminous and Anthracite Statistics for Pennsylvania—1918," the output per inside worker in Pennsylvania in 1918 was compared with the output per employee in the United States in 1913. Obviously, the output per employee in the same area should have been taken in each case, the output in the bituminous mines in 1918 being 1009.87 per employee and in the anthracite mines 670.91. As in the bituminous mines of Pennsylvania, each man produced 1009 tons and the anthracite mines 520 tons the bituminous mines did not increase their output per man while the anthracite mines produced 29 per cent. more per head. Neither the bituminous nor the anthracite mines of Pennsylvania had in 1913 a general strike, so the comparison with 1918 would be closely comparable if only the bituminous region of Pennsylvania in 1918 had had an adequate car supply and the culm banks of the anthracite region been worked with equal assiduity in the two years mentioned.

Inclined Plane of the Union Mining Co.

By U. U. Carr
Monongahela, Penn.

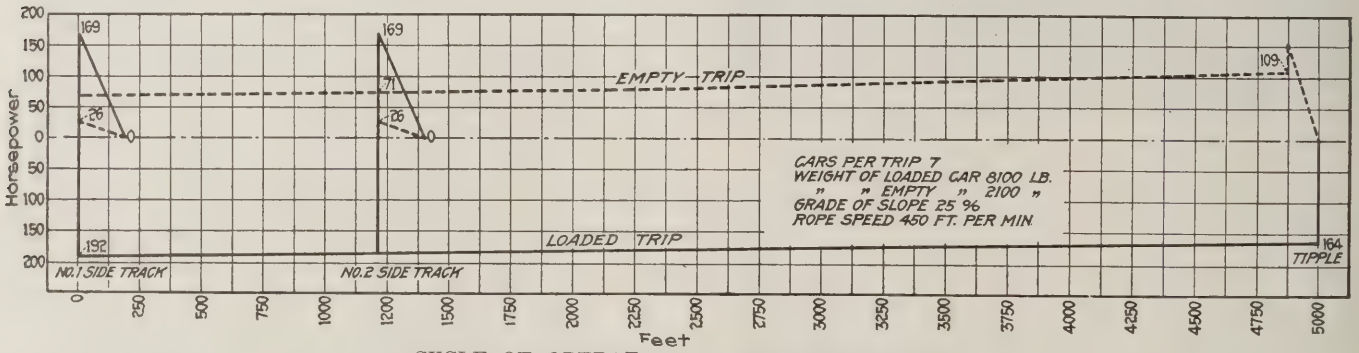
SYNOPSIS—*An inclined plane machine that had been used for several years proved inadequate to handle an increased output. Accordingly an electrically driven hoist was installed. This hoists empties and lowers loads. During the latter operation the motor acts as a generator and returns more power to the line than it consumes in hoisting.*

AN INTERESTING example in inclined plane operation is afforded by the electrically driven hoist recently installed for the Union Mining Co. at Mt. Savage, Md. This mining operation produces the fireclay used by the Mt. Savage Fire Brick Co. Two beds separated by 300 to 400 ft. of intervening strata are worked. The material is lowered down an incline 5000 ft. long having an average grade of 25 per cent. The usual type of incline machine had been operated for a number of years but proved inadequate to handle the present output. The installation of heavier machinery of a different type was therefore decided upon.

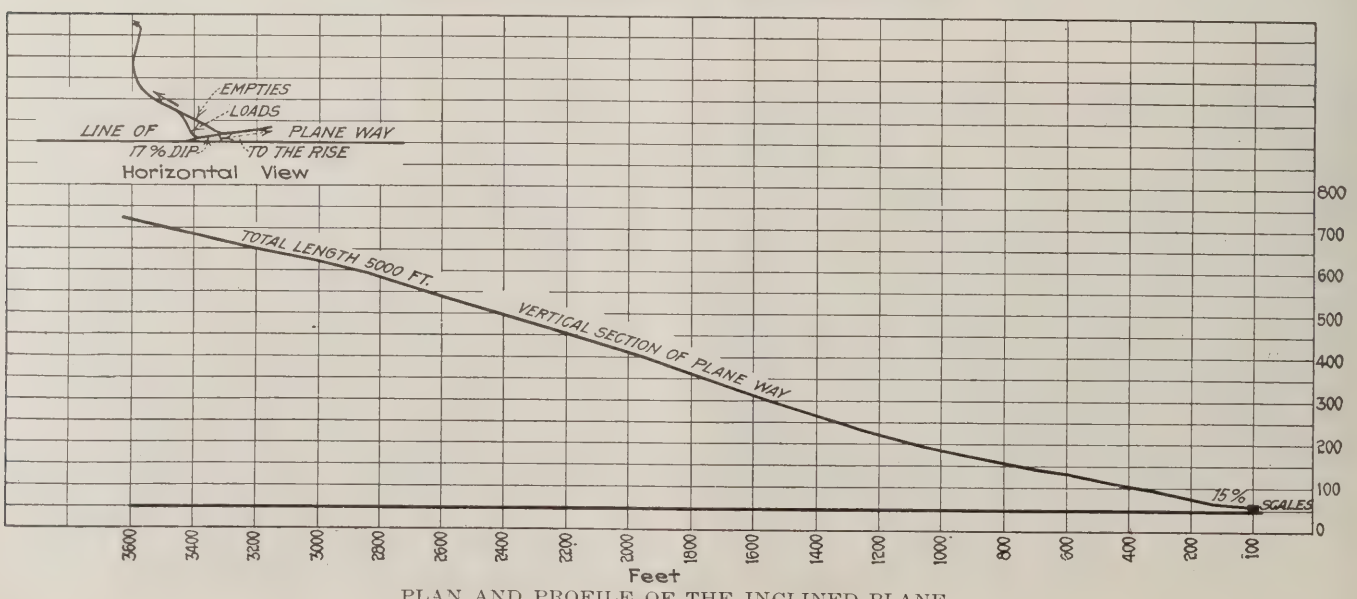
The hoist installed has a single keyed drum 60 in. in diameter with a capacity for coiling 6000 ft. of 1-in. rope. This machine is provided with post brakes and driven by a 200-hp. motor through two gear reductions. In operation trips of seven loaded cars, weighing 8100 lb. each, are placed on sidetracks at the different levels and adjacent to the single track of the incline. These trips are pulled from their respective sidetracks onto the incline, using the motor as a source of power. The motor is then reversed and, acting as a generator, furnishes the braking effect necessary to absorb the energy of the decending loads. The empty trip, also of seven cars, weighing 2100 lb. each, is pulled up the incline by the motor and lowered into the side track by means of the hand brake.

In lowering the loaded trip the regenerative action of the motor insures absolute safety from runaways, and a uniform speed is secured without effort on the part of the hoistman. The hand-operated post brake is of ample capacity to hold the load at any point. As an additional safeguard it is set by a weight and held in the released position by the operator, who is thus always ready to apply the brakes in case of failure of the power supply with a consequent loss of braking effect in the motor. It is to be noted that the hand brake is only used when lowering the empties onto the sidetracks. The disastrous heating and wearing of mechanical brakes incident to their use on long inclines is thus avoided.

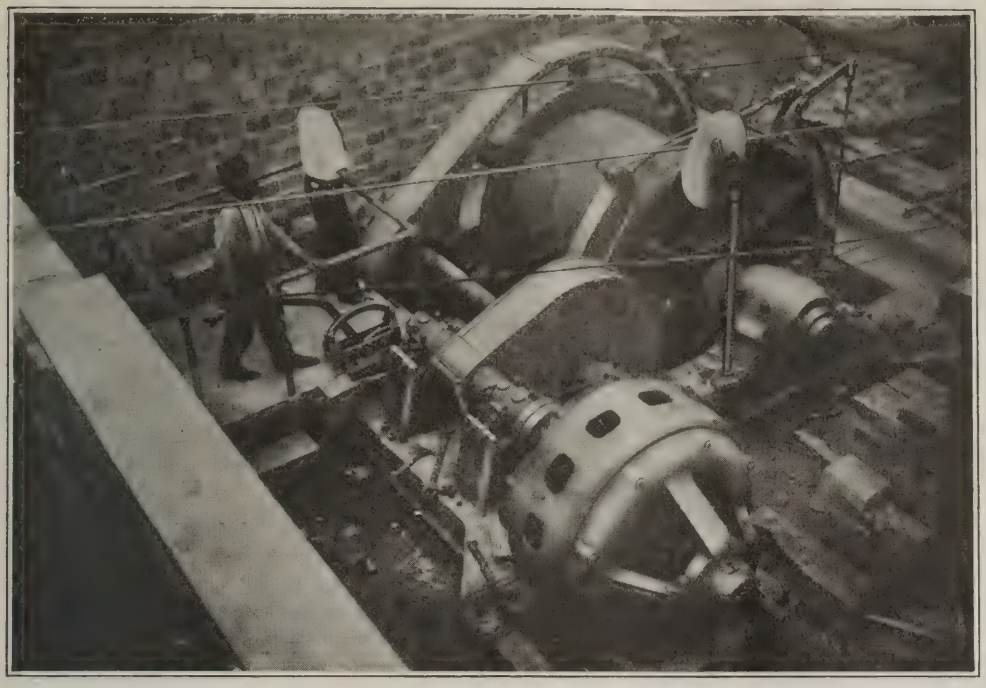
The rope speed is 450 ft. per minute, and while no power readings are available the estimated power required to hoist the empty trip varies from 109 hp. at



CYCLE OF OPERATION OF THE MINE HOIST



PLAN AND PROFILE OF THE INCLINED PLANE



THE HOIST IN OPERATION BEFORE COMPLETION OF HOIST HOUSE

the bottom of the incline to 70 hp. at the top. In lowering, the loaded trip develops 192 hp. at the top of the incline, diminishing to 164 hp. at the bottom. The power developed is much in excess of that consumed and on a kilowatt-hour basis the power charge would be negative.

The hoist was designed and built especially for this service by the Diamond Machine Co., of Monongahela, Penn. It is driven by a Westinghouse Type C.W., three-phase, 60-cycle, 440-volt motor.

"Sengite"—A New Mine Explosive With a Guncotton Base

By M. Meredith
Liverpool, England

The manufacture of a new explosive, known as "sengite," to meet the shortage of nitroglycerine explosives, now used by the mining industry in South Africa, has recently been commenced in that country. The new explosive, which has a guncotton base, is the result of experiments conducted by Kynoch, Ltd., at the Umbogintwini (Natal) factory. It consists in the manufacture of tonite, in which nitrate of soda is substituted for nitrate of barium, which is usually used in that explosive. By this substitution it was found that an explosive of approximately similar strength to gelignite could be produced.

The process of manufacture is to incorporate the various ingredients, thoroughly clean, sieve and blend, and finally under hydraulic pressure press them into the shape of a cartridge. The pressure used is from 5 to 10 tons per square inch. In pressing a recess is left in the cartridge to receive the detonator. It is also possible by this process to leave a sufficient amount of water in the cartridges without appreciably reducing their blasting strength, with the advantage that the cartridge is a perfectly safe one to handle. This explosive is so insensitive to shock as to be quite safe if hammered with a steel tool. Accidental explosions in mining caused by drilling into unfired holes would not occur where this explosive is employed. Sengite, on the other hand, cannot be reliably detonated with an ordinary detonator, such as is used for tonite or gelignite. It will, however, detonate with absolute regularity if it is loaded and fired with a primer cartridge of gelignite or gelatine. The new explosive has been given a rigid test by a number of mines and has been found satisfactory in every way. The special equipment necessary, having a monthly capacity of 5000 cases, is now being built at Johannesburg. The sengite produced up to the present has been made on the original experimental machines. All of this has been of a uniform strength equivalent to ordinary gelignite.

Other derivatives have also been made, and it was found that a series of explosives containing other ingredients can be produced, so that weaker and cheaper forms of explosives can be made to take the place of the series of gelignites and dynamites, down to about the strength of 30 per cent. nitroglycerine explosives. The cost of producing sengite under war conditions was slightly greater than that of gelignite, but peace time prices may change this.

The name of this new explosive originated with the manufacturers, the first four letters being the initial letters of the following words "substitute explosive, no glycerine." The last three letters are taken from the word dynamite.

It is quite likely when an explosion occurs in a mine that the cage, signaling devices, headframe tower, or derrick may have been wrecked or disabled. Immediate preparations should be made to descend the shaft. To determine whether men are alive at the bottom, signals should be given by pounding on any pipes extending down shafts. Lack of response may be due to the pipes being broken. To make sure, get a ¼-in. rope, fasten to its end a lighted electric hand or flash lamp, a lighted safety lamp and a small cage containing a canary bird, and lower them to the bottom of each shaft. If men are alive at the bottom they may see the lights and give some signal or attach a message. The lower end of the rope should remain down five minutes, it should then be withdrawn, and the safety lamp and the canary examined. If the safety lamp is still lighted, and the canary alive or not disabled, men may safely descend the shaft, provided no change of ventilation in the meantime would cause the air in the shaft to change from still or intake to an upcase current. The return of the lighted safety lamp and the live canary will indicate that the oxygen content of the air is more than 17 per cent. (pure air contains about 21 per cent.) and that the carbon monoxide content, if any, is less than 0.20 per cent.—*Rescue and Recovery Operations in Mines.*

Coal Resources of Western Canada—II*

By James White
Assistant to Chairman, Deputy Head, Commission of Conservation, Ottawa, Canada

SYNOPSIS—*British Columbia, like Alberta, has coal in many stages of mineralization, but so large is Western Canada that the government believes it best to make plans for the carbonizing of the low-grade coals of Saskatchewan, thus saving freight and, incidentally, byproducts. The close of the article speculates on the possibility of such utilization of the Saskatchewan lignites and on the briquetting of near coke and the powdering of coal.*

THE Crowsnest region contains the most important body of coal now being mined in British Columbia. The coal covers an area of 230 square miles, and is a high-grade bituminous, occasionally running into anthracite, averaging about 64 per cent. fixed carbon. Much the greater portion of the coal is converted into coke, the remainder being sold as steam coal. There are 22 workable seams, with a total thickness of 216 ft., 100 ft. of which is estimated as workable.

In addition to the Crowsnest field referred to above, areas of coal-bearing rocks are found at several points in southern British Columbia. The Princeton field includes an area of about 50 square miles. At Princeton there is an 18½-ft. seam of lignite carrying 42 per cent. fixed carbon, 38 per cent. volatile matter and 16 per cent. moisture. At Nicola seams 6 ft., 10 ft., 5 ft. and 12 ft. thick respectively, have been mined. The Nicola coal is a sub-bituminous and analyzes about 47 per cent. fixed carbon, 39 per cent. volatile and 4 per cent. moisture. Coal has also been found at Tulameen, Kamloops, Hat Creek and North Thompson River. The total area in Vancouver Island underlain by coal seams is about 600 square miles. These coal fields contain some of the best steam coals on the Pacific Coast.

The coal of the Comox field is a coking, bituminous fuel and contains 57.2 per cent. of fixed carbon, the highest carbon content of all the Vancouver Island coals. Three seams have been mined in this field. The Nanaimo field has a productive area of 65 square miles, though the area underlain by coal seams is somewhat larger. The seams vary in thickness. Occasionally a seam containing from 2 to 3 ft. of dirty coal carries 30 ft. of clean coal at a point only 100 ft. distant. Run-of-mine coals from this field run as high as 56 per cent. fixed carbon and 43 per cent. volatile combustible; the commercial samples having a heat equivalent of 12,470 to 13,160 B.t.u.

The coal fields of the Queen Charlotte Islands are of Cretaceous and Tertiary age. The Cretaceous coals range from semi-anthracite to low-carbon bituminous. The Tertiary coals are lignites. In 1871 mines were opened in the semi-anthracite at Cowgitz, but the coal was so badly crushed that the enterprise was abandoned. This coal analyzed 83 per cent. fixed carbon and 5 per cent. volatile combustible; the fuel ratio being 16.5.

Central British Columbia has lignite beds at Alexandria, Quesnel and Prince George on the Fraser, on the Nazko River, Nechako River, Dean River and Lightning Creek. Three seams of bituminous coal, possibly a coking coal, aggregating 20 ft. in thickness, have been reported on a tributary of Morice River, and three seams on Goat River, a tributary of the Telkwa, aggregate 56 ft. in thickness.

The most important coals thus far discovered in the northern portion of British Columbia are the semi-anthracites and anthracites of the Groundhog Mountain area. An area of 170 square miles is assumed to be coal-bearing. It contains eight seams, with an aggregate thickness of 30 ft.

The "actual" and "probable" reserves in British Columbia are: Semi-anthracite, 1.9 per cent.; bituminous, 85.4 per cent.; low-carbon bituminous, 3.3 per cent.; cannel, 2.4 per cent.; lignitic, 7.0 per cent. Lignites have been discovered on Kispiox River, Sustut River, Peace River and Liard River. Bituminous coal has been found near Peace River cañon, and on the Taku River.

Canada's total consumption of coal in 1916 was 29,865,856 tons. Of this total, 41.3 per cent. was Canadian and 58.7 per cent. was imported coal. In normal times, taking the average during the period, 1894-1913, the consumption is about 48 per cent. Canadian and 52 per cent. imported, the increase in imports at the present time being due largely to the demands for munition and other manufactures in the coal-less portion of

TABLE VII. COAL PRODUCTION IN BRITISH COLUMBIA 1898-1917

Year	Tons	Value	Year	Tons	Value
1898	1,263,680	$3,384,858	1908	2,333,708	$7,292,838
1899	1,431,101	3,833,307	1909	2,606,127	8,144,147
1900	1,791,833	4,799,553	1910	3,330,745	10,408,580
1901	1,919,488	5,141,487	1911	2,542,532	7,945,413
1902	1,808,441	4,844,040	1912	3,208,997	10,028,116
1903	1,676,581	4,490,844	1913	2,714,420	8,482,562
1904	1,862,625	4,989,174	1914	2,239,799	6,999,374
1905	1,945,452	5,211,030	1915	2,065,613	6,455,041
1906	2,146,262	5,748,915	1916	2,584,061	8,075,190
1907	2,364,898	7,390,306	1917	2,433,888	8,235,716

TABLE VIII. COAL PRODUCTION OF THE PRAIRIE PROVINCES AND BRITISH COLUMBIA IN THE CALENDAR YEAR 1917

	Tons	Per Cent. of Canada's Production	Value
Saskatchewan	355,445	2.53	$662,451
Alberta	4,736,368	33.72	14,153,685
British Columbia	2,433,888	17.33	8,235,716
Total	7,525,701	53.58	$23,051,852

TABLE IX. IMPORTS INTO PRAIRIE PROVINCES, BRITISH COLUMBIA AND PORTION OF ONTARIO TO WEST OF LAKE SUPERIOR IN THE YEAR ENDING MARCH 31, 1917

	Tons	Value
Bituminous lump	2,067,416	$2,850,121
Bituminous slack	260,197	337,655
Anthracite	521,611	2,924,308
Total	2,849,224	$6,112,084

*From a booklet entitled "Fuels of Western Canada." Continued from page 748 of the issue of Apr. 24.

Canada—Ontario and Quebec—and to the decrease in the production of Nova Scotia.

Locomotives, in 1916, consumed 8,677,354 tons. This constituted 29.1 per cent. of all coal consumed in Canada. It was 34.3 per cent. of the total consumption of bituminous and lignite in the Dominion and was 38.2 per cent. of the total consumption of bituminous.

The Vancouver Island and Nicola Valley collieries, in 1917, exported 32.6 per cent. of their output to the United States, exported 2.4 per cent. to other countries and sold 65 per cent. for consumption in Canada. The corresponding figures for 1912 are 21.2 per cent., 7.5 per cent. and 71.3 per cent. respectively. In 1902, 75 per cent. was exported to the United States. These figures show a remarkable change of market.



BRITISH COLUMBIA, SHOWING PRINCIPAL COAL-PRODUCING CENTERS

The production in the Crowsnest district in 1917 was 617,956 short tons. Of this production, 252,949 tons, or 40.9 per cent., was exported to the United States; 82,441 tons, or 13.3 per cent., was sold in Canada; 282,566 tons, or 45.7 per cent., was converted into coke or was used for colliery purposes.

In 1917, the Crowsnest Pass Coal Co. produced 504,762 short tons, the Canadian Collieries, 690,111 tons, and the Western Fuel Co., 714,533 tons, contributed, in the aggregate, 78.4 per cent. of the production of British Columbia.

In 1917, the Vancouver Island collieries produced 1,648,201 tons, or 67.7 per cent. of the output of the province; the Nicola-Princeton collieries, 167,731 tons, or 6.9 per cent.; Crowsnest (East Kootenay) district, 617,956 tons, or 25.4 per cent.

At present, owing to the war, abnormal conditions prevail, and anthracite is almost unobtainable west of Lake Superior. It has been predicted that when the war is over and conditions approximate to normal, hard coal will be marketed at a lower price. An examination of prices during the last 20 or 25 years, however, and the well-established fact that at the present rate of consumption the anthracite of the United States would be exhausted in less than a century, indicate that the theory of lower prices after the war is utterly fallacious. Even prior to the war, the production was decreasing at the rate of approximately 1 per cent. per annum. The question, therefore, is: What can be done in the way of producing a fuel that approximates to anthracite or toward the production and utilization of lignite under more advantageous conditions?

The briquetting of carbonized lignite promises to furnish an artificial anthracite. So far as the writer knows, however, no plant has yet produced it on a commercial scale, though, on the recommendation of the Research Council the Dominion Government has appropriated $200,000 for that purpose, this sum to be supplemented by votes of $100,000 each by Manitoba and Saskatchewan. In 1917, B. F. Haanel, of the Mines Branch, Department of Mines, investigated the process of manufacture and practicability, costs, etc., of the manufacture of carbonized lignite briquets. Presumably based on Mr. Haanel's report, the Research Council estimated that a plant with a capacity of 30,000 tons could produce the briquets for $7.25 per ton, assuming that the lignite, half slack and half run-of-mine required to produce one ton of briquets, could be purchased for $1.12½. As the production of slack in 1917, at the principal mines in the Estevan district, was only about 55,000 tons, it is obvious that all lignite required over and above this amount would be run-of-mine, which, on the basis of costs in 1917, increases the cost of the briquets 75c. per ton, or to $8 in all.

In 1917, the Commission of Conservation instructed its mining engineer, W. J. Dick, to make an investigation of markets, freight rates and cost and tonnage of lignite in the Estevan district. Mr. Dick reported that, based on the figure for operating expenses supplied by the Research Council, and allowing the manufacturer a profit of $1 per ton, the briquets could be marketed at a lower price than anthracite in western Manitoba and Saskatchewan, the price ranging from 45c. per ton less than anthracite in Portage la Prairie to about $2 per ton less in Moose Jaw. If run-of-mine coal is used, it will of course decrease this profit by 75c.,

but will leave an ample margin in the Regina and Moose Jaw markets.

In manufacturing carbonized lignite briquets, the raw material is heated in closed retorts to drive off the moisture and nearly all the volatile matter. The carbonized material is left behind as a coke which contains about double the amount of fixed carbon contained in the raw lignite. This carbonized material is mixed with a binder and compressed in a briquetting machine. Subsequently the briquets are waterproofed by heating, and so coking, the binder. Two tons of raw lignite produce one ton of briquets. This, of course, practically doubles the amount of fixed carbon and ash.

The question of the material to be used as a binder is an important one. Coal-tar pitch makes an excellent binder, but it is reported that the cost is high; the quantity available in Canada is also somewhat limited. Sulphite pitch, produced in the manufacture of paper pulp, has been successfully used as a binder in experimental work. The production of briquets of all kinds in the United States in 1916 was 295,155 net tons; in 1917 it was 406,856 tons; in 1916 the plant at Bankhead, Alta., produced 82,249 tons of briquets.

Pulverized coal was utilized first in cement plants and was found to be an excellent low-priced fuel of high efficiency. Later, it was applied in certain metallurgical processes and, during the last four years, several United States railways have successfully operated locomotives with this class of fuel.

In copper smelting, notable results have been achieved; furnaces, with a rated smelting capacity of 500 tons of ore per day, are now smelting twice that amount with pulverized coal. Notable economies have been obtained where it has replaced oil fuel, and a better distribution of heat has been obtained. W. G. Wilcox states that by comminution "we have changed entirely the characteristics of coal as commonly known." In addition to the greatly increased efficiency obtained, pulverized coal is practically smokeless, small coal can be utilized, anthracite culm, bituminous screenings and coke breeze assume a new importance, inferior grades of coal can be mixed with better grades and burned

TABLE X. ANALYSES OF BRITISH COLUMBIA COALS

Locality	Moisture Condition*	Loss in Air-Drying	Moisture	Volatile Combustible	Fixed Carbon	Ash	B.t.u. per Lb., Gross	Fuel Ratio	Carbon Hydrogen Ratio	Coking Properties	Authority†
Crow's Nest Pass:											
Corbin, No. 4 mine	A.D.	0.4	0.5	24.6	61.1	13.8	.....	2.50	17.9	Poor coke	Mines Br., B. 26
Michel colliery	A.D.	1.2	0.7	22.4	65.0	11.9	13,260	2.90	16.9	.....	Mines Br., B. 26
Coal Creek colliery	A.D.	0.9	1.3	26.0	63.8	8.9	13,640	2.45	17.3	.....	Mines Br., B. 26
Flathead Area:											
Butt's 31-ft. seam	R.	...	4.7	24.1	59.2	12.0	.....	2.45	....	Non-coking	Mines Br., B. 26
Okanagan Lake, B.C. seam	....	...	1.6	33.9	55.4	9.1	.....	3.89	....	.....	Geol. Surv., M. 53
Tulameen, Granite Creek	D.	...	...	33.7	54.0	12.3	.....	1.60	14.9	.....	Mines Br., B. 26
Nicola, Middlesboro collieries	A.D.	0.5	3.9	37.6	44.5	14.0	11,230	1.20	12.3	.....	Mines Br., B. 26
Chilliwack River, 5 miles up	.....	...	...	‡35.7	63.9	0.4	.....	....	....	.....	Geol. Surv., M. 53
Vancouver, English bay	A.D.	4.6	14.5	34.3	44.3	6.9	.....	1.30	....	Non-coking	Mines Br., B. 26
Nanaimo Area:											
No. 1 mine, Douglas seam	A.D.	0.6	1.6	40.6	47.7	10.1	12,620	1.20	14.4	.....	Mines Br., B. 26
Newcastle seam	A.D.	0.5	1.9	40.7	45.7	11.7	12,230	1.10	14.3	.....	Mines Br., B. 26
Wellington seam	A.D.	0.7	1.1	39.7	49.2	10.0	13,020	1.25	15.0	.....	Mines Br., B. 26
Comox Area:											
No. 4 mine, lower seam	D.	...	...	31.6	56.5	11.9	12,870	1.80	16.5	.....	Minex Br., B. 26
Comox lump coal	R.	...	1.1	32.2	56.3	10.4	13,210	1.75	15.3	Fair coke...	Mines Br., B. 26
Trent River seam	.....	...	0.9	32.9	58.3	7.8	.....	....	....	.....	Geol. Surv., M. 53
Browns River seam	.....	...	0.9	23.8	70.9	4.3	.....	....	....	.....	Geol. Surv., M. 53
Beaufort mine	.....	...	...	‡29.3	55.7	14.9	.....	....	....	Slow coking	Geol. Surv., M. 53
Baynes Sd. mine, Richardson seam	.....	...	1.2	34.1	48.5	16.2	.....	....	....	.....	Geol. Surv., M. 53
Baynes Sd. mine, upper seam	.....	...	...	‡29.1	57.5	13.4	.....	....	....	Slow coking	Geol. Surv., M. 53
Baynes Sd. mine, lower seam	.....	...	...	‡29.5	64.7	5.8	.....	....	....	Slow coking	Geol. Surv., M. 53
Suquash, Pacific Coast mine	D.	...	...	34.3	42.7	23.0	11,100	1.25	....	.....	Mines Br., B. 26
¾ m. south of Kliksiwi River seam	.....	...	3.7	42.2	39.8	14.3	.....	....	....	.....	Geol. Surv., M. 53
Kink River, near Beaver Har. seam	.....	...	3.7	39.3	47.0	10.0	.....	....	....	.....	Geol. Surv., M. 53
Koskimo coalfield	.....	...	1.0	34.4	54.0	10.6	.....	....	....	.....	Geol. Surv., M. 53
Queen Charlotte Islands:											
Yakoun River, Masset inlet	.....	...	2.7	38.2	53.7	5.4	.....	....	....	.....	Geol. Surv., M. 53
Camp Wilson	R.	...	2.0	35.7	48.3	14.0	.....	1.35	14.0	Firm, coherent coke	Mines Br., B. 26
British Pacific Coal Co	R.	...	5.3	5.3	65.2	24.2	.....	12.0	31.7	Non-coking	Mines Br., B. 26
Cowgitz	R.	...	2.2	7.9	75.3	14.6	.....	9.55	....	Non-coking	Mines Br., B. 26
Fraser River Above Lytton:											
Hat ck. 1 mile above Marble cañon	.....	...	8.6	35.5	46.8	9.1	.....	....	....	.....	Geol. Surv., No.53
North Thompson river, 45 miles up	.....	...	2.2	38.1	46.8	12.9	.....	....	....	.....	Geol. Surv., No.53
Kohasganko river	.....	...	9.9	42.6	34.0	13.5	.....	....	....	.....	Geol. Surv., No.53
Nechako river, Fort Fraser	.....	...	10.5	41.4	43.2	4.9	.....	....	....	.....	Geol. Surv., No.53
Skeena River:											
Skeena river, 9 miles above forks	.....	...	1.0	19.1	39.0	40.9	.....	....	....	.....	Geol. Surv., No.53
Skeena river, 20 miles above forks	.....	...	1.5	7.2	46.0	45.2	.....	....	....	.....	Geol. Surv., No.53
Watsonkwa River	.....	...	...	‡40.5	57.5	2.0	.....	....	....	.....	Geol. Surv., No.53
Morice River, seam No. 1	.....	...	4.3	28.9	54.6	12.2	.....	....	....	.....	Geol. Surv., No.53
Morice River, seam No. 2, top	.....	...	4.5	25.9	55.6	14.0	.....	....	....	.....	Geol. Surv., No.53
Morice River, bottom	.....	...	3.6	28.2	53.9	14.3	.....	....	....	.....	Geol. Surv., No.53
Coal Creek, 5 ft. 6 in. seam	.....	...	1.4	10.9	80.8	6.9	.....	....	....	.....	Geol. Surv., No.53
Tooza River, 16 miles from mouth	.....	...	4.6	33.8	42.7	19.0	.....	....	....	.....	Geol. Surv., No.53
Telkwa River:											
Goat Creek	R.	...	1.3	31.0	59.8	7.9	.....	1.90	....	Fair coke	Mines Br., B. 26
Goat Creek	R.	...	2.7	4.9	76.4	16.0	.....	15.60	....	Non-coking	Mines Br., B. 26
Goat Creek Transcontinental seam	.....	...	0.8	8.2	81.6	9.4	.....	....	....	.....	Geol. Surv., M. 53
Goat Creek, lower seam	.....	...	1.0	9.9	80.8	8.3	.....	....	....	.....	Geol. Surv., M. 53
Hudson Bay Mountain	.....	...	9.2	5.6	74.7	10.5	.....	....	....	.....	Geol. Surv., M. 53
Tuchi River, Babine Lake	.....	...	2.5	17.3	52.2	28.0	.....	....	....	Non-coking	Geol. Surv., M. 69
Coal Creek, Zymoetz River	.....	...	5.4	34.0	48.2	12.4	.....	....	....	Partly fritted	Geol. Surv., M. 69
Shegunia River, Salmon R., No. 3 seam	.....	...	1.2	20.6	57.3	20.9	.....	....	....	Coking	Geol. Surv., M. 69
Kispiox	.....	...	1.2	10.3	64.8	23.7	.....	....	....	.....	Geol. Surv., M. 69
Groundhog Area:											
Western Development Co	.....	...	1.2	6.5	83.4	8.9	.....	....	....	.....	Geol. Surv., M. 69
Trail Creek	.....	...	1.4	7.2	49.0	42.4	.....	....	....	.....	Geol. Surv., M. 69
Pelletier seam	.....	...	1.3	7.7	61.9	29.1	.....	....	....	.....	Geol. Surv., M. 69
Firepan Creek, Tacla Lake	R.	...	8.7	36.7	44.3	10.3	.....	1.20	....	Non-coking	Mines Br., B. 26
Peace River, Carbon River	R.	...	1.5	20.5	75.9	2.1	.....	3.70	....	Barely agglomerates.	Mines Br., B. 26

*"A.D." indicates that the sample analyzed was air-dried; "R" indicates sample as received; "D" indicates that sample was dried at 105 deg. C.

†"Mines Br., B. 26" indicates that the information was obtained from Bulletin No. 26, Mines Branch, Federal Department of Mines. "Geol. Surv., M. 53," and "Geol. Surv., M. 69" indicates that it was extracted from Memoir 53 and Memoir 59 respectively, Geological Survey of Canada.

‡Moisture and volatile combustible combined.

successfully, and the labor of the fireman is reduced to a minimum.

To obtain the best results, about 85 per cent. should pass a 200-mesh screen and it should contain not more than 1 per cent. of moisture. After being reduced to this high degree of fineness it is blown through a burner nozzle, the volatile gases of the pulverized coal igniting instantly. The fixed carbon is consumed by the heat of the volatiles, the flame resembling an oil or gas flame. By increasing or decreasing the supply of air or fuel, the operator regulates the supplies and has the operation under absolute control.

W. G. Wilcox, in the *Mining and Scientific Press*, June 22, 1918, p. 850, says: "By grinding an inch cube of coal so fine that 85 per cent. will pass a 200-mesh screen, we have increased the surface exposure from 6 sq.in. to approximately 1800 sq.in. Thus, we have increased the velocity of combustion 300-fold. By doing so, we have changed the characteristics of the fuel. We now have a fuel that is 300 times more active than the inch cube of coal, a new type of fuel that has in it inherent possibilities not to be found in lump or slack fuel."

Mr. Wilcox further points out that increasing surface exposure increases the intensity of the heat. The rate of combustion doubles for each rise of 18 deg. F., and thus pulverized fuel burns hundreds of times faster than lump coal.

In the manufacture of carbocoal, a high-volatile coal, after crushing, is distilled at a low temperature, 850 deg. F. to 900 deg. F. This first distillation yields gas and tar and a product, called "semi-carbocoal," which is high in carbon. The first distillation is continuous, the coal being agitated and mixed by a twin set of paddles. Thus all portions of the charge are uniformly distilled.

After mixing the semi-carbocoal with part of the pitch obtained from the tar produced in the first distillation, the mixture is briquetted. The briquets are then subjected to a second distillation at about 1800 deg. F., which yields carbocoal, additional tar and gas and a substantial amount of ammonium sulphate.

Carbocoal is dense, dustless, clean, uniform in size and quality, and stands transportation without disintegration; its density is greater than that of coke and more nearly approaches that of anthracite; the briquets can be made in any size from ½ oz. to 5 oz., the larger sizes being better suited for locomotives and the smaller being adapted for domestic use; the yield of tar and ammonium sulphate is also greater than is obtained in the byproduct coking process.

Where a coking coal is obtainable at a reasonable price, the establishment of central coking plants near large centers of population seems to offer the maximum of advantage. Such a plant would produce, a coke or artificial anthracite, gas for cooking or heating, coal tar which contains the elements entering into the manufacture of a whole series of valuable substances, benzol, toluol and other raw materials for explosives, aniline oil whence aniline dyes are manufactured, and ammonia, liquor from which is produced sulphate of ammonia, a valuable fertilizer. The coke thus produced can be used for all purposes for which anthracite is used. It requires a little more care in firing. Furnaces burning coke require a somewhat larger firebox than for hard coal.

W. J. Dick estimates that: "Such a plant established in the city of Toronto to supply 300,000 tons of artificial anthracite per annum would not only provide such fuel cheaper than anthracite, but would supply 1,500,000 M. cubic feet of gas at a cost of 10c. per M. at the plant; again, based on pre-war prices for cost of plant and bituminous coal, the profit on the undertaking would be considerably more than 50 per cent. per annum." Whether such coke plant be municipal or private owned, it offers what is, at the present time, the most promising solution of the fuel question for Saskatchewan, Manitoba, Ontario and Quebec.

The steadily increasing price of anthracite and the decrease in the reserves of this valuable fuel emphasize the warnings the Commission of Conservation has issued from time to time, urging the greater utilization of our water powers, both to decrease the consumption of imported coal and to use in bartering for such fuel in time of need. During the war, Canadians cannot expect to receive their full quota of anthracite, and the consumer should appreciate the necessity of using other coal fuel. The citizen who has, heretofore, burned anthracite regards the prospect of general use of raw bituminous coal with dismay, and will turn with relief to a smokeless fuel, such as coke, provided we can supply him with an article that has most, if not all, the characteristics of anthracite.

The initial difficulty in the preparation of such a fuel lies in the fact that Nature, with the agencies of pressure and time duration far beyond anything that man can hope to approximate to, has produced the dense, stony fuel which we call anthracite, whereas our

TABLE XI. ANALYSES OF NOVA SCOTIA COALS

(From "Analyses of Canadian Fuels, Part I, The Maritime Provinces," by Edgar Stansfield and J. H. Nicholls, Bulletin 22, Mines Branch, Federal Department of Mines)

District	Moisture Condition	Loss in Air Drying	Moisture	Volatile Combustible	Fixed Carbon	Ash	B.t.u. per Lb. Gross	Fuel Ratio	Carbon-Hydrogen Ratio	Name of Mine
Sydney Area:										
No. 7 or Hub seam	Air-dried	0.9	2.6	35.5	56.1	5.8	13,490	1.60	14.5	Hub colliery.
Harbour seam	Air-dried	0.8	1.6	38.0	54.6	5.8	13,780	1.45	14.3	No. 9 coll., Glace Bay.
Phalen seam	Air-dried	1.5	1.9	34.3	58.4	5.4	13,770	1.70	14.2	No. 5 or Reserve coll.
N.S.S. & C. Co., main seam	Air-dried	0.8	2.7	36.3	54.0	7.0	13,400	1.50	14.1	No. 1 colliery.
Inverness Ry. & Coal Co	Air-dried	1.8	7.6	36.9	45.9	9.6	11,230	1.25	11.8	Inverness colliery.
Pictou Area:										
Acadia Coal Co., Foord seam	Air-dried	1.9	1.8	32.7	54.4	11.1	13,000	1.65	15.3	Allan shaft.
Acadia Coal Co., Cage Pit seam	Air-dried	1.7	2.0	30.8	56.9	10.3	12,910	1.85	15.8	Albion colliery.
Intercol. Mining Co	Air-dried	0.3	1.1	24.4	60.1	14.4	12,830	2.45	16.6	Drummond colliery.
Springhill Area:										
Dominion Coal Co	Air-dried	0.8	2.0	31.6	57.4	9.0	13,100	1.80	14.6	No. 2 colliery.
Dominion Coal Co	Air-dried	0.5	2.3	32.7	53.8	11.2	12,680	1.65	15.0	No. 3 colliery.
Joggins mines	Air-dried	0.4	3.2	39.6	44.3	12.9	11,770	1.10	13.0	Chignecto colliery.

* Though not strictly germane to the subject of "Fuels of Western Canada," the analyses of typical and well-known coals of Nova Scotia and the United States have been added for purposes of comparison.

imitation—coke—has a cellular structure developed by escaping gas during distillation, a structure analogous to that produced in bread-making.

Hitherto, it has been assumed that coal should be coked practically at the pit mouth. The general acceptation of this idea is largely due to the fact that the coke was manufactured for metallurgical purposes, and the amount used by many smelters would not justify the erection of coke ovens at the smelter nor, in many instances, would it be possible to utilize all the gas produced in connection with the coking. On the other hand, a plant established near a large city has not only a market for the coke, or artificial anthracite, but also for all the gas produced.

Summing up the foregoing discussion of the economic utilization of our coals under existing circumstances, I am of the opinion that, speaking generally, coking plants established in the immediate vicinity of large markets offer the most advantageous method of utilizing coal for domestic purposes.

For large individual consumers, locomotives, and certain other uses, pulverized fuel promises to revolutionize present practice. It is almost axiomatic that the less labor and cost expended on the preparation of coal fuel the better; and, other things being equal, the process that approximates most closely to this dictum is the most efficient and most economic.

Owing to the slacking and crushing due to evaporation of the contained moisture, the mining of lignite is carried on in the autumn and winter, though the mines could be more efficiently operated in summer. To permit mining in summer, and to avoid slacking, it has been suggested that the lignite lump be put in pits in the ground and covered with earth, the covering being wetted from time to time if necessary.

Mr. Brereton, City Engineer of Winnipeg, states that good results have been attained by piling the lignite on the surface and covering it with slack. An application has been made for a patent on storing lignite lump in pits with masonry or concrete walls and bottom, but it is questionable whether this is a patentable device.

The Abuse and Care of Motors

By Richard Bowen
West Pittston, Penn.

With the passing of the mule comes a new era in the transportation system of every mine. In many mines where the development has reached to considerable proportions it is no small proposition to replace animal with mechanical power. Thousands of feet of trolley wire have to be strung, miles of rails have to be bonded and fishplated, and the switches and frogs that were in use oftentimes require replacement by heavier material. In order to do this we may have to take down roof, take up bottom, and in many cases do considerable skipping. This all goes on the deadwork list.

The foregoing is only a small part of the expense. There is the installation of the generator, motors, cables and everything that goes with the system if it is to be successful. It is during the installation of this material that great care should be taken by the person having charge of this work.

Particular attention should be given to the manner of hanging the trolley wire, as it has been my experience to find hangers work themselves loose two weeks after they were put in, resulting in the wire falling to the ground and coming in contact with the rail. Holes for the hangers should never be drilled where the roof is soft. It is far better to place pipe across from rib to rib and clamp the hangers thereto.

The position of the frogs and switches are also important. Of course, the position of the frog on the wire will be governed by the location of the frog in the road; hence it will be seen that all curves connected with the branches should have as long a radius as possible.

Every section of a mine where the haulage is done by electricity should have a circuit breaker of its own, so that if anything goes wrong with the power in one section it will not affect any other part of the mine.

All trolley wire at the foot of the shaft and along traveling roads and crossings should be guarded by strips of board 4 to 6 in. wide running parallel with the wire. The bonding of the road should be inspected every day and any defects remedied immediately. The power lost through defective bonding is sometimes greater than that required to start the trip.

In some mines mules and horses are badly abused; but this is as nothing compared with the abuse some locomotive runners give their machines. The durability and upkeep of a locomotive depend entirely on the care taken by the motorman. Two motors may work under identical conditions but be handled by different men. It will be found that it takes more to keep up one of them than the wages paid the motorman; and it is not unusual to change armatures on one motor two or three times as often as on the other.

The following are some of the causes that cost the company thousands of dollars yearly: (1) The motorman overloads his motor. This results in backing up the trip a dozen times in order to start it, even with a severe jerk. This wastes time and throws an undue stress on different parts of the machine. (2) Throwing the power on too quickly when starting the motor from rest. (3) Bringing the motor to a standstill when in full motion by applying reverse lever and brake. (4) Not shutting off power soon enough when about to couple the motor onto the trip. This results in a severe shock to the motor on coming in contact with the bumper of the leading car. (5) Not keeping sand boxes clean or oiling motor properly. Some motor runners use the same kind of lubricant for different parts of the machine. This should not be done. The fast-moving parts should have light thin oil while the journals and other heavier parts should have heavy oil or grease.

A good motor runner when starting his trip will throw on his power gradually as the load increases; and when he finds the load too heavy, he does not waste any time in jerking the trip but cuts it in two. He will always shut off the power before he applies the brake and never try to stop the machine by throwing the reverse lever unless there is danger of an accident.

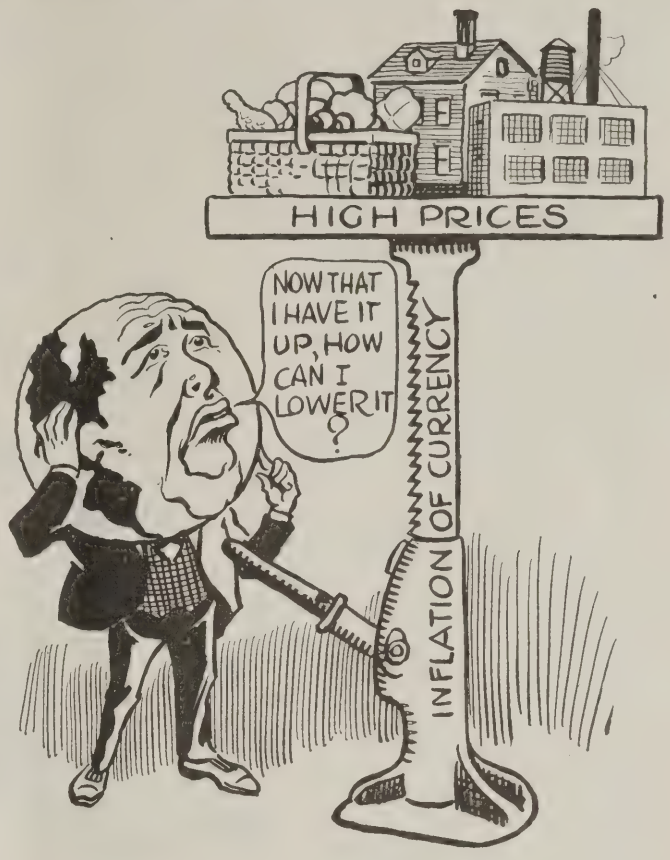
He will also use his judgment when he is about to stop his motor for any reason. He does not wait until his trip is at the required spot and then throw his reverse lever and apply the brake in a hurry, but shuts off his power in time so that the trip will be near a standstill by the time it reaches the required point.

The ambitious motorman is always looking over his machine to see that none of the bolts, nuts or anything else has worked loose. If he finds anything of this nature he does not send for the head electrician but takes his wrench and tightens it himself.

Prices—Yesterday, Today and Tomorrow*

By O. P. Austin
Statistician of The National City Bank of New York

SYNOPSIS—*The author blames the increase in prices to inflation of currency, rather than to labor demands, and shows that it is world-wide and not restricted to belligerents or even to civilized people. It embraces all products at the place of manufacture, and so does not rest on war demands or transportation. Resting on inflation it will fall with deflation, but that deflation the author regards as extremely remote.*



In A few instances since the war there have been slight reductions in prices, but in others there are still advances, and the index figures on foodstuffs in New York today are actually higher than those on Nov. 5, 1918, when the whole world so joyously welcomed the apparent termination of the great conflict which had raged for 51 months.

To attempt to determine what is likely to happen in the future we must try to find the cause of the things which have happened in the past, and also to see whether this cause is or is not likely to continue in the near future. When prices began to advance in the opening of war, we could readily see that the upward movement was due to the urgent demand for the food and raw material required by the enormous armies which had been put into the field, and this cause has been designated the "scarcity demand"; but when we found the advance extending to many articles in which there was no scarcity, and which were not used by the armies or utilized in the manufacture of their requirements, we began to realize that a part of the advance must be due to some cause other than mere war or scarcity demands.

Edgar Crammond, the distinguished British statistician and economist, in an address before the London Institute of Bankers on Mar. 26, 1919, stated that the three facts which would tend to make the fall in prices a very gradual one are: (1) The vast increase in the amount of paper money; (2) the huge increase in the amounts of public debts of the belligerents; (3) the determination of labor to maintain wages and improve the standard of living.

Raw silk, for example, for which the war made no special demand and which was produced on the side of the globe opposite that in which the hostilities were occurring, advanced from $3 per lb. in the country of production in 1913 to $4.50 per lb. in 1917, and over $6 per lb. in the closing months of the war. Manila hemp, also produced on the opposite side of the globe, and not a war requirement, advanced in the country of production from $180 per ton in 1915 to $437 per ton in 1918.

Mechanically ground wood pulp, not a war requirement, advanced from $14 per ton in the opening months of the war to $35 per ton in the opening months of 1916, and the grade known as "chemical bleached" advanced from $50 per ton at the beginning of the war to $100 per ton in January, 1919. Goat skins, from China, India, Mexico and South America advanced from 25c. per lb. in 1914 to over 50c. per lb. in 1918, and yet goat skins were in no sense a special requirement of the war.

Pig tin, produced by Chinese labor in the Malayan Peninsula and the Dutch East Indies, and not to a very great extent a war requirement, sold in the country of production in 1914 at 30c. per lb. and in the same markets at 75c. per lb. in the closing weeks of the war.

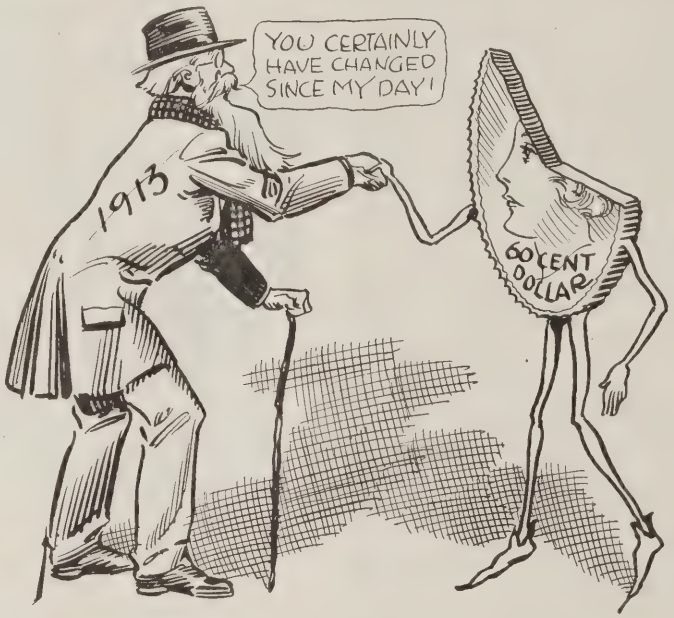
Sisal grass, produced in Yucatan, advanced from $100 per ton in 1914 at the place of production to nearly $400 per ton in 1918, and Egyptian cotton, a high-priced product, and thus not used for war purposes, jumped from 14c. per lb. in Egypt in 1914 to 35c. per lb. in 1918. Even the product of the diamond mines of South Africa advanced from 60 to 100 per cent. in price per karat when compared with prices existing in the opening months of the war.

The prices which I have quoted to you are in all cases those in the markets of the country in which the articles were produced, and in most cases at points on the globe far distant from that in which the war was being waged. They are the product of countries having a plentiful supply of cheap labor and upon which there has been no demand for men for service in the war. The advance in the prices quoted is in no sense due to the high cost of ocean transportation, since they are those demanded and obtained in the markets of the country of production.

Why is it that the product of the labor of women and children who care for silk worms in China and

*Paper presented at meeting of the Editorial Conference of the New York Business Publishers' Association, Hotel Astor, New York City, Apr. 11, 1919.

Japan, of the Filipino laborer who produces the Manila hemp, the Egyptian fellah who grows the high-grade cotton, the native workman in the diamond mines of South Africa, the Mexican peon in the sisal field of Yucatan, the Chinese coolie in the tin mines of Malaya, or the goatherd on the plains of China, India, Mexico or South America has doubled in price during the war period? The articles enumerated were in no case for use in the war, and the prices are those in the country of production and thus not due to the increase in ocean freights or dangers of oversea transportation. The advance has been general, world-wide. In a few articles in which an over-production was occurring, in which the demand fell below normal, the advance was not so strongly marked; but there is scarcely an article in the long list of those entering world markets in which there has not been an advance, no matter how distant its place of production from that in which the war was occurring or how little the war's demands for it or for the labor by which it was produced.



Surely there must have been some general underlying causes for this world advance, this simultaneous demand by people of all classes and in all parts of the globe for higher prices for their products irrespective of their relation to war requirements. While we may be willing to accept the immediate demands of the war as a partial explanation of the advance in the prices of foodstuffs and certain manufacturing material and manufactures, we must look further for the cause of the similar advance in articles upon which the demands of the war could have had no direct bearing. It is true that a marked advance in the price of one important class of products does cause an advance in the prices demanded for other articles which must be exchanged for those in which the advance has already occurred, but it does not seem probable that the advance due to scarcity of a comparatively few of the world products required for war could have been the chief cause of the doubling of prices in practically every article produced in every part of the world, many of which had not the most remote relation to war requirements.

Apparently the principal causes of the advance in prices during the war were, stated in their chronological order, first, "scarcity demand"; second, the advance in wages presumably due to the increased cost of living and demand for labor, and, third, the large increase in world circulating media, or, to put it in a single word, "inflation." Professor A. C. Miller, member of the Federal Reserve Board, an authority whose views are entitled to high consideration, in a recent address before the American Academy of Political and Social Science, named as the two chief causes of the advance in prices "scarcity demand" and "inflation," adding that "there is so much evidence of an artificial abundance of money in comparison with the things that are purchasable by it that the abundance of money must be credited with at least an equal influence in explaining the high prices which have prevailed."

What were the articles for which the war created a scarcity demand? Food, clothing, transportation facilities and material for the battlefield. How much did it add to the world's demand for these articles? Of course, the percentage of increase in demand for strictly war materials was very large, but was there really as great an increase in demand for other materials, food, clothing and transportation facilities as we are accustomed to imagine? Let us assume that the number of people participating in the war was forty million, which is probably more than those in the field at any one time. Do we realize how small a share those forty million were of the world's consuming population? Less than 2½ per cent. We think of forty million as a large number of people to feed, and so it is; but it must be remembered that the number of people in the world who must be fed and clothed and supplied with transportation facilities every day of the year is 1,800,000,000, or 45 times as many as the highest number in the military service at any time during the war. Of course, the soldiers were better fed than are many of the people in certain sections of the world, but even if their per capita consumption was four times as much as the average it would still represent but a small percentage of the world's daily food consumption. And it must be further remembered that all these 40 million people in the armies had been consumers of food before the beginning of the war, not to quite so great an extent perhaps as after entering the activities of the military service; but it cannot be assumed that the war added 40 millions to the world's consumers of food and clothing. Nor can it be properly assumed that the withdrawal of these millions from the industries actually reduced to that extent the world's producing power, for four millions of these were already in the military service and the places of the other 36 million were to a considerable degree filled by others who had not been up to that time actively engaged as producers.

Much of the material used in preparing the supplies for the battlefield was "switched" from the usual lines of industry, for there was an immediate cessation of railway construction, building operation and a thousand industries which formerly required manufacturing material; and as a result of this cessation of activities the material formerly used by them became available for war purposes.

It thus appears on close analysis that the scarcity demand created by the war was not so great in food, clothing or manufacturing materials as has been pictured, while the fact that 15 millions are still under arms minimizes the reduction in military demands which had been expected.

One factor often mentioned in the attempt to determine the causes of high prices is the advance in wages of labor, but the fact that the increase in compensation of labor was in most cases given because of the fact that the cost of living had already advanced at least somewhat minimizes the relative importance of this factor in attempting to discover the real causes of the general world-wide advance in prices. And it must also be remembered that several million persons who had not been engaged in the industrial and business world came to the assistance of those engaged in these duties during the war.

Where, then, shall we turn in the search for the principal cause of the general advance in prices of articles produced the world over and their relation to the demands of the war. What other cause can we find after giving due consideration to the scarcity demand, the destruction by war and the increased cost of labor? The most prominent among the possible or probable causes is the theory advanced or accepted by the historians, economists, statisticians and financiers of the world that inflation in currency is usually accompanied or closely followed by an advance in prices; and, as already indicated, so high an authority as a member of the present Federal Reserve Board, Professor A. C. Miller, has recently declared that "the abundance of money must be credited with at least an equal influence in explaining the high prices which have prevailed."

I wonder if we do fully realize the quantity of paper money which the responsible governments of the world have put afloat since the beginning of the war—thirty-six billion dollars. The paper money in existence in the 15 principal countries of the world at the beginning of the war was less than eight billion dollars, and at the end of the war was over 44 billions, an increase of 36 billions in 51 months, and this does not include any of the 80 billion dollars worth of paper currency issued by the Bolsheviki in the 18 months of their control in Russia. Thirty-six billion dollars of new paper money added to the circulation of the world by 15 responsible governments in a little over four years of time!

Advance in Prices Due to Paper Currency

We had been inclined to charge up the advance in prices occurring prior to the war to the fact that eight billion dollars worth of gold was turned out by the mines of the world in the 20 years following our famous gold and silver campaign of 1896. But here are 36 billion dollars worth of paper promises to pay turned out as legal tender money by 15 responsible governments in a short four-year period.

Do we realize how vast a sum is this 36 billion dollars worth of paper currency which has thus been put into circulation in such a brief time? It is more, in its face value, than all the gold and all the silver turned out by all the mines of all the world in the 427 years since the discovery of America.

True, much of this paper money is now more or less depreciated in its value as compared with gold, the world's accepted standard, but the fact that it has behind it not only a certain amount of the yellow metal but also the pledge of the governments by whose authority it was issued renders it at least an accepted medium of exchange in the countries of its origin, while the fact that nearly every neutral country of the world has meantime increased its paper currency and national indebtedness, permitting its gold to pass from circulation into the vaults of its banks as a security for the paper circulation, tends to widen the field affected by this inflated currency.

In addition to these vast sums of legal tender currency turned out by 15 responsible governments of the world, these same governments have at the same time made an even more spectacular advance in their issue of another series of promises to pay, which, while not legal tender in the ordinary sense of the term, do form a more slowly moving mass of currency. By this I mean the 180 billion dollars worth of bonds or other forms of national obligations issued by the governments of the world in the past four years, for national debts of the world have advanced from 40 billion dollars at the beginning of the war to 220 billions at its close. And while these bonds or other governmental promises to pay money at some future date are not legal tender currency in the ordinary sense of the term, they do pass current in the financial world and prove a basis upon which money may be readily obtained by their holders, and to this extent are an addition to the world's circulating medium.

Bank Deposits Show Enormous Growth

Still another increase in circulating media is found in the enormous growth in bank deposits, which of itself increases circulation through the increased use of checks, especially in countries such as the United States, where the check forms so large a share of the daily business transactions of the country. Bank deposits in 15 principal countries of the world have grown from 27 billion dollars in 1913 to approximately 75 billions at the present time, the ratio of increase being about the same as that of currency.

These increases, in circulation, indebtedness and bank deposits, while occurring chiefly in the countries participating in the war, have also extended to many other countries, especially in Europe, where the six principal neutrals have during the war period increased their national debts one billion dollars, their note circulation over a billion dollars and their bank deposits by about one billion.

Thus in a short 4½-year period world paper money has increased 36 billion dollars, world evidences of national indebtedness 180 billion dollars and world bank deposits nearly 50 billion dollars. Most of this enormous increase has occurred in "uncovered" paper. The gold mines of the world have turned out less than two billion dollars worth of the precious metal during the war period and most of the world's gold, which formed 55 per cent. of world circulation at the beginning of the war, has passed into the vaults of the governments of their great banks as a basis for their paper currency, and now bears a relation of but about 20 per cent. to the flood of paper money in circulation; and this proportion of gold to paper varies widely when the respective countries are compared.

If the world's historians, financiers, economists and statisticians are right in their general belief that an advance in prices usually accompanies or closely follows inflation in currency, and especially in paper currency, can we be surprised at the world-wide advance in prices which we have witnessed during the past four years, in which world currency and bank deposits trebled and national debts quintupled?

We come now to the third and final question, that of

prices of tomorrow. May we expect a material reduction in general prices in the near future? And in trying to determine this we must see whether the causes which brought about the advance during the war period are likely to be removed.

The chief causes of the advance seem to have been the scarcity demand, the higher cost of labor and the increase in circulating media.

The scarcity demand came on the very first day of the war, for most of the countries entering that struggle found that the demand upon them would be far in excess of their supplies either of foodstuffs or military requirements; and as the weeks and months and years progressed this fact was more strongly impressed upon them.

During the closing year of the war the ammunition factories of the various participating countries were able to meet to a great extent the requirements of their own armies, but in the matter of foodstuffs the scarcity demand still continues, with little prospect of abatement, at least in the near future. The number of mouths to feed in Europe has not decreased, and that continent, which has not for many years been able to produce its own requirements of foodstuffs, now finds itself with neglected soils, a disordered population and unable to return to normal production in the immediate future. In manufacturing materials, for which Europe has also been dependent upon other parts of the world, she will require abnormally large quantities at least in proportion to her attempts to manufacture, for her stocks of this class of merchandise are absolutely exhausted. In all parts of the world which have relied upon Europe and the United States for manufactures the shelves are empty and must be filled, and most of the manufacturing sections of Europe will evidently be slow in resuming the production of manufactures for exportation, and will have limited facilities for transporting or marketing them even if produced. So it seems that, although the demand for war material has terminated, the other features of the scarcity demand will continue, at least in a somewhat modified form in the immediate future, especially as relates to world requirements of food, manufacturing material and manufactures, while developments thus far do not point to an early reduction in labor costs.

If we are right in assuming that a considerable proportion of the world advance in prices is due to the enormous increase in world currency, can we expect a marked reduction in prices until the cause, inflation, is removed? Or, to put it in another form, that part of the advance caused by inflation can only be cured by deflation, by a reduction in the enormous stocks of currency which, as I have shown you, have trebled during the war, while that other form of slowly moving currency, governmental obligations, has quintupled.

Is it probable that these two forms of currency can be or at least will be reduced in the near future? The governments of the world, which were paying less than two billion dollars a year of interest on national debts at the beginning of the war, are now paying and must continue to pay a total of over 10 billion dollars a year in interest, and at the same time all other expenses of governments have advanced. Official estimates of the budgets or expense accounts of several of the principal countries for the coming fiscal year have already been announced and indicate that their necessary expenses in the first full year of after-war peace will be about four times as great as in the year preceding the war. The British budget for the next fiscal year is estimated at about six times as much as in 1913, and those of France, United States and Canada about four times as much as before the war. Present indications are that the governments of the world will be compelled to collect in taxes from their people about 50 billion dollars a year as against about 12½ billions in 1913, or say a billion dollars a week as against a billion dollars a month before the war; and this does not include anything for sinking funds or other provision for reduction of outstanding debts. If this be true, is it probable that the governments in those countries which have greatly increased their circulation and must now demand such enormous increases in annual payment of taxes will find it advisable or possible to materially reduce the amounts of currency available for such payments?

If the governments which have been the chief participants in the world increase of currency should fail to materially reduce that excessive supply, and if the world's demand for food, manufacturing material and manufactures is to continue at the present rate, are we justified in expecting a general reduction in prices in the near future? The question, I think, answers itself. There will, of course, be instances in which there will be material reductions, but in general terms the outlook for marked or rapid decline, at least in the near future, does not seem so very encouraging.

While there may be a downward trend in the general price level and distinct reductions in certain articles, the difficulty in removing the chief causes of the advance suggests that the general reduction in prices in the near future may not be as rapid as some people have anticipated.



Mining Congress Tackles Export Problem

A meeting of the coal-export committee of the American Mining Congress, of which Henry M. Payne, of the Bertha Coal Co., is chairman, met at a luncheon, Saturday, May 3, held in the rooms of the Machinery Club, 50 Church St., New York, James F. Callbreath, secretary, American Mining Congress, occupying the chair.

It may be said from the outset that the purpose of the American Mining Congress, as expressed by its secretary, is not to add another element of confusion to that already existing in regard to the export problem. The purpose of the Congress is to serve all elements in the industry, and to bring about coöperation between them. The wholesalers have discussed or are discussing the problem; the National Coal Association has attacked it without arriving at definite conclusions, and the United States Bureau of Mines has its own suggestions formulated.

There is a risk of cross purposes, and to avoid any such unfortunate outcome the American Mining Congress, the representative of all interests in the mining industry, is trying to use its coördinating influence. As Mr. Callbreath has well said, the American Mining Congress should serve to allay the present confusion and, should it fail to achieve such a result, it will cease all its attempts to interest itself in the export situation. When it has succeeded in bringing the representatives of the various interests to put their feet under one table its work will end, unless those interests seek its further assistance.

The principal of the informal talks was made by Allen Walker, of the Guaranty Trust Co. Mr. Walker has taken an active part in promoting export associations of many kinds under the Webb-Pomerene act. He stated that the foreign nations all had their export associations. Great Britain, at first, tried to do business without industrial coöperation. The salesmen on their arrival in foreign ports declared that they were not troubled so much by the activity of the German, Japanese or Frenchman as by the competition of their own countrymen. They advised a measure of coördination.

Wedded to their methods and their trade marks, and confident that their past activities had established for them an enviable reputation, the leaders in British trade resented these suggestions and sent other salesmen, men of larger caliber, but from them they rereceived the same reports. Some of the companies even sent their executive heads to find out the true situation. They finally decided that the best way of handling foreign trade was by an association among all those in the industry. Thus transactions became simplified.

Did they want something of the Government, they approached the proper board with an authoritative and certain voice. There were no longer as many voices as there were exporting corporations. The associations were successful because they hunted in packs. They were busy seeking business and not in struggling for their share of it. The aggregate was larger, so there was more for all. The principle, according to Mr. Walker, should be "No national competition in the foreign field."

A large number of export associations have been formed already in all lines of business. The discussions all started with the conviction that nothing could be done, that each producer would "paddle his own canoe." But ultimately the export bodies were formed and those who at first opposed associations most vigorously became the most enthusiastic of supporters.

Charles S. Keith, of the Central Coal and Coke Co., was in the beginning not at all favorable to the lumber export association, though he is a leading producer of lumber. He ultimately changed his point of view entirely, stating that if he did not sell a stick, a plank or a board of lumber abroad he would nevertheless be an enthusiastic member of the association, for he would realize that it helped him by removing the surplus production from the American market.

To continue to give the gist of Mr. Walker's address it may be said that much of the difficulty in the formation of export associations arises from the opposition of those who have expended time and money in establishing a reputation. Perhaps the goodwill thus created is not as important as the established exporter thinks. Still it is doubtless of some value. What there is of it should be saved. It would be suicidal not to sell at least for some time under trade marks well known in foreign trade. However, the association's name should accompany the trade mark of the individual member of the association. The allocation of orders gives no trouble. They may be apportioned according to the volume of previous foreign business, or in some other way.

Walker Would Unify Voice of Exporters

There is an advantage in dealing with the Government as a unit, as the American Federation of Labor has shown. Labor has practically but one voice. Capital has had the voices of 793 associations with conflicting viewpoints. No wonder the American Federation of Labor with its clearly enunciated propositions has been heard, while the multiple voices of capital have been an unconvincing discord.

As an outcome the meeting voted "That the chairman be authorized and requested to appoint a committee, representing the several coal interests involved, such committee to prepare a report and recommendation for coöperative effort to be submitted to a general conference to be called by the chair." The committee appointed consisted of Henry M. Payne, chairman, representing the American Mining Congress; Allen Walker, acting as advisor; G. M. Dexter, representing the National Wholesale Coal Association; Thomas Ferrell, representing the National Coal Association; and Van H. Manning, representing the Bureau of Mines.

The committee on coal export which called the meeting consisted of Dr. Henry M. Payne, of the Bertha Coal Co.; Henry G. Brown, of Philadelphia; George F. Lee, of Wilkes-Barre; F. W. Wilshire, of New York; and J. P. Walsh, of Pittsburgh. Those present at the meeting were James F. Callbreath, Dr. H. M. Payne, W. T. Coe, representing Mr. Wilshire and London representative of the Consolidation Coal Co.; J. M. Lee, of the Lee Coal Co.; H. G. Brown, of the Blair-Parke Coal and Coke Co.; Allen Walker, of the Guaranty Trust Co.; George M. Dexter, of the National Wholesale Coal Association; Charles S. Allen, of the New York Wholesale Coal Association; R. Dawson Hall, of *Coal Age;* W. P. Harriman, of the Irving National Bank; George N. Reed, of the Newark Traffic Club; G. H. Montague, an attorney with a large knowledge of export business; Francis Caughi, of the Guaranty Trust Co.; Dr. H. Foster Bain, of the United States Bureau of Mines.

Great Extension of Industrial and Scientific Research Shown in Great Britain

The Mining Association of Great Britain has under consideration the establishment of a single research association for the whole kingdom, to include coal sections or branches dealing with the problems peculiar to particular localities. Valuable work has already been done in this direction at the Doncaster Coal Owners' research laboratory, says the *Colliery Guardian*, and it is clear that there is ample scope for an extension of this work throughout the coal fields of the country.

Encouragement has been afforded for the establishment of research associations by the committee of the Privy Council for Scientific Research, which reports a considerable extension of the work of this new department. Over five million dollars are available to the support of such associations as need governmental financial assistance. But it is open to any industry to establish an approved association without seeking assistance from Parliamentary funds; such associations will be entitled to the same privileges as well as assistance by way of advice and information as those in receipt of a grant. Some hesitation has been shown to establish any relationship with the Government in connection with special researches because of the publicity such a course might entail; furthermore, it is not always desirable that such researches should be fettered by state control.

However, among the numerous schemes initiated by this committee a prominent place is occupied by the work of the Fuel Research Board. Buildings and equipment, estimated to cost over half a million dollars, are now in course of erection for this board; when they are completed a comprehensive chemical investigation of English coal seams is expected. This work, it is stated, should be under Government direction and control. It is not expected that it will clash in any way with the work contemplated by the National Coal Mining Research Association. The latter organization will presumably be mainly concerned with problems connected with the practical work of mining. Already some preliminary work has been undertaken in this direction, and grants have been made by the committee of the Privy Council to the Institution of Mining Engineers for investigations into the atmospheric conditions in deep and hot mines.

Mining Men Will Meet in Chicago

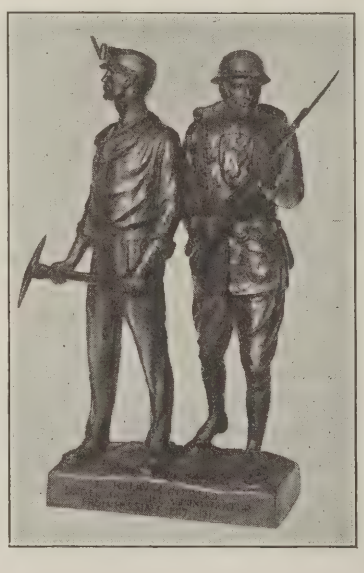
The American Institute of Mining and Metallurgical Engineers will hold its convention in Chicago, Sept. 22 to 26. This meeting promises to be one of decided importance to coal men, for subjects of vital concern to the coal industry will be under discussion.

In addition to the technical talks, an elaborate social program is being arranged, and excursions by the institute as a body are planned to many points of interest in the vicinity, including the steel mills at Gary, the oil refineries at Whiting, metallurgical plants at East Chicago and North Chicago, and operations in the LaSalle district, where are many cement, coal and zinc industrial establishments. The producers of coal should get a glimpse of the manner in which other producers of raw materials solve problems similar to those which perplex the coal industry.

Reception to Dr. Garfield

Of all staffs, few indeed are more enthusiastic than the staff that supported Dr. H. A. Garfield in the work of the Fuel Administration. The members of that organization feel that the operations of their establishment were always conducted for the sole good of the public, that no ulterior motives entered into the actions of their chief. "Without political ambition, without regard to the swarm of Senators and Representatives who sought places for friends, Dr. Garfield pursued the even tenor of his way," is the testimony of one of his associates, who spoke with the memory of a long term of service in the Fuel Administration lingering happily in his mind.

On Apr. 24 the members of the staff held a dinner in Dr. Garfield's honor at the Waldorf-Astoria, New York City. Thirty-eight of the staff, including the one they assembled to honor, were present. The invited guests were few: J. H. Wheelwright, president of the National Coal Association, W. K. Field, ex-president of that association, and T. L. Lewis, acting president of



BRONZE STATUETTE PRESENTED TO DR. GARFIELD BY HIS STAFF

the United Mine Workers of America. Unfortunately, Mr. Field and Mr. Lewis could not be present.

An an evidence of their affection and esteem, the staff presented Dr. Garfield with a bronze statuette of a miner backing up a soldier in the labors of the World War. It is a representation in bronze of the poster which obtained such a large circulation when production of coal was so much desired. It well serves to typify Dr. Garfield's connection with the winning of the great conflict.

No attempt was made to secure attendance of the large number of Dr. Garfield's admirers outside the Fuel Administration, or a larger banquet hall would have been filled to overflowing. It was a "homey" affair where the members of the staff who had worked together could meet in private converse. None of the speeches was given to the public. The souvenirs contained an admirable photo-engraving of the chief and of the bronze statuette illustrated in this article. On the facing page will be found an illustration showing the guests assembled to do Dr. Garfield honor.



Dinner Given to Dr. H. A. Garfield by His Washington Staff, New York City, April 24, 1919

Commencing on the right and passing to the left: W. A. Williams, H. A. Cochran, A. C. Dodson, S. B. Thorne, C. H. Means, G. E. Howes, L. Mitchell, J. F. Mulqueen, Rembrandt Peale, A. W. Calloway, H. Nusbaum, T. B. Gregory, M. L. Requa, J. H. Wheelwright, W. B. Symmes, Dr. H. A. Garfield; W. E. Hope, J. D. A. Morrow, A. M. Ogle, N. S. Schroeder, G. N. Snider, A. M. Macleod, C. C. Marvel, J. T. Lynn, C. B. Nichols, W. A. Marsh, S. B. Crowell, F. E. Harkness, F. M. Whitaker. Up the center between the tables starting from the foot of the table, E. M. Snyder, W. C. Hull, G. N. Allen, H. D. Nims, G. F. Macgregor, J. H. Allport and E. Q. Trowbridge. R. V. Norris and A. F. Hebard came in later, the former having to preside at a dinner at Columbia University.



Investigating Site of North Dakota Experiment Station

The North Dakota lignite field now is being studied by O. P. Hood, so as to determine the advantages of various prospective sites for the lignite experiment station. Mr. Hood is the Bureau of Mines engineer who is in charge of lignite investigations which will be made under the Special Act of Congress passed at the recent session.

The Texas field already has been visited and hearings conducted at Houston, San Antonio, Austin, Waco, Dallas, Ft. Worth and Hoyte. The last named place is the location of a lignite mine. The hearings in Texas developed the fact that an experiment station located there would have large financial assistance from local interests.

The interest shown by Texans in the lignite experiment station was much greater than was known to Federal officials prior to the hearings. It is due largely to the fact that Texas has a very serious fuel problem. Sources of coal are distant. The heavy increases in the price of fuel oil during the war has caused widespread concern. As a result the state is very anxious to make use of its extensive deposits of lignite.

The lignite experiment station is not on the auction block and it will be located at the point where the chances of success seem greatest. The appropriation of $100,000 is regarded as too small for the work in hand, but Mr. Hood is determined that with it, and with such aid as may be forthcoming from the lignite industry, he will prove that lignite can be beneficiated so as to produce a commercial fuel.

Would Combine America's Water Power and Coal Resources

The great war has unrolled the map of the world and hung it above the desk of every engineer and businessman. As a consequence American efficiency must be brought to higher standards. One of the best ways that this can be done is to hitch up America's coal and America's water power. To this effect spoke George Otis Smith on Apr. 16 in the course of his address at the meeting of the Engineering Society of Western Massachusetts, meeting at Springfield. An extract from his remarks on that occasion is as follows:

The phase of conservation that best meets the present day need is conservation of energy; and engineering efficiency has been defined as conservation of labor. Indeed, when the advocate of the supertransmission project proposes power economy for the industrial region extending from New England southward, what he really has in mind is economy of human energy. Displacing steam-generated power with water power or saving coal in the central station instead of wasting it in the small out-of-date local plant are not to be thought of simply in terms of economy in coal. We look back of the coal and see the miner and the fireman. Every ton of coal saved is the 1/900th of the miner's year's toil saved; thrift that is well worth while, if that amount of human energy thus saved is put to a better use. Labor-saving in general means a surplus of man-power available where it is more productive and hence more valuable and therefore worth the higher wage.

In the second place, industrial New England must plan to safeguard in every way its chief asset—skilled labor. Just as Emerson said that the Civil War had unrolled the map of the world and hung it above the desk of every engineer and businessman, we must now think in terms not of Massachusetts or of New England or even of North America, but of the whole world. Old England has for two years been working on this same plan of consolidation of power systems and centralization of power supply. And the reason for economy is outspoken: to meet American competition in the world markets. With more expensive fuel and practically no water power, England must get more kilowatts from the ton of coal and so reduce the power item in manufacturing costs. On the other hand, it is New England's clue to keep in the lead by making the power supply free from any danger of shortage, such as threatened us in the winter of 1917-1918 and by securing cheaper power and thus increasing its use by every industry. If the British engineers are planning an annual saving of 50 million tons in the fuel account of England, a tonnage twice New England's consumption of soft coal, our own engineers must meet this competition in industrial efficiency. Since modern machinery multiplies man-power, cheap electricity is the only method of harmonizing high wages and low costs. Hitching up America's coal and America's water power most efficiently is absolutely essential if America's standards of living are to be maintained. The super-power plan thus becomes a large item in the human-welfare program.

George S. Pope, who has been in charge of the fuel division of the Bureau of Mines for the past several years, has been appointed chief engineer of the new government fuel yard located in Washington. Coal for the use of government departments in the capital will be stored and handled in this yard.

Coal dumped at tidewater in the Pocahontas region of the Railroad Administration is only slightly less at this time than it was a year ago, according to a report to the Director General of Railroads from the regional director. Coal and coke loadings for other than tidewater destinations, however, have shown a decrease averaging 5000 cars weekly. The regional director in the southern district reports an increased movement of coal from the Alabama district which has been made possible by an improvement in the labor situation.

EDITORIALS

Inflation of Currency and Prices

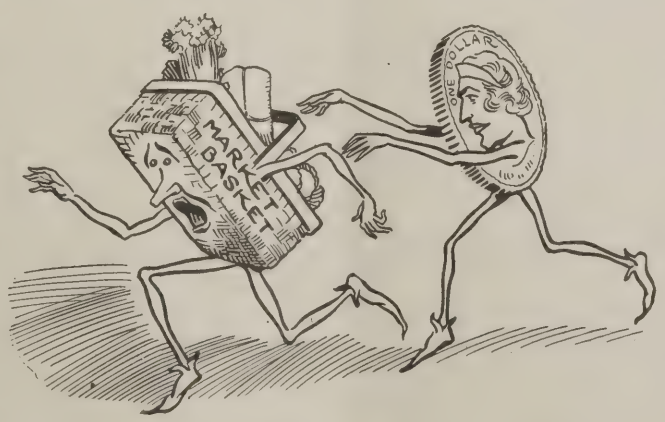
WHENEVER buyers have much money they can buy much goods, provided prices have not changed. But buyers compete with each other and, given a fixed productivity, prices will rise till the ability to buy reaches a normal level. With prices, wages also rise. This is one theory of price inflation, and quite a reasonable one.

The difficulty is to tell what is money. Certainly gold, silver, nickel and copper currency may be so classified, and so also may paper money. There is, moreover, an equivalent to money in bank deposits, which form the basis of an exchange of credits, making the use of real money unnecessary. Bonds which are readily negotiable, especially Government bonds, are also instruments for credit. A degree of credit, furthermore, adheres in all securities entitled in any way to that name. As a result of the number of media for exchange it is hard to tell just how much money-equivalent may at this or any other time be available. There are degrees in exchange ability, the quality being dependent on the security and on its varied conditions during its life. The use of a security for a medium of exchange rests also upon the readiness with which the public can and will use that security as a basis for credit.

For these reasons, it is hard to evaluate the amount of money and money substitute now and before the war. But Mr. Austin, in an article read before the Editorial Conference of the New York Business Publishers' Association, and appearing on another page of this issue of *Coal Age*, certainly showed that the medium of exchange had far more than doubled. It would seem that it should have become cheapened, therefore, far more than one-half. But money has not been so greatly cheapened, as everyone knows. The price of things in general has been increased about 55 per cent. The medium of exchange is therefore depreciated to about 64 per cent. of its old value. It would seem, then, that a still further adjustment with higher prices is likely. The reduction in values so long expected by some people cannot come till currency is deflated, and that time is extremely remote. Meantime prices must rise.

This is an uncomfortable fact to all of us, especially to those who have saved money and have not purchased real property; and also to those who have to face increased prices without increased income. But it will certainly make for business progress, as the worst thing a man can do under such circumstances is to forbear to buy. The more real property the individual purchases, the more his wealth will acrue; the more money and evidences of indebtednes such as mortgages he retains, the poorer he will become.

To recite the change in conditions: The quantity of currency with which the world's business is transacted has trebled in volume since the world war first began. Where before the war there were 40 billions of dollars of Government securities, now there are 220 billions, or 5½ times as much. Where in 1913 bank deposits were 27 billions of dollars, now they are 75 billions, or nearly three times as much. All these facts suggest that the trail of high prices does not just at this moment have a horseshoe bend. It is, at least for the nonce, a straightaway and not a kite-shaped track.



DOLLAR WILL NEVER CATCH UP
Since the market basket got war training the dollar has never been able to overtake it.

You can't cut prices. Why then assume the other fellow can? He, like yourself, has cut prices already to the quick.

We Never Were a Nation of Quitters

A NATION, like an individual, is successful if it has the courage and devotion to carry entirely through those emprises in which it engages. The higher the emprise, the greater should be the determination that, once commenced, it shall not be spoiled by a too feeble will. We must carry on, as a distinguished French statesman declared, "till the last quarter of an hour."

It is said that our Allies are a little wearied and disposed to give way to reaction. A little letting up, a little mental and moral sagging has been detected in ourselves. The soldiers want to come back home, and their parents are eager for a chance to welcome them. We want to spend as we spent in earlier days. We do not want to skimp, but to live our lives as in less frugal times.

But we must finish up the mess which the war has left. We must meet the bills for material on which labor has been expended. We must pay those who have fought for us, provide for the insurance of the dead and wounded, take care of the sick and restore to industry those who are blinded or lamed by battle.

Those who have been crying "Stand by the President" have still a chance left to do so. We do not need to follow him in all his policies. Some of them may seem somewhat at variance with those he has formerly advocated, some may seem hardly the best under the circumstances. But what of it? We agree with him at least in the age-long practice of paying our debts and in the unquestionable duty of taking care of our boys.

Honesty is the best policy

always. It is needless, however, to recite this fact as a reason for providing for the payment of our debts. Still it is true, and worthy to be recorded as an interesting, though hardly relevant fact, that a successful floating of the Victory Liberty Loan and a consequent prompt payment of our debts will ease the industrial situation and replace much dangerous idleness by healthy activity.

The staff of every coal company should take peculiarly to heart the appeal now being made for the purchase of Victory bonds; for operating staffs have received for the most part large increase in wage during the war and, earning steadily, have every opportunity to save money. With the mine workers the problem is more difficult. The brain workers, therefore, must be asked to do everything in their power to make up for any deficiency in the subscriptions of the manual laborers, whose time is now broken. It is certain that larger purchases could have been made by industrial workers had they been disposed to greater frugality. At most mines the subscription to the previous loans barely reached $10 per month per man. Such a purchase would today, with slow time, more nearly represent the greatest sacrifice possible; but it can in most cases be made, and it will be borne with comparative ease when the coal market again becomes busy.

If we depress the prices of others we shall depress our own prices. As the Italians say "One hand washes the other." The close-fisted purchasing agent, at this present time, is wrecking other people's business as well as his own, and he doesn't get his lower prices after all.

Use Judgment in Floating Liberty Bonds

OUR NATIONAL honor is engaged to the buying of the present loan. We owe it to the returning soldiers—and yet more to those who will never return—that every bond be subscribed. We also owe to the returning soldiers employment and, as far as may be, steady employment. The slogan of the Department of Labor is "For every star, a job." It is a splendid sentiment; every employer, every buyer will do well to heed it. A printed copy of it might even be put on the desk of the chief of the Railroad Administration for his admonishment. But that is neither here nor there.

The bond issue must be bought and to this end all our spare funds should be dedicated. Those who are in receipt of salaries and wages should buy in installments as largely as they possibly can and pay for the bonds as fast as they are able, by a large measure of self-negation. Do not fear that by such self-denial the retail traders and those trades which feed them will suffer and men be laid idle. Those industries are even now doing well. All the luxury trades are booming. They have no reconstruction woes. Theirs are rather reconstruction joys and triumphs. The only troubles they have are growing pains. Their wings can be clipped, not a little but much, and no harm will be done anyone.

But the call to drastic economy in buying does not apply to all industries. We need to keep business going for the returning soldier. Thus it is not advisable to avoid expenditures for building, because the building trades and the basic industries dependent on building need stimulation. To erect a house or factory is a patriotic—and profitable—act, especially if the payment is spread over a period of some months or years.

A man questions in his mind whether he will buy Liberty Bonds or build a house for rent. He has no available savings, but he is in a business which brings him in $1000 a month in excess of frugal living costs. The house could be built for $2000. If he could spread the $2000 over 10 months, the house would cost only $200 a month, he could then pay $800 a month for Liberty Bonds and so buy $8000 worth. If, however, he decided to pay for his house with the first two months of saving, the building would interfere with the purchase of four times its value in Liberty Bonds. Rather than do that he should forego his building and buy $10,000 worth of Liberty Bonds and thus put his whole ten months' income at the disposal of industry. It would be still better for him to put the whole $10,000 in the building of five houses and thus afford shelter to those who find such accommodation increasingly hard to secure.

The same rule applies to larger and smaller investments. We should aid languishing industries by purchases, for that will be as great a national help as buying Liberty Bonds, provided the payments for the work effected will be spread over as long a time as would be the payments for the Victory Bond.

It is to be regretted that the new Liberty Bond issue did not provide for some expenditure on behalf of the reëstablishment of business. It is a pity that when the soldier returns he should find the National Government ceasing to make all kinds of perfectly normal purchases.

Something has been said about the danger of compelling the banks to carry the national indebtedness. It is said that for the good of business they should not buy too large a proportion of this Victory issue. There is certainly a danger to industry should they purchase too many bonds, but it is true also that the needs of industry will be small if no construction is attempted.

We were almost betrayed into writing "America first" as our rule. Perhaps a better maxim would be "Our valiant American defenders first." We owe them a job therefore let us do our utmost to provide them with it. If we don't want to build a house or a workshop or buy machinery or coal on time payments, then let us buy Liberty Bonds to the limit. But if we can arrange to give work directly to the boys who jeopardized their lives in our service or if we can do it indirectly by stimulating the industry in which they work let us do it. They saved us. Let us now take off our coats and fare forth to serve them.

If the salaries of purchasing agents were raised we would have prosperity in a hurry. They just simply "can't see" high prices, because they are not getting the high wages to meet them. This fact is the reason for their soreheaded pessimism.

We hear it questioned whether there are compensations for the grim cruelties of war. Certain it is that there are compensatory pleasures in surrendering our own wills for the nation's benefit. The Liberty Loan still has a few days to run. Still there are a few hours during which we can put our patriotism to the acid-test. Not what we want to do with our money is the question, but what the nation needs. One more triumphant effort, one more surrender to the public welfare before peace is signed! Let us say we kept the faith to the very end.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Slackness of work in the bituminous region has made strikes less frequent than they would otherwise be in that portion of the field. Men are always keener for work when there is not a great amount of work for them to do. In the anthracite region with the prospect of steady work comes the prospect of strikes about every little matter.

Thus at the Bellevue mine of the Lackawanna Coal Co. the men struck Apr. 28 owing to the discharge of two men who are said to have been dropped without cause. As a result 1500 men were laid idle. In Apr. 29 a strike rendering about 500 men idle occurred at the Drifton mines of the Lehigh Valley Coal Co. Apparently the company had loaded an excessive amount of coal produced by company or day hands, which is known as "company coal." The miners felt that this company coal reduced their own possibilities of earnings. There was also a dispute as to sheet-iron and dead-work charges. However, the Buck Mountain and Eckley "feeders" of the Drifton colliery continued at work.

It is surprising that Chris. J. Golden, the union president of District No. 6, has declared for Government ownership of mines. With the steady work in the anthracite region and the prospect of a continued shortage of coal it is also strange that he is advocating the six-hour day with five days a week. He is looking to establish the closed shop. He wants a 100 per cent. organization, no man to be employed who will not pay dues to the union. He hopes that all this will come about in 1920. The contract cannot be made till April of that year, but when the time comes to contract for the labor of the anthracite mines he would have these terms inserted. He says he will sign no agreement that does not concede them all.

Representatives of the employers of the State of Pennsylvania and representatives of the labor employed in that state were unable to reach any agreement at a conference on Apr. 28 regarding proposed increases in the schedules of compensation benefits. The employers took the position that they were willing to support the proposed changes in the administrative features of the compensation law, but declined to discuss amendments increasing benefits.

A conference with the Governor when representatives of the employers and labor will lay their case before him will be held next week, and whatever the outcome of the scheduled conference may be the labor people are determined to make a fight for an increase in benefits.

On Apr. 28 the big strike of the Southwest mine workers came to an end, the miners securing all their demands.

Labor Opposes Undue Price Reduction

While, during recent weeks, there has been a lurking suspicion in some parts of West Virginia that certain operators were cutting prices to a point below the cost of production, it was not until the publication about Apr. 25 of the prices at which a few operators in the Fairmont and northern West Virginia fields had sold coal during April to certain railroads that such suspicions were verified.

When the prices were published not only was there a vigorous protest from other producers but the representatives of the United Mine Workers accused the Director General of Railroads of bad faith, directing specific attention to his promises that no reduction in the selling price of coal which would affect the wages of labor would be encouraged.

When it became known that certain operators were selling coal at $1.60 a ton, H. E. Peters, district organizer, District 17, in charge of the Fairmont office of the district, gave out the following statement: "One of the most interesting reports current today is to the effect that operators in the Fairmont field have been selling, and contracting for the sale of, coal at less than $1.75 per ton, which is ridiculously below the price of coal in the Fairmont field, as fixed by the Government, which price was $2.50 per ton.

"Past and present experiences demonstrate conclusively that Fairmont coal cannot be mined and sold and present wages maintained at these prices. There must be some sinister motive back of this movement that seeks to reduce the selling price of coal in the Fairmont field. If the motive is to reduce the cost of production by reducing wages, then the officials of the United Mine Workers of America wish to serve notice on operators of the Fairmont field, here and now, that we will not stand for any such reduction. There is a temporary depression in the coal trade but that fact should not be taken advantage of or used as an excuse to cut prices. The operators who do so will bring a curse upon their own heads.

"Walker D. Hines, General Director of Railroads, has advised the international officials of the United Mine Workers of America that there would be no reduction in selling price, which would affect the wages of the miner and he also promised that there would be no unfair advantages given to one group of operators over another. Railroad coal would be purchased in general markets at general market prices.

"We are suspicious that there are some sharp practices between Mr. Hines and individual operators in the Fairmont field and we wish to advise them again that this is no time to even attempt to revive these old and unfair competitive conditions."

Arkansas Labor Union Loses Bache Case

It will be remembered that the Coronado County Mining Co., Franklin S. Bache, president, a company operating in Sebastian County, Arkansas, sued the United Mine Workers of America for damages incurred when members of a local union made a raid on the property of the company located at Jamestown, Ark. A judgment was given for $600,000, three times the damages substained, that being the proportion required by the Sherman Anti-Trust Law when by a conspiracy damages are inflicted on one who appears later in court as a plaintiff.

To the $600,000 was added $120,000 for interest so that the total was $720,000. The decision was rendered by a jury in the United States District Court, sitting at Fort Smith, Ark., November, 1917. The mine workers appealed, and arguments on the appeal were heard in St. Louis last December. The United States Circuit Court of Appeals handed down on May 2 a conditional affirmation of the judgment rendered by the District Court.

Judge Trieber, with the concurrence of Judge Sanborn, in his opinion dismissed all the assignments of error made by the miners' counsel with, however, one exception. Judge James D. Elliott, who tried the case in the District Court four days before the case went to the jury and four days after the case came up for trial, granted the coal company the right to ask that interest be added to the judgment.

Judge Trieber ruled that this fixing of the interest to be added, while the trial was in progress, was an error. He ordered that the coal company, within 40 days, file a remittitur of this interest. Unless this is done, the decision says, the case will be remanded to the District Judge for retrial. Judge Hook handed down a dissenting opinion in which he said the case should be remanded because of instructions given by Judge Elliott, which had the effect of coercing the jury into returning a verdict in favor of the coal company.

Leave Your Explosives Outside

Safety Letter of
Consolidation Coal Co.
To Its Safety Committees.



RECENTLY, at a neighboring mine, a miner set down a keg of powder in the blacksmith shop. As is only too usual, he had punched a small hole in the top with his pick. The blacksmith was making a weld as the man set down his keg. A red hot spark flew in the open pick-hole and set off the powder.



One man was killed instantly and another horribly burned. Just a moment of carelessness, but it cost one man his life and frightfully mutilated another. The hole that was open in the top of the keg was not over a quarter of an inch wide and yet a spark which might have landed anywhere in the shop chose this little quarter of an inch of space for itself and found its way into the powder.

The unexpected, the improbable or the seemingly impossible, not only can happen but does happen frequently. You cannot depend on luck to prevent accidents. You must prevent accidents by not taking chances. Explosives are made to explode, that is their business, and you would be the first to complain if they failed to explode. In the interests of your safety, rules have been made concerning explosives. They must be stored in a safe place. Powder jacks must be airtight and a top must be kept on them. Blasting caps must be kept separate from other explosives. These rules are only the teachings of common sense, and if common sense teaches you that you must not stick a lighted match into a keg of powder, does it not teach you just as plainly that you must use constant care in handling your explosives from the time you receive them at the magazine, until you explode them in the blasting of your coal?

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Perils in Reconstruction

Letter No. 6—In reading the several letters that have appeared in *Coal Age*, regarding the work of reconstruction following the great war, I have tried to view the question from the angle of each writer and beg to offer a few thoughts of my own.

All will agree that we have entered a new world in which changes follow each other so rapidly that, before we can adapt ourselves to one set of conditions new ones arise. The period of reconstruction following the great war is already here and has brought with it difficult problems that are proving troublesome to adjust satisfactorily. Many of these problems are without precedence to guide us in dealing with them. Their solution will call for the exercise of the best qualities of patriotic and thinking men. The business opportunities in the industrial world are such as have never before been witnessed.

The remark of Thomas Hogarth, *Coal Age*, Feb. 13, p. 333, appeals to me as practically correct. He says, "Before there will be any great change for the better, we shall experience a change for the worse," and we are now expriencing that prediction. The industrial world, today, is almost paralyzed, the condition being one of expectant waiting. Thousands of working men are idle. Our own mine, employing 100 men, shut down recently; and the mines in many other places are working but half-time, a number being closed for lack of orders.

Facing this industrial paralysis, which it is hoped is only temporary, are the high prices of provisions, clothing and other necessities of life. The high cost of building materials of every kind has caused the cessation of all work of construction, except what is absolutely necessary. Merchants decline to purchase more than what will satisfy their present needs, fearing a general drop in prices. Even iron furnaces are run only to fill urgent orders. How long this state of affairs will continue can only be suggested.

PATRIOTISM AND THE LABOR QUESTION

My thought is similar to that expressed by Joseph R. Thomas, on page 332, of the same issue to which I have just referred, where he says, "We are now facing a crisis that will demand the best judgment of miners and operators alike. The most difficult of the problems liable to arise is the adjustment of labor questions." It is my belief that the present labor problem is a serious one and its adjustment must, to a large extent, depend on the patriotism of both capital and labor.

Never has there been a time, in the history of our country, when a mutual spirit of coöperation was more needful than now. Labor must bear in mind that it cannot destroy capital and live, and capital must remember that to crush labor is to despoil its own usefulness. Both are vital forces in the industrial world and must work in harmony, displaying a spirit of patriotism and common sense, in order that each may live and prosper.

War conditions have spoiled manufacturers and producers, as well as wage earners. Such was the demand for labor that men without skill received from $6 to $8 a day for attending a machine that almost any boy could operate. The common hatchet-and-saw carpenter was paid from $5 to $7 a day for his labor. Producers of all classes of materials and supplies made enormous profits, amounting to 200 and 300 per cent. on the cost of production.

These conditions now no longer prevail, and it is difficult for men to get down to the old pre-war prices. Labor is restless, and a new basis of values will have to be established, before any adjustment of industrial problems can be reached. To avoid serious consequences, however, there should be no reduction of wages, until the cost of living has ben reduced. Then, as Thomas Hogarth has remarked, "let us look boldly at these perils and do what we can to overcome them before they are upon us."

In closing, allow me to say that we shall come nearer to the true solution of our problems through the exercise of good business sense and patriotism, rather than by attempting legislation and adopting extreme views and methods. It is well to be optimistic, but there is danger in an optimism that is not warranted in the world of facts. It is not possible to operate a coal mine long on optimism alone. Let us start right and allow our business sense to prevail, making it possible for all classes to live and prosper.

JOHN ROSE,
Dayton, Tenn. Former District Mine Inspector.

Correct Accounting

Letter No. 3—A recent writer in *Coal Age*, speaking of mining costs, reveals the prevailing disgust or dislike that many mining men manifest when discussing costs of operation. I refer now to the letter of Thomas T. Brewster, which appeared in the issue, Mar. 13, p. 501.

While it is readily admitted that no amount of pen-and-ink work will render a physically unfit or poorly managed mine profitable, it is yet possible to humanize and make clear the cost of operating even the smallest mine, by adopting an accurate method of accounting for all equipment and material purchased and in use. Even allowing that what supplies and equipment are purchased during the year will be paid for by the year's business, let me ask if that is any reason why this year should be burdened with the expense due to the purchase of material and equipment that will be used for years to come?

Moreover, as suggested by the editor, who has added a few comments on this letter, how would it be possible to show the present condition of the operation, or arrive at a proper valuation of the property, if the plant were suddenly destroyed by fire and the book accounts were all that remained to tell the story? Suppose, for a moment, a haulage motor is purchased at a cost of $9000, and let it be assumed that the machine

has a probable life of five years; it would certainly be unfair to have the tonnage for the purchase year pay the capital sum of the cost of the motor, while the remaining four years are charged only with its cost of maintenance and repairs. Can anyone deny that it would be more fair to distribute the first cost of the motor so that each year of its life would bear the due proportion of that cost?

My opinion is that buildings and other equipment that become a permanent and improved part of the plant should be charged as capital invested, since they are an asset that must be reckoned in any future valuation of the property for the purposes of sale or insurance. All rails, timber and other supplies needed for daily use should be charged as supplies to the stock or supply account and only carried to the expense account when taken out and used.

However, it is important to remember that a system may be as complex as you choose to make it and yet fail of the desired effect if the actual operating heads of the different departments are indifferent or incompetent. The question of how large a stock of castings or supplies must be carried is one to be decided by each manager. But, ample supplies are insurance against idleness and often prevent very costly delays.

———, Penn. SUPERINTENDENT.

Firebosses as State Officials

Letter No. 3—In the issue of *Coal Age*, Mar. 20, p. 544, Robert A. Marshall asked to hear what arguments can be advanced for and against the employment of mine firebosses by the state. While I can think of no good reason why firebosses should be thus employed, a number of reasons suggest themselves in opposition to such a plan.

In the first two paragraphs of his letter, Mr. Marshall sets forth clearly the necessity of the employment of firebosses, who he claims should be considered as acting in the capacity of "mine examiners." He states that he is not in favor of their employment by the state. In his third paragraph Mr. Marshall argues that "these men should be in the mine during the entire day."

Analyzing the Situation Carefully

Now, it is well known that most state laws require that the firebosses shall examine the mine before the men enter the mine for work in the morning, and a few state laws require, besides, a second examination to be made by the same or other firebosses during working hours, while the men are in their places. In my opinion, it is obviously out of the question to expect that the firebosses making the first examination, in the early morning, shall remain in the mine throughout the day. Furthermore, that is not necessary, inasmuch as most if not all state laws require the mine foreman and his assistants to look after the safety of all men employed underground.

In addition to the arguments already set forth against the employment of firebosses by the state, I want to ask why it is not just as important that mine foremen and assistant foreman should be likewise employed by and under the authority of the state. All of these officials are charged with the same duty of caring for the safety of the men who work in the mine. For a failure to discharge those duties, any of these officials can and should be prosecuted. It is my belief, however, that their employment by the state would neither emphasize these duties nor insure their faithful performance.

On the other hand, assuming that the fireboss is a state official, would it not be true that it would remove him from the jurisdiction of the foreman and prevent the latter being held responsible for the conduct of the mine, in respect to its safe operation? Would not such a condition of divided authority result in a lack of mine discipline?

Under the present system, state authority in mines is represented by the state mine inspectors, who are charged with the duty of seeing that all mining operations, in their respective districts, are prosecuted safely and in compliance with the requirements of the law. It is up to the state inspectors to see that any violators of the laws are punished.

Practical Effect of State Employment

Let me say, here, that a state-employed fireboss, having an exaggerated idea of his own importance and clothed with state authority, could cause a mine foreman all kinds of worry and trouble and seriously hamper operations in the mine. There is hardly a question but that some firebosses, if clothed with such authority, would not be slow to make their presence felt, in which case relief would be hard and slow to obtain.

To my mind, there is no more reason for state-employed firebosses in mines than for our state-employed factory and mill inspectors being used as operatives and made a part of the organization of the factory or mill. State mine inspection is a very proper and necessary precaution and safeguard, and is welcomed by every well-meaning mine operator. But, there would be strong objections to the presence of state-employed operating officials in the mines. Let me say emphatically that the mine foreman is and, properly should be, responsible for the safe operation of the mine; but he cannot be charged with this responsibility without he has full authority over everyone employed underground.

EDWARD H. COXE, Gen. Mgr.,
Braznell, Penn. Snowdon Coke Co.

Exhaust from Steam Pump

Letter No. 3—Referring to the question of disposing of the exhaust steam from a pump located in a mine, allow me to cite an instance of this kind that occurred in a mine where I was employed some years ago. The pump was located in the bottom vein and handled all the water coming from the four veins above. The heat from the steam pipe that supplied the steam to the pump, and from the pump itself, together with the annoyance of the steam exhausted into the airways, made it necessary to resort to some means of disposing of the exhaust in some practical way.

The arrangement of the mine was such that it was possible to carry a split of fresh air through the pump-room, after which it was conducted, by means of an air bridge built over the main intake airway, directly into the main return and passed out of the mine. Another split of fresh air was carried directly to the men working east and west of the main slope. Notwithstanding these facts, however, such was the heat caused by the pumping arrangements that the men were forced to strip to the waist while at work.

The plan that was adopted to overcome this difficulty was as follows: A condenser was provided and placed in the main airway, at a point where a 4-ft. dam was

built across the airway. The dam is always full of water, which is permitted to flow over the top of the wall and run a short distance down the airway to the sump. The exhaust steam from the pump, which was located about half-way between the sump and the dam, was conducted to the condenser at the dam where it was condensed and passed off with the water. The cold water continually flowing into the dam kept the condenser cool and enabled it to do its work.

Previous to building the dam and erecting the condenser, the exhaust steam from the pump had been conducted into the sump below. But, by this arrangement, the sump water was kept in a boiling condition, which greatly interfered with the efficiency of the pump. I should also state that another dam was built in the airway at a point below the sump, so as to prevent any water from running further down the slope.

Although it is not stated in the inquiry that started this discussion, where the pump is located, my advice to the assistant superintendent is to try and conduct all the hot air and steam, from the place where the pump is located, directly into the return airway. Steam or hot moist air almost invariably makes a dangerous roof condition in a short time. As a general thing, it acts also on the pillars and entry ribs, causing them to crumble. RICHARD BOWEN.

West Pittston, Penn.

Letter No. 4—Referring to the inquiry regarding the question of whether the exhaust steam of a mine pump should be conducted into the suction or into the column pipe, *Coal Age*, Mar. 20, p. 549, let me say that I agree fully with the editorial reply given on the same page.

As there explained, the exhaust of a mine pump operated by steam is often conducted directly into the tail pipe of the pump, but using the precaution to enter the pipe at a point sufficiently below the pump to insure that the steam will be injected into the water. Then, with a little care in starting the pump, there should be no trouble from back pressure or pounding.

On the other hand, however, should the exhaust connection be made with the discharge pipe, water-hammer would result and water would undoubtedly flow into the pump through such connection.

In addition to the above, let me suggest attaching some form of a condenser to the exhaust pipe, which will not only increase the power of the pump but require less speed to run it and obviate the disadvantage of exhausting into the air or even into the suction pipe.

Of course, the use of a condenser on a small pump that is used for local pumping only, is not economical; but wherever any considerable pumping is to be done in the mine a condenser should be installed.

Sugarloaf, Penn. JOSEPH LAWRENCE.

Cost Reduced in Machine Mining

Letter No. 2—Since reading the letter of John H. Wiley, *Coal Age*, Mar. 13, p. 501, I have been looking for something further on the matter of cutting coal with machines. To my mind, it is certainly a subject that should interest all coal men, and I cannot but feel that others than myself were surprised at Mr. Wiley's statement that his cutters "easily cut from 15 to 20 places in a single night." That is going some and certainly speaks volumes for either the cutters or the machines.

While not familiar with the machine he mentions or the "special bit" used in that machine, I made a little calculation somewhat as follows: Assuming that Mr. Wiley's machines cut an average of 18 places, 20 ft. in width, in 8 or even in 9 hours, this would mean $18 \times 20 = 360$ ft. cut, or an average of 45 ft. an hour ($2\frac{1}{4}$ places), for an 8-hour shift; or 40 ft. an hour (2 places), for a 9-hour shift.

All mine bosses should read Mr. Wiley's letter to their cutters. He states that he has installed two machines, the performance of which has more than exceeded his expectations, no machineboss being required to look after the machines and keep them in good condition, as the machinemen themselves easily repair their own machines.

If these machines are new, they should not need much attention in the way of repairs. But, let him wait until the mine has developed sufficiently to require 10 or 12 times that number of machines. Most of them will then be old and need frequent repairs, and things will not be apt to run along so smoothly. This is not to say, however, but that machinework is far superior to pickwork, both in economy and output.

As an illustration of what some machinemen are doing, let me cite an instance, by way of contrast. Only a few days ago, while waiting for the mine foreman to come out of the mine, I was approached by a big strong-looking fellow who was seeking a job. He claimed to be a coal cutter and stated that he had been working in a mine only a few miles from here.

In response to my inquiry as to the cause of the man's leaving his old place, he said that he had no good boarding place. He added that he had a good job cutting by the shift and admitted that he was paid for a whole shift whether he cut one or five places, the latter being the largest number he had cut in a single shift. At that moment, the foreman came in sight and I was glad to tell the man that he had better stick to his old job and left him with that advice.

TWO POINTS OF INTEREST IN MACHINEWORK

There are two things worthy of note in Mr. Wiley's letter. In the first place, he should have given a full description of the special bit used in the Sullivan machine he mentions. It must be the particular form of the bit that enables those machines to cut from 15 to 20 places in a single shift. A description of the bit would be of interest, and I hope this will be forthcoming in some later discussion.

Another point to which attention should be called is the amount of bottom coal that Mr. Wiley says they are leaving. When using the Sullivan machine, it is possible that it may be necessary to leave "from $4\frac{1}{2}$ to 5 in. of bottom coal"; but this is not required in the use of the old Goodman machines that we have at work in our mines.

With us, the cutters are expected to catch the bottom on the back of the cut, while leaving but 2 in. at the front where the cut is started. I wonder if it has ever occurred to Mr. Wiley that the leaving of 5 in. of bottom coal when making a 6-ft. cut across a place 20 ft. wide means a loss of $\frac{5}{12}(6 \times 20 \times 80) \div 2000 = 2$ tons of coal, which is then left in each place. Or, when cutting an average of 18 places a night it would mean the loss of 36 tons left as bottom coal, each shift.

We are all anxious to know how to reduce costs in getting out coal and will gladly receive any suggestion

having that as its object. There is nothing new in the superiority of machines over pickwork. But the avoiding of delays in the movement of the coal from the face to the tipple is an even greater factor in reducing the cost of operation.

In our mine we are doing everything possible to keep the roads in good condition, so as to prevent wrecks and expedite haulage. Machine bosses look after the machines and make needed repairs; an electrician supervises the power lines, sees that the rails are well bonded, and attends to other electrical matters; the foremen and firebosses look after the ventilation of the mine, which is provided with a good ventilating fan and good air-courses.

Our men are not required to work in bad air or wet places and are promptly supplied with all needed material in their working places. They do not need to hunt in other places for timber or rails, and are not kept waiting two or three days for a switch to be laid before they can get cars up to the face. By attention to these details, we try to increase the daily ouput of coal, which will certainly reduce the cost of operation.

McIntyre, Penn. THOMAS HOGARTH.

Efficiency of Mine Officials

Letter No. 7—For some time past, my duties have been to study the organization of industrial plants both large and small, and it has given me great pleasure to note the drift of the discussion in *Coal Age*, relating to the efficiency of mine officials.

Long and close observation has convinced me that, in nine cases out of ten, when a foreman is upbraided by one of his superiors in office it is not the foreman who is at fault as much as those above him. The real source of the trouble can generally be traced to the fountainhead, which may prove to be the general manager or even the president of the company.

The average coal-mining man will claim that, almost without exception, the mining of coal is fundamentally different from the work in other industries. It will be explained that the complexity of the operations necessary to extract coal from the ground and prepare it for the market makes it difficult to operate a coal mine on an especially efficient basis. That this is a fallacy has been proved by the success of men who have made the greatest advances in coal-mining methods and practices.

Criticizing the Higher Officials

The thought of criticising the president or general manager of a large coal company may cause a feeling of horror. While it is known that these high officials have often been severely arraigned behind their backs, few have attempted to lay the blame for low production, or increased cost of operation, on the shoulders of these higher officials.

Let me say, here, that I am not a disgruntled foreman, a disappointed salesman of mine equipment, an unsuccessful efficiency engineer, or a minority stockholder. I am simply a man who has had the privilege of traveling through many coal fields and interviewing many coal officials, in an unofficial capacity. In other words, I am an "observer," without prejudice or malice. From this viewpoint, allow me, then, to give a few illustrations prompted by my personal observations:

Suppose, for instance, the management of a large bakery hires capable bakers but supplies an inferior flour or yeast and, on receiving complaints from customers regarding the poor quality of the bread, went into the bakeshop and upbraided the bakers, only to be told that it was the flour or the yeast that was to blame, and he replied, "A d——poor excuse for a baker to offer when his bread is poor." But, it is just as foolish to expect that any good foreman or superintendent can produce results in a mine when he is not provided with suitable tools and equipment for the work.

Defective Power Distribution and Poor Equipment Cause Loss in Tonnage

As another illustration, let me cite a large coal company operating two mines, one in Ohio and the other in Alabama. The Alabama mine falls far short of producing the results attained in the Ohio operation. The management calls for an explanation and is promptly informed by the Alabama superintendent that he has not the power required to haul the coal.

An examination of the books, however, shows that the Alabama mine has apparatus that will give twice the electrical energy available at the Ohio plant. The prompt dispatch of an electrician, from the home office to Alabama, results in the discovery that the distribution system at the mine is defective, the installation having been poorly made, which is causing excessive line losses. Here, also, the blame for the poor results obtained in the Alabama mine should rest on the shoulders of the management, who alone were responsible for the equipment of both the mines.

Below the "Mason and Dixon line" there are, to my knowledge, four mine superintendents who, for the past three years, have been wanting certain equipment that would enable them to produce a much larger tonnage for the same cost of operation, besides keeping a more satisfied lot of men. The arguments of these superintendents, however, have fallen on the deaf ear of a general superintendent who is an autocrat. While he tells his men that they can have anything they want, their requisitions sent to the office are regularly changed to conform to his own ideas and inclinations.

This same high official, at the time of a recent election, absented himself an entire week from his office, being more concerned over a $1500 bet he had made on the election than about anything connected with the mines. Notwithstanding these untoward conditions, the aforesaid superintendents are being constantly upbraided for their failure to produce the increased tonnage demanded by the president. Speaking plainly, in this case, the president of the company is responsible for the general superintendent employed by the company, and is the real man who is to blame for the lack of tonnage produced at these mines.

Other instances could be mentioned where the high officials of companies are the ones to blame for the inefficiency of those in charge of operations in their mines. It has been said that "He who scorns with a lordly air the suggestions of his subordinates will, if given enough rope, eventually hang himself." The saying aptly applies to coal mining, and expresses the demotion or ousting of a number of gentry whose names have been adorned with high-sounding titles.

Within the past two weeks I have noted the passing of an assistant manager whose subordinates had all been forced to lead a dog's life. For 14 years this official had occupied, not to say held, a job, being the oldest man in point of service though young in years and without experience. For six of those years, he had acted as assistant manager. Any new idea that chanced to be

brought to his attention by one of the men was sure to be greeted with a sarcastic remark and an aggravating smirk. He had "thought of the same thing for years and turned it down as not being practicable." In fact, he threw cold water on everyone who served under him and was a veritable joykiller.

The change produced by the successor to the man just mentioned was indeed remarkable. The newcomer is a young man also, but possessed of different characteristics. Tactful and bright, he never thinks that he knows *all* about anything, but gives sincere consideration to any suggestions coming from his men. His maxim is "No man can make a success of any job, unless he lets the other fellow help him run it," and he means every word he says.

Effect of Change in Management

Soon after this new assistant manager took charge, another change for the better occurred, and no one felt sorry when, five days later, the superintendent was handed his walking papers. That official had been a particular friend of the "sarcastic dub" previously ousted, and had been getting fat around the waistband. He seemed fairly glued to his comfortable office chair, which he seldom left for a trip into the mine. Sitting in his office, his particular delight was to tell filthy jokes and yarns whenever he could get an audience. The company lost none of their assets when he was shipped.

The new superintendent who succeeded to the office is a fine type of Irishman—the kind of a man that makes everyone want to help him "put the job across." Though he is here, there and everywhere, he never seems to be in a hurry; but you can be sure that he knows what he is after when he starts for the tipple or the mine. There is no worry or fret, and he always has the time and humor to pass a word of greeting with the men. He is not a windjammer, but *he is efficient.*

It is unnecessary to say, in closing, that these changes in the official management of that company wrought a wonderful change in the operations in the mine and that this was quickly apparent on the monthly cost-sheet of the mine. OBSERVER.

Philadelphia, Penn.

Letter No. 8—Speaking of the efficiency of mine superintendents reminds me of an incident that occurred in my own experience, when it was my misfortune to have to serve under a superintendent who was what I would term a "grouch." Almost every time he came into the mine, he wanted to change some plan that I had started.

On one occasion this super visited some pillar workings and stopped the work then in progress on eight pillars, explaining that it would only be temporary as he wanted to work out a plan of his own. I listened to his explanation and then told him that we had tried the same plan some time before he came to the mine and it had failed. This, however, did not satisfy him and, although our present plan was working successfully and we were troubled with very few "bounces," which had been such an annoyance previously, we were compelled to follow his instructions.

The result was just what I had expected. The bounces again occurred more and more frequently; and, I regret to narrate that we had one or more fatal accidents, lost considerable coal and lowered our daily tonnage before he was convinced of his mistake and would permit us to resume the plan he had interrupted.

There is no encouragement in working under such a superintendent. No opportunity is given to a foreman to show his ability, while he is always in a position to bear the blame of others' mistakes. On the other hand, it is a pleasure to work for a superintendent who is anxious to see what ability a foreman possesses and who leaves him to exercise his own judgment until he proves his inefficiency.

On another occasion, I worked under a superintendent who invited all his bosses to attend monthly meetings, for the purpose of discussing problems pertaining to efficiency in mining. He also held first-aid meetings, once a month, when men received training in first-aid work. Those who trained with breathing apparatus were given an allowance of two hours for the work.

There was a safety-suggestion box hung in the mine foreman's shanty, and the men were invited to put their suggestions regarding safety into the box. In this way, many useful ideas were evolved and greater efficiency resulted from the superintendent's efforts to educate and train his men.

Ways of Inefficient Superintendents

Many of the so-called "hundred-per-cent. supers," today, are men who can get out coal, at a smaller cost per ton, without regard to the methods they use or the property they destroy. The cheap coal produced by these men is often the most expensive when a true estimate is made of the losses that follow the adoption of their poor methods of mining. The foreman is not allowed to pay out one cent for cleaning up falls in the air-courses, timbering travelingways and making certain necessary provisions for the safe drawing of pillars.

On the other hand, men are started to skipping entry ribs and room pillars, till these supports become too weak to carry the overburden, and a squeeze cuts off, perhaps, 25 or 50 per cent. of coal that should have been mined later but is now lost beyond recovery. In the working of a high seam, I have observed from 4 to 6 ft. of coal abandoned because the foreman was not permitted to pay two men, each, two days' wages to perform the work necessary to reach the coal.

Too often a superintendent who does not expect to remain long in his place will attempt to make a good showing by building wooden stoppings where rock or cement should be used, and buying second-hand material that will hardly outlast his time, all the while planning to let the other fellow bear the expense when he himself has gone.

My idea of an efficient superintendent is one who is a practical miner, from experience, and has a good technical education that enables him to be familiar with all the uptodate electrical and mechanical appliances used in mining. He should be able to draw plans and superintend all work of installation or construction in and about the mine. He should be a good accountant so as to be able to make correct estimates and reports, both of work and material.

A superintendent should visit the mine regularly and often enough to be fully familiar with its requirements, and be able to discuss the work in hand with the foreman. Should a disaster occur when the foreman and fireboss are both in the mine, the superintendent should be able to lead the rescue work, by his knowledge of the workings and the ventilation of the mine.

———, Utah. CARBON.

[The discussion of "Efficiency of Mine Officials" will close with Letter 11, now on hand.—Editor.]

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Mixing Acid Solutions

In preparing some electrolyte for lead and acid batteries, it was found that there was on hand two bottles of acid diluted with water to different strengths. The first bottle contained 12 per cent. acid and 88 per cent. water; the second bottle, 72 per cent. acid and 28 per cent. water. We required a solution containing 15 per cent. acid and 85 per cent. water and, there being no hydrometer available, it was necessary to calculate the proportion for mixing the two solutions on hand, so as to obtain one of the required strength.

If pure distilled water had been available, it would, of course, have been possible to dilute the stronger solution with water, until the required strength was obtained; but no suitable water was available. In the emergency, I remember a very simple formula was used to determine the proportions in which two solutions of different strengths should be mixed to produce one of a required strength. Can *Coal Age* give me such a formula and explain how it is obtained. I think this will be of interest to others than myself.

Pittsburgh, Penn. ELECTRICIAN.

It is evident that a larger proportion of the weaker and a lesser proportion of the stronger solution must be taken in order to produce a solution containing a medium percentage of acid, greater than the first and less than the second. Hence, for every part of the stronger solution let n parts of the weaker solution be taken, making $n + 1$ parts in all. The percentage of acid in the new mixture will then be expressed thus:

$$\frac{0.12n + 0.72}{n + 1} \times 100; \quad \text{or} \quad \frac{12n + 72}{n + 1}$$

But, since the required mixture must contain 15 per cent. of the acid, we write

$$\frac{12n + 72}{n + 1} = 15$$

$$12n + 72 = 15(n + 1) = 15n + 15$$

$$15n - 12n = 72 - 15$$

$$3n = 57$$

$$n = 19$$

Therefore, it is necessary to take 19 parts of the weaker solution to one part of the stronger solution.

Available Oxygen

Kindly explain why it is that a safety lamp will burn in the air, but not in carbon dioxide, when the latter actually contains a larger proportion of oxygen than the air itself. I am told that only one-fifth of the volume of air is oxygen, while carbon dioxide is two-thirds oxygen, by volume. And yet oxygen is the supporter of combustion. STUDENT.

Holsopple, Penn.

It is true that carbon dioxide contains a much larger proportion of oxygen than air. The percentage of oxygen, by volume, being: Air, 20.9 per cent. and carbon dioxide, 66⅔ per cent. But, while the oxygen of the air is free or uncombined, that of the carbon dioxide is chemically combined with the carbon. In other words, the oxygen of the air is what is called "available oxygen," while the other is combined.

The combustion of the carbonaceous matter, in the burning of a lamp, depends on the amount of available oxygen present in the atmosphere surrounding the lamp. Where there is no available oxygen the lamp will not burn.

The Halby Shoveler and Loader

I was much interested in reading the description of the Halby shoveling and loading machine, which appeared in *Coal Age*, Jan. 9, p. 67, under the title "Portable Coal Loaders."

Having recently contracted for driving a rock tunnel, 9 x 10 ft. in section, and including 4 miles of gangways, I would like to ask one or two questions relating to this machine. Our gangways must be driven half in coal and half in rock, as the seam of coal has a pitch of 45 deg. It occurred to me that if the Halby machine is applicable to such work, it would be of great assistance to me in the carrying out of my contract.

Kindly advise me which of the two types of the machine described would be best adapted to my work. Also, I want to ask if the front part forming the shovel of the machine is fixed so that it can move vertically. If it moves sideways, does the shovel *only* move or is it necessary to turn the whole body of the machine? Please inform me where I can secure a catalog of the machine. E. N. ALLEN.

Newcastle, Wash.

As was stated in the article to which this correspondent has referred, there are two types of the Halby machine mentioned, the one being 6 in. wider and requiring nearly 18 in. more headroom than the other. The smaller of the two machines, known as the T700, is designed to work in a 5-ft. seam, while the other, the T600 machine, is adapted to higher openings. Both of these types have practically the same length; but in the smaller machine the power and truck sections are separate, while in the larger they are combined.

As stated in the previous article, the discharging conveyor at the rear of the machine is arranged, in the smaller type, to swing, so that it can discharge its material into a car standing on a track at one side of the machine. In the larger machine, the material handled can only be discharged into a car standing behind the machine and on the same track with it, or in direct line with the shovel.

As these machines are well adapted to the class of work mentioned by this correspondent, we do not wonder that his attention was arrested by their description, and we gladly recommend their use for the work in question. For a descriptive catalog, write the Lake Shore Engine Works, Marquette, Mich.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Bituminous (Penn.) Mine Foremen's Examination, Apr. 8-10, 1919

(Selected Questions)

Ques.—(a) For what does the bituminous mining law of Pennsylvania provide? (b) What is meant by the term "bituminous coal mine" and the term "excavation and workings"?

Ans.—(a) The bituminous mining law of Pennsylvania is an act intended to provide for the health and safety of persons employed in and about the bituminous coal mines of the state, and to secure the protection and preservation of mining property.

(b) In the meaning of the bituminous mine law, the the term "mine" includes the shafts, slopes, drifts, or incline planes connected with excavations that penetrate the coal strata. The law continues:

"Which excavations are ventilated by one general air current or divisions thereof and connected by one general system of mine railroads over which coal may be delivered to one or more points outside the mine, when such is operated by one operator."

This addition to the definition of a mine would seem to exclude such excavations in coal strata as are void of ventilation, besides restricting the application of the word "mine" to excavations in coal strata that are operated by one operator, which is obviously not the intent of the law.

The expression "excavations and workings," in the meaning of the bituminous mine law, includes all the excavated portions of a mine, both abandoned and working, together with all shafts, tunnels and other passageways and openings, both in use and in process of making, together with their equipment of material and machinery below the surface of the ground.

Ques.—As mine foreman, what observations would you make in your daily examination of the working places?

Ans.—The mine foreman must closely observe every operation going on in the mine, to see that no unsafe practices are employed and that everything is done in compliance with the requirements of the mining law and the mine regulations. He must examine the condition of each working place to see that the roof is safe and the coal properly mined. He must give particular attention to the ventilation of the working faces and all abandoned areas and other void places in the mine, and see that there is no dangerous accumulation of gas and that all places are healthy and safe for work. He must see that there is a sufficient supply of timber and other material, on hand in the working places and that the same are being properly used.

Ques.—What are the principal requirements on haulage roads to insure the economic haulage of coal?

Ans.—Main haulage roads should be driven as straight as possible and have sufficient headroom and clearance at the side of the track to insure the safe and speedy movement of the cars. The track must be well laid and ballasted and the roadbeds drained. Where electric haulage is employed, careful attention must be given to the bonding of the rails. As far as practicable, steep grades and sharp curves must be avoided on the haulage roads and no doors must be constructed at the foot of a grade where a motorman or driver may be unable to control the movement of the cars.

Ques.—In a certain mine where the heaving of the floor has thrown the track out of alignment and reduced the headroom so much that bottom must be lifted on the haulage roads or the roof shot down to permit the passage of mules and cars, the entries are driven 10 ft. wide on 40-ft. centers and rooms turned off the entries on 30-ft. centers and driven 24 ft. wide. What is the thickness of the room pillars; and, assuming you were taking charge, what suggestions would you make to eliminate these troubles?

Ans.—The chief cause of the trouble, in this case, appears to arise from the small room pillars, which are only 6 ft. in thickness while the rooms are 24 ft. wide. It would be better to drive the rooms on 40-ft. centers and reduce their width to 20 ft., making the thickness of the room pillars also 20 ft. If practicable, the entries should be driven 8 ft. wide, instead of 10 ft., as at present. All rooms should be turned narrow, the roomnecks not exceeding 8 ft. in width and driven a distance of 10 yd. before the room is widened out. Every precaution should be taken to drain the workings and prevent the accumulation of water on the roads or in the rooms, which would soften the bottom and increase the trouble, if permitted.

Ques.—How would you render first aid to a person with a broken forearm?

Ans.—Having sent at once for a doctor, proceed to examine the injury and place the broken limb in as comfortable a position as possible, observing whether the break is a simple or a compound fracture. In the event of the latter, great care must be exercised to prevent the sharp splinters of bone from tearing the muscles and increasing the danger of the wound. If the injury is a simple fracture and the skin is not broken, however, there is little danger of the wound being infected, and the principal object, while awaiting the coming of the doctor, is to prevent any undue movement of the injured limb by binding it carefully to a temporary splint or otherwise securing it in a manner to prevent further injury from the broken bones penetrating the flesh.

It may be necessary to treat for shock, as indicated by the color of the face and a general depression or stupor of the injured person, approaching semi-unconsciousness. Hot coffee or hot tea should be given in small quantities at a time, or a half-tablespoonful of aromatic spirits of ammonia in a tablespoonful of water. If whiskey or brandy is the only stimulant available give but one large drink or swallow, as more may cause further depression. Smelling salts held to the nose is good. Avoid exposing the person to a cold current of air and protect him by a covering of coats or blankets to overcome the effects of shock when this is apparent from observation of the victim.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Opportunities in Foreign Markets for American Coal

ALGERIA

[Consul A. C. Frost, Algiers, Jan. 29, 1919]

Algeria is greatly in need of coal at the present time. The gas works have been practically closed for the past year and other public utilities greatly embarrassed for lack of coal. According to the statement of a local official, Algeria requires annually for its railways 180,000 tons; the gas and electric establishments, 95,000 tons; industries and agriculture, 125,000 tons; a total of 400,000 tons. In 1913 Algeria imported 2,251,000 tons of coal, including bunker coal. Imports have progressively declined since the war, on account of lack of means of transportation, and in 1917 they amounted to only 228,000 tons.

Before the war American coal could not compete to advantage with British coal, on account of the higher transportation charges; but it is thought that conditions may be more advantageous in this respect after the war.

[A list of three persons or firms in Algiers who have expressed a desire to represent American coal companies can be obtained from the Bureau of Foreign and Domestic Commerce or its district or coöperating offices by referring to file No. 114099.]

BRITISH GUIANA

[Consul G. E. Chamberlin, Georgetown, Jan. 27, 1919]

The annual importation of coal into British Guiana is from 27,000 to 35,000 tons, all soft or steam coal. This is used chiefly for bunkering, although the sugar estates and the Demerara Electric Co., Ltd. (electric lighting and tramways), use some imported coal. The price of coal imported the last of January was $20.10 c. i. f. Georgetown—the importers paying tonnage and light dues of 25 and 4 cents, respectively, per ton for cargo landed; pilotage, which for a vessel drawing from 17 to 18 ft. is $25; and landing charges from vessel to wharf, 32 cents. In case the coal is discharged into lighters the charge for lighterage is 72 cents per ton.

During the past three years most of the coal consumed in the colony has been imported from the United States; prior to that, chiefly from the United Kingdom. During the high price of coal considerable wood fuel has been used by the local steamer services, the Demerara Electric Co. (Ltd.), the sugar estates, and the Demerara Railway Co. The latter in normal times uses patent fuel exclusively, and probably will return to that when obtainable.

There are no gas plants in this consular district. The municipal waterworks of Georgetown and the municipal electric lighting plant at New Amsterdam use wood fuel almost exclusively.

[A list of the leading importers of coal in Georgetown, British Guiana, can be obtained from the Bureau of Foreign and Domestic Commerce or its district or coöperating offices by referring to file No. 110980.]

FRANCE

[Consul General George A. Bucklin, Bordeaux]

The coal question in France is a complicated one, and will be so for several years to come. Before the war practically all of the coal consumed in this region came from England and Germany, only an insignificant amount being mined here. Now coal is an urgent need, and will continue so to be. England has not enough to supply the demands made upon it, and it is the endeavor, of course, to totally eliminate German coal importation. America will have to supply its share of the demand.

At present the purchase and distribution of coal is made by the French government, but, it is understood, this will not continue for longer than about April, 1919, and when the coal traffic goes back into the hands of the merchants American coal will undoubtedly be sought.

Under normal conditions American coal finds competition difficult with other foreign coal having much shorter hauls. But it is affirmed that the French government, through some sort of agency, will exert control over the price of coal to the effect that an average sale price will be set and the cost and profits will be pooled and divided among all the coal merchants in France, according to the tonnage sold by each. The individual merchant will, of necessity, pay the price required by his foreign exporter; but the cost to him and the selling price to his clients will be arranged by this clearance agency so that an average profit per ton sold will be allowed to each merchant, and the selling price of coal will be the same all over France. This arrangement is to hold good for one or more years, in accordance with the needs and its usefulness.

[A list of large coal dealers and importers in Bordeaux, France, can be obtained from the Bureau of Foreign and Domestic Commerce or its district or coöperating offices by referring to file No. 110591.]

The consumption of coal in Marseille, prior to the war, states Consul General A. Gaulin, Marseille, under date of Feb. 5, 1919, averaged about 2,500,000 tons, of which about 1,500,000 tons were imported—chiefly from the United Kingdom. From 40 to 45 per cent. of the imports consisted of bunker coal. There were only occasional imports of American coal, and these depended largely upon the labor situation in Wales, and the available supplies of British coal. During the last few years, owing to the war conditions, the imports have fallen off considerably. But a revival of this trade is imperative and inevitable, and there is an excellent opportunity for American coal exporters to secure a permanent foothold in this market. It is estimated that the local requirements during the next few years will be approximately 3,000,000 tons annually.

Steam and locomotive coals are and will remain in great demand. At least 50,000 tons of gas coal and 100,000 tons of anthracite will also be required. The American coals best known at Marseille are Pocahontas and New River. It is reported that the freight rates from Wales to Marseille have been recently fixed at 42s. ($10.22) per long ton. But large shipments from England are unlikely in the near future.

[A list of dealers in and importers of coal at Marseille, France, may be obtained from the Bureau of Foreign and Domestic Commerce or its district or coöperative offices by referring to file No. 113899.]

SPAIN

[Consul Louis G. Dreyfus, Jr., Malaga, Feb. 5, 1919]

There is an excellent market for American coal in Malaga. During the past year the small quantity which was imported was from England for the Altos Hornos, the local steel mill, for use in the completion of orders for the allied governments. The rest that was used in Malaga was received

Coal and Coke Exports from New York in March

The lack of shipping, together with the high cost of freight, accounts, at least in part, for the decrease in the tonnage of anthracite and bituminous coal and coke sent to foreign countries from the Port of New York during March of this year. Comparing these figures with those of March in 1917 and 1918, shows a considerable loss in tonnage but a decided increase in the value of the exports, excepting that of coke.

Reference to the list of countries to which fuel was sent last March shows an almost complete change in markets from the countries to which shipments were made in March, 1917, much of which can be attributed to the war.

The following tabulation shows the tonnage of coal and coke shipped from the Port of New York to foreign countries during March in 1917, 1918 and 1919, together with the total value and the average cost per ton, thereof:

	Anthracite						Bituminous						Coke					
	1917		1918		1919		1917		1918		1919		1917		1918		1919	
To	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Argentina															151	$2,640		
Barbadoes	26	$250			25	$394			200	$1,400								
Bermuda	777	5,908	50	$540									2	$16				
Brazil	212	1,793											273	3,767			77	$715
British West Indies	24	230													2	56		
British South Africa															15	420		
Canada	9,812	75,039	1,053	6,868	586	6,446												
Chile	73	902											10	169				
Costa Rica			1	23									9	95				
Colombia	5	90	6	83					4	70					10	260		
Cuba			1,497	12,536	5	83	100	$450							18	560	2	56
Ecuador							1,531	13,396										
Falkland Islands									3,565	20,854								
France															500	5,000	274	3,850
Guatemala																	20	480
Haita									18	90								
Italy	4	60													207	4,000		
Mexico	20	180					1,468	5,043			134	$1,607			25	700		
Newfoundland	142	923																
Nicaragua															10	275		
Panama													75	452	3	140	6	176
Peru													96	1,294			1	25
San Domingo	2,420	17,976			288	2,427	35	309	721	4,776					10	240	10	280
Salvador															5	190		
Trinidad							30	176										
Venezuela	205	2,306					60	275			6	125	40	480				
Totals	13,720	$105,657	2,607	$20,050	904	$9,350	3,224	$19,649	4,508	$27,190	140	$1,732	505	$6,273	956	$14,481	390	$5,582
Average cost per ton		$7.70+		$7.69+		$10.34+		$6.09+		$6.03+		$12.37+		$12.42+		$15.18+		$14.31+

from the Spanish mines at Penarroya, Puerto-Llano and Asturias. As soon as trade conditions are normal again, however, the national product will not be able to compete with foreign coal, not only because of its very inferior quality, but also because of the increased railway-freight rates from the mines to Malaga. As it is, wood and "orujo" (the residue of the olives after extraction of oil) have been substituted for coal wherever possible.

The estimated annual consumption of coal in Malaga is 100,000 tons. On account of the mild climate other fuels are used in heating and cooking. With the exception of a part of the coal used by the Andaluces Ry., which has a very favorable contract with the Penarroya Coal Co., most of the supply used locally has been imported in the past from Cardiff and Newcastle. It is probable that English coal will continue to supply the market unless American exporters can sell their product laid down at Malaga at the same or better figures. This will largely depend upon freights.

The present is a very advantageous time for American coal to enter this market. Vessels would not have to return in ballast, but could, in season, obtain cargoes of olive oil, oxide of iron, almonds, essential oils, etc. The import duty on coal is 3.50 pesetas ($0.67) per metric ton.

[A list of coal dealers and large consumers in Malaga, Spain, may be obtained from the Bureau of Foreign and Domestic Commerce or its district or coöperating offices by referring to file No. 113814.]

SWITZERLAND

[Consul H. H. Dick, Basel, Feb. 27, 1919]

The prospects for the importation of American coal into Switzerland seem very good, providing the necessary colliers can be obtained to transport it. In normal times about 250,000 tons of coal are needed each month for all purposes in Switzerland. Practically all of this coal was formerly imported from Germany, although small quantities came from Austria, France and England. That from England was employed principally, under control of the British Board of Trade, by industries manufacturing products for Great Britain.

Coal is absolutely necessary for Swiss industry. Without it industry must cease. Because of its shortage the Swiss railway officials have been forced five times to curtail traffic on the Federal railways, even eliminating all trains on Sundays and all express trains. Germany took advantage of Switzerland's situation and raised the prices gradually until June, 1918, when by a convention Switzerland was forced to pay double the former prices in Swiss francs instead of in marks, which had fallen in value. The prices per carload (10 tons) established in June, 1918, for coal at the mine were as follows: Bituminous from the Saar, 1900 francs ($366.70); briquets or anthracite from the Ruhr, 2000 francs ($386). In carload lots (10 tons each) the freight costs were as follows: Rail transportation from Saar to Basel, 115 francs ($22.20); from Ruhr to Basel, 210 francs ($40.53); rail and water transportation from Ruhr to Basel, 260 francs ($50.18).

The retail prices based on these costs were: Bituminous from the Saar, 250 francs ($48.25) per metric ton; coke (made at Basel), 300 francs ($57.90) per metric ton; anthracite (assorted domestic), 270 francs ($52.11) per metric ton.

Now that Germany is no longer in a position to force Switzerland to pay such prices, the effort is being made to arrange for delivery at greatly reduced rates, and thus convert into cash enormous stocks accumulated at the mines of the Ruhr. It will be difficult, however, for Germany to make delivery owing to a scarcity of rolling stock, as well as to existing internal disorders. Belgium has recently offered 600,000 tons of coal to Switzerland, and the importations from France and England are increasing. It is thought by various dealers that the prices for both German and Entente coal will fall to about 120 francs ($23.16) per metric ton delivered at the Swiss frontier.

Dealers will be glad to receive offers for American coal, quoting prices c. i. f. Cette, France or Rotterdam. The latter place is preferred, as coal can be transported either by rail or water directly to Basel.

[A list of coal dealers in Basel, Switzerland, can be obtained from the Bureau of Foreign and Domestic Commerce or its district or coöperating offices by referring to file No. 113690.]

An arrangement has been arrived at between Poland and German-Austria to prolong the agreement whereby Austria is supplied with coal from Poland. The tonnage thus supplied is still very small owing to the Dombrowa mines in Poland not having yet got into working order.

Foreign Coal Trade Opportunity

The municipal authorities of a city in Austria who are in charge of the electric center, waterworks and tramway service desire to purchase coal, reports an American consular officer. Correspondence may be in English. Those interested may obtain further information by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its branches and referring to file No. 29195.

New Coal Rates to Europe

Announcement was recently made by the Shipping Board of new rates on coal from North Atlantic ports to various European ports of destination. The new and reduced rates range from $22.50 a ton of 2240 lb. to $31 a ton, with a guaranteed daily discharge of from 700 to 1500 tons.

The new rates as announced by the board were as follows:

	Coal per Ton of 2240 Lb.	Guaranteed Daily Discharge Tons
Bordeaux-Havre	$22.50	700
Antwerp-Rotterdam	22.50	1000
Gothenburg (Sweden)	26.50	1000
Copenhagen-Ronne (Denmark)	27.00	1000
L'dskrona-Malmo (Sweden)	27.00	1000
Oxleosund (Sweden)	28.00	1000
Stockholm	28.00	1500
Marseilles	26.00	1000
Genoa	26.50	1000
Naples	26.00	1000
Trieste-Fiume-Venice	31.00	800

Discharge as above indicated, with time counting 24 hours after arrival of vessel, whether in berth or not, Sundays and holidays only excepted. If discharge is not completed within the time specified demurrage to be paid at the rate of $1 per net registered ton per running day, payable day by day.

These rates are not applicable on bookings made prior to announcement.

Homeward rates from above ports to United States ports, or commodity rates for homeward cargo will be established and quoted upon application.

Coal Resources of Netherlands

Under date of Feb. 11, Minister John W. Garrett reports from The Hague that with a prolonged spell of cold weather the coal problem has again assumed a leading position in the Netherlands, and the question of that country's independence of foreign powers for its fuel supply is once more being actively debated. A few weeks ago an official report was issued estimating the coal resources of the country as 1,766,000,000 tons in the Peel district, 3,165,903,537 tons in southern Limburg, and 324,000,000 tons in the Winterwijkschegebied. This makes a grand total of 5,255,803,537 tons of coal, sufficient to supply the Netherlands, at the pre-war rate of consumption of 10,000,000 tons per annum, for 525 years. None of this, however, is first-grade coal.

In addition to the question of availability of coal, the question of cost renders it of vital interest for Holland to achieve a position of independence in this regard. Last year the price of coal in Limburg amounted to 17 florins (the normal exchange value of the florin is 40.2 cents) per ton, whereas Germany demanded 90 florins per ton. This year Germany has reduced the price to 50 florins; but, in view of the scarcity of coal throughout Europe as a result of greater demand and destroyed mines, no appreciable decrease in the price of foreign coal is expected at present.

Will Ship Coal to Sweden

Coal will be shipped to Sweden by the Hutchinson Coal Co. operating in the Fairmont region of West Virginia, that company having recently secured a contract calling for the delivery of 10,000 tons to that country, the contract specifying that only lump coal shall be shipped. Heretofore little or no coal has been exported to Sweden, and the order placed with the Hutchinson company is regarded as beginning of an extensive coal trade with that nation. The order in question has furnished work for the miners at the Laura Lee, Mt. Clare and Erie mines of the company.

Australia in Need of Coal

Advices from Melbourne under date of Apr. 21 state that owing to the quarantine due to the epidemic of influenza a serious coal shortage has resulted in Australia. On the date given there was only three weeks' supply of fuel on hand and many industries were threatened by a forced shutdown.

London Secretary of American Chamber of Commerce

George P. Toby, long connected with banking and industrial corporations in this country, has been appointed Executive Secretary of the American Chamber of Commerce in London and will sail for his new post about May 12, meanwhile conferring with American merchants as to the service which the American Chamber in London can render them. Mr. Toby has been long known as an investment banker, and in this capacity has made a careful study of the operation of American industrial and public utility corporations.

G. M. Cassatt, president of the American Chamber of Commerce in London, who is now in the United States, in announcing the appointment explained that the London organization has as its members the representatives in England of American manufacturing and exporting interests, and also of the foremost British manufacturers and exporters, too, and importers from the United States. The former are active members, the latter associate. The Chamber has standing committees on finance, commerce and trade, transportation, trade information, etc., and the membership is also divided by businesses into trade groups, each working through its own committee. Thus almost any inquiry can be expeditiously handled by referring it to the proper committee or proper trade group.

"The London Chamber," Mr. Cassatt concluded, "wants to be used. What we most desire is that the individual American manufacturer, merchant, exporter from one end of the country to the other should learn to look upon us as an overseas service bureau of his own—on the spot and on the job, ready to work for him, to protect his hand and to look out for his interests. We are there to promote American business."

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lambert's Point				
Apr. 21	Amer. S.S. Lake Benton	Havana, Cuba	2,052	48
Apr. 22	Amer. S.S. Lewis K. Thurlow	Rio de Janeiro, Brazil	3,713	822
Apr. 22	Amer. S.S. Cristobal	Cristobal, C. Z.	9,904	335
Apr. 23	Nor. S.S. Borghild	Gibraltar FO	4,859	489
Apr. 24	Amer. S.S. Moritz	Havana, Cuba	2,737	361
Apr. 24	Ital. S.S. Angiolina	Gibraltar FO (Italy)	4,537	737
Apr. 24	Amer. S.S. Lake Shore	Rio de Janeiro, Brazil	1,815	688
Apr. 24	Amer. S.S. North Pines	Rio de Janeiro, Brazil	2,772	1,154
Apr. 26	Amer. S.S. Achilles	Cristobal, C. Z.	12,154	996
Apr. 26	Amer. S.S. Oceano	Gibraltar FO (Italy)	6,101	732
Sewall's Point				
Apr. 23	Am. Sch. Dunham Wheeler	Rio de Janeiro, Brazil	2,904	....
Apr. 26	Amer. S.S. Okesa	Pernambuco, Brazil	2,643	447
Newport News				
Apr. 21	Amer. S.S. Vindal	Santiago, Cuba	1,505	295
Apr. 22	Amer. S.S. Republic	Rio de Janeiro, Brazil	5,901	....
Apr. 22	Amer. S.S. Lake Desha	Antilla, Cuba	2,934	367
Apr. 23	Br. S.S. Rimutaka	Wellington, N. Z.	4,022	839
Apr. 25	Am Sch. Cecilia M. Dunlap	San Juan, P. R.	1,385	....

COAL AND COKE NEWS

EDITED BY ALEX MOSS

Harrisburg, Penn.

Representative Donnelly of Schuylkill County has introduced in the House a bill (1320) requiring the delivery of explosives to miners in the anthracite region at points below the surface. The bill provides that on and after July 1, 1919, explosives to be used by the miners in the hard-coal fields shall be delivered to them by the operator at a point below the surface most convenient to their place of work. The quantity supplied to each miner shall be in accordance with an order left by such miner at the mine foreman's office the day previous, and the quantity not to exceed the amount provided by law. The bill also provides that any operator who fails or neglects to furnish explosives to the miners as provided in the act shall be liable to a fine of ten dollars for each failure.

A bill to regulate the weight of anthracite coal and imposing penalties for short weight has been introduced by Representative Norton. This bill states that on and after the first day of July, 1919, two thousand pounds shall make or constitute a legal ton of coal throughout the state. A fine of $50 is to be made in all cases of short weight, provided that in all cases thirty pounds shall be allowed for the variation in scales.

A measure granting the right to corporations to construct and operate tunnels under the bed of navigable streams, where necessary to reach their coal supply, subject to the approval of the Water Supply Commission, was presented by Senator Crow of Fayette County, on Apr. 30.

A bill was presented to the House on Apr. 30 by Mr. Phillips, of Clearfield, providing that bituminous miners may collect at law rates due for mining coal, 76 lb. to constitute a bushel and 2000 lb. a ton. All mine cars are required to be uniform in capacity.

Five years without a single fatality in the mine under his care, is the record made by Harry Lewis, foreman of the Primrose colliery of the Lehigh Valley Coal Co., near Mahanoy City, and his work has been formally recognized by P. C. Fenton, State Mine Inspector in the Twentieth Anthracite District, who has written a letter of congratulation to Mr. Lewis.

Actual fatalities in the anthracite mines have decreased from 618 in 1913, to 551 in 1918, while the deaths per million tons of output have shrunk from 6.75 in 1913 to 5.54 in 1918. It has been the intelligent application of good mining principles and "safety first" ideas by the operating companies, through foremen like Mr. Lewis, which has helped to lessen the hazards of mining.

Mr. Lewis has been with the Lehigh Valley Coal Co. ever since 1897, when he was appointed fireboss at Packer No. 5. In 1904 he was made assistant foreman, and in 1910 he was made foreman at the Primrose colliery, which position he still holds.

Charleston, W. Va.

Both operators and miners in West Virginia are up in arms over the developments of the last week or two in connection with railroad fuel purchases, the publication of figures showing that some operators in the state sold coal for April delivery for as low as $1.60 per ton. The miners have denounced such sales in unmeasured terms and see in such a policy an effort to reduce wages, while operators are chagrined at the supine way in which some of the men in their industry have fallen in with the plans to beat down coal prices.

A large tonnage of coal was sold to the railroads at prices ranging from $1.60 to $1.85—a price considerably below the price fixed by the Government. Coal men who realize the organized effort being made to "bear" the coal market deplore the lack of organization and cohesion among those in the industry.

Aside from developments as to railroad fuel prices, the outlook for the industry in the state at the end of April was somewhat more encouraging. Certainly production had reached a somewhat higher level in many of the West Virginia fields, the improvement in a single week being pronounced.

It was estimated that in several districts the output had reached about 50 per cent of the full-time capacity. Larger quantities of coal were being moved both to the West and to tidewater, lake business having augmented the demand in West Virginia, production in several districts having been considerably increased as a result of a growing demand from lake territory. Even slack felt the effect of the growing demand, byproduct companies appearing to be in the market for larger quantities of this coal. Coke production, however, is still lagging.

Fairmont, W. Va.

A perfect furor was created in the Northern West Virginia fields during the fourth week of April when it became known that eight or ten different companies had been selling railroad fuel during April for a price as low as $1.60 a ton and from that up to $1.85. Prices at which 61,000 tons of coal were sold by these operators to the New York, New Haven & Hartford Railroad Co. during April are as follows. A. McBeil & Sons, 8000 tons at $1.85; George E. Warren Co., 10,000 tons at $1.75; Antler Coal Co., 5000 tons at $1.75; Har Mar Coal Co., 5000 tons at $1.75; Knickerbocker Fuel Co., 10,000 tons at $1.60; West Virginia and Pennsylvania Coal Co., 10,000 tons at $1.85; Knickerbocker Fuel Co., 10,000 tons at $5.74, that price being for coal delivered alongside Port Liberty piers, trimmed and bunkered. The fact that coal companies would become a party to the effort of the Railroad Administration to break down coal prices could hardly be credited.

There was a nearer approach to normal, however, in coal loadings during the week ending Apr. 26 than during previous weeks, coal men declaring that production was approaching 75 per cent., basing their estimate on the fact that the average loadings were 600 cars a day. It is even predicted that within 30 days shipments will have reached normal levels, though all do not concur in such a prediction, being rather inclined to believe that not before the end of the summer will there be full-time production.

The number of idle mines is still quite large, but it is apparent that a larger tonnage is being mined where mines are running. Increased fuel orders and increased lake orders have contributed to the increase in the total shipments from Northern West Virginia. Coal is moving to lake points at about the rate of 300 cars a week.

Dallas, Tex.

Slackness in the coal-mining operations in Texas, Oklahoma and Arkansas at this time is bringing the people of these states and other states that look to them for their fuel supply, dangerously near the famine point, according to coal dealers here. Coal-mining operations have been slack throughout the season. Various causes have contributed to this. First, there has been a marked shortage of railroad rolling stock, which has made the transportation of coal next to impossible. This has been reflected in decreased operations at the mines. Second, there have been various labor disputes which have tied up various mines for considerable lengths of time, and there has been a dearth of miners in some localities, especially in Texas, where the miners found work in the newly developed oil fields more profitable.

Last year the domestic consumers were induced to purchase their winter supply of coal early, and thus the mines were kept in operation throughout the summer months. But this year the consumers have not so purchased their coal. Dealers say there will be a greater shortage of coal in the Southwest next winter than last year, unless the consumers are induced to purchase their coal supply during the summer months and the mines can be kept in operation.

According to some coal operators, the production of coal in the Southwestern district must be increased at least one hundredfold if the threatened famine is to be avoided. These operators say the mine operations have so slackened that there is hardly any coal reserve on hand.

Boise, Idaho

With the signing by Governor Davis of House Bill No. 40, there has been created in Idaho a Bureau of Mines and Geology which, if properly directed, should in time become an important factor in the development of the mineral resources of the state. The board of control of this bureau is composed of Governor D. W. Davis, as chairman; the president of the Idaho Mining Association; Jerome J. Day, of Moscow; the professor of geology at the University of Idaho; D. C. Livingston, the state mine inspector; Robert N. Bell, and the dean of the School of Mines; Francis A. Thompson, as executive secretary.

The initial appropriation is $30,000 for the biennium, the general distribution of which is provided for by the act as follows: "For coöperation work with the United States Bureau of Mines, $15,000 to be matched by a like appropriation from Federal funds; for coöperative topographical and geological work with the United States Geological Survey, $10,000, which also is to be matched by a similar Federal appropriation; for general geological economic investigation of the mineral resources of the state, $5000."

The new bureau will therefore be the means of expending in mining, metallurgical investigations and in geological and topographic surveying the sum of $55,000 during the present biennium. The coöperative work in topographic surveying will be fully of as great a value to the agricultural and forestry interest of the state as to the mining industry, and for that reason the bill had the general support of all communities. Washington, Oregon and California each have a well organized survey of this kind and the creation of such a bureau of survey has been urged in Idaho for many years and has finally become a reality.

PENNSYLVANIA

Anthracite

Lofty—The Lehigh Valley Coal Co. has leased coal lands in Carbon and Schuylkill Counties to the Dodson Coal Co. The tract is near this town and is also near the former Silver Brook colliery, which was operated 15 years ago by Wentz & Co., under the name of the Silver Brook Coal Co. The Lehigh Valley company has been interviewing miners and former officials of the Silver Brook company concerning their knowledge of the worked-out areas in the old workings of that company.

Freeland—Pennsylvania state agricultural officials have opened an office at this place, and are fighting the "potato wart" disease which has broken out in the mining villages surrounding Hazleton. The coal companies are coöperating by furnishing steam and other aids, in the fight against the disease.

Hazleton—The Cranberry Creek Coal Co., west of town, is changing its pumping equipment from steam to electricity and, where conditions permit, drill holes through the rock are being used as column outlets instead of the column lines formerly used.

Berwick—Four operations have been started to dredge coal from the Susquehanna River, and another party is preparing to do the same. All expect to get more coal from the river this year than formerly. A Scranton firm erected a washery on the east side through which river coal is run. It finds a ready market for the hundreds of tons taken out daily.

Weatherly—The Supreme Court of Pennsylvania on Apr. 22 decided that where employees of a coal company are sent to a hospital for treatment for injuries by permission of a company, the latter is responsible for payment of the bills. The opinion was rendered in the case of the Middle Coal Field Hospital against the Lehigh Valley Coal Co.

Wilkes-Barre—As the result of a fire that started in the twelve east gangway of the Nottingham mine of the Lehigh & Wilkes-Barre Coal Co. at Plymouth on May 3, fifty men nearly lost their lives. All were brought to the surface, however, though many of the men are in a serious condition. The men were overcome by blackdamp, falling in rows along the gangway.

Mahanoy City—Deeds were recorded on Apr. 29 conveying a large tract of land in Union, West Mahanoy and Butler Townships from Louis V. Gerhardt, of Paris, France, to the Wentz Corporation, organized and existing under the laws of Virginia and from the Wentz Corporation to the Raven Run Coal Co. The consideration in each case was $28,333.33 and the extent of the transaction involved 37 and 21/27 twelve hundredths parts of the entire tract of 1200 acres.

Freeland—The Pond Creek Coal Co. will resume operations at its mine as soon as the colliery can be reopened. This mine was closed during the slack market period.

Carbondale—A petition has been presented to the city council by property owners of Canaan St., asking the council to restrain the Tappan Coal Co. from further mining operations until the mine fires which have been burning for several years be extinguished.

Scranton—Maintaining the rate established by court in 1916, the county commissioners of Lackawanna County have set the triennial assessment on coal lands in the county, which will stand until 1922, at $300 per foot-acre. Coal lands in Lackawanna County under the present assessments, with a tax of three mills and a valuation of approximately $57,000,000, bring in about $175,000 in county taxes, about 80 per cent. of it being paid by the coal companies.

Pottsville—A cage containing ten miners dropped 1100 ft. at the Maple Hill shaft of the Philadelphia & Reading Coal and Iron Co. on May 5, resulting in the death of one miner and serious injuries to the nine others, two of whom may die.

Minersville—One of the greatest fires this region has ever seen is raging at the Lytle colliery timber and culm bank. Refuse timber and coal dirt from the mines has been thrown for years on this dump, almost mountain high, and fire, starting in the very heart of the bank, has such a stubborn hold that great streams of water have failed to extinguish it. The Susquehanna Collieries Co. has a large number of men fighting the flames.

Dorranceton—Two men were killed and three other workers injured on Apr. 29 as a result of a gas explosion which occurred in the Pettebone mine of the Delaware, Lackawanna and Western R.R., Coal Department. It is thought the accident was due to carelessness on the part of one of the doorboys. The supposition is that one of the door tenders failed to do his duty in closing a door after a locomotive had passed through and thereby allowed gas to collect. It is believed that sparks from an electric locomotive ignited, causing the explosion. The explosion did not cause a fire, but completely wrecked a portion of the mine.

West Hazelton—The Alliance Coal Co. workings at Kaska William, which have been flooded with water for many years, will be freed by electric pumps now being installed.

Bituminous

Uniontown—The Whyel Coal and Coke Co., Harry Whyel, president, has purchased from the C. S. Bygate Estate of Pittsburgh, Penn., the 153-acre tract of coal known as the Whitehead tract in the Irwin gas coal basin in Westmoreland County, Penn. and is preparing to open a mine on it. It will require a shaft about 300 ft. deep and 6000 ft. of railroad.

Waynesburg—G. M. Scrugham, D. M. Hertzog and R. M. Hite, trustees of J. V. Thompson, in bankruptcy, have sold to the Cumberland Coal Co. a block of Pittsburgh vein of coal in the eastern part of Franklin township, aggregating about 1168 acres; consideration, $450,654.30. W. Harry Brown, of Pittsburgh, has sold to the Buckeye Coal Co. one-seventh interest in four tracts of coal in Cumberland township; consideration, $1. C. C. Jordan has sold to the Cumberland Coal Co. coal under a lot in Jefferson borough; consideration, $257. Annie B. Luse, of Carmichaels, has purchased from Dr. W. M. Parry, of Waynesburg, and Dr. Roger S. Parry, of Washington, a tract of Pittsburgh vein coal in Aleppo township, containing 104.-1675 acres; consideration, $7,812.56. Dr. Roger S. Parry, of Washington, has purchased from E. E. White 104.1675 acres of Mapletown or Sewickley vein coal in Aleppo township; consideration, $1. H. G. Rockwell, of Chicago, has sold to the Cumberland Coal Co. one-half interest in two tracts of coal in Whiteley township, equal to about 49 acres; consideration, $1. [The Cumberland Coal Co. is a subsidiary of the H. C. Frick Coke Co.—Editor.]

Uniontown—The Thompson tangle, dormant for several months, came to the front again here with the hearing upon a petition to dissolve the Thompson creditors' committee on the ground that it had long ago ceased to function. The hearing developed the fact that another deal is now pending for the sale of the involved estate and that negotiations have been well advanced. The negotiations with the unnamed purchaser are being conducted by J. V. Thompson, with assistance being given both by the trustees in bankruptcy and the members of the creditors' committee. The fact that a sale is now pending was introduced to show that the creditors' committee still is functioning.

Connellsville—W. J. Culleton and M. A. Buriss, superintendents of the H. C. Frick Coke Co., have exchanged plants. Mr. Culleton, who has been superintendent of the Phillips mine, has been transferred to Footedale and Ronco. Mr. Buriss, in charge of these mines, has gone to Phillips. Employees of each plant presented remembrances to their "super" upon his departure.

WEST VIRGINIA

Caples—The Central Pocahontas Coal Co. has recently completed negotiations for the purchase of the Standard Pocahontas Coal Co. The property includes a total of about 1900 acres of coal lands, with mine, dwellings, etc., having a capacity of about 10,000 tons per month. It is understood that the company is arranging plans for further development at an early date, to increase this amount to a total of 25,000 tons per month. Headquarters of the company are in the Payne Building, Welch, W. Va.

Fayetteville—Progress is being made by the East Gulf Coal Co. in the improvements being made at its plant at East Gulf, in the Stone Coal field, 30 new miners' dwellings being now under construction.

Williamson—After having been suspended for the greater part of the winter, operations will be resumed at practically every mine on Pond Creek, Mingo County, in the near future. This has been made possible through additional orders recently received.

Glen Alum—The Glen Alum Coal Co. will complete work in the near future on its No. 3 plant and will therefore be in position to mine and ship coal from that plant in a few weeks. The company has recently received orders which will insure full-time operations throughout the summer.

Bluefield—Summer improvements at the Coalwood plant of the George L. Carter Coal Co. will include the erection of a large steel tipple, an automatic hoist and a large number of company houses. Both at Coalwood and at Seaboard a number of men are now engaged in getting the mines in readiness for future activities. The shaft at the Coalwood plant reaches 19,000 acres of a 7-ft. seam of Pocahontas coal. The holdings of the Carter Coal Co include 40,000 acres in West Virginia, Kentucky, Tennessee and Iowa.

KENTUCKY

Whitesburg—A number of operators in the Elkhorn fields have recently secured contract orders for shipment to the Lake trade, and feel much better concerning the prospects for summer business. It is reported that several of the operators see full-time operations ahead of them.

ALABAMA

Birmingham—A gas explosion in the Regal mine of the Majestic Coal Co. at Pinson, in the northern portion of Jefferson County, Apr. 29, resulted in the death of 21 employees, included in the number being the master mechanic of the company. Seven other men were taken to a local hospital seriously injured, and further fatalities may result. Only a small number of the men were burned by the explosion, the majority of the deaths resulting from suffocation from the fumes. The physical damage was confined to the inside of the mine and operations will be resumed in the course of a week.

OHIO

Wilbern—The Wayne Coal Co., of Pittsburgh, will soon start another stripping operation at this place. An additional 2000 acres of coal lands has been acquired and equipment is now being installed. It is expected to have the operation working by July 1.

Crooksville—The New York Coal Co. has opened up a 3500-acre block of coal adjoining the old workings of its mine near Rose Farm, and is arranging to operate the mine on a much larger scale than formerly. With the opening up of the lake trade, the output of the mine will reach 1500 tons per day.

INDIANA

Brazil—A tract of 118 acres of coal land three miles south of Harmony, belonging to Lewis McCollough, has been sold to E. Williams, of Paris, Ill., who will develop the coal under the land at some later period.

ILLINOIS

Du Quoin—The large plant of the Security Coal and Mining Co., of Missouri, owned by the Rutledge & Taylor Coal Co., Chicago, has resumed operations after a shutdown of two weeks. During this time a new railroad scale has been installed and general repairs made throughout the mine. The scale was put in by the Howe Scale Co. and was manufactured at Rutland, Vt. A much better outlook is reported for steady work at this mine in the near future.

Tamaroa—The Victory Collieries Co., at Tamaroa, north of Du Quoin, is installing a modern coal crusher which will increase the market value of its output. This mine was purchased two years ago by Dowell & Lafont, of Du Quoin, well known land dealers in southern Illinois, and reopened and then sold again to the present owners. Since its reopening it has increased in size and output 200 per cent.

Harrisburg—Reports coming from Saline County, mainly the mines surrounding Harrisburg and the O'Gara mines, say that mining conditions are almost at a standstill. In addition to the mines being idle, the Big Four R.R. has made slashing reductions in its yard forces and it is stated that many men have been laid off for as many as 60 to 90 days. No hope is held out for the mines to resume more steady work for at least three months.

Carlinville—The vast developments of the Standard Oil Co. are rapidly shaping into completion. One large mine has been completed and opened since last May. The other shaft at Shoper reached coal three months ago, and the machinery is fast being installed. The power plant which, it is said, can furnish enough power to run fifty mines, is almost finished. The railroad has been completed as far as Shoper. A big dam for a water reservoir is finished and the addition of 200 houses in Carlinville is about to be opened, with all houses completed.

Belleville—The St. Louis & O'Fallon Coal Co., after being fined $25 and costs by a justice of the peace on each of three charges of violating the state mining law by failing to provide suitable washroom facilities at the so-called Nigger Hollow Mine No. 2, has announced that it will appeal to the Circuit Court. The charges were brought by State Mine Inspector Thomas Wright, and were substantiated by the testimony of miners.

Edwardsville—Work was begun recently on the steel tipple of the new Donk Bros. mine here, which is to have the largest shaft in southern Illinois.

Alton—The Moro Coal Co., failing to get the Big Four R.R. to move to its line, near Moro, will move its mine to the railroad. The company bought the old Kable mine more than a year ago and on the advice of experts sank the shaft at some distance from the railroad, in the expectation that the railroad company would build a spur to the mine. But the railroad company has declined to do so and the coal company has failed to induce private capital to build the spur, so another shaft is to be sunk right up close to the railroad. Work was begun on it a few days ago. John Kekich, of Alton, is head of the company. The company has about 1000 acres of coal.

TEXAS

Rockdale—Axford Hicks, of Tyler, Tex., has leased 1000 acres of land near Rockdale, in Milam County, Texas, and is sinking a number of test holes in an effort to locate lignite veins. It is his intention, if lignite is found in paying quantities, to open up a large mine.

MONTANA

Havre—A 7ft. coal seam has been uncovered on the Pat Yeen ranch here by well drillers, at a depth of 150 ft. The coal resembles the Lethbridge coal.

Great Falls—Deeds have been placed on record by which coal lands between Belt and Sand Coulee have been transferred to the Anaconda Copper Mining Co. for a consideration of $158,000. It is understood the company purchased these lands with a view of making them into its chief coal

mines in northern Montana upon the exhaustion of its mines at Tracy, which is looked for within the next three years.

WASHINGTON

Wenatchee—The main shaft of the Wenatchee Orchard Land Co. coal mine near Appledale has penetrated to the coal seam, which has been found to be 10 ft. thick.

Walla Walla—While driving a well on the George W. Glouck farm near Atkins, at a depth of 490 ft., a large vein of lignite was uncovered, samples of which burned well under test.

Spokane—W. S. Rogers has been elected president of the Colville Valley Coal Co. A. N. Cantril, secretary and treasurer, and Joe Budersdorf, as manager, were reelected. Work is proceeding in the development of the company's mine near Colville, about 350 ft. of tunnel and 170 ft. of shafting being completed to date.

Foreign News

Princeton, B. C.—Railway construction men on strike here became troublesome toward the end of April and are charged with responsibility for a fire which broke out at the Princeton Coal and Land Co.'s plant. That the fire was incendiary in its origin is indicated by the fact that the hose, with which an effort was made to control the flames, was found to have been cut. While no definite particulars have been secured as yet, it is not believed that serious damage resulted. Detachments of the Royal Northwest Mounted Police have been dispatched to the scene and it is confidently expected that order will be restored in a short time.

Victoria, B. C.—Satisfactory progress is being made in the opening of the new No. 3 Mine of the Merritt Collieries, Ltd. Two slopes have been driven as well as two levels. Thomas Rowbottom is in charge of the work.

The Canadian Western Fuel Co. is continuing the development of the Wakesiah mine. This work was pressed forward for some months and then stopped. Its resumption is taken to indicate the company's intention to put the mine on a producing basis as soon as possible.

Suquash, V. I.—The Pacific Coast Coal Mines, Ltd., has pumped the water out of its old mine at Suquash, Vancouver Island. This property has been idle since the year 1914. With a ready market and good prices, it is likely that the company purposes making it productive without delay. This mine is situated in what is known as the Suquash Coal Field of the Island, approximately 170 miles north of Nanaimo, B. C. Comparatively little active development has taken place in that section.

Halifax, N. S.—Representatives of the Nova Scotia Steel and Coal Co. and the Dominion Coal Co. are pressing their claims upon the Provincial Legislature with regard to enabling each company to obtain access to submarine coal deposits, hitherto inaccessible to the owner except through the property of its competitor. The companies having failed to get together and come to an understanding, as requested by the Provincial Government, it is announced that legislation will shortly be introduced to compel the companies to exchange coal areas on fair terms. While this would not affect the Dominion Coal Co. to any great extent, as it has ample reserves of unworked coal adjacent to its present workings, it would be most advantageous to the Nova Scotia Co. whose present workings are nearly exhausted and whose reserves would then be rendered accessible.

Winnipeg, Man.—Official records show that a total of nearly 600,000 tons of hard and soft coal came into Winnipeg between June 1 and Mar. 1, of which about 360,000 tons was shipped from the western mines. W. P. Brereton, city engineer, stated that "western coals have done splendid work at the city's high pressure plant, where most of the city's municipal purchases have been used." Archibald Blackie, city chemist, says that the analysis gave the best record for any soft coal the city has had, most of the samples examined for the city under guarantee orders showing the western coal to be higher in B.t.u. values than the standard required. The percentage of ash was also lower than required by the guarantee.

Victoria, B. C.—In placing coal mines in British Columbia under the income tax law for purposes of taxation, the Government has been guided by the recommendation of a taxation board, which was appointed two years ago for the purpose of investigating the present provincial methods of obtaining revenue and making any suggestions considered wise for the removal of inequalities and the better distribution of the burden. The board's report, which was laid before the Provincial Legislature during its last session, gives considerable attention to the taxation of mining but, for the most part, its comments are directed to the situation in respect of metalliferous mining. Among its proposals, however, was that which was adopted—namely, the bringing of the collieries under either the 10c. per ton royalty or the income tax law, the Government to collect whichever method yielded the greater revenue.

Personals

John L. Briton, of McAlester, Okla., was elected vice president of District 21, United Mine Workers of America, in a special election recently held in the district.

Major D. B. Wentz, president of the Wentz Companies, has returned from France and is expected to visit the anthracite collieries of the company in the near future.

J. B. Neale, production manager during the war for the Fuel Administration, has been summoned by the President and will sail for Paris at an early date. No details of the import of his mission are available.

I. D. Thomas, of Hazleton, Penn., on Apr. 30 was appointed superintendent of the East Bear Ridge mines near Frackville, Schuylkill County. He was formerly manager of the Harleigh Brookwood Coal Co. at Harleigh.

William Crooks, who has been connected with the Tennessee Coal, Iron and Railroad Co., has assumed the position of superintendent of the Montevallo Mining Co. at Aldrich, Ala., taking the place left vacant by the recent resignation of **T. W. Lloyd.**

H. B. Payne, House Building, Pittsburgh, Penn., has been appointed district factory representative for bituminous fields of Pennsylvania and all of West Virginia by the Atlas Car and Manufacturing Co., of Cleveland, Ohio, handling the Atlas line of storage-battery locomotives.

J. B. Crankshaw, former manager of the Cranberry Creek and Alliance Coal Companies, accompanied by Mrs. Crankshaw, has sailed for his former home in London, England. Mr. Crankshaw will be associated with his father in an important English engineering company.

Edwin Ludlow, for the past ten years vice president of the Lehigh Coal and Navigation Co. has resigned, effective July 1. **W. G. Whildin**, a Lansford man, who has been a life-long employee, will succeed him. **J. P. Warriner** will continue as manager of the Cranberry Creek and Alliance Coal Companies.

W. P. Engleman, of New York City, has been retained as chief engineer of the Domestic Coke Corporation of Fairmont, W. Va. Mr. Engleman, during the war, was in the service of the Government as a coke and byproduct expert. He has resigned his Government position and has established his headquarters in Fairmont.

F. J. Dawson has been appointed assistant to the general manager of the Raleigh Coal and Coke Co., Huntington, W. Va., his appointment being effective May 10. Mr. Dawson has been general inspector and consulting engineer for all the smokeless fuel operations in the state. He is by profession a civil and mining engineer, his experience having taken him to England, Scotland, Wales, Mexico and Canada.

Charles F. Colbert, Jr., of Brownsville, Penn., for the past eight years sales manager, and recently also assistant general manager of the W. Harry Brown coal and coke interests, and who since the sale of these properties to the Pittsburgh Steel Co. has been looking after the closing up of the transfer of the properties, has severed his connection with these properties and taken an interest in and the position of general manager of the Pioneer Coal and Coke Co., a recently organized brokerage concern with offices in the Henry W. Oliver Building, Pittsburgh, Penn. He will sell his property in Brownsville and move to Pittsburgh.

Obituary

Robert Lake, well known throughout Michigan, Ohio and Indiana as a coal merchant, having served as president of the Tri-state Coal Association, died in Jackson, Mich., on Apr. 29.

Coming Meetings

American Wholesale Coal Association will meet on June 3 at Cleveland, Ohio. Secretary, L. Romanski, Chicago, Ill.

Illinois Mining Institute will hold its annual meeting May 22, 23 and 24. Secretary, Martin Bolt, Springfield, Ill.

National Coal Association will meet May 21, 22 and 23, at Congress Hotel, Chicago, Ill. Secretary, J. D. A. Morrow, Washington, D. C.

Illinois and Wisconsin Retail Coal Dealers' Association will meet at Hotel Nelson, Rockford, Ill., June 4 and 5. Secretary, I. L. Runyan, Chicago, Ill.

International Railway Fuel Association will hold its annual meeting May 19-22 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

Retail Coal Dealers' Association of Texas will hold its annual meeting on May 19 and 20 at Fort Worth, Tex. Secretary, C. R. Goldman, Dallas, Tex.

Central Pennsylvania Producers' Association will hold its annual meeting May 15 at Chamber of Commerce Building, Altoona, Penn. Secretary, Charles O'Neill, Altoona, Penn.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 10 in the Keith and Perry Building, Kansas City, Mo. Secretary, C. N. Fish, Leavenworth, Kan.

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind., subject to ratification of executive committee. Secretary, J. W. Paul, Pittsburgh, Penn.

National Retail Coal Merchants' Association will hold its annual convention at Buffalo, N. Y., May 14-16, with headquarters at Lafayette Hotel. Secretary-Manager, E. B. Gordon, 1727 Pennsylvania Ave., Washington, D. C.

Kentucky Mining Institute expects to hold its annual meeting this year on May 30 and 31 at Lexington, Ky. Secretary, C. W. Strickland, Huntington, W. Va.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

American Society of Mechanical Engineers will hold its spring meeting at the Hotel Statler, Detroit, Mich., June 16 to 19. Secretary, Calvin W. Rice, 29 West 39th Street, New York City.

Recent Coal and Coke Patents

Mine Car. M. S. Runsvold, Bisbee, Ariz., 1,276,418. Aug. 20, 1918. Filed Sept. 7, 1917. Serial No. 190,211.

Coal-Mining Machine. J. Gricar, Lowell, Ariz., 1,278,333. Sept. 10, 1918. Filed Jan. 25, 1917. Serial No. 144,518.

Smoke Consumer. A. Habig, Montreal, Quebec, Can., 1,278,639. Sept. 10, 1918. Filed Oct. 26, 1915. Serial No. 58,007.

Safety Device for Mine Cars. L. Pichler, Fort Wayne, Ind., 1,278,742. Sept. 10, 1918. Filed Jan. 10, 1918. Serial No. 211,207.

Boiler Furnace. A. C. Mott, Jr., assignor to A. Cox Stove Co., Philadelphia, Penn., 1,276,395. Aug. 20, 1918. Filed Sept. 8, 1917. Serial No. 190,341.

Mining Apparatus. C. J. E. Waxbom, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,276,141. Aug. 20, 1918. Filed Oct. 11, 1912. Serial No. 725,323.

Process of Treating Coal. C. H. Smith, assignor to International Coal Products Corporation, Richmond, Va., 276,428. Aug. 20, 1918. Filed Jan. 31, 1916. Serial No. 75,288.

Safety Gate for Mine Shaft. W. H. Finley, assignor to Fairmont Mining Machine Co., Fairmont, W. Va., 1,276,199. Aug. 20, 1918. Filed Feb. 19, 1918. Serial No. 218,054.

Furnace Structure. R. M. Spencer, assignor to Columbus Heating and Ventilating Co., Columbus, Ohio, 1,278,777. Sept.

10, 1918. Filed Jan. 23, 1913. Serial No. 743,721.

Steam Boiler. J. Harter, Jr., assignor to Babcock & Wilcox Co., Bayonne, N. J., 1,280,996. Oct. 8, 1918. Filed Oct. 13, 1915. Serial No. 55,625.

Publications Received

The Nenana Coal Field, Alaska. By C. C. Martin. Department of the Interior, Bureau of Mines. Bulletin 664. Illustrated, 55 pp., 6 x 9 inches.

Illinois Mining Statutes Annotated. By J. W. Thompson. Bulletin 169, Law Serial 15. Department of the Interior, Bureau of Mines. Unillustrated, 594 pp., 5¾ x 9⅛ inches.

Notes on Lignite—Its Characteristics and Utilization. By S. M. Darling. Technical Paper 178. Department of the Interior, Bureau of Mines. Unillustrated; pp., 19; 5¾ x 9⅛ inches.

Statistics of Mines and Quarries in Ohio, 1917. Bulletin of the Industrial Commission of Ohio, Vol. V, No. 2. Department of Investigation and Statistics, Report No. 36. Unillustrated, pp. 98, 6⅝x9⅝ inches.

Monthly Statement of Coal Mine Fatalities in the United States, November, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, 31 pp.; 6 x 9 inches.

Quarry Accidents in the United States During the Calendar Year 1917. Compiled by Albert H. Fay. Technical Paper 213. Department of the Interior, Bureau of Mines. Unillustrated; pp., 62; 5¾ x 9⅛ inches.

Abstracts of Current Decisions on Mines and Mining, Reported from January to May, 1918. By J. W. Thompson. Bulletin 172, Law Serial 16. Department of the Interior, Bureau of Mines. Unillustrated; 160 pp.; 6 x 9 inches.

Coal-Mine Fatalities in the United States, 1918, and Coal-Mine Statistics Supplementing Those Published in Bulletin 115. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, pp. 61, 5¾ x 9 inches.

Annual Report of the Superintendent, United States Coast and Geodetic Survey, to the Secretary of Commerce for the Fiscal Year Ended June 30, 1918. Department of Commerce, United States of America. Illustrated, 133 pp.+index; 6 x 9¾ inches.

General Orders, Regulations and Rulings of the United States Fuel Administration. Compiled by the Legal Division of the Administration. Including the acts of Congress, executive orders and proclamations of the President pursuant to which the United States Fuel Administration was created and is acting. Unillustrated, 614 pp. and index. 5¾ x 9⅛ inches.

Trade Catalogs

New Book of E. M. Synchronous Motors. Electric Machinery Co., Minneapolis, Minn. Bulletin 501. Pp. 42; 8½ x 11 in.; illustrated. Describes briefly and simply the construction, characteristics and the applications of the synchronous motor.

The Nixon Ratchet Mining Drill. The Bonney-Shanks Co., Chattanooga, Tenn. Catalog. Pp., 8; 6 x 9 in.; illustrated. Describes in detail the manufacture and operation of a practical ratchet drill for driving entries and airways, taking top and bottom, and mining hard coal.

Fifty Years of a Successful Industry. The Yale & Towne Manufacturing Co. Souvenir Booklet. Pp. 76; 5½ x 8 in.; illustrated. Commemorative of the completion of 50 years of activity by the corporation. Is of interest as illustrative of the origin and development of one of the well-known American industries.

"Over 1000 Scoop Conveyors." Portable Machinery Co., Passaic, N. J. Folder Pp. 20; 6x9 in.; illustrated. Shows the various uses of the scoop conveyor and describes clearly the labor, time and money-saving features of the machine in storing, reclaiming, loading and unloading loose materials.

Reducing Ash-Disposal Costs. American Steam Conveyor Corporation, Chicago, Ill. Booklet. Pp. 12; 8½ x 11 in.; illustrated. Of interest to engineers and power plant executives will be the diagram and description of an ash conveyor that paid for itself in eighteen months. Diagrams and photographs of actual installations are used to liven the booklet.

Lidgerwood Coal-Handling Cableways. Lidgerwood Manufacturing Co., New York, N. Y. Bulletin 34. Pp. 10, 9 x 12 in., illustrated. Covers a cableway for coal-storage purposes. It is claimed that with the aid of the device described and illustrated in the bulletin, coal can be successfully stored where the ground available could hardly be utilized with any other method.

Industrial News

Pittsburgh, Penn.—Gellatly & Co. and the Ohio Brass Co. announce that they are now located in Suite 2205-06 Oliver Building.

Indianapolis, Ind.—Dean Bros. Steam Pump Works have opened a New York City office at 141 Broadway. H. Meachem has been appointed district sales manager.

Whitesburg, Ky.—The Caudill Coal Co., at Caudill, Ky., has changed its name to the Solon Coal Co. Williamsburg and Whitley City interests control the company.

Chicago, Ill.—On May 1 the local office of the Ohio Brass Co., of Mansfield, Ohio, was moved from 508 Fisher Building to 1217 Fisher Building, 343 South Dearborn St. The telephone number has been changed to Harrison 4343.

Hartford, Conn.—The Terry Steam Turbine Co. announces the appointment of R. L. Thomsen as sales manager. Previous to his appointment, Mr. Thomsen was manager of the Marine Department for the Griscom-Russell Co.

Cincinnati, Ohio—The Pocahontas Coal Sales Co. and the Glen Alum Fuel Co. announce that they have removed their western office, in charge of John R. Miller, from 1405 to 1207 Fisher Building. The telephone number is Harrison 5414.

New York, N. Y.—Greene, Tweede & Co., 109 Duane St., manufacturers of Palmetto and other packings, have issued a new catalog which in effect is a guide book to the use of packings. It contains much of value to those who use and buy packings, and will be sent free of charge upon request.

Hazard, Ky.—It is reported that the Thornton Creek branch of the Louisville & Nashville R.R. will be extended into the Headwaters division of the section, tapping additional coal and timber districts which have been waiting on rail connections.

Cleveland, Ohio—Drusus H. Nichols and John C. Moore, formerly managing director and assistant director of the Allied Publicity Bureau, announce the organization of the Nichols-Moore Co., general advertising agents, to be located at 11705 Detroit Ave., Cleveland.

Wilmington, N. C.—The Cement Products Co., manufacturer of the "Sanisep" sewerage disposal systems, with main offices at Wilmington, N. C., has opened a branch sales office at 39 Cortlandt St., New York, which is in charge of J. F. Harris, vice president of the company.

Pittsburgh, Penn.—The Pittsburgh Mining Machinery Co., with offices in the First National Bank Building, has recently completed extensive improvements at its factory for rebuilding and repairing mining machines, locomotives, motors, etc. The new shops are at Magnolia and Cantril Sts., North Side.

Jersey City, N. J.—The Joseph Dixon Crucible Co., manufacturers of silica-graphite paint, crucibles, graphite greases and graphite lubricants, have announced the removal of their Philadelphia sales office from 1020 Arch St., to Rooms 801 and 802 of the Finance Building, South Penn Square, Philadelphia, Penn.

Charleston, W. Va.—The Malleable Coal Co. is understood to be arranging plans for the construction of a large coal tipple at its coal-mining properties, and the building of two additional miles of railroad line. It is said that the company is planning for the development of new coal-mining properties in addition to its present works. Samuel Butler is manager.

Indianapolis, Ind.—It is reported that the Neal Gravel Co., Indianapolis, Ind., plans to double the capacity of its plant at Attica, which will necessitate the purchase of engines, boilers, crushers, screeners and gravel-removing equipment, possibly a new steam shovel. This is to be the largest plant of the four owned and operated by the company. It also owns two or three coal mines.

Baltimore, Md.—The Black & Decker Manufacturing Co., builders of portable electric tools, electric air compressors and special machinery, has established a New York office at Room 2920, Equitable Building. The office will be in charge of G. R. Lundane, who will supervise the distribution of the company's products in New York city and surrounding territory, including the State of Connecticut.

Buffalo, N. Y.—The Copper Coal Co., of Brockwayville, Penn., has been incorporated in this state under the same name, with W. C. Quinn, president of the parent company, and George B. Burd and A. C. Hynd, of Buffalo, incorporators. Capital stock is $200,000. The idea is to sell the coal, which comes from the Argentine mine in Butler Co., Penn., through this market and possibly open an office here.

Frankfort, Ky.—The State Railroad Commission has been advised of the completion of the 10-mile coal-carrying railroad of the Black Mountain R.R. from Huline, Bell County, Kentucky, to the Louisville & Nashville junction in Harlan County. Offices are in Pineville, and the line will be placed in operation as soon as necessary eqiupment arrives. This will open up shipping for several new mines.

Toledo, Ohio—D. H. Goodwillie, service director, will receive bids until June 3 for installing coal-handling equipment consisting of (a) one track hopper coal crusher and elevator and conveying machinery, (b) one suspended steel coal bunker with supports, (c) one traveling weigh hopper, all to be erected complete at the Broadway Pumping Station. H. C. McClure, Valentine Building, Toledo, Ohio, City Engineer.

Cinncinnati, Ohio—The City of Covington, across the river from Cincinnati, has passed an ordinance that will eliminate the temporary coal merchant. The ordinance provides a license of $500 for a temporary merchant. The coal men claim this will be an equal protection for other merchants as well as themselves. The new ordinance will make it unprofitable for the individual dealer to enter the coal business for a few months during the winter season.

Fairmont, W. Va.—Directors of the Consolidation Coal Co., at a meeting in Baltimore recently, elected Frank R. Lyon, of Fairmont, a vice president and placed him in charge of all operations of the company. Brooks Fleming, Jr., of Fairmont, was made assistant to the president and will likely be Mr. Lyon's assistant in the company's operations, which embraces numerous mines in the States of Maryland, West Virginia, Kentucky and Pennsylvania. For six years Mr. Lyons has been general manager of the company.

Seattle, Wash.—To investigate terminal facilities and improvements in transportation necessary to handle the output of the navy coal lands at Cook Inlet, Alaska, Captain Sumner, E. W. Kittelle and Capt. L. E. Gregory, U. S. N., are on their way to join a party of scientists in Alaska who will handle a part of the investigation work. The navy is planning to bring Alaska coal into use, and the facilities needed at the Matanuska fields, which will be investigated, and the expense of installing transportation and terminal works, will be covered in the report to be submitted to guide the making of appropriations for the purpose. The party will be absent about six weeks and will work from Anchorage as a base.

Jefferson City, Mo.—Missouri now has a workmen's compensation law. The bill as amended and passed by the Senate was passed by the House Thursday, May 1, by a vote of 125 to 4. It is to be administered by a bi-partisan commission of four, one member of which shall represent the employers and one the employees. The commissioners will be paid $4000 a year each. The bill becomes effective Nov. 1. It provides for medical aid for the first eight weeks at a cost of not to exceed $200. Compensation is to be on the basis of 66⅔ per cent. of wages, computed on the annual average, the maximum to be $15 per week and the minimum $6 per week. Temporary total disability is not to exceed 400 weeks. For temporary partial disability the provision is two-thirds of the wage loss, not exceeding 200 weeks. For permanent total disability the compensation is to be two-thirds wages for 240 weeks and thereafter 40 per cent. of wages for life. The burial benefit is $100 in every case and total dependents are to receive two-thirds of wages for 300 weeks. All insurance for employees is to be procured from private companies. Employers and employees may elect whether to come under the law's provisions.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Anthracite Industry Busy, While Bituminous Market Is Still Stagnant—Better Conditions In Soft Coal Looked for Soon—Some Price Cutting Reported—Scarcity of Egg Coal

IT IS interesting to note the contrast presented by the anthracite and bituminous branches of the coal industry at the present time. In the hard-coal regions activity is everywhere in evidence, while in the sections where bituminous coal is mined many operations are barely working. The reason for this difference will readily be appreciated when it is understood that anthracite coal is used principally by domestic consumers, while bituminous coal is consumed by the industries. Of the 90 million tons of anthracite produced yearly, probably 70 million tons is burned for domestic purposes; the domestic consumption of bituminous coal, on the other hand—70 million tons — is negligible when compared to the large annual output.

However, better days are coming for the soft-coal operators, as increased activity is discernible in industry in general. Once the Victory Loan is successfully closed and out of the way, and the political turmoil in Europe quiets down, plants the country over can begin to extend their operations and count on the necessary banking assistance to enable them to do so. When the present uncertainties besetting shipping, price regulation and public utilities are removed, it will mean a renewal of prosperity; and a renewal of prosperity means an augmented demand for fuel. The two are inseparable.

Still, it must be recorded with regret that though an improvement is observed in soft-coal conditions from week to week, the change is barely perceptible. There is quiet buying here and there, but the tonnages are not large enough to exert any material effect on prices. There is plenty of spot coal available, and thus steam-coal users see no necessity at this time for haste in the closing of contracts for their future requirements. Railroad buying, in the main, is still shrouded in mystery, though it has been made public that the Pennsylvania lines east of Pittsburgh have contracted for a large tonnage of run-of-mine at the former Government price.

In the anxiety to dispose of coal, some of the Middle West operators are reported to have released their output at comparatively low prices, and the same has been said of operators in the Eastern fields. This tendency to recede from the announced intention of curtailing production rather than selling coal at a loss is not true of the industry as a unit. In fact, prices are being adhered to firmly, and the output of only 7,362,000 net tons of bituminous coal during the week ended April 26 is proof conclusive that the rate of production is still far behind the rate of consumption.

If plans of the Government materialize, much of the stagnation in the bituminous coal industry will be eliminated by the export of a large volume of coal. The necessary ships have been promised by July, and the soft-coal operators, through the National Coal Association, have signified their willingness to coöperate in every way possible.

So great has been the demand for the domestic sizes of anthracite that already the mines are unable to ship the necessary tonnages. The call from consumers for prompt delivery of coal that will not be burned until next fall is reflected in a growing shortage of egg coal. Many of the mines have sufficient orders on their books to carry them through the month of July, and even the steam sizes of anthracite are being called for in increasing volume. The prices of these coals have tightened considerably. During the week ended April 26 the anthracite mines produced 1,401,000 net tons of hard coal.

WEEKLY COAL PRODUCTION

Bituminous coal production during the week ended Apr. 26 is estimated at 7,362,000 net tons, and is a slight falling off compared with the output of the week of Apr. 19, estimated at 7,413,000 net tons. During the same week of 1918 the operators of the country produced 11,720,000 net tons. The daily average per working day during the current week is estimated at 1,227,000 net tons, as against 1,235,000 net tons during the week preceding and 1,358,000 net tons for the calendar year to date. For the period of Jan. 1 to Apr. 26, 1919, the production of bituminous coal is estimated at 135,759,000 net tons, and falls 42,313,000 net tons, or 24 per cent., below the output of the same period of 1918, estimated at 178,072,000 net tons.

The production of anthracite in the United States during the week ended Apr. 26 is estimated at 1,401,000 net tons, as compared with 1,568,000 net tons for the week ended Apr. 19, and 1,870,000 net tons during the corresponding week of last year. The daily average per working day during the week ended Apr. 26 is estimated at 234,000 net tons, as compared with 237,000 net tons, the daily average for the calendar year to date and 312,000 net tons, the daily average for the same period of 1918. For the calendar year to date, production of anthracite is estimated at 23,662,000 net tons for the corresponding period of 1918.

Shipments of bituminous coal from the tidewater harbors to all points during the week ended Apr. 26 are estimated at 453,074 net tons, as compared with 405,117 net tons during the week preceding, and 873,630 net tons during the same week of last year. During the current week improvement occurred at all harbors with the exception of Philadelphia. The New England shipments of bituminous coal by tidewater during the week of Apr. 26 amounted to 102,789 net tons, as compared with 79,491 net tons during the week preceding. Tonnage was loaded at Baltimore for the first time since the week ended Mar. 29 and amounted to 3478 net tons.

Beehive coke production in the United States during the week ended Apr. 26 is estimated at 261,767, net tons, as compared with 294,848 net tons during the week ended Apr. 19, and 655,698 net tons during the week of Apr. 27, 1918. The current week's production, the lowest recorded in recent years, shows, when compared with the preceding year's production, the tremendous pressure which was brought to bear at that time to make available the amount of coke which was necessary for war purposes. During the current week, production fell off in all states, with the exception of those west of the Mississippi. Pennsylvania production continues on the downward grade, and is today but 40 per cent. of that recorded during the week of Apr. 27, 1918.

With the opening of the lake season, bituminous coal figures on dumpings at the lower lake ports are once more available, and beginning with this issue, will be a regular feature of the weekly report. During the week ended Apr. 19 the tonnage loaded amounted to 288,524 net tons, and was approximately 50 per cent in excess of the tonnage loaded during the same week of last year. For the season to date, the tonnage loaded amounted to 561,235 net tons, as compared with 288,186 net tons during the same period of 1918.

Atlantic Seaboard

BOSTON

A dull featureless market. Apparently no decision yet on railroad requirements for this territory. Operators in need of May and June orders and concessions made to get them. No change in outlook for contracts. Hampton Roads factors still struggle with only hand-to-mouth business available. Slight improvement noticed inland. Margin between spot prices and those for deferred delivery, especially where rehandling is involved. Anthracite shipments slowing up. Egg in short supply. Coal for New England railroads likely to be factor in slow movement of domestic sizes. Retail prices advanced in Boston.

Bituminous—The market drags along with no significant change. There is quiet buying here and there, but the tonnages are not large enough to have any effect on prices. Buyers are aware that spot business is what is particularly desired by the shippers, while all-rail or at tidewater, and many of them are temporizing by arranging only for May or June delivery, leaving until later in the season their decision as to making contracts. There has seemed no inducement thus far to close such contracts on the quotations available, except in the case of certain specialties. Steam-users who have the run of the market and can buy from a range of coals see no reason for haste in closing for their requirements.

It was supposed that by May certain doubtful features would be settled, but railroad fuel and season rates of freight on

barges and steamers from Hampton Roads are both undetermined, except in a limited sense.

Instead of the long-awaited spurt in demand it develops that operators are much in need of orders for May and June delivery. This is particularly true of those producers whose coals are less favorably regarded, although there is distinctly a strong selling effort in behalf of the highest grades from the Somerset and Cambria districts. In most cases concessions of 10c.@25c. have been made to secure spot business, and it is this sign of weakness that gives buyers the impression there is plenty of time for securing next season's supply.

As to contract quotations, there is no apparent change. Practically no concessions are reported, for as yet neither shipper nor consumer seems able as yet to sense what the situation will be next fall and winter.

The Pocahontas and New River shippers still have hard going in New England. Seldom are there any sales reported. One of the street-railway systems is receiving bids this present week, and on that portion of the tonnage to be taken at plants directly on tidewater there is much interest to see the result. Only scattering business seems to be available for the Hampton Roads shippers and their tonnage is extremely light for this market. Most of the business that could be closed easily was underwritten early in the season before the $2.75 per net ton f.o.b. mine basis went into effect, and on the latter figure only the most loyal of customers have been induced to make season arrangements. For the bulk of their tonnage inland the Hampton Roads distributors are obliged to rely upon quality and years of service to offset the heavy differential in favor of the all-rail coals, and it is a notable fact that there is now observed some improvement in the demand from this source.

There is still a pronounced margin between present prices for spot shipment on the Southern coals and quotations for extended delivery. For the latter $7.90 is the current figure per gross ton on cars Boston, while May deliveries have been offered rather freely on the basis of $7.20@7.35. There are still a number of West Virginia shippers who are offering standard Pocahontas and New River at $2.35 per net ton at the mines. Accumulations are the order of the day at the Virginia terminals, and with the exception of low grades from Pennsylvania there is today no class of coals on which the market is so druggy as the high-grade smokeless varieties from the Pocahontas and New River districts.

Bituminous prices current at wholesale are about as follows, f.o.b. mines and at loading ports, per gross or net tons as designated:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@$2.75	$2.80@$3.25
Philadelphia, gross tons	4.20@ 4.90	5.00@ 5.30
New York, gross tons	4.50@ 5.25	5.35@ 5.70
Alongside Boston (water coal), gross tons	6.10@ 6.85	6.90@ 7.55

Georges Creek is quoted at $3.20 f.o.b. mines per net ton.

Pocahontas and New River are unchanged at $4.69@5.14 f.o.b. Norfolk and Newport News, Va., per gross ton, according to the shipper, for spot or contract. F.o.b. Boston the present gross ton range would be $7.20@7.65. It is understood that factors are still offering contracts on cars Boston for inland delivery at $7.90 per gross ton.

Anthracite—Since the last week in April shipments of domestic sizes have slowed up materially. Retailers who have stirred up the public to put in coal now find themselves unable to get cargoes forward in sufficient volume. All-rail there has also been a noticeable slackening in the tonnage of domestic sizes. The demand from the public for prompt deliveries now of coal that will not be used until next fall is reflected in the shortage of egg at most of the loading ports.

One of the ominous features of the current situation is the large tonnage which it is understood the Railroad Administration has ordered carried in Philadelphia & Reading barges to supply fuel for New England railroads at Portland, Maine, and points east. If carried through this will seriously curtail the space available to move domestic sizes in transportation that is normally the largest single channel of supply for tidewater New England. And this is done at a time when eighty or ninety steamers of the emergency fleet type are lying idle with no authority being exercised to put them into service. Something is wrong somewhere, and unless steps are taken to correct this particular situation there will be another anxious for the anthracite-consuming public.

On May 1 the Boston retail dealers advanced the price of broken, egg, stove and chestnut from $11, sidewalk delivery, to $11.50. Part of this advance is due to the situation at wholesale, but most of the 50c. increase is due to the recent wage agreement with teamsters and chauffeurs.

NEW YORK

Anthracite demand active, with some operators sold six weeks ahead. All sizes, particularly stove and egg, wanted. Canada sends many orders while the West is looking for quick shipments. The bituminous market slows down with prices showing a slight falling off. Buyers look for cheaper coals and hesitate to make purchases.

Anthracite—The long expected activity in the anthracite market is here, and both producers and dealers find themselves well supplied with orders. Many of the former, especially the so-called Independents, have orders sufficient to keep their operations going at full speed for several weeks to come. It was said in some quarters that some of the smaller operations have plenty of orders for domestic coals to keep them busy until the early part of July; in fact, it was said that some had sent word to dealers handling their product not to accept any more orders at present.

The larger companies are also crowded with orders and their operations are kept humming, most of the mines being reported as working nearly full time.

The trade expects an unusually busy summer as most cellars are far short of next winter's fuel supply, the consumers having delayed placing their orders in the expectation of a reduction instead of an advance in the price.

There is a heavy and an increasing call from Canada and the West, and coupled with it is a cry for quicker shipments. Consumers in Canada and the West are just as anxious to fill their bins as are the consumers here.

So far as the local market goes the heavier call is for stove and egg, but the other sizes do not lag far behind. Salesmen, however, have no difficulty in moving any of the other sizes, since dealers are willing to take any size in order to get what they want in the larger coals. Along the line the trade is active. Demand is heavy and the dealers are filling their bins.

Pea coal does not move so quickly as the larger sizes, but there is no anxiety regarding it. Whatever uneasiness existed last week regarding quotations has about disappeared, and reports of any slight concessions being made now are few and far between.

The steam coal situation has tightened considerably. Demand is good and there is comparatively little surplus coal to be seen at Tidewater. Quotations are firm, but slight concessions were heard on certain grades of buckwheat and barley.

Retail dealers report considerable activity. Consumers are now anxious to get their winter supply in before the summer vacations begin and are urging deliveries.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports, are as follows:

	Mine	Company Circular
Broken	$6.05	$7.90
Egg	5.95	7.80
Stove	6.20	8.05
Chestnut	6.30	8.15
Pea	4.90	6.65
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—Conditions in the bituminous market are quiet and are reflected in quotations for the various grades of coal, which in the majority of cases show a decline from last week. Business is dull here and shippers, do what they will, are unable to convince buyers that the present is the time to buy.

Many buyers continue to cling to the opinion that they will be able to get coal at lower prices rather than pay higher prices next fall, and for that reason are holding back their orders. However, there are many who believe the turning point in the situation is not far distant. With it may come a complete reversal in present market conditions and a hustle to get coal. The mines are working scarcely better than half time, and the workers are not taking kindly to this program.

In this harbor the movement of coal since the end of the harbor strike has been a disappointment. It was expected that consumers would want to replenish their stocks and buying would continue to be heavy for several weeks to come. Many buyers after partly filling their bins curtailed their deliveries with the result that boat movement is slow and some shippers have had difficulty in getting rid of loaded boats unless they make concessions.

During the past week there has been a falling off in buying for commercial purposes, but bunker demand has remained brisk. Contract coals are moving rapidly, which enables shippers to keep their stocks at the docks down to a minimum.

While there has been a slight change in current quotations for spot coal for the various grades, shippers have not been forced to dispose of their stocks at low figures. As usual much depends upon supply and demand.

There have been many inquiries for coal for export, but no actual closings of contracts have been reported.

Dumpings of bituminous coal here for the week ended May 3 were 5955 cars, as compared with 5420 cars the previous week. During April there were 20,708 cars dumped as compared with 11,516 cars in March, 23,668 cars in February and 23,769 cars in January.

Current quotations for the various grades of bituminous, for spot shipment and on contract, follow:

	Spot	Contract
South Forks	$2.90 to $3.25	$2.95 to $3.50
Cambria County (good grades)	2.75 to 2.95	2.95 to 3.25
Clearfield County (good grades)	2.50 to 2.75	2.80 to 2.95
Reynoldsville	2.50 to 2.75	2.75 to 2.95
Quemahoming	2.65 to 2.85	2.95 to 3.10
Somerset County (best grades)	2.65 to 2.85	2.95 to 3.10
Somerset County (poorer grades)	2.00 to 2.35	2.50 to 2.75
Western Maryland	2.25 to 2.75	2.50 to 2.75
Fairmont	2.00 to 2.25	2.35 to 2.50
Latrobe	2.10 to 2.25	2.25 to 2.40
Greensburg	2.25 to 2.35	2.35 to 2.60
Westmoreland ¾ in.	2.60 to 2.75	2.60 to 2.75
Westmoreland run-of-mine	2.35 to 2.60	2.35 to 2.65

PHILADELPHIA

Strong demand for family sizes of anthracite. Business booked long time in advance. Heavy call for egg, making loss of broken tonnage less important. Pea improves. Price cutters increase their rates. Stove orders impossible to fill. Successful advertising campaign. Steam sizes show slight improvement. Bituminous dull and without feature. Little spot coal.

Anthracite—There is an intense demand for all the domestic sizes. All companies are jammed with orders, and those concerns who are willing to accept business for weeks ahead report heavy tonnages for shipment right up to July. The shippers are surprised at the amount of business for egg being received from the local trade. Except in the suburbs, the Philadelphia dealers formerly ordered a small tonnage of this size; but now the orders are out of all proportion to the production. This is particularly gratifying to the operators, for they have lost quite a lot of strictly commercial tonnage due to the turning of many gas companies to coke, which can now be purchased at a much lower relative price.

Stove size is in a hopeless state so far as the producers are able to fill orders for it. Every dealer is insistently calling for this size. At the offices of the larger shippers it is reported that sufficient orders for stove have been received in the last week or two to absorb the entire production for several months. Many yards are entirely bare of it, and no promises are being made as to when they can be stocked. Chestnut, too, is active, but a greater tonnage of this size seems to be coming here. Pea continues to be the size in least demand, but the improvement in this size has been so noticeable that promises of immediate shipment are no longer being made. The companies who had been compelled to send some of this size to storage yards are now able to send their full production directly into the market.

As anticipated, several of the price cutters who have always made pea coal their special point of attack have advanced their rates on this as well as the other sizes. The lowest figure at which pea coal can now be purchased at retail is $8.50, which is 50c. less than the dealers generally are charging.

The steam trade is slow to respond and appears to be something of a puzzle to all anthracite men. The big companies continue to stock while the smaller operators who are compelled to move their coal are

cutting prices and hoping for changed conditions. They report that some of their trade has gone over to bituminous; others over-bought and are now consuming their surplus stock. Yet it can be said there is actually some improvement in the steam sizes. Buckwheat is in much better demand and good improvement has been shown in the demand for rice. Barley is still hopeless, and no one really expects that it will improve for many weeks or even months.

No one can be found who is willing to venture a decided opinion on buckwheat, but it is apparent to some that the $3.40 price is hurting it. Some of the largest contracts carrying that price are still in the hands of consumers unsigned. In the meantime sales are reported around $2.85, with small lots at $3. As heretofore, rice is stronger than buckwheat, but is being offered at from $2.50 to $2.60. For barley a fair price is $1.50, and shippers are glad to get it.

The prices per gross ton for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5 95	$7 80	Buckwheat	$3.40	$4.45
Egg	5 95	7 80	Rice	2.75	3.65
Stove	6 20	8 05	Boiler	2 50	3 50
Nut	6 30	8 15	Barley	2.25	3 15
Pea	4 90	6 50			

Bituminous—The trade continues quiet with practically no improvement during the last six weeks or more. Despite this colorless state of affairs shippers remain fairly optimistic that the turn in the road will soon be in sight. As it now stands, no one is willing to produce any more coal than is absolutely necessary to fill orders in hand. Most of the production continues to be aplied on contracts, and even such agreements as have been signed are not taking the full amount. Under such limited production there is of course little spot market.

All houses continue to receive numerous inquiries for prices on contracts, many being from the same consumers who have been asking figures for weeks past. They are simply sounding the market. While all shippers of consequence have received the proposition of the railroad authorities to supply fuel on the basis of a $2.40 to $2.50 price, it is not thought it has been accepted by many. The following are the prices which have ruled lately:

Georges Creek Big Vein	$2.90 @ $3.00
South Fork Miller Vein	2.90 @ 3.00
Clearfield (ordinary)	2.75 @ 2.90
Somerset (ordinary)	2.55 @ 2.70
Fairmont lump (ordinary)	2.40 @ 2.50
Fairmont mine-run	2.15 @ 2.25
Fairmont slack	1.90 @ 2.00

BALTIMORE

Increased activity in contracts follows some cutting on particular grades of bituminous. Wide range of quotations on both contract and spot coals of like quality. Hard-coal men here continue busy with deliveries. Exports look healthy.

Bituminous—There are undoubted signs of increasing activity in the contract market. For some weeks the trade heard of a number of inquiries on contracts, but few closings of importance were noted following the quotations of prices that held pretty well to the old Government maximum figures, even on the less desirable fuels. Now, however, quite a few consumers who want specialized coal have stopped purchasing in the open market, even at an advantage, and are closing at or near the old maximum. In addition there has been some decided cutting in contract quotations on fair to good coals in many instances, and this has stimulated buying.

Even on contracts on similar grades of coal, however, there is at times a considerable latitude of prices, and on some pretty good coals offerings were noted all the way from a mine basis of $2.50 to $2.95 to the trade. The spot market was spotty the past week, sales of best coals at tide being noted in a range of from $2.40 to $2.95 mine basis to the trade, of good coals not of special grading at from $2.20 to $2.80, and on less desirable coals at from $2.10 to $2.50, showing at times an overlap of prices on coals of decidedly different quality.

The export movement continues encouraging, and inquiries and orders are such that only the lack of bottoms prevents a considerable spurt in the movement. For the week ending Apr. 26 the Custom House reports total loadings on foreign account of 19,690 tons, including 1456 tons used by the carriers for bunker purposes.

Anthracite—The hard-coal dealers here continue busy making deliveries for May at the low price schedule of the year, the April cut having been maintained by the retailers for the month of May, at least. Some of the dealers are still delivering on orders placed the first half of April, not having received all the coal they ordered from mine connections. Wherever possible the trade is delivering promptly in order to keep yard forces moving at maximum and to get as much coal as possible from the mine connections. Chestnut still remains rather scarce here. Pea coal is the most liberal in supply.

Lake Markets

PITTSBURGH

Pennsylvania R. R. pays full price. Trade much encouraged. Contracts beyond Sept. 1 not popular. Production at about 50 per cent.

The Pennsylvania R.R. lines, east of Pittsburgh, has closed a contract with the Pittsburgh Coal Co. for 1200 tons of coal daily to the end of the coal year, at $2.35 for mine-run, the former Government price. The news came as a surprise to some in the trade, although not to those who have been strongest in their views as to the future of coal values and who had given due weight to the recent stiffening among producers. Earlier in the year the attempt to secure full Government prices was a half-hearted sort of affair, but in the past few weeks the leading operators have gone at the matter in a way that showed they really meant it; and for a fortnight past many operators have refused to contract for coal at the $2.35 price for deliveries running longer than to Sept. 1. However weak and uncertain the Pittsburgh district coal situation has seemed to be since the signing of the armistice, one fact stands out prominently, that for several weeks past it has been growing stronger.

The whole Pittsburgh district is feeling elated over the situation as now presented, but it has some interesting questions to answer. For instance, how gracefully can the operators continue their contention that the railroads and the general public should pay precisely the same price, when the Pennsylvania R. R. has accepted the $2.35 price? Also the contention of Pittsburgh operators that they were not given as fair a price, under Government control, as certain other districts, should perhaps make them view with equanimity the acceptance of lower than Government prices by other districts.

Production in the district continues at about 50 per cent. of capacity, stocks still being in evidence, while consumption, at least by the steel industry, continues to decrease and lake shipments do not amount to much in point of tonnage. There continues to be business, of small total tonnage, placed at various special cut prices, this not affecting the attitude of large producers or having any influence upon contract prices, which are well maintained, and with some operators refusing contracts for the full period to Apr. 1 next. We repeat last week's market quotations. Byproduct coal, largely nominal, mine-run, $2.35; high-grade gas coal, slack, $2.10@2.20; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $2.60@2.70; steam, slack, $1.90@2; mine-run, $2@2.35; all net ton at mine, Pittsburgh district.

BUFFALO

Bituminous still slow. Anthracite moving fast. Some sizes scarce.

Bituminous—The market is still weak. Slack did not rally after it dropped off on the opening of the lake trade. Other grades hold pretty well, but it is only by efforts on the part of mine owners that any sort of profitable prices are maintained. This is partly because business is starting at a slow rate and partly because consumers refuse to accept the advice of the shippers and stock up against a sudden advance. It is the idea of the jobbers that consumption is still in excess of buying.

The Buffalo bituminous trade is so dependent on the Canadian movement that it is now especially slow, for Canada is not industrially as active as we are. Besides, the practice of shipping coal into Canada when it cannot be sold here always spoils that market when there is a surplus. The best to be said of the market is that the operators have held up production in a wonderful way against the small demand, thus showing that there is no excess profit to trade on.

Bituminous prices remain as before, with Allegheny Valley weaker than Pittsburgh, at $4.65 for Allegheny Valley sizes, $4.45 for Pittsburgh and No. 8 lump, $4.20 for same mine-run, and $3.80 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The demand has been heavy of late, on account of the advance in price this month. Some days the supply has given out, much as it used to during the shortage period. Some of the lake shippers have been unable to get any for loading vessels, but they are not anxious, for the upper-lake ports are not ordering any as yet. This is shown by the slackness of lake freights. They opened at 42½c. to the head of Lake Superior and 50c. to Milwaukee and South Chicago, but shippers have cut the rates so that a new adjustment is likely to take place soon.

Lake shipments for the week were 119,200 net tons, of which 32,800 tons cleared for Chicago, 29,700 tons for Duluth-Superior, 22,800 tons for Milwaukee, 10,500 tons for Marquette, 9500 tons for Sheboygan, 7500 tons for Fort William and 6400 tons for Hancock.

The general advance of anthracite has put up local prices 10c. a ton horizontally as follows.

	F.o.b. Cars Gross Ton	At Curb Net Ton
Grate	$8.65	$10.35
Egg	8.55	10.30
Stove	8.80	10.20
Chestnut	8.90	10.60
Pea	7.10	9.15
Buckwheat	5.80	7.85

With 25c. additional for loading to lake vessels.

CLEVELAND

Prices in the Cleveland coal market are rather spotty, with a leaning toward strength. Slack probably should be excepted, for No. 8 operators are virtually buried under surpluses. A great deal of business is being repressed because of uncertainty at Washington on the Peek-Hines controversy, and this is expected to come out once a decision is reached.

Bituminous—Operators believe considerbusiness that has been held back for weeks and months will be placed shortly, many steam-coal users having stated they would come into the market about May 15. The price disagreement at Washington will be settled soon, is the general belief, and a settlement will be followed by a marked stiffening in demand. Iron and steel and allied plants—the largest single class consumer of coal in northern Ohio—now are operating at from 30 to 40 per cent. of normal. The United States Steel Corporation is reported holding up shipments. But stabilization of prices will directly affect steam coal favorably, operators say, and the industry will buy again.

Meanwhile, slack coal is piling up at the mines in southern and eastern Ohio and the quotations have weakened accordingly. As low as $1.45 is reported for No. 8 slack by Cleveland consumers. On No. 6 slack, $1.60 is the lowest said to have been offered. For lake shipment, $1.60 has been quoted on No. 8 slack. No. 8¾-in. lump for the head of the lakes seems to have settled at $2.35 to $2.45, compared with $2.80 last season. Massillon lump prices have been advanced 15c., making the net ton delivered in Cleveland price $7.15 to $7.25. Pocahontas prices have remained unchanged, as have these of anthracite, but the tendency all the time is upward. Considerable domestic Pocahontas and anthracite is being taken.

Some mines in the No. 8 district are reported operating close to 100 per cent., while others, whose output is not going so largely to the lakes, are as low as one day a week. The railroads now are taking less fuel, reflecting poor business. Car supply everywhere is ample. Operators are unanimous in declaring bituminous coal will be scarcer and higher as the year wears on, and are campaigning actively to make sales, especially in the domestic trade.

Lake Trade—Chartering at Lake Erie ports is quite active, with the car dumpers handling all the way from 1600 to 1900 cars a day, probably averaging about 450,000 tons a week for the present. Both tonnage and cargoes are plentiful, and the feeling that it will be wise to crowd up as much coal as possible early in the season still persists.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$10.85 to 10.95
Chestnut	11.15 to 11.25
Grate	10.95
Stove	11.05 to 11.15
Pocahontas:	
Forked	8.50 to 8.75
Lump	7.78 to 8.01
Mine-run	7.20

Domestic bituminous:	
West Virginia splint	7.05 to 7.15
No. 8 Pittsburgh	6.10 to 6.35
Massillon lump	7.15 to 7.25
Steam coal:	
No. 6 slack	4.30 to 4.40
No. 8 slack	4.70 to 4.85
Youghiogheny	4.90 to 5.10
No. 8 ¾-in. lump	5.35 to 5.50
No. 6 mine-run	4.40 to 4.50
No. 8 mine-run	4.70 to 4.85

DETROIT

Buying demand continues light in the bituminous branch of the Detroit market. Prices are somewhat unsettled.

Bituminous—Only a small volume of business is being handled in the bituminous section of the Detroit market, according to jobbers, who also report that prices denote a rather unsettled condition. Consumers of steam coal are not buying freely, and their orders are described as few and scattering, covering only small tonnages. Many of the larger consumers are still deterred from action by the abnormal size of reserves. There seems a disposition on the part of a considerable number to remain out of the market until the present reserves have been largely cleared away, the purpose bing to get rid of as much as possible of the stock purchased last season, in which is much coal of low grade and unsatisfactory power.

Efforts to stimulate business by shading prices are imputed to some of the dealers who have been credited with being the most earnest advocates of maintaining price stability. Sales have not been increased materially by the lower prices, some of the jobbers say. Large consumers, they explain, would prefer to pay the prices fixed by the Fuel Administration, if by doing so they could feel assured that competitors would not be accorded a price reduction that would constitute an advantage.

On a long-ton basis, quotations at the mine are reported as being approximately $2.50 a ton on Hocking lump with West Virginia gas and splint lump 15c. higher and Pocahontas about $2.75. Mine-run from the Hocking and other leading Ohio districts is offered at $2, and from West Virginia at $2.25. Ohio slack ranges around $1.50, with the West Virginia product about 50c. higher. West Virginia splint and gas three-quarter-inch lump is quoted at $2.50.

Anthracite—Most of the leading retail dealers seem to be quite well supplied with anthracite. Though the movement has not been heavy, the unusual weather conditions have assisted in conserving the supply. Domestic consumers are being urged to buy next winter's fuel now.

Lake Trade—Despite the fact that there has apparently been only a moderately large movement of lake coal, preliminary reports indicate that shipments from Lake Erie ports to May 1, will exceed 1,000,000 tons, surpassing shipments of 860,797 tons in the similar period of 1918.

COLUMBUS

A slight improvement in the steam trade is reported in Ohio territory. Reserve stocks are being used up and some of the larger consumers are now in the market. Uncertainty as to price is still holding up contracting to a large degree.

The steam trade is showing slightly more activity than has been exhibited during the past few weeks. Buying on the part of certain manufacturing concerns is more active as reserve stocks have been used up in some instances. Contracting, however, is still held up because of uncertainty as to prices, and little is expected until the price question is settled.

Railroad business is still up in the air, so to speak. While some short-time agreements have been made, still the larger contracts are being held in abeyance until prices are adjusted. Large steam users are also waiting on the railroad fuel matter. Reserve stocks are still rather large, and consequently purchasers are biding their time. Rubber factories have large reserve stocks, and the same is true of many iron and steel plants. There is considerable steam tonnage being bought off the open market at reduced figures, but prices are not demoralized to any great extent.

The domestic trade is quiet, as little demand is reported except for the fancy grades. Pocahontas and West Virginia splints are moving well, and prices are generally above the last Government levels. Retail stocks are fairly good and most of the dealers are loath to increase them. Retail prices are fairly well maintained, and the larger dealers especially are holding firmly. The lake trade is slowly opening. May 1 was the date set for the official opening of navigation, and some vessels were loaded at that date ready for movement to the Northwest. But dockmen are slow in making contracts because of price uncertainty. The lake trade is not expected to be under full sway before June 1. A large tonnage is being carried over on the upper lake docks.

CINCINNATI

Steady improvement evident in coal market conditions.

Generally speaking, the coal situation in Cincinnati has shown a steady improvement, and the business transacted during the past week augurs well for the immediate future. The large coal dealers have expressed themselves as being satisfied with the existing conditions, and the continued flow of inquiries is taken as a sign that the consumer is no longer waiting for prices to drop, but is contemplating the placing of orders. The large industrial firms have shown a willingness to make contracts for steam grades, which is in itself a good omen as this kind of buying has been quiet here recently. The demand for domestic grades is comparatively steady. Prices are remaining firm with no immediate prospects of serious fluctuation.

LOUISVILLE

Markets stronger, with good demand. Many producers raising prices on domestic, and feeling that they have sold too much coal at less than it is worth.

There has been a strong demand for better grades of domestic coal during the past few days, and many of the operators of eastern Kentucky who were quoting prices of $2.85 are now quoting a minimum of $3. Prices given out to jobbers and retailers a few weeks ago, and for April, May and June delivery, were based on regular monthly shipments of at least ten cars. Buyers in many instances were uncertain over this point, and figured that prices were set for the three months.

The demand for mine-run and general lines of steam coal has been better. Railroads have been buying freely, but have been unable to secure much good engine coal on contract at much less than $2.35 per ton for eastern Kentucky. Industrial consumption is picking up as even large stockers are running low. Byproducts plants are not buying much, as they loaded up strongly some months ago, are still fairly well stocked and not operating at capacity. The demand for the steel and iron industries is not strong.

Retailers are buying a fair volume of coal for stocking purposes, and report a slight improvement in local demand. However, not much stocking is expected on the part of the domestic consumer until late in May.

Egg sizes are back to prewar differentials of about 25 per cent. under block coal, and that is where the grade should be according to many operators, who never figured that egg should sell for block prices. General quotations, short tons, are as follows:

	Eastern Kentucky	Western Kentucky
Block	$3.00@$3.25	$2.60
Egg	2.60@ 2.85	2.60
Run-of-mine	2.40	2.35
Nut and slack	2 00	2.05

The fact that the better grades of eastern Kentucky and West Virginia, as well as smokeless coal, can be secured this year during the early spring and summer is expected to encourage buying on the part of better grade consumers who held off last year in hopes of eventually being able to secure high grades.

Enough river coal is arriving to take care of the river handlers, there being only three or four companies along the river who are making any effort to handle barge coal. These concerns are now securing very fair shipments.

BIRMINGHAM

Market conditions without change, steam trade being dull. Domestic demand keeps pace with the output. Commercial production on about the same basis as past few weeks. Mines of furnace companies either closed down entirely or operated on about 50 per cent. schedule.

As far as sales are concerned, there is no improvement in the local market over a week ago, though basic conditions of the trade are considered as stable and more promising. Consumers are rapidly using up their reserve supply and will be obliged to buy coal in the near future to supply the needs of industry. The output of steam coal is being absorbed daily and there is no accumulation, while prices are being maintained firmly on Government schedule in effect Jan. 31.

Domestic coal is moving as fast as it is mined, and there is demand for more than is to be had at this time. Yards are stocking slowly, not being able to secure the tonnage that they desire on account of the restricted amount of domestic coal coming from the steam-domestic operations.

Collieries throughout the district, outside of domestic mines and those employing convict labor, are running on about half time. Some of the largest mines of the furnace companies have been closed down and will remain idle pending improvement in the iron market.

Coke

CONNELLSVILLE

Spot furnace coke market stiffer. Adjustment values approximately unchanged. Production continues to decline.

The spot furnace coke market is distinctly stiffer. As to the general market, this is of little direct consequence, for the spot market has been a narrow affair for weeks, represented by small tonnage that a few operators had to dispose of, while there was scarcely any demand from furnaces as the furnaces were well supplied by contract deliveries. The operators have been endeavoring to adjust production precisely to requirements so that there would not be any spot coke to offer, but furnaces have been blowing out at such a pace, and so suddenly, that this has been difficult. Now the operators seem to be catching up. Their production has certainly decreased at a rapid rate. One week ago and two weeks ago there was spot furnace coke to be had at $3.60, and it was thought $3.50 might possibly be done, while the best grade would bring only $3.75. In the past few days the cheapest coke available has been $3.65, and $3.75 has been paid in several instances.

Adjustments for May shipments on contract are not favorably affected by the stiffening in the spot market, except that they reduce the ammunition of furnaces seeking a lower price than was arranged for April deliveries. One operator refused to go below $4, as desired by the furnace, and the contract has been canceled. Adjustments have probably been made, or will be made, at $4, with perhaps an occasional adjustment at a slightly higher figure.

Foundry coke is in about the same position as formerly, there being a fair demand, but in tonnages much smaller than the foundries involved usually take. The market may be quoted at $3.65@3.75 for spot furnace, $4@4.25 on contract adjustments for furnace and $4.25@6 for foundry, depending on brand, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Apr. 26 at 135,360 tons, a decrease of 13,465 tons.

Buffalo—The demand continues light, with prices not always uniform. Quotations run from $7.25 to $7.60 for 72-hour foundry, $6.60 to $7 for 48-hour furnace, and $6 to $6.10 for off grades. Breeze and other reject coke are still unsalable. The lake movement of iron ore sets in slowly. As a rule the furnaces are not receiving any, for the regular sales have not been made yet. A little has come in on carrying contracts that held over from last season. The lake fleet depends in the main on grain for down cargoes, hoping for ore on the next trip.

Middle Western

GENERAL REVIEW

Coal market on the mend, and mining conditions showing great improvement. Railroad situation still affects Middle West.

The coal situation throughout the Middle West continues to show a slight improvement over last week. While this improvement is small, as usual, it is encouraging to note that within the last six weeks the market has been on the mend, rather than on the decline.

Reports from the Franklin and Harrisburg districts of Illinois are especially gratifying, both from the standpoint of improvement on current shipments and on contract. The buying public is showing an increased tendency to cover their coal requirements by contract, although unfortunately some of these contracts do not call for shipment until later in the season. No matter which way you look at it, however, a contract means that a certain

amount of coal is taken from the market for the year, and if the number of contracts is large enough, their influence is bound to be felt sooner or later.

Roughly speaking, the mines in Southern Illinois showed a decided improvement. Next came the mines in the Central district, which just about held their own. The scattered coal-producing properties throughout the rest of the state showed a little decrease in the tonnage produced and sold, but this is only natural, considering the dull times we are now experiencing. The situation in Indiana is not quite so good as that in Illinois. Even the mines in the Indiana Fourth Vein district slipped back a little rather than improved. This decrease in tonnage in the Indiana fields is so small that it is practically negligible.

The railroad situation continues dull in the extreme. The only reports available show that some of the roads bought little coal from mines in the Springfield district. No railroad coal was sold in Indiana last week. While the mines in the Middle West are idle, the gentlemen in charge of the purchase of coal for the railroads down at Washington continue to dilly-dally and delay matters to an extent which is proving decidedly disadvantageous to the coal industry in the Middle West. There is no denying the fact that there would be a tremendous improvement, both in the coal market and in operating conditions, if the proper authorities at Washington would make up their minds to tackle the railroad fuel question in the right way and settle it at an early date. In the meantime, labor is growing restive under the delays, and some operations report losing a large number of their men to other industries.

The bulletin of the National Coal Association reports that there was an increase for the week of 1468 cars for the producing fields of Indiana and Illinois. Inasmuch as the number of cars produced the week before last was 6668, this increase of practically 1500 cars is especially gratifying. The operators appear to be confirmed optimists, and they are looking forward to a time, within the next four to six weeks, when conditions will be much better than they are now.

CHICAGO

Steam market improves while domestic situation is unchanged. Pocahontas coal brings high prices.

The Chicago steam market has improved a little, as several sizable sales on the current market have been reported. Furthermore, the tendency throughout the country to contract for coal has been felt in Chicago, and a number of contracts closed have been for Chicago plants. Coal piles are getting pretty low, and this is bringing a large number of purchasing agents back into the market once more.

The domestic situation for the city continues unchanged, with a big demand for high-grade Eastern coal, and but little demand for coals produced in this territory. It is reported that Pocahontas and New River lump or egg have been sold as high as $4.25 to $4.50 per ton, f.o.b. mines. The reasons for this condition are: First—the retail dealers of Chicago feel that if they do not buy their Pocahontas coal now, they won't be able to buy it later on, on account of the export plans of the Administration. Second—the public have not taken at all kindly to the increased prices on anthracite, and therefore there is a very strong demand for high-grade substitutes, such as Pocahontas. Third—the West Virginia operators are having a hard time placing their steam sizes; in fact, their steam sizes have to be sacrificed. For this reason they are trying to break even by placing abnormally high prices on their domestic sizes.

Prices are as follows:

	F.o.b. Mines, Per Ton	Rate to Chicago
Southern Illinois Franklin, Saline and Williamson Counties, Etc.		
Prepared sizes	$2.55 to $2.75	$1.55
Mine-run	2.35 to 2.50	1.55
Screenings	1.85 to 2.20	1.55
Central Illinois—Springfield District		
Prepared sizes	$2.55 to $2.75	$1.32
Mine-run	2.35	1.32
Screenings	2.05	1.32
Northern Illinois		
Prepared sizes	$3.25	1.24
Mine-run	3.00	1.24
Screenings	2.75	1.24
INDIANA		
Clinton Fourth Vein District		
Prepared sizes	$2.65 to $2.75	1.27
Mine-run	2.35 to 2.45	1.27
Screenings	2.05 to 2.25	1.27
Knox County Field		
Prepared sizes	2.65 to 2.75	1.37
Mine-run	2.35 to 2.45	1.37
Screenings	2.05 to 2.25	1.37
West Virginia Splint		
Prepared sizes	2.50 to 2.75	2.60
Mine-run	2.25 to 2.50	2.60
New River and Pocahontas		
Prepared sizes	4.25 to 4.50	2.60
Mine-run	2.75 to 3.25	2.60
Hazard and Harlan, Ky.		
Prepared sizes	3.00 to 3.50	2.45
Mine-run	2.55 to 2.75	2.45
Nut, pea and slack	1.80 to 2.30	2.45
Cannel lump	2.75 to 3.50	2.45
Smithing coal	3.00 to 3.25	2.60

MILWAUKEE

Promulgation of the spring price schedule stimulates the coal market. Coal cargoes arriving daily by lake.

The coal market, which has been quiet pending the promulgation of the spring schedule of prices, is now on a better basis, and a steady increase in business is looked for. The new schedule, which became effective May 1, cuts anthracite grades 20c. per ton, with the exception of buckwheat, which was reduced 85c. The reductions in eastern bituminous are much heavier. Illinois and Indiana coals remain unchanged. Dealers are urging consumers to stock up early at present prices, as coal and service are at bottom figures for the season. It is expected that prices will be stiffened on hard coal as the season advances. The custom in the past has been to add 10c. per ton to anthracite each month until September, in order to stimulate ordering.

Milwaukee got an early start on coal supplies by lake this year. Eighteen cargoes were received during the month of April, the aggregate receipts being 59,535 tons of anthracite and 92,652 tons of soft coal. Last year no coal cargoes were received in April. The first day of May brought three cargoes aggregating 7300 tons of anthracite and 9600 tons of soft coal.

Following are the retail prices of coal at Milwaukee which became effective on the first of May:

For Domestic Use

Anthracite—Chestnut, $12.30; stove, $12.20; egg, $12; pea, $10.80; buckwheat, $9.75.

Bituminous—West Virginia splint, screened, $7.25; Hi-Heat, $7.25; Hocking lump, egg and nut, $7; Pittsburgh, screened, $7; Pocahontas, mine-run, $7.75; Pocahontas, egg and nut, $9.75; Cheerful Chunks (Kentucky for grates), $7.75; Smithing, $8.10.

Coke—Range, egg and nut, $11; pea, $9.75.

An extra charge of 50c. per ton if coal is carried in, and an extra charge of 25c. per ton on all deliveries in less than ton lots. No extra charge for carrying in coke, but an extra charge of 25c. per ton on orders of less than one ton.

Steam Coal

Youghiogheny—Screened, $6.10; pile run, $5.85; screenings, $5.25. Pittsburgh—Screened, $6; pile run, $5.60; screenings, $5.25. Hocking Lump—Screened, $6; pile run, $5.60; screenings, $5. West Virginia Splint—Screened, $6.25; pile run, $5.85; screenings, $5.25. Kentucky Lump—Screened, $6.75; pile run, $6.35; screenings, $5.25. Pocahontas—Mine run, $7; screenings, $5.50; Kanawha Gas—Mine-run, $5.75. Smithing, $7.10.

Illinois and Indiana—Screened, $6.50; pile run, $6.25; screenings, $6; smithing, $7.68.

ST. LOUIS

An inactive market, with everything lagging. Some few contracts being let on local business at a price below cost of production.

The local situation is not encouraging, for the reason that local wagon-load delivery contracts in St. Louis are going far below cost of production. In spite of the efforts made by the United Mine Workers to keep their operators from selling coal below cost, the fact remains that it continues to a greater extent now than at any time since the Fuel Administration removed restrictions.

The market has shown a tendency to strengthen some on screenings, but on other sizes, if anything, there has been a breaking away from the prices that were maintained some time ago. There is a little railroad tonnage moving out of these fields, but it is so slight that it makes little impression on the field as a whole. The few contracts that are being made other than railroad are light and are not taking much tonnage at this time.

In the Mt. Olive and Staunton fields prices are pretty well maintained, and while work is not plentiful the mines for the most part are getting a couple of days a week. This coal continues to move north and west and in fairly good tonnage, everything considered.

In the Carterville field of Williamson and Franklin Counties there has been a let-up in the amount of business offered, with the result that working time continues to decrease, and practically every mine in the entire district now producing commercial coal is on short time. As in other fields, screenings are in good demand, as well as the smaller sizes of nut. The railroad tonnage from this field is somewhat light, but even at that it is heavy enough to make an impression in the tonnage of certain operations, as well as to keep a large number of miners satisfied as to time.

One of the things noticeable at the present time is the failure of business to come from the south as heretofore. This coal seems to have lost out in a large section of the south to which it formerly went at this season of the year in heavy volume. This is occasioned by the fact that the larger part of this territory has been neglected during the high price period in the past year or two, and also the inroads made by the West Kentucky and Alabama coal will be hard to overcome.

There is at the present time a light tonnage of Carterville and anthracite being put into storage, but it is not noticeable. It will, however, continue to grow from now on. The same may be said of coke, both byproduct and gas.

There is no smokeless coming in and no demand for it and the same applies to Arkansas.

Coal and Coke Securities

New York Stock Exchange Closing Quotations May 5, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com	(BB)	154	157½
Burns Brothers, Pfd	(BB)	110	112
Central Coal & Coke, Com	(CK)	55	...
Central Coal & Coke, Pfd	(CK)	63	...
Colorado Fuel & Iron, Com	(CF)	44½	44¾
Colorado Fuel & Iron, Pfd	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com	(EH)	28¼	29
Elk Horn Coal, Pfd	(EH)	...	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, Pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	52½	52⅝
Pittsburgh Coal, Pfd	(PC)	87	88
Pond Creek Coal	(PD)	17⅞	18½
Virginia Iron, Coal & Coke	(VK)	57½	59

* Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	...
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74½	75
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	90
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99⅞	100
Lehigh Valley Coal, Gtd. Int. Red. to 4½, 1933	79¼	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	83⅛	85
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	88	...
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	80	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	91	95½
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	88	85¾

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by The Matthew Addy Company as per Department of Commerce Committee Schedule.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$30.75	$30.35
Northern Basic	27.55	27.55
Southern Ohio No. 2	28.55	28.55
NEW YORK, Tidewater delivery		
Penna. 2X	31.90	.....
Virginia No. 2	31.15	32.40
Southern No. 2	33.95	34.70
BIRMINGHAM		
No. 2 Foundry	26.75	25.75
PHILADELPHIA		
Eastern Pa. No. 2	30.65	31.90
Virginia No. 2	30.85	33.25
Basic	30.90	29.65
Grey Forge	30.90	29.65
Bessemer	31.85	.....
CHICAGO		
No. 2 Foundry Local	27.25	26.75
No. 2 Foundry Southern	31.75	33.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry	28.15	26.25
Basic	27.15	25.75
Bessemer	29.35	29.35

* F.o.b. furnace. † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2.45	$3.47	$4.19½	$3.39	$3.47
Channels, 3 to 15 in.	2.45	3.47	4.19½	3.39	3.47
Angles, 3 to 6 in., ¼ in. thick.	2.45	3.47	4.19½	3.39	3.47
Tees, 3 in. and larger	2.45	3.52	4.19½	3.39	3.47
Plates	2.66	3.67	4.44½	3.39	3.67

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
2.75	3.44	3.80	3.50

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.25	$4.00	$5.11	$4.37	$4.50	$5.00	$4.75
Cut	3.45	6.50	5.61	6.50	....	6.75	....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes 5/16-in. and larger	$3.25	$6.00	$4.27	$5.04	$6.15	$5.25	$5.55
Track bolts	4.90	8.90	5.17	Prem.	7.20	8.00	6.55
Standard section angle bars	3.00	....	4.22	Prem.	4.60	....	4.95

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List —5%	List —2%	+15%	+30%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.50	$6.50	$7.25	$8.50	$7.35
Assorted	6.40	7.50	6.50–7.00	6.40	8.75	7.60

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$60.70	$65.70	$58.35	$59.80	$53.00	$77.55	$65.00
6 in. and over	57.70	62.70	55.35	56.80	50.00	74.55	62.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$45.00	$55.00	$45.00	$65.00
Standard openhearth rails	47.00	57.00	47.00	67.00
Light rails, 8 to 10 lb.	2.58½*	3.13½*	2.83½*	3.13½*
Light rails, 12 to 14 lb.	2.54*	3.09*	2.79*	3.09*
Light rails, 25 to 45 lb.	2.45*	3.00*	2.70*	3.00*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$18.50	$16.50	$15.50
Stove plate	16.00	16.50	15.50
No. 1 machinery cast	22.00	22.00	19.50
Machine shop turnings	8.00	6.75	7.00
Cast borings	9.50	9.75	7.50
Railroad malleable cast	13.50	16.50	14.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.13	$0.18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	13c.	15c.
Hol'ow	24c.	.....	..

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Inches	Steel Black	Steel Galvanized	Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	50½%	24%	¾ to 1½	39½%	23½%
½	54½%	40%			
¾ to 3	57½%	44%			

LAP WELD

2	50½%	35%	2	32½%	18½%
2½ to 6	53½%	41%	2½ to 4	34½%	21½%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	46½%	29%	¾ to 1½	39½%	24½%
½	51½%	39%			
¾ to 1½	55½%	43%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	48½%	37%	2	33½%	20½%
2½ to 4	51½%	40%	2½ to 4	35½%	23½%
4½ to 6	50½%	39%	4½ to 6	34½%	22½%

Stocks discounts in cities named are as follows:

	New York Black	New York Galvanized	Cleveland Black	Cleveland Galvanized	Chicago Black	Chicago Galvanized
¾ to 3 in. steel butt welded	47%	31%	46½%	31%	57½%	44%
3½ to 3 in. steel lap welded	42%	27%	42½%	27½%	53½%	41%

Malleable fittings. Class B and C, from New York stock sell at list + 12½%
Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+12½%
Galvanized cast steel rigging	+ 7½%
Bright plain rigging	35%
Bright cast steel	22½%
Bright iron and iron tiller	5%

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Chicago Current
*No. 28 black	4.35	5.62	6.22	6.45	5.27	5.37
*No. 26 black	4.25	5.52	6.12	6.35	5.17	5.27
*Nos. 22 and 24 black	4.20	5.47	6.07	6.30	5.12	5.22
Nos. 18 and 20 black	4.15	5.42	6.02	6.25	5.07	5.17
No. 16 blue annealed	3.75	4.77	5.37	5.65	4.67	4.77
No. 14 blue annealed	3.65	4.67	5.27	5.55	4.57	4.67
No. 10 blue annealed	3.55	4.57	5.17	5.45	4.47	4.57
*No. 18 galvanized	5.70	7.42	7.57	7.70	6.62	6.72
*No. 26 galvanized	5.40	7.12	7.27	7.40	6.32	6.42
No. 24 galvanized	5.25	6.97	7.12	7.25	6.17	6.27

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 15c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	$0.25	$1.00	$1.90	$1.40	$1.28	$1.05
Hot pressed hexagon	.25	1.00	1.90	1.20	1.08	.85
Cold punched square	.25	1.00	1.90	.75	1.30	1.00
Cold punched hexagon	.25	1.00	1.90	.75	1.30	1.00

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	50—10%	40%
Chicago	50%	50%
Cleveland	60–10–10%	60%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller	40%	50%	50%
Larger and longer up to 1 in. by 30 in.	50%	40%	40%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York $2.00 Cleveland $3.00 Chicago $2.25

For cast-iron washers the base price per 100 lb. is as follows:
New York $5.00 Cleveland $3.75 Chicago $4.00

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ½ and smaller	4–10–5%	60—5%	45%
Tinned	30%	60—5%	40%

Boiler, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York $6.35 base Cleveland $4.75 Chicago $4.72 Pittsburgh $4.65

Structural, same sizes:
New York $6.25 Cleveland $4.85 Chicago $4.82 Pittsburgh $4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw in barrel	$1.63	$1.55	$1.71	$1.65	$1.80	$1.65
5-gal. cans	1.76	1.65	1.81	1.80	2.00	1.75

WHITE AND RED LEAD—Base price.

	Red				White	
	Current		1 Year Ago		Current	1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	13.00	14.50	12.25	12.50	13.00	12.25
25 and 50-lb. kegs	13.25	14.75	12.50	12.75	13.25	12.50
12½-lb. keg	13.50	15.00	12.75	13.00	13.50	12.75
5-lb. cans	15.00	16.50	14.25	14.00	15.00	14.50
1-lb. cans	16.00	17.50	14.25	14.50	16.00	14.50

500 lb. lots less 10% discount. 2000 lb. lots less 10–2½% discount.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati $15 and 16 Birmingham $15.00
St. Louis, salmon 10.00 Denver 12.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L.c.l.	C.l.	L.c.l.	C.l.	L.c.l.
No. 1 grade	$1.35	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.45	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.80 per roll in carload lots and $2.05 for smaller quantities.

Shingles, red and green slate finish cost $5.00 per square in carloads, $5.25 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots		Less Than Carload Lots	
	N. Y.	Chicago	N. Y.	Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$50.00	$50.00	$51.00	$51.50
Tar pitch (in 400-lb. bbl.)	19.00	16.00	20.00	17.00
Asphalt pitch (in barrels)	30.00	30.00	35.50	35.50
Asphalt felt	65.00	65.00	69.50	69.50

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0.056	$0.11	$0.162
Seattle	.09	.175	.30
Los Angeles*	.082	.154	.236
New Orleans	.12	.15	.20
Pittsburgh	.065	.115	.....

*F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price of pine per M in carload lots:

	1-In. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$38@41	$38.00	$40.00
Birmingham	39.00	33.00	31.00
Denver	45.00	38.00	44.00
Cincinnati	43.00	42.00	37.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder
New York	.....	$0.27½	$0.30	.....	$2.40
Boston	$0.22¼	.24½	.26½	$0.31	2.40
Cincinnati	.19¼	.21¼	.23¼	.....	2.35
Kansas City	.19	.23¾	.26¼	.30	2.45
New Orleans	.23¼ (50%)	.22¾	.24¾	.....	.....
Seattle	.....	.18½	.21	.....	.....
Chicago	.18¾	.21¼	.25½	.....	.....
St. Paul	.19	.23¾	.26½	.....	2.45
St. Louis	.19	.23¼	.25¾	.30	2.35
Denver	.17½	.22	.24½	.28¾	2.60
Dallas	.189	.22⁵	.288	.342	.....
Los Angeles	.19	.24	.27	.....	2.75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7.2	8½	14¼
Fiber or sponge	8	13	8½	18
Transmission	7	13	8¼	20
Axle	4½	4¾	4½	5¼
Gear	4½	7½	8½	8
Car journal	22 (gal.)	4.9	8½	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	87.00	90.00	79.00	100.00	75.00	100.00
Commercial	42.00	50.00	18.50	22.00	15.00	22.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	30%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.40	$0.30

Steam—Discounts from list

First grade 25% Second grade 35% Third grade 40%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	50%
Denver	35–5%	30%
Birmingham	30%	35%
Chicago	45%	35%
Cincinnati	40–10%	30%

RAWHIDE LACING—20% for cut; 45c. per sq.ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.9
Asbestos for high-pressure steam	1.60
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.80
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft., ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.26	Atlanta	$0.29½
New York	.28	Denver	.29
Cincinnati	.29	Kansas City	.28½
Chicago	.26½	New Orleans	.27½
St. Paul	.28	Seattle	.27
San Francisco	.26	Los Angeles	.28

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard List Per Lin.Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1-in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2-in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3-in.	.90
10-in.	1.30	3½-in.	1.05
85% magnesia high pressure			List
For low-pressure heating and return lines			4-ply 58% off; 3-ply 60% off; 2-ply 62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ⅙ lb. rolls	48c. per lb.
Rubber tape, ⅙-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$15.00	$16.00	$34.00	$11.00	$20.00	$31.50	$12.67	$15.25	$27.75
10	17.65	19.00	48.60	25.40	29.00	59.00	20.25	24.25	46.90
8	24.50	33.00	70.00	35.45	35.00	72.50	27.60	32.60	.....
6	39.00	44.00	.....	.....	61.00	120.00	48.25	54.75	.....
4	56.00	60.00	.....	.....	86.00	.....	66.40	73.75	.....
2	85.01	89.00	.....	.....	130.00	.....	96.00	104.50	.....
1	110.00	116.00	.....	.....	176.00	.....	127.00	135.50	.....
0	165.00	170.00	.....	.....	222.00	.....	169.00	179.00	.....
00	.....	.....	.....	.....	270.00	.....	203.50	214.00	.....
000	.....	.....	.....	.....	330.00	.....	246.50	257.50	.....
0000	.....	.....	.....	.....	400.00	.....	295.50	308.00	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chairs etc., the following freight rates per 1000 lb. are effective:

Boston	$0.30	New Orleans	$0.38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	.49*
Denver	.99	Pacific Coast (all rail)	1.25*
Kansas City	.59		

Note—Add 3% transportation tax. Minimum carload, 80,000 lb.

COAL AGE

Volume 15 New York, May 15, 1919 Number 20

The Day of New Ideals

By Floyd W. Parsons



OLSHEVISM will not prevail in the world for the reason that it will not be successful for those who are advocating it. What a man gets by force will eventually be taken away from him by someone else who is stronger. The bitter opponent of all mobs of industrial shirkers that become active in the United States from time to time will not be the capitalist, but the American workman himself. The other day in Washington I was talking to a great labor leader, and he was emphatic in the statement that "an autocracy of labor is as bad as an autocracy of capital."

The average workingman in this country is the most intelligent employee in the world. He is fully aware that our social system is not perfect, but he knows that such alterations in our laws as are demanded by the changing times can be brought about by methods that do not include rapine, bloodshed and incendiarism. He also has learned that in this great Nation a majority of those who have reached prosperity began life in humble circumstances. Among us there are a few so-called "lucky" men who have achieved wealth without labor, but as a general rule those among us who succeed do so through intense application and never-ceasing industry.

The lessons of the war plainly indicate the commencement of a new era throughout the world. Although we are fortunate to live in a country where the new order of things will be inaugurated in a sane and peaceful fashion, this does not mean that the parties to industry can act with indifference toward the necessities of the times. Labor in America has proved to capital that it stands as a barrier between destructive radicalism and a rule of law. Employers who have not seen this and do not appreciate the fact will lose out in the coming days, because they still stand as representatives of a system in business that can no longer succeed.

There is no doubt that betterment work, profit-sharing, bonus payments and stock ownership are splendid ways to hold the interest of the worker and to share the fruits of business with him. But all of these plans fail to give the employee the thing he desires most, and that is an opportunity to fully express his individuality. No industrial scheme will ever operate with complete success unless it creates in the workman the same sort of interest that he would have if working for himself. Old ideals are no more, and old conditions will no longer be accepted without question.

The real labor problems of the future will not be so concerned about wages and hours as has been the case in the past. Large labor turnovers will be remedied with something besides dollars. High costs will more often be properly attributed to low production, and the latter will be found to result from an uninterested working force. It has been demonstrated time and again that the output of a plant can often be increased 50 per cent. by some simple adjustment that removes the cause of general unhappiness on the part of a company's employees.

On the other hand, there should be no confusing of charity and business. No self-respecting man desires to have his life ordered for him. Those corporations that will be most successful in the future will be the ones where wise managements have imbued the men with a spirit somewhat akin to the feeling that, in the past, nourished only the owners of many establishments.

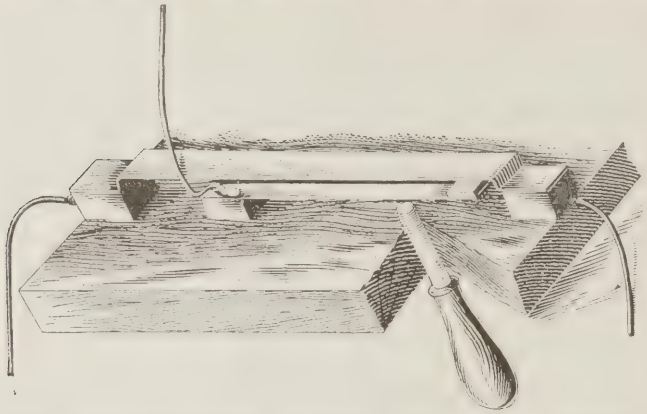
The cause of the failure of radicalism in America is identical with the cause of the failure of nineteenth-century conservatism. In both cases the workman is deprived of incentive by a system that holds forth no reward and thus kills individual initiative. Of course, any employer is free to fight the present desire of workmen for recognition, but the farsighted boss today will secure for his business all the brains and energy of his men by hitching up with them and pulling in double harness. Such managements are the only ones that can survive.

IDEAS AND SUGGESTIONS

Homemade Signal-Light Switch

BY JOSEPH POWER
Ziegler, Ill.

The illustration shows a switch for signal lights that may be made readily in the average mine shop. The drawing is practically self-explanatory and needs little comment. In operation the plug is pushed in until contact is made with the copper sheet, breaking contact with the line to the red light. This extinguishes the



EASILY CONSTRUCTED SWITCH FOR SIGNAL LIGHTS

red light and lights the green one. A release or withdrawal of the wooden plug extinguishes the green light and relights the red light.

This device may be advantageously built on sections of 1-in. plank, when and in the quantity needed. With such planks a switch of this kind can usually be built in from ½ to ¾ hour each. The chief materials are copper sheets and nails.

Reinforced Concrete Used as Props in English Coal Mines

Shortage of timber in England is largely responsible for the recent introduction of reinforced-concrete props in the coal mines of that country. But for this shortage it might have been many years before this form of prop would have been regarded as established, and this despite the fact that reinforced concrete has been employed for most other forms of construction and has been extensively adopted by the collieries. The scanty use which hitherto has been made of concrete props is not due to apathy on the part of the colliery manager, says the *Engineering World,* nor yet to his failure to appreciate their possibilities. In the first place there has been a disinclination to use anything other than timber on account of the extra weight involved in handling concrete props. Then there is the question of cost, which in the pre-war days was wholly unfavorable to concrete as compared with timber. That, however, is merely a question of initial outlay and can in no sense be regarded as a fair comparison, which would only be possible by considering the maintenance costs of a given length of roadway of concrete and timber props for a certain length of time.

All other conditions being equal, there is little reason to doubt that the concrete prop would prove the better investment, especially in districts tending to bring about either dry or wet rot. Also with concrete props a better roadway can be maintained than would be the case with timber, which has an important bearing upon the matter of ventilation. An objection raised against the concrete prop is that, unlike timber, it gives no warning but collapses suddenly when the breaking strain is reached; this, however, is disputed in the event a proper reinforcing and suitable concrete is used.

Up to this time practically all the concrete props used in England have been made at the collieries where they were installed; in some instances they have been made remarkably well considering the available facilities for their construction. In some cases, however, the reinforcement has been of the makeshift order; and owing to the method used in filling the molds, there has not been the necessary intimate relation between the concrete and the reinforcement which is an indispensable condition of success. To counteract the resulting weakness of improperly designed props, they are frequently made far heavier than necessary. As a result of numerous tests on various types of concrete props, the design has been much improved and props are now being manufactured in standard sizes and placed on the market.

New Method of Gas Detection

BY E. P. BRENNAN
Thomas, W. Va.

In mines where the ordinary flame type of safety lamp is the only means used for the detection of explosive gas, many dangerous conditions have often existed and many unaccountable accidents occurred. Especially is this so in open-light mines where the failure to detect gas is sure to lead to disaster. The firebosses and other mine officials are unable to detect deposits of methane when these are in thin layers near the roof. Very often the inability to detect gas is not due to the incompetency of firebosses or other officials, but to the construction of the lamp used in testing.

In nearly all ordinary safety lamps approved for mine use, the air containing the oxygen necessary for combustion enters either below the flame or over the glass cylinder, and so a little above the flame; and as this is at a point varying from 6 to 10 in. below the top of the lamp, there is always a possibility of thin layers of gas remaining undetected.

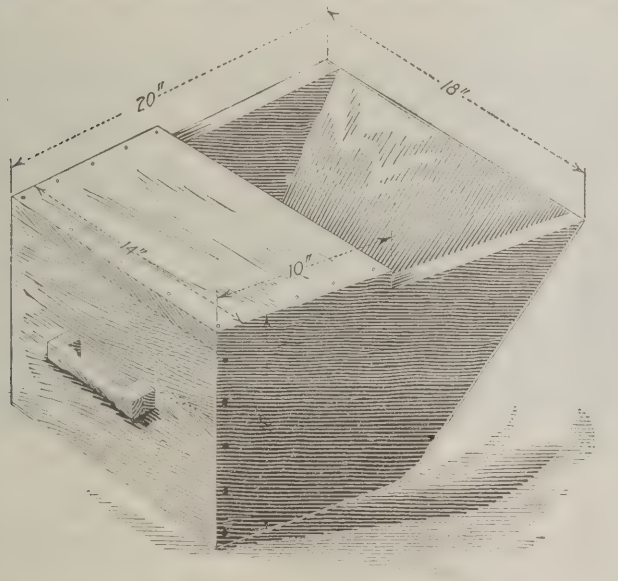
I have overcome this difficulty by using an ordinary bulb syringe, which is a small, soft-rubber ball with a hard-rubber tube attached. With this syringe an air sample can be secured from any desired place even though that place may be entirely inaccessible to the safety lamp. The sample is then forced slowly onto the flame of the lamp through the proper channels, and methane, if present, is detected in the usual way.

No one should experience any trouble in securing and testing a sample. The operation is very simple, as will be seen from the following description: Squeeze the soft-rubber ball tightly with one hand. This forces out the air. Then hold the nozzle of the syringe at the place where the test is to be made. Release the pressure of the hand and allow the ball to resume its normal shape. This draws in a sample of the mine air through the hard-rubber tube. Hold the tube in a downward position to retain the sample in the ball, then place the end of the tube under the intake ring of the lamp and force the sample onto the flame by squeezing the ball.—*Our Own People, a monthly publication of the Davis Coal and Coke Co.*

Water Scuttle or Bucket

By W. H. Luxton
Linton, Ind.

Efficient methods of performing any kind of work or labor ought to be encouraged so far as possible. The accompanying illustration shows a water scuttle or bucket that is so constructed as to gather thin sheets of water and do away with the present method of bailing it—namely, lifting it into a powder keg with an old coal shovel and then dumping the keg's contents



WATER SCUTTLE THAT DOES AWAY WITH THE NECESSITY OF BAILING

into a water box. The latter is a costly method as it is decidedly slow.

The sides, part of the top and the rear end of the scoop, to which the handle is attached, are made of 1 x 10-in. lumber. The bottom is of thin sheet iron or block tin, with holes punched as shown for nailing purposes. The scoop is of convenient shape to scoop up shallow water. Both hands get a suitable hold, similar to that in which a miner would utilize a shovel. One hand takes hold of the cross-piece, or cover, while the other grasps the handle.

Since employees are liable to cut their hands when using powder kegs, and such cuts sometimes prove serious, safety of operation ought to be an incentive to the use of the scuttle here described. It can be constructed readily in mine shops or elsewhere at small expense.

Handy Spike Carrier

By S. D. Hainley
Osceola Mills, Penn.

In my travels from mine to mine I have noticed the different receptacles that tracklayers and daymen use for carrying spikes, nails and similar articles. Most of them employ an old dinner pail, kettle or something of the sort that can be picked up around town.

The best receptacle of this kind that I have yet seen, considering cost, durability, convenience and safety, was



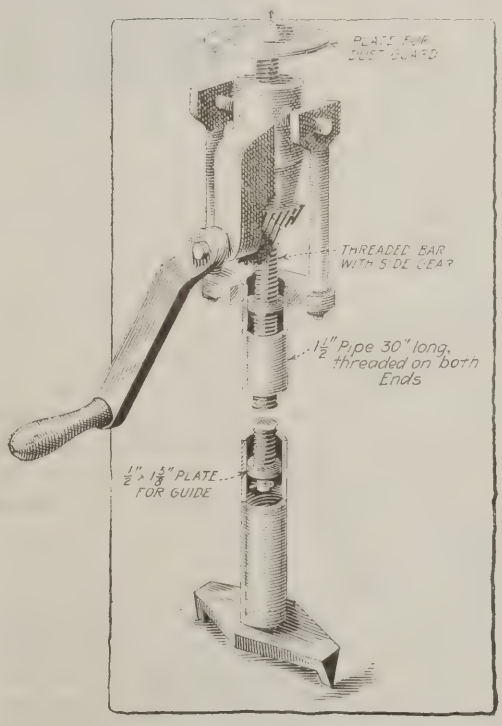
SIMPLIFIES CARRYING OF SPIKES

one made out of a powder can (25-lb. keg), cut in two through the middle, with the rough edge belled down on the inside. Thus, in reaching for a spike or nail, there will be no danger of cutting the hand. Two holes are then punched—a 20d nail will do for a punch—on opposite sides, for a bail, which can be made out of an old bond or almost anything that makes the completed pail easy to handle.

Portable Mine Drill

By W. A. Jones
Sturgis, Ky.

A roof drill that has been found useful and satisfactory is shown below. The machine is simple and light, yet is strong in construction. The drill may be



SIMPLE HOMEMADE MINE DRILL

easily and quickly transported about the mine and set up rapidly where needed. Any ordinary mine blacksmith ought to be able to build this drill.

The Future of Peat as a Fuel—I

By J. B. C. Kershaw
Colwyn Bay, North Wales

SYNOPSIS—*Peat is probably more widely distributed throughout the world than were the original beds of coal-forming materials. Many attempts have been made to utilize this low-grade fuel. Although after the sods, or "turves," are air-dried they are extensively employed in certain localities for domestic purposes, the more ambitious attempts at the use of peat for power generation employ a briquetting process of some sort.*

NEXT to coal, peat is the most widely distributed naturally occurring solid fuel. In fact, if one considers only the area covered by the peat deposits of the world, without relation to their depth or thickness, it is probably true that the deposits of peat now occupy a larger area of the earth's surface than was occupied by the lower-lying coal measures in the earlier stages of geological history. The figures given hereafter enable one to form some idea of the enormous extent of the area covered by the peat bogs in all countries situated in the northern temperate zone. The occurrence of peat in temperate regions is explained only by the fact that the plant growths that produce peat require a moist but cool atmosphere and habitat for their development. This is never found nearer to the equator than 45 deg., nor does it occur within the frigid zone. Peat is found in abundance in the United States, Great Britain and Ireland, Denmark, France, Germany, Hanover, Holland, Hungary, Italy, Oldenburg, Russia, Bavaria and Sweden. As regards area and extent, the peat bogs of what were up to a few years ago the "crown lands" of Russia, are reported to contain 100,000,000 cu.ft. of excellent peat. The Swedish bogs are estimated to represent 3,000,000,000 tons, while the swamp regions of Virginia cover nearly 1000 square miles and have an average depth of 15 ft. In Germany the peat bogs cover 11,580 square miles, and in Ireland one-tenth of the surface of the whole country. The depth of the Irish bogs varies from 16 to 23 ft., but in certain cases this depth is much exceeded and some are known to have a depth of 50 ft. Finally, in the United Kingdom, which is liberally provided with coal measures, there are, according to Perkin, 6,000,000 acres of peat bog, with an average depth of 12 feet.

All the nations of the world, therefore, whose industrial activity and prosperity in the past have been based on the development of their deposits of coal, are well provided with this alternative source of heat and power.

The question of the best methods of utilizing their resources of peat is one of the highest importance for the leading manufacturing countries of the world. As their reserves of coal become exhausted, and the cost of working them increases, it will be necessary to fall back upon peat in order to be able to compete in the world's markets with countries such as Switzerland, Norway and Sweden, which possess immense water-powers capable of cheap development for industrial purposes.

This change from coal to peat is already occurring in certain European countries where coal is not plentiful or is of poor quality. And the change, no doubt, will be accelerated by the results of the recent war, which has already doubled the cost of coal mining, and consequently the price of coal, in nearly all the countries of the world.

Peat is a mass of decaying vegetable matter which under suitable natural conditions and with the lapse of time might be converted into a form of coal. The peat bogs to which reference has been made in the foregoing paragraphs may therefore be regarded as composed of a partially formed solid fuel that comes under the classification of "low-grade" fuel, owing to its high percentage of moisture.



FIG. 1. CUTTING PEAT FROM A LARGE BOG IN DUMFRIESSHIRE, SCOTLAND

If heat and great pressure were applied to this mass of decaying vegetable matter and the water were eliminated, a residue would probably remain that would possess many of the characteristics of coal. This conversion of vegetable remains into peat occurs only in swampy districts, because the water shuts off the decaying plant from the action of oxygen or air, and the decomposition that occurs is due, not to oxidation, but to internal changes which may be represented by the following chemical equation:

$$6C_6H_{10}O_5 = 7CO_2 + 3CH_4 + 14H_2O + C_{26}H_{20}O_2$$

Cellulose thus yields carbonic-acid gas, marsh gas, water and peat. The molecule of peat is therefore more complex in structure than that of cellulose. It is represented by 26 atoms of carbon with 20 of hydrogen and 2 of oxygen. Its molecular weight consequently is 364.

The moisture in peat is therefore largely due to the water evolved as a result of the chemical changes accompanying its formation. Peat fresh from the bog often contains from 80 to 90 per cent. of moisture.



FIG. 2. METHOD OF DRYING PEAT IN SCOTLAND

By air-drying, with prolonged exposure to wind and sun, this moisture content can be reduced to 20 per cent. Below this limit it is difficult if not impossible to pass by means of natural agencies, and this fact explains why peat has never come into wide use for industrial purposes, where the supplies of other forms of fuel have been both plentiful and cheap.

The high percentage of volatile matter in peat is another hindrance to its use for industrial purposes, since the heat produced by its combustion can only be economically utilized in special forms of furnaces. The low percentage of ash and absence of sulphur, on the other hand, are characteristics of the fuel which count in its favor. The disadvantages arising from the high percentage of moisture and volatile matter, however, have been largely surmounted in the latest methods of using peat for power purposes.

The following are approximate analyses made in my own laboratory, on air-dried English, Irish and Scotch peat:

	English Peat		Irish Peat		Scotch Peat	
Moisture	20.3		21.6		26.2	
Coke	27.9	Ash 1.0, Fixed carbon 26.9	21.8	Ash 2.3, Fixed carbon 19.5	24.6	Ash 2.1, Fixed carbon 22.5
Volatile	51.8		56.6		49.2	
	100.0		100.0		100.0	

The calorific value of air-dried peat varies considerably, but the average may be fixed at 7500 B.t.u. Peat briquets dried by natural agencies may be considered as possessing half the heat content of good coal.

Peat Briquets

The earliest method of peat utilization was that of slicing the brown and black peat of the bog into small oblong blocks, called "turves," and allowing these to dry in the sun and air. The turves, which in Ireland are cut 24 in. long by 6 or 7 in. square, shrink considerably on drying, and are only about half this size when ready for use. Much of the domestic fuel burned in the villages and towns of Ireland today is peat won from the bogs by hand labor and dried in this way. Figs. 1 and 2 show the system in use in Dumfriesshire, in Scotland.

Modern methods of briquetting peat, however, are based upon the use of machinery, both for cutting the peat, squeezing out the excessive moisture, and for molding the material into briquets afterward. The aim has always been to reduce the hand labor required for these operations to the lowest possible point.

Some details will now be given of the more notable and successful installations of this kind, commencing with those in use abroad, since it is in Germany and Russia that the greatest progress has been made in utilizing the peat and bogland resources of the European continent.

Germany.—The manufacture of peat fuel briquets, even before the war, was a flourishing industry in Germany, and there is no reason to believe that the industry has suffered any setback during the period of hostilities, since the scarcity of coal and rising price in all countries have favored the production of the cheaper low-grade fuel.

The peat, in the majority of the German installations, is won from the bog by portable centrifugal pump dredgers, which first cut and pulp the peat by means of rotary cutters, and then transport the pulped mass (which contains 15 times its own volume of water), to the factory, where the briquet-making machinery is installed. Here the pulp is first passed through a centrifugal machine to extract the greater part of the water, and is then transferred to a cylinder press, which operates on the principle of a paper-making machine and delivers the peat in the form of a thin sheet to the drying cylinders.

The moisture in this way is reduced to between 15 and 30 per cent. and the peat, in the form of a moist hot powder, is then fed into the briquetting machine. Here it is subjected to a pressure of 30,000 lb., and is molded into the form and shape desired for the finished briquet fuel. No binding agent is required, since the bituminous matter contained in the raw peat suffices in the majority of cases, under the combined influence of pressure and heat, to produce a clean and hard briquet, in which the percentage of moisture is between 11 and 15 per cent. and the ash from 9 to 12 per cent. The calorific value of these machine-made briquets is said to be about seven-eighths that of ordinary coal. The cost of manufacture, in Germany, before the war, was from $1.25 to $1.75 per ton. A plant to produce 50 tons per day was estimated to cost $80,000.

Peat briquets are largely used for domestic heating purposes in Germany, since they are practically smokeless. In order to prove, however, that the generation of power is quite practicable with this form of fuel, some details will be given of the electric power-generating station situated on the Wiesmoor peat bog in East Friesland, North Germany, which is run entirely with peat won from this extensive tract of bogland.

Fig. 4 shows the position of the bog, which is shaded, and the 150-mile district over which the current is distributed. The original power station marked *A* in the plan was erected in 1909, and was designed to generate 3600 hp. It has been twice enlarged and now provides considerably over 6000 hp. to the docks and harbor at Emden, and to the electric tramways that run into Wil-

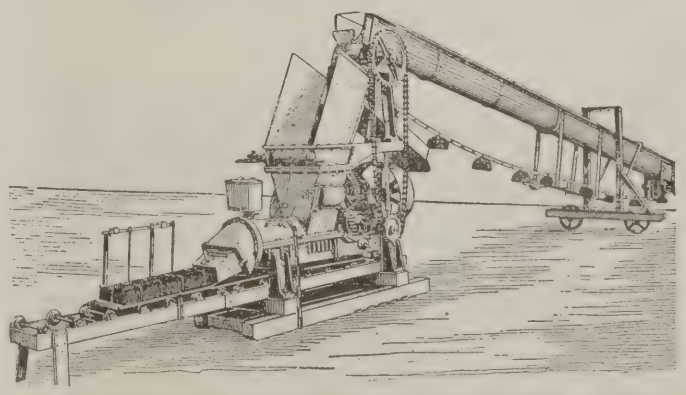


FIG. 3. GERMAN MACHINE THAT MAKES PEAT BRIQUETS

helmshaven and Oldenberg from the surrounding villages. The Ems-Yade canal is also operated with electric power, derived from the Wiesmoor generating station.

Fig. 5 shows the main transmission lines, with their length marked in kilometers. The power house, after the first enlargement, was equipped with four water-tube boilers and superheaters, and with three turbo-generators each of 1250-kw. capacity, delivering three-phase current at 6000 volts. This potential is raised in a separate transformer house to 20,000 volts for transmission purposes.

A portion of the electric power is utilized for operating the electric dredging machines, which form one of the chief features of this installation. The dredgers used at Wiesmoor were designed and built by an Oldenberg firm of engineers and are mounted upon wheels, so that they can be run on timbers or on rails along the edge of the bog. The dredgers are of the chain-bucket type, the chain being driven by an electric motor placed at the head of the bucket frame. A second motor, placed to the left, causes the whole bucket frame to travel in a horizontal direction, backward and forward, through a space of about 13 ft. The wet turf, containing 90 per cent. of water, is emptied from the buckets into a trough and is carried from this by means of a belt conveyor to an electrically operated press. It issues from this press in the form of a uniformly thick pulp, and is then, with the aid of another electrically operated conveyor, carried to the cleared and drained portion of the bogland for drying, where it is delivered in the form of a thick carpet.

In addition to the large dredgers there are many smaller turf-pulping machines at work on the Wiesmoor.

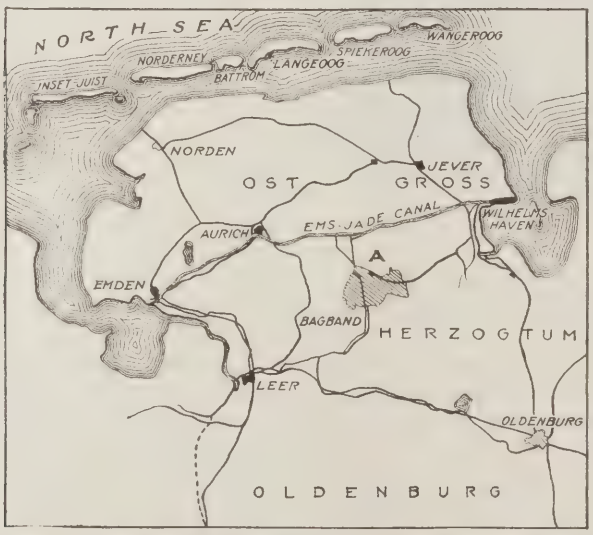


FIG. 4. WIESMOOR PEAT BOG, EAST FRIESLAND, NORTH GERMANY

Those machines are fed by hand and consist of an electrically operated bucket conveyor and a pulping and molding press that tears apart the peat fibers and then pulps them. The peat pulp issues from the press in the form of a continuous thick belt, and a workman standing by the delivery chute cuts the peat into strips. These machines are much smaller than the others, and a 12-hp. electric motor is sufficient for operating them. According to the guarantee of the manufacturing firm, one machine in a 10-hour day can produce 60,000 to 80,000 turf sods or briquets.

Fig. 3 shows a machine of this type at work and Fig. 6 a German design of drying installation with use of artificial heat.

The size of the blocks of half-dried peat when first cut into is 4 x 5 x 13 in. As soon as a dry crust has formed upon them so that they can be handled they are stacked in small heaps, where they are left exposed to the sun and air until the moisture content has been reduced to 25 or 30 per cent. and the blocks have shrunk in size to 2 x 2 x 10 in. They are then loaded in cars, which are drawn along a narrow-gage railway by a gasoline locomotive to the power house. In the summer months the output of dried peat from the dredgers and drying grounds exceeds that of the requirements of the generating station, and the surplus dried peat is therefore built up in large stacks in the open, or is stored

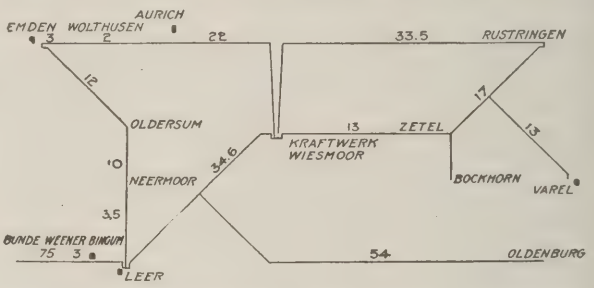


FIG. 5. TRANSMISSION LINES FROM WIESMOOR GENERATING STATION

in covered sheds. When once dried and hard the peat blocks do not readily take up additional water.

The combined dredging and briquet-molding equipment installed on the Wiesmoor can produce in the usual five summer months' operation (April to August) 30,000 to 35,000 tons of dried turf briquets. Improvement has been chiefly directed toward reducing the cost by dispensing more and more with hand labor, both in the winning of the turf and in the after process of drying and storing it until used.

As regards the methods adopted for burning the fuel after is has been dried as described above, a series of belt-conveyors carry the peat briquets to the storage bunkers, and then, after screening and weighing, to the feed hoppers attached to each boiler. The grates are inclined at an angle of 36 deg. to the horizontal, and are divided into two portions, each of 43 sq.ft. superficial area. The halves are fed alternately with briquets by raising a lever that actuates a hinged door on the fire side of the feed hopper.

Since the calorific value of the air-dried peat fuel is low, the draft requires careful regulation in order to avoid great excess of air and a low evaporative efficiency in the boilers.

A steam-raising test made soon after the Wiesmoor plant was started gave an evaporation of 3.01 lb. of water per pound of dried peat, and a boiler efficiency of 73.5 per cent. The mean calorific value of this peat was 4.824 B.t.u., or just about one-third that of good coal. Working out the cost of the fuel from these figures, taking the price of the turf briquets at $1.25 per ton, and the fuel consumption at 11.35 lb. of peat per kilowatt-hour, we find that the fuel required will cost between 0.29c. and 0.34c. This compares quite favorably with the cost of coal in the best managed large modern power stations.

Russia.—Before the war Russia was second only to Germany in the number and capacity of its installations for producing peat fuel. According to Haanel, the number of separate plants in 1910 was 1300, and the

output of machine peat amounted to over 5½ million tons annually. Many private plants existed in connection with cotton mills and other manufactures, some of which were producing nearly a quarter of a million tons of peat fuel yearly.

The method used in these Russian machine-peat plants was similar to that described above—that is, the peat was cut and pulped by a combined type of machine; it was then formed into blocks by hand labor and was finally dried by exposure to the sun and wind in the open air.

Canada. — The Canadian Government in 1909-10 erected a small experimental plant for producing machine-dug peat at Alfred, Ontario, in order to encourage the development of the peat resources of the Dominion upon sound lines. This plant was similar in design and principle to those already described as being in opera-

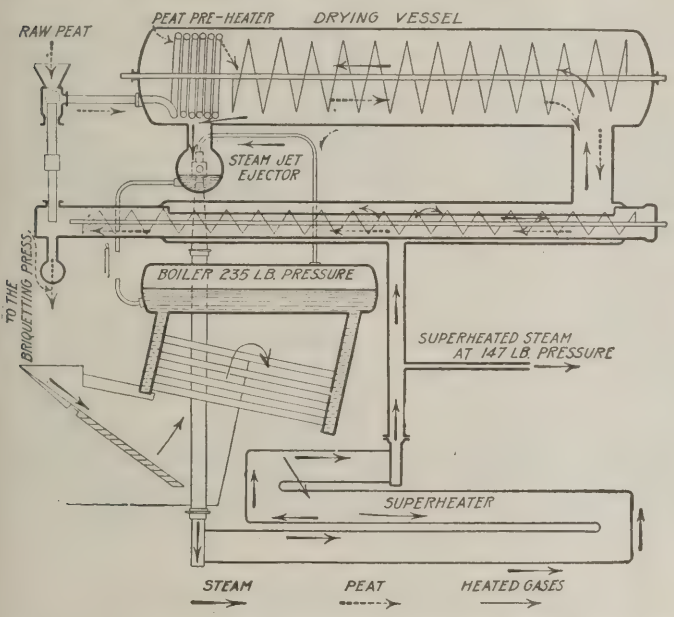


FIG. 6. DIAGRAM OF GERMAN DRYING INSTALLATION

tion in Germany and Russia, the only improvement being that a system of cables was employed to transport the pulped peat to the drying-grounds. The peat produced at this plant in the 1911 drying season had a moisture content of 16 to 20 per cent. and was employed for a series of steam-raising tests in two different types of boiler—a Babcock & Wilcox marine type of water-tube boiler and an internally-fired boiler of the locomotive type. Bulletin 17 of the Canadian Department of Mines contains a full record of these tests, while the table presented below gives a summary of the figures obtained in the six main tests:

	Water-Tube Boiler			Fire-Tube Boiler		
Test number	1	2	3	4	5	6
Net calorific value of the fuel as fired—B.t.u. per lb.	7490	7490	6990	7130	6970	7110
Peat fired per hour, lb.	476	586	569	160	214	341
Peat fired per sq.ft. of grate surface, per hour, lb.	20.5	15.5	15.0	17.7	23.8	37.9
Equivalent evaporation per hour, from and at 212 deg. F., lb.	1950	2322	2250	621	802	1054
Equivalent evaporation per hour, per sq.ft. of heating surface, lb.	2.88	3.43	3.32	2.89	3.73	4.9
Lb. of dry flue gas per lb. of peat	12.4	9.8	11.1	9.8	9.1	6.5
Temp. of flue gas leaving boiler, deg. F.	720	760	715	690	690	750
Equivalent evaporation from and at 212 deg. F. per lb. of peat as fired, lb.	4.10	3.96	3.95	3.89	3.74	3.09
Thermal efficiency of boiler furnace and grate, based on the net calorific value of fuel, per cent	53.1	51.3	54.8	52.9	52.1	42.2

These efficiencies are low when compared with those said to have been obtained at the Wiesmoor power station, but it must be remembered that peat contains a high percentage of hydrogen, and that when heated two-thirds of the combustible matter it contains is liberated in the form of hydrocarbon gases. A large combustion chamber is therefore required with secondary air admission in order to obtain good results with peat fuel. This does not appear to have been arranged for in the Canadian tests.

(To be continued)

Coal Output of United Kingdom in 1918

The output of coal from mines in the United Kingdom during the 52 weeks ended Jan. 4, 1919, is estimated to have amounted to 226,699,000 long tons, being 21,361,000 tons, or 8.6 per cent. less than in the previous year. The tonnage raised in each of the principal districts was:

District	Output, 52 Weeks Ended Jan. 5, 1918 Tons	Jan. 4, 1919 Tons	Decrease in 1918 Tons
England and Wales:			
Northumberland	10,190,000	9,843,000	347,000
Durham	31,070,000	28,397,000	2,673,000
Yorkshire	40,770,000	35,378,000	5,392,000
Lancashire, Cheshire and North Wales	24,980,000	22,518,000	2,462,000
Derby, Nottingham, and Leicester	33,220,000	29,915,000	3,305,000
Stafford, Salop, Worcester, and Warwick	19,770,000	17,624,000	2,146,000
South Wales and Monmouth	48,340,000	46,529,000	1,811,000
Rest of England	5,440,000	4,791,000	649,000
Scotland:			
The Lothians	4,900,000	4,541,000	359,000
Fife and Kinross	6,360,000	6,362,000	*a* 2,000
Rest of Scotland	22,930,000	20,713,000	2,217,000
Ireland	90,000	88,000	2,000
Total, United Kingdom	248,060,000	226,699,000	21,361,000

a Increase.

The year's production by four-week periods, contrasted with the output during the corresponding weeks of 1917, was:

Four Weeks Ended	1917 Tons	1918 Tons	Decrease in 1918 Tons
Feb. 2, 1918	20,430,000	18,830,000	1,600,000
Mar. 2	19,880,000	19,140,000	740,000
Mar. 30	19,840,000	18,760,000	1,080,000
Apr. 27	18,660,000	17,700,000	960,000
May 25	20,090,000	16,860,000	3,230,000
June 22	18,730,000	17,790,000	940,000
July 20	18,990,000	15,780,000	3,210,000
Aug. 17	17,770,000	16,040,000	1,730,000
Sept. 14	19,500,000	17,770,000	1,730,000
Oct. 12	19,160,000	17,890,000	1,270,000
Nov. 9	18,960,000	17,750,000	1,210,000
Dec. 7	19,360,000	16,740,000	2,620,000
Jan. 4, 1919	16,690,000	15,649,000	1,041,000
Total	248,060,000	226,699,000	21,361,000

Comparison between the figures for the months March to June are affected by the dates at which the Easter and Whitsuntide holidays fell in the two years. During the period ending July 20, 1918, the output was heavily affected by sickness among the workpeople.

The approximate number of persons on colliery books at all collieries, excluding those engaged in getting ironstone, fire-clay, ganister, etc., has been estimated to be as follows, taking four weekly intervals.

Feb. 2, 1918	985,000	Aug. 17	926,000
Mar. 2	983,000	Sept. 14	927,000
Mar. 30	980,000	Oct. 12	941,000
Apr. 27	957,000	Nov. 9	950,000
May 25	935,000	Dec. 7	959,000
June 22	926,000	Jan. 4, 1919	984,000
July 20	921,000		

The average yearly output of coal per person employed in the coal mines in the United Kingdom was 236 tons in 1918, contrasted with 252 tons in 1914. The average wages cost per ton of coal raised for the 6 months to June 30, 1918, was $2.96, against an average of $1.52 for the complete year 1914. As from June 30, 1918, an additional war wage of $0.30 per day to all persons of sixteen years and over and $0.18 per day to those under sixteen years of age was granted.

Firebox Conditions and Heat Distribution

THE United States Railroad Administration is sending out two sheets showing the conditions both good and bad that may exist in a locomotive firebox, and the distribution and utilization of heat in a locomotive. All data and illustrations are taken from the University of Illinois Experiment Station Circular No. 8, entitled "The Economical Use of Coal in Railway Locomotives." Although the data presented concern especially steam locomotives, it is equally applicable to steam plants in general, particularly those employing internally fired boilers. It is therefore here reproduced in its entirety.

The condition represented in Fig. 1 shows the admission of enough and not too much air. With the grates and draft apparatus in proper condition, a level and uniform firebed permits air to enter without undue obstruction over the entire grate surface and at the same time prevents cold air from entering through holes or thin spots.

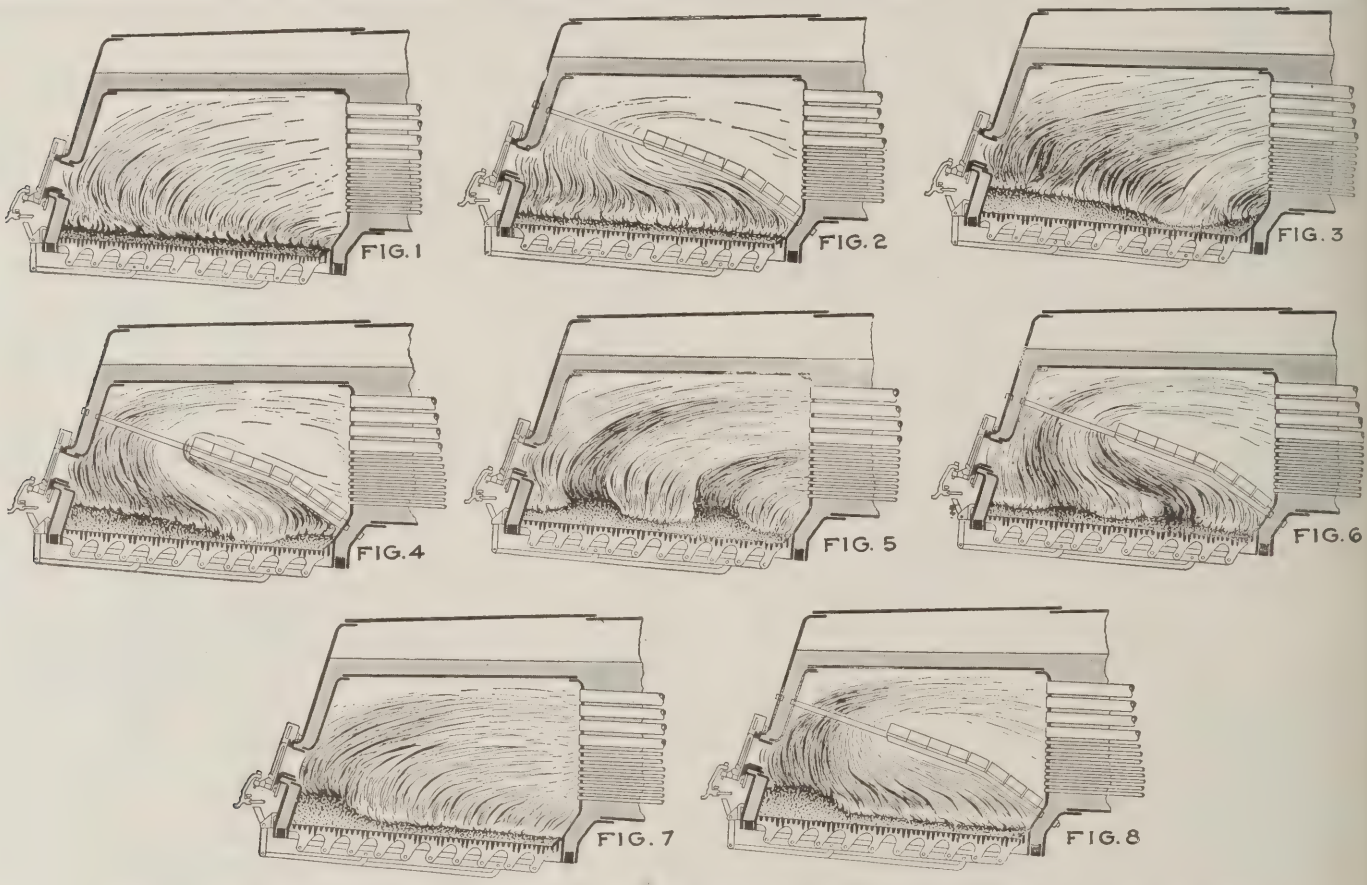
With a light, level and bright fire most of the air supply enters the firebox through a uniform firebed. The firebed being uniform, without holes, clinkers or banks, the air enters in many small streams equally distributed over the entire grate surface. Every part of the fuel bed and of the gases just above the fuel bed has its share of the uniformly distributed and finely divided air streams which are entering through the gates.

High and uniform firebox temperatures result from a proper air supply and a good mixture, and most of the coal and gases burn before they can escape from the firebox. High firebox temperatures insure the burning of combustible gases which with lower firebox temperatures escape without giving up their heat.

When holes occur in the firebed the result is too much air in parts of the combustion chamber and not enough air in others. Holes permit too much air to enter the firebox for the amount of coal which is being burned where the holes exist. The air coming through the hole is in a comparatively solid stream, and where this air comes through there is little fuel to burn. At points where there is fuel on the grate not enough air is coming through, and the opportunity for good mixing is lost. The large volume of cold air coming through the hole cools that part of the firebox, and combustion in other parts of the firebox is retarded.

The condition represented in Figs. 1 to 8 shows the results of both not enough air and of too much air. Banks may restrict the air supply to such an extent that there is not enough air to insure combustion. Even though large quantities of air may enter through the thinner parts of the fire or through the firedoor, the combustible gases arising from the banks may not receive a sufficient supply of air before they escape from the firebox. The firebox may be receiving too much air and still not burn the coal because of the poor mixing.

Above the thinner parts of the fire there may be more air than is needed to burn the fuel with which it comes in contact. This surplus air does not assist in the combustion process, but reduces the firebox temperature and carries off heat through the stack.



FIGS. 1 TO 8. ILLUSTRATING THE GOOD AND BAD CONDITIONS THAT MAY EXIST IN THE FIREBOX OF A LOCOMOTIVE

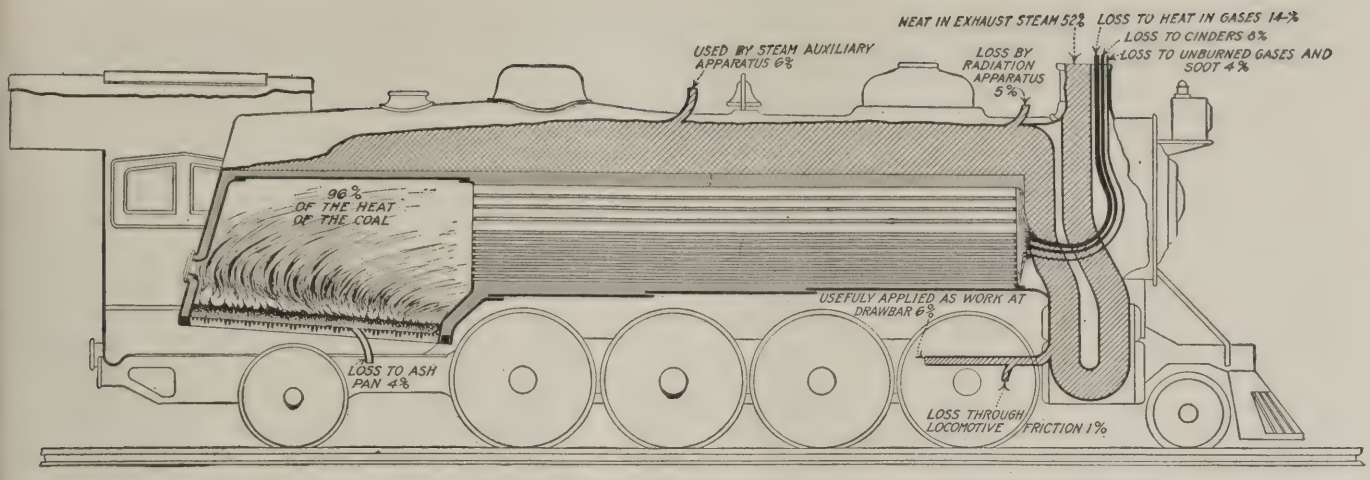


FIG. 9. UTILIZATION OF THE HEAT GENERATED IN THE LOCOMOTIVE FIREBOX

Where the coal and gases are heaviest the incoming air supply is least, and neither the incoming air nor the gases arising from the fuel are sufficiently divided into numerous and well distributed small streams to permit easy and rapid mixing. Gases arising from the fuel bed reach the flues in a very short time and mixing must be rapid.

The banks of green coal and the smoky gas arising from them tend to cool the firebox as a whole. Some parts of the fire burn much more brightly than others and the temperature throughout the firebox is not uniform. Smoke and unburned gases result from this condition.

Combustion in the firebox liberates heat from the coal. Combustion is not complete, and all the heat of the coal is not liberated. Cinders and combustible gases escape unburned from the firebox and pass out through the stack.

Much Heat Escapes with Stack Gases

Some of the heat liberated from the coal is carried out of the stack by the stack gases. Air and coal at a temperature of, say, 70 deg. F., go into the firebox; the gases which they form come out of the stack at 500 or 600 deg. F. For each ton of coal which goes into the firebox about 12 tons of air also go in and about 13 tons of gases pass out of the stack. It takes some of the heat of the ton of coal to heat these 13 tons of gases from 70 to 600 degrees.

The heat liberated in the firebox, except that which is used to heat the stack gases, passes through the firebox sheets, the boiler tubes and the superheater units to the water and steam. Some heat is lost by radiation. This comes from all parts of the locomotive which are warmer than the surrounding air. The most of the heat lost by radiation comes out of the steam.

The heat in the steam is used for auxiliary purposes, is lost as leaks or goes to the cylinders to do work. Some coal is lost to the ash pan and ash pit.

Of the heat going to the cylinders a large portion passes out the stack in the exhaust steam. This exhaust steam produces the draft necessary to force into the firebox and through the firebox, boiler and front end the 12 tons of air and the 13 tons of gases which are moved for each ton of coal fired. That portion of the heat converted into work in the cylinders moves the locomotive and its train. A portion moves the locomotive and its parts, and the remainder becomes work usefully applied in hauling tonnage.

New Byproduct Plant Erected at English Coke Works

A new battery of 35 simplex regenerative ovens has recently been erected at the Lambton Coke Works at Fence Houses in Durham, England. These regenerative ovens were decided upon to avoid the erection of another boiler plant, and many considerations entered into the arangement of the byproduct plant. There was an indirect recovery plant of 35 ovens, including a rotary scrubber, and room for only two 100,000-ft.-per-hour exhausters in the exhaust house. It was therefore undesirable to have two separate streams of gas, as there could not be a spare exhauster for each battery.

It was finally decided to have one stream of gas on the pressure side, the suctions from the two batteries uniting at the exhauster and being regulated by valves. The gas then went through a Pelouse tar extractor to the saturator and, after cooling, to the benzol scrubber, which consisted of the old rotary scrubber rebrushed, plus the former tower benzol scrubbers.

The oven walls in this plant are parallel, which is for obvious reasons a great advantage. It has been said that there were some expanding or salt-containing coals for which parallel walls were unsuitable, but this has yet to be proved. Tapered ovens are a relic of the days when, owing to uneven heating, ovens could not be pushed. Some brilliant genius then thought that by giving a 2-in. taper in 400 in. he would accomplish some highly beneficial results.

Coal Output in Taiwan in 1918

According to investigations made by the productive industries bureau of the Government General of Taiwan, the output of coal for 1918 in Taiwan will be about 700,000 tons, although it was at first estimated that there would be an output of about 1,300,000 tons because of increase in the area of coal mines. The demand for Taiwan coal is increasing in South China with Hongkong as a center. The export of coal to South China since January amounted to 247,676 tons valued at 2,424,150 yen ($1,207,000), the export during November being 22,059 tons. Judging from this, the export of coal for the whole year of 1918 will amount to about 260,000 tons, being 30,000 to 40,000 tons less than originally estimated owing to the scarcity of tonnage.—*Commerce Reports.*

How to Compass Industrial Co-operation*

By Charles P. Steinmetz†
Schenectady, N. Y.

SYNOPSIS—*The author advocates large changes in our industrial management, which he hopes will put our industries eventually in the hand of the workers; but he would do this without haste, confiscation, revolution, or ill will. This proposal is to give labor dividends based on the wages paid and on the amount of excess profits above a certain percentage, the gross returns to labor being made equal to the excess profits allotted to capital.*

THERE are two old sayings: "In unity is strength," and "a house divided against itself shall not stand." If these statements are true in anything, they are true in Mother Industry; and they are particularly true today where modern civilization in the world's war has practically become bankrupt, and when we now, as receivers, have to reorganize the world again.

Our industrial life must be coöperative if it would be successful and efficient. If industry is to take care of the world's work in such an effectual manner as to redeem our civilization from the direful effects of the last few years, it must have coöperation. But can that coöperation be obtained?

The radical labor agitator or socialist tells us there can be no peace between capital and labor. He contends that they are inherently antagonistic and must fight to a finish, because the interests of one are against the interests of the other. Yet in industrial depression the employer as well as the employed suffers. So the old-time corporation president preaches to us that the interests of capital and labor are identical; that if the individual interests are trusted to his keeping they will be taken care of.

At the same time every child sees and knows that a dollar more paid out in wages means a dollar less of profit, and that the interests of capital and labor are different—entirely opposite in some respects. We cannot get any further in solving the problem if we take an extreme view one way or the other. The interests of capital and labor are not identical, but are the same in some respects and opposite in others.

In general, in any industry, those interests which have to do with those outside the industry—with customers, etc.—are usually identical, whereas within the industry the interests of employer and employee are often opposite to each other. Thus there are relations in which the interests of capital and labor are identical and some in which they are not identical, but this is not strange. There are many other relations in our modern civilization where there are both identical interests and unidentical interests. Take buyer and seller, manufacturer and customer, landowner and renter. Their interests are, in certain ways, opposed and still we do not have warfare. Because there are some features where their interests are opposite is not reason enough to make them fight each other.

In all these relations which closely duplicate those existing between employer and employee, the conflicting conditions are not settled by warfare. On the contrary there are often—I might almost say very often—friendly relations between the manufacturer and customer. Unfortunately the historic relation between capital and labor is far different. It has been full of conflict.

Why it is necessary that employer and employees—capital and labor—cannot agree and coöperate in a similar manner? The reason is historical. In the days of small manufacture the employer and employee bore an equal standing as regards industrial power. The organization of employers, as represented by the formation of industrial corporations, meant an increased power on the side of the employer and a disadvantage to the employed. As a result, labor organizations were formed; but conditions had already become hostile.

How to bring the coöperation about, how to return to such conditions as should have remained operative, is the main problem, for it is essential that we bring about coöperation within our industry if we wish to meet the demands of the new world.

Present Differences of Long Standing

It has taken two generations of development to create the present unfortunate situation where differences are settled by fighting, and the situation is so strained that we cannot expect to secure this coöperation by merely wishing or talking about it. It is a long, slow, difficult work which will have many setbacks, and we have to remain at that work and fight zealously for it.

Adjustment must come first from the employers, but not for any moral reason. The present situation is not the fault of labor more than capital. It is merely an historical development of a situation beyond the control of man. The employer must have a broader view than his employees. We must not forget that there are still many imperfections in our civilization. Most serious is it that a large majority of men cannot enjoy such a complete education as would fit them to make the most of themselves, and heads of industry as a rule have the benefit of the broader education and must take the broader view of things. We cannot expect the same broad view of one who left school at fourteen years of age as of a man who has enjoyed a more extensive education.

That the initiative must come from capital is clearly realized. But we must remember coöperation does not mean merely spending a few dollars here and there. The work of social reconstruction is probably the most important which faces us today in the industrial field, and men must devote their time and attention to it; and those attempting to solve the problems involved must give the same high-grade service to that work as is given by those in charge of other administration. We cannot expect to see any positive results until we are really willing to approach it more seriously than in the past, giving it our time and interest, and expending in its solution the ingenuities of the same quality of men and the expenditures of a like amount of money as are de-

*Abstract of address entitled "Industrial Coöperation," delivered before the Editorial Conference of the New York Business Publishers Association.

†Consulting engineer and one of the foremost electrical experts of the present day.

voted to the accomplishment of other industrial objectives.

Coöperation implies two parties working together, not one settling the matter and telling the other, "You must do that and that and then we will coöperate." Unfortunately most of the serious efforts made in this direction have been of that character. The employer has worked out plans and then asked the employees to coöperate along those lines. Very often the plans have been good, and the whole scheme would have been satisfactory if it could have been worked out jointly; but it came as paternalism and was therefore tainted from the beginning. That is not coöperation. It is easy to say we must have coöperation; also easy to find fault. But it is not easy to make suggestions as to how it should be done and how the present strained relations between capital and labor should be overcome. Probably there is no single way to bring about true coöperation. Success in it and the methods to be followed depend largely on local conditions and existent social relations. There is no broad and single way. The old-time industrial relation made an industry the private property of the owner and recognized only capital and not labor. This relation was destroyed forever at the moment when President Roosevelt interfered in the anthracite wage dispute and thus brought both sides to terms.



THOSE WHO HAVE TRIED IT SAY IT WORKS WONDERS
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The other extreme is the socialistic conception that all wealth is created by labor, to whom all wealth, therefore, belongs, and that capital is a parasite on industry and receives its ability to levy a tribute on the workingman by reason of having acquired a monopoly in the means of production. But that point of view is unjustifiable. Industrial production now requires both capital and labor.

The present labor unrest arises logically from a demand for a share in the profits and management of industry. Since both labor and capital are necessary, it is right that they both have a share in the profits and a hand in the management of the industry. There are several ways of attempting to provide for this, but most of them have been unsuccessful. One way is by welfare work. This is important and useful but offensive and insulting when forced on labor in a paternalistic manner.

It is appreciated where it is done, not as welfare work, but merely as a matter of corporate self-interest. We must realize that the quality of a man's work depends on the conditions under which it is done, for on those conditions depend the self-respect and quality of the man. But welfare work will never, especially if we use that name for that class of activity, bring about coöperation. We should rather term it an Industrial Relation Department or Committee, instead of a Welfare Department. The most difficult thing in coöperation is to put yourself in another man's place and see things as he sees them.

Another method attempted for the purpose of creating a unity of purpose between capital and labor is the system of giving bonuses during times of industrial prosperity, and thus interesting the employee in the industry. To some extent this scheme is all right though it smacks somewhat of paternalism. It might work well in Germany, where people have been trained to look up to their masters as superiors, but it leaves a bad taste in the mouths of Americans. They are prone to ask, "Why not give us an increase of wages instead of a bonus?" The bonus system has also the disadvantage that the workman shares only in profit and not in management. Another attempt in the same direction is the committee system, which is claimed to have been put in successful operation in England. There are several forms of this scheme. There are the committees elected by employees which take up with employers all relations of importance both to the company and the men, and arbitrate the wages, hours, etc. Another form is the joint committee system in which half the members are elected by employees and half are appointed by the corporation. This appears to have much in its favor, but here also there are some difficulties. Labor has its own organization, and action of this kind is apt to be taken by labor unions as an attempt to supplant them and deny them recognition. Labor unions claim that they represent the employees. Facts show that in many cases they are right, because while union men may often have a minority among employees, when serious questions arise experience shows, not infrequently, that the majority of nonunion workers follow the lead of the unions rather than of the nonunion committees.

Shop committees are liable to be considered as eliminating the labor unions by establishing a rival union.

While the leaders of industry recognize the necessity for coöperation, the labor organizations thus far do not. But there is another side. Do we want the committee system? Let us assume it is successful. A board of directors acts for the one side and a labor committee or committees for the other. Is this not another alignment for warfare? Have we not in effect organized two different parties to battle with each other?

The last proposition is the wage dividend. Mother Industry requires capital and labor. Therefore both are entitled to a fair rate of wages for the work done. All

profits beyond that belong to capital and labor. These should be divided as dividends, one part being dividends on capital stock, the other being divided on labor stock as determined by the yearly wages received. This system is in operation in a number of companies, including certain electric-utilities corporations among others. It lacks, however, provision for a share in the management.

But we could carry it farther and recognize labor as equivalent to capital and give the labor stockholder the same directing power in the management as the capital stockholder. This would be revolutionary, but both would share in the profits, getting dividends, one on capital stock and the other on what may be called "labor stock."

Both could share in the management and, if the "labor shareholders" so preferred, labor-union officials could hold the proxies and thus watch over the interests of the employees. This does not set up a rival administration but brings about joint control by evolution and not by revolution. The question is, What employees should be recognized as stockholders? Should everyone, even if he joined in the company's operations only yesterday, vote today with those of longer affiliation?

There are many things that show that only those who have been with the organization for a number of years should be recognized as wage stockholders receiving dividends and taking part in the management. We could set the limit at ten years. There would not then be many such voters, and their enfranchisement would not make any radical change in industry. Every year or so the minimum could be reduced till it fell to six or even five years. This would eliminate any opposition except from the extreme socialists who refuse in any way to recognize capital. The workers might be encouraged to buy stock with their labor dividends and so eventually, receiving both capital and labor return, they would finally become predominant in the industry by a natural and desirable evolution. In fact, in the final wind-up, the only stockholders left would be the workingmen.

Thus what we look upon as revolution would be brought about by the peaceful and unopposed forces of evolution. Our society would be socialized with the good will of everybody.

Coal Operations in Newfoundland

A coal company consisting of more than 200 shars holders was organized in the early fall of 1918 to operate and develop the bituminous coal area in the district of St. George's, on the western shore of Newfoundland. By November, 1918, sufficient capital had been subscribed to commence operations, which have been continued to date. An entry has been driven in one seam a distance of 150 ft.; the level of this entry is about 135 ft. below the point where the seam outcrops. Over 250 tons of coal have been mined, and samples used in St. John's are said to have better burning qualities than any now imported. At the beginning of operations the coal seam was 4 ft. 9 in. thick and continued increasing in thickness up to 5 ft. 4 in. at the face of the entry, with every indication of further improvement as operations advance. The entry has opened up about 5000 tons of coal. By the last of May it is hoped the entry will have been advanced an additional 100 feet.

Illinois Mining Institute Meeting

The annual meeting of the Illinois Mining Institute will be held May 22, 23 and 24, on board the "Golden Eagle," which will leave St. Louis at 10:00 a.m. on Thursday, May 22, for Quincy and Keokuk. At 11 o'clock S. T. Jenkins will deliver the address of welcome, to which William Hall will respond. After lunch the afternoon session will start at 1:45 with a paper entitled "Power Transmission Methods in and Around Coal Mines," by W. S. Farnham, mining engineer of the Goodman Manufacturing Co., followed by one by Steve Gosnell on "What Constitutes a Proper and Lawful Examination of a Mine by a Mine Examiner."

At 9:30, Friday morning, J. C. Thompson, director of the Department of Mines and Minerals, will read a paper on "Should the Abandoned Workings of a Gassy Mine Be Sealed or Ventilated," followed by discussion. At 1:30 p.m. J. H. Tracey, electrical engineer of the Electric Storage Battery Co., will read a paper on "Care and Attention That Should Be Given Storage Batteries," and after discussion of this subject Martin Bolt, assistant director of the Department of Mines and Minerals, will read a paper on "What Has Been the Result of the Consolidation of All Mining Agencies in the Department of Mines and Minerals."

On Saturday, at 9:30, a business session will be held, the meeting adjourning at 11:30 on the arrival of the boat at St. Louis. Those desiring to attend the meeting should advise S. T. Jenkins, Boatmen's Bank Building, St. Louis, Mo., not later than May 20.

Convention of National Coal Association

The National Coal Association will hold its annual convention May 21, 22 and 23 at the Congress Hotel, Chicago, Ill. The opening session on Wednesday begins at 10:00 a.m., with a roll call of the association and individual members, followed by appointment of committees; address by H. H. Merrick, president of the Chicago Association of Commerce; business meeting; consideration of proposed amendments to the charter; reports of the president and general secretary. In the afternoon, at 2:30, the reports of the treasurer, finance committee, railroad relations committee, cost accounting committee, foreign trade committee, credentials committee will be read; also report of election of directors by districts and at large.

On Thursday, at 10:00 a.m., the board of directors will meet, after which the meeting will be addressed by Dr. H. A. Garfield, United States Fuel Administrator. At 2:30 p.m. the president of the association will address the convention, followed by A. F. Sheldon, president of the Sheldon School and founder of the Business Science Society, whose address will be on selling coal for a profit. The session will end with questions and discussion.

The morning session on Friday starts at 10:00, with demonstration of an open-price bureau in operation, followed by an address by H. A. Wheeler, president of the Chamber of Commerce of the United States, on "The Sherman Law." At 2:30 in the afternoon Mr. Sheldon will address the meeting on "Bolshevism and What American Business Men Should Do to Meet It," after which a little time will be given to questions and discussions, followed by report of the resolutions committee.



PANORAMIC VIEW OF EXPERIMENTAL MINE AND EXPLOSIVES STATION NEAR BRUCETON, PENNSYLVANIA

The New Pittsburgh Station of the Bureau of Mines—IV

By George W. Harris
Editorial Staff, *Coal Age*

THE Bureau of Mines each year finds an ever-increasing number of problems that require solution. For example, there is the work of the fuel section at the Pittsburgh station, which is under the charge of H. Kreisinger, fuel engineer. The situation regarding the supply and use of fuel throughout the country was most acute during the war period. There were many requests from the public for advice and for special direction in fuel problems, all of which tended to divert the energies of the fuel section from its normal activities; and in the midst of all this, the laboratories of this section were moved from the old arsenal in Pittsburgh to the new building on Forbes Street.

During most of the time this country was in the war the bureau collaborated with various Government organizations, such as the Fuel Administration among others, which required technical information about coal, mining, and allied subjects and industries. The assistance afforded by the chemical and mining sections in these matters has been referred to in previous articles. The station's fuel section took an active part in tests on fuel, boilers and so on, and work of this nature is still being carried on for the United States Shipping Board at Erie, Penn., where marine boilers are being investigated. This research includes the combustion of coal in the furnace and the absorption of heat by the boiler itself—in other words, the combustion and heat transmission processes are followed from the grate through the furnace and the boiler passes up to the stack.

This work applies to all boilers and is of special interest to those operating boiler plants in any industry. Hand-fired furnaces have been worked on up to the present time, but all types of stokers will be taken up by the bureau either in the field or in the laboratory. In this boiler work the temperature at the different passes is measured and the absorption of heat is studied at various points. In connection with this whole matter Mr. Kreisinger emphasizes the following fundamental idea: Coal in a hand-fired furnace is gasified in the fuel bed on the grate, and the vital problem is how to properly mix the combustible gases with air in order to burn them as they rise from the fuel bed. Sufficient air cannot penetrate the fuel bed to accomplish complete combustion; also, it is a misconception to think that the speed of combustion in furnaces depends on temperature. The most important fact is that the rate of combustion depends on the speed with which suffi-



FIG. 1. GROUP OF PITTSBURGH STATION SECTION CHIEFS

Left to right—R. H. Kudlich, mechanical engineer; S. P. Howell, explosives engineer; H. Kreisinger, fuel engineer; L. C. Ilsley, electrical engineer; S. B. Foley, metallurgical engineer.

cient air is mixed with the gases to burn them. The temperature in a furnace is always high enough to actually burn the gases, but the point is that there is not enough air intimately mixed with them to support complete combustion. Steam-raisers should be especially interested in the fuel section's work on marine boilers, and it is this type of boiler which is shown in Fig. 2. Referring to this illustration, an attempt is being made by the fuel engineers to introduce more air into the furnace and to mix it thoroughly with the combustible gases, first drilling holes in the furnace door; second, through holes in a bridge wall erected at the rear of the grate; and thirdly, by means of a transverse air pipe at the first baffle plate. The air pipe has nozzles along its length through which air is directed into the burning gases as indicated. This air should actually penetrate at least to the center of the gases over the fuel bed and a complete mixture be effected.

If combustion takes place in the middle of the nest of boiler tubes, the heat is mainly used to advantage only in the remaining half of the boiler. A consider-

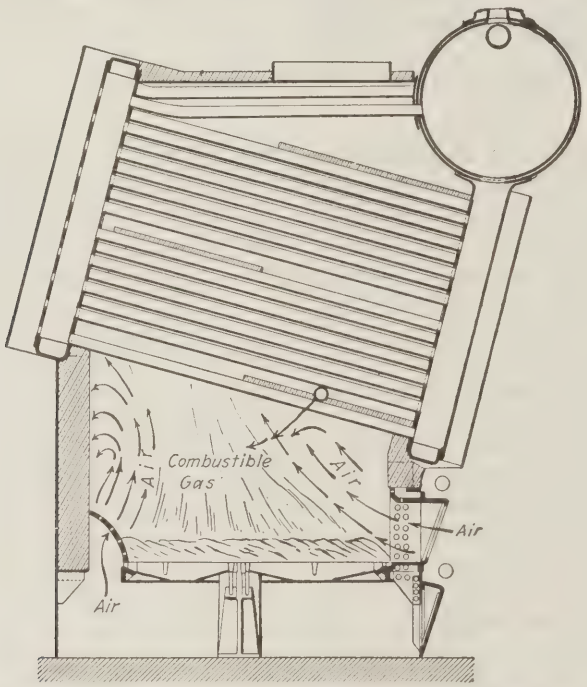


FIG. 2. SECTION OF MARINE BOILER SHOWING INTRODUCTION OF AIR

able percentage of the heat may be lost in that way. Often the flames continue through the boiler tubes into the stack, and this delayed combustion among the boiler tubes becomes quite a factor when the boiler is being driven hard. Proper admission and good mixing of air with the burning gases is a serious problem, and a great deal of information has been obtained in this connection. When the account of these investigations is published it should make most interesting reading. This work on marine boilers has been carried on in coöperation with F. W. Dean, of the Shipping Board, and the general trend has been in the direction of research of somewhat an advisory nature.

The fuel section at Pittsburgh has a large field to cover. Among various fuel activities striking progress has been made in the byproduct coking industry in the United States during the last few years, but the bureau has not been able to keep pace with advance in this field for lack of funds. Furthermore, the byproduct companies that control patents on ovens and processes in this country do not seem inclined to coöperate with the bureau, preferring rather to do their research work privately.

Mr. Kreisinger considers the saving of byproducts extremely important and believes that the byproduct coke oven has the biggest future of any of the methods of using coal. A large part of the bituminous coal should go to the byproduct plant, where the coal will be used to the greatest advantage. Here the byproducts will be saved and the coke can be burned under boilers. Black smoke coming from the coal-burning furnaces is an indication showing that we are using coal in the wrong way. That part of coal which causes the smoke escaping from the boiler stack could be much better turned into gas and liquid fuel. The heat units in gas are worth, for household purposes, eight to sixteen times as much as the same B.t.u. in coal under steam boilers. This attitude taken in regard to the proper method of using coal is from the standpoint of the fuel engineer. The chemist handles another phase of the problem, that connected with the drugs, dyes and other byproducts derived from the coal tars.

Powdered fuel offers another field for research work which the bureau will enter into energetically in the near future. Considerable progress has been made in the utilization of coal in this form commercially, and the fuel section plans to investigate processes already in use rather than to originate new methods. Those who have experienced difficulties when using powdered fuel will be assisted if they will coöperate to the extent of contributing the carfare and expenses of those sent to investigate such matters at their plants. First, the bureau will go to the plant where it will aim to locate troubles by trying out the process on a large scale. Then work on special individual problems will be carried on in the Pittsburgh laboratories and an effort will be made to solve them. Work of this kind will be started in the next few months and as much time devoted to it as is given to hand-fired problems.

Among other things, investigations will be made of what actually happens in the combustion space of a powdered-coal-burning furnace. There seem to be two main problems in firing powdered coal under stationary boilers—ash disposal and ability of the furnace to stand the temperature and effect of the slag. The furnace firebrick is affected physically by the slag deposited on it, and its chemical composition is also changed. But these problems are more or less common to steam boilers fired by any method. A study will be made of the composition of the ash and then an attempt will be made to devise a brick to stand up to the work. An endeavor will be made to lower the temperature, say to 2400 deg., and to do this by having the furnace absorb the heat close to the point where it is generated rather than by excess of air. The bureau will also take up the investigation of heating furnaces used by steel and other plants in which powdered coal is burned.

The problems just mentioned are some of those occurring to a practical man at first sight. Other investigations will go on by momentum gained in war work. Some kinds of work may not seem to be so important, but they are valuable research investigations nevertheless—for example, heat transmission in steam boilers among others. Heat-transmission apparatus will be installed in the fuels laboratory to test the efficiency of boilers under different conditions—using tubes of different diameters and lengths, for example; also, the

effect of initial temperatures, the velocity of gases and scale will be matters considered in connection with the efficiency of a boiler. Furthermore, small furnaces will be installed in the laboratory for testing the combustion of anthracite and coke, also carbon in soot. The combustion of coke is especially important to metallurgists. Some coke dissolves or is eroded rapidly in furnaces; other coke may not be quickly enough affected by heat. Tests will be made on coke of various physical make-up. While a considerable part of the fuel section's work is connected with the details of special problems, nevertheless much of its research has to do with the first principles which control the uses of coal.

A big field for research work at present is the utilization of lignite. The Government has recently appropriated $100,000 for investigations in this field, and the bureau is preparing to take the matter up intensively. Lignite in the main is used locally—in agricultural districts and in sections away from manufacturing centers. Speaking generally, 55 to 60 per cent. of the heat value of lignite is realized, whereas 65 to 70 per cent. efficiency is obtained in the case of a good coal. This difference is partly due to the moisture in lignite. A properly designed furnace should improve the efficiency. A promising future opens up for lignite when used in gas producers. Here the moisture in the lignite is not so detrimental. In general, it is necessary to fit this fuel to market conditions and put it to such use for which it possesses natural advantages. The same is as true of lignites in Texas as in the Dakotas, but in the former state the lignite deposits are within 50 miles of the coast, and may be utilized for industrial purposes.

Those investigations relating to the prevention of electrical shocks, electrical fire hazards and the initiation of mine explosions by electric sparks, flashes or electrical phenomena are conducted by the electrical section. This section is under the direction of L. C. Ilsley, electrical engineer.

The Bureau of Mines has developed a system whereby mine apparatus that meets certain requirements for safety is approved as permissible for use in gaseous mines. The electrical section has done considerable work in this connection. A number of motors for use with coal-cutting machines have been approved and several types of electric miner's safety lamps have been developed and are on the permissible list. These approved lamps are being widely used by the miner. They materially increase the safety of mining and also in many instances increase the efficiency of the workman.

This approval system is worthy of a few words in explanation: Several steps enter into or lead up to the establishment of a line of permissible equipment: First, a decided need for such approved apparatus must exist. Being assured of the need, a preliminary investigation is made of such apparatus as is then on the market or contemplated. From information thus gained an official schedule is prepared outlining conditions under which tests will be made, fees to be charged for conducting tests in conformity with the schedule, etc. These schedules are sent out to anyone interested in that particular line of equipment. This gives every manufacturer an equal opportunity, which is entirely optional on his part, of submitting equipment and having it on the Bureau of Mines permissible list.

In the past a number of manufacturers have submitted equipment to be tested under permissible schedules with a resulting improvement in equipment and greater safety to the mining public. The future of this system is assured. The calls for new lines of approved mine equipment are frequent. Such a system bearing so intimately on questions of safety can not but have a bearing on mine compensation insurance. It seems probable that insurance rates will be reduced wherever permissible apparatus is adopted. If such is the case, there will be an added incentive for purchasing approved equipment. No police power is exercised by the Bureau of Mines as to the use of approved equipment in the several states, but many operators insist upon apparatus having the permissible seal of the bureau.

The electrical section is at present occupied with the tests of equipment submitted under the different permissible schedules and in conducting preliminary investigations to obtaining data for the establishment of new schedules, chief of which are for shotfiring batteries and storage-battery locomotives. In addition to the foregoing the section is interested in rules and laws connected with installation, inspection and maintenance of electrical equipment.

In all investigations bearing on the approval of equipment an effort is made to be practical. Laboratory tests



FIG. 3. MOTOR TESTING GALLERY NO. 5

are followed up by field investigations. Also, all approvals are conditioned to satisfactory field performance. Several bulletins and technical papers have been published covering different activities of the section.

Motors for use on various mine equipment are tested in gallery No. 5, shown in Fig. 3. This testing gallery is located just outside the main building adjacent to the south end of the chemical wing, and consists of a steel shell arranged so that air and gas can be mixed in it in any proportion desired. It is surmounted by a small crane by which the lid of the gallery may be removed to allow pieces of machinery to be lowered into it. To prove the suitability of motors for use in atmospheres containing firedamp, the motor to be tested is placed in the gallery, which is then filled with an explosive mixture. It is also made certain that this gas mixture fills the case around the motor itself. The gas inside the motor is now ignited. The protecting case to the motor

is considered satisfactory provided no flames issue from it and provided the gas in the gallery outside the motor is not ignited by the explosion which takes place within the motor. Fifty or more tests are usually made for each motor investigated. In addition to this test, the apparatus is carefully inspected to see that all motor casing joints have proper flanges; also, to see that there are no through bolt holes or other openings which will permit flames to pass to the outside. It is assumed that gas will be fired in the motor case at times, and the explosion must not propagate from the motor to the surrounding atmosphere.

Interesting investigations are being conducted in the mechanical section at the Pittsburgh station by R. H. Kudlich, mechanical engineer, under the direction of the chief mechanical engineer of the bureau, O. P. Hood, with headquarters at Washington, D. C. Mr. Kudlich is investigating mechanical appliances used about mines, with special regard to safety. At present safety catches for mine cages are receiving attention, and this work will lead to the establishment of a schedule for the approval of this type of apparatus similar to the plan followed by the electrical section and to the development of really efficient safety catches. Much other mine equipment will be similarly investigated in the future. Shaft gates, overwind devices, cages and skips, hoisting ropes and other mechanical haulage devices are a few of the many things considered as problems for investigation. These all have to do with the safety of the miner and naturally have first place. But conservation of resources and elimination of waste also constitute an important part of the bureau's work. Under this latter would logically come the economic handling and preparation of coal in the mine and on the surface.

We consider our work always in a course of evolution, says S. P. Howell, explosives engineer, in charge of physical tests of explosives and blasting supplies of the bureau. Additional tests are instituted from time to time if they mean increased safety or efficiency in the use of explosives. Changes in the methods of the explosives section are made after due consideration and study of conditions, or after conferences with the users or manufacturers of explosives. The headquarters of the explosives section is at the Pittsburgh station. Here also the explosives-chemical work is done. But physical tests of commercial explosives are made at the Explosives Experiment Station built adjacent to the Experimental Mine near Bruceton. The men carrying on this work have the proper sociological benefits. An up-to-date wash and changehouse has recently been installed for both the mine and explosives station men. Also a clubhouse has been completed where single men may live and where hot lunch may be served to all employees. It is hoped that in time houses may be built at this field station for employees with families.



FIG. 4. PORTION OF ELECTRICAL LABORATORY SHOWING APPARATUS FOR TESTING EQUIPMENT

With such improvements in view, the bureau expects to acquire more land for the purpose.

The explosives testing station was built for peace purposes, but a great deal of war work was done there for the United States Engineers and the Ordnance Department. These special investigations are about finished now and peace work will start again. At this station tests are made primarily of all explosives and blasting supplies used in mining operations, and a large portion of the time is used in testing explosives to determine their permissibility for use in coal mines. An important special work recently has been the proving of the practicability of T N T for industrial purposes—but not for use in coal mines. A tremendous quantity of this explosive was accumulated in this country for war purposes. The present tendency seems to be to divert this valuable asset essentially to Government departments—that is, to have the Reclamation Service, the Alaskan Commission and other similar projects use all this explosive.



FIG. 5. BOMBPROOF FOR TESTING EXPLOSIVES

The explosives section has been doing some T N T research work, but in a way not to interrupt the regular work of this department. At present requests from manufacturers have been made for tests of about 40 explosives—so there is a quantity of work on hand. The metal-mining men especially want to know what gases are given off by explosives. This is important, for in metal mining much larger amounts of explosives are used than in coal-mining work, and the ventilation is not so good in a metal mine as in coal workings.

A good view of the new Explosives Experiment Station buildings and the plant at the Experimental Mine is given in the headpiece. The former buildings have only recently been constructed. However, the apparatus used at the old arsenal was set up here and in moving such equipment from the old site and establishing it at the new station improvements were effected in installation and operation. The various pieces of equipment are distributed in three buildings which are located about 50 ft. apart. The fourth building is an office.

The old gas and dust gallery moved from the arsenal grounds to its new location here has been described in the Aug. 25, 1917, issue of *Coal Age*, under the title, "Coal Mine Investigations—III." This gallery is a steel tube simulating a mine entry and has an internal diameter of 6 ft. 4 in. and a length of 100 ft. The new features added to it include an extension of 145 ft. consisting of a 20-ft. movable section between the old and the new parts. This gives a gallery 245 ft. long. The 100-ft. portion of this tube will be used for testing the permissibility of explosives. When the movable section is in place it will form a gallery which the Experimental Mine engineers propose to use for testing the explosibility of various coal dusts. The ballistic pendulum, large and small impact machines, pendulum friction device, Bichel gages, calorimeter and flame tests apparatus are used here the same as at the arsenal. All buildings here are constructed of hollow partition tile with stucco outside and concrete foundations and floors.

The bombproof, where the rate of detonation of explosives is determined, is constructed entirely of concrete and the greater part of it is below the surface of the ground on the hillside (see Fig. 5). The top is well reinforced with iron rods; 1-in. armor plates protect the top and sides of the interior against shots. Considerable war work has been done here. It was started in August, 1918, and is still going on.

Shortly the explosives section will carry on similar work to the war research, with permissible explosives. In making these tests the explosives are placed in tubing through which four wires pass transversly. From the bombproof the wires are carried to a Mettegong recorder in an adjacent house, as shown in Fig. 6; it registers the interval of time between the breaking of each of the four wires passing through the explosive in the bombproof. The practical value of this work lies in the fact that explosives with a high rate of detonation have a great shattering effect.

One of the most recent sections to be instituted at the Pittsburgh station was the metallurgical. This section was organized during the war and was run on a coöperative basis with the Ordnance Department. Samples of steel which went into service under the War Department passed through the metallographic laboratory at Pittsburgh. Here steel was examined under the microscope with respect to general conditions as to heat treatment and quality of metal. An intensive study from the viewpoint, both of the laboratory and the plant, was made of certain defects which occasioned the greatest trouble to ordnance manufacturers with the idea of locating their cause and finding means for prevention. Not only was steel examined here, but non-ferrous alloys as well. Out of this war work various problems have come forth in the field of iron and steel and ferrous and non-ferrous alloys to which this section is giving its attention. In this connection an instance can be cited—the investigation of ferromanganese production in the blast furnace, which started during the war, is being carried to a conclusion and will doubtless lead to excellent results.

With the reorganization of the Bureau of Mines personnel after the war, there will be quite an increase in the Pittsburgh station force. At the present time, says Mr. Lyon, there seems to be two branches of research which should be emphasized at this station in addition to the investigations already being carried out there; that is, work on fuels and in the line of ferrous metallurgy. This station being in the world's greatest coal and iron industrial center, it will be possible to make a most intimate study of both problems. All these advantages and the splendid equipment of the new building should attract to the Pittsburgh station other high-class men wishing to undertake research work and make this the greatest technical laboratory of the world.

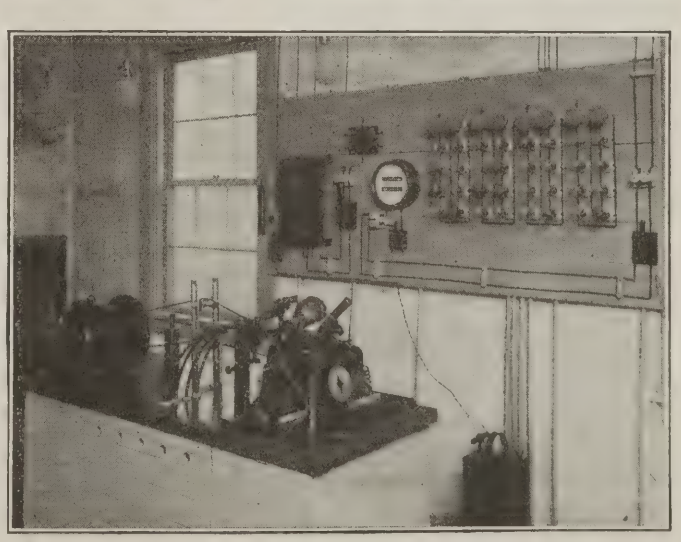


FIG. 6. METTEGONG RECORDER FOR REGISTERING TESTS



Some of the Problems That Beset the Exporting of American Coal

By far the livest matter of coal interest in Washington this week is the export problem. The fact that the plans being worked out by an interdepartmental committee have been kept as secret as possible has caused much additional speculation.

Some features of the plan, which have leaked out, are not meeting with unanimous approval from the coal industry. It is stated that the Government is more interested in supplying coal to meet a temporary demand in certain European countries than it is to pave the way to build up a permanent exporting trade in South America and elsewhere, and is anxious to obtain detailed supervision of this export trade.

Italy is said to be requesting 1,000,000 tons of American coal each month. Switzerland wants 60,000 tons a month. France wants 5,000,000 tons to be delivered at Mediterranean ports during the next twelve months. Northern Africa will require some 2,000,000 tons during the next year. Some of the coal men are inclined to object to having their industry turned into an eleemosynary organization without some compensating advantages. This is especially the case when England is busy making five-year contracts and otherwise doing all it can to reëstablish itself in South America.

Despite the exceptions which are taken to the preliminary plans which are being worked out, there is reason to believe that a program will be arranged which will allow much of the emergency coal to move to Europe and at the same time secure for coal exporters some valuable assistance from the Government in obtaining permanent business.

Some predict that before many years practically all of the coal for Mediterranean ports will be brought through the Dardanelles from the Russian mines. The possibility that some of the coal producing nations of Europe may have foreseen this condition is thought by some to be the reason why they are willing now to allow themselves to be undersold in the Mediterranean by American coal.

A combination under the Webb Act is not looked upon with favor in some quarters. It is felt that the export coal business must be handled by a private corporation. Five factors enter into export coal: Production, selling, financing, transportation and docking. It is feared that the producers of export coal will not be willing to pool their outputs. Central Pennsylvania and West Virginia producers, for instance, might not be willing to pool their outputs. Various districts might be mentioned where such an agreement would be very difficult indeed to obtain. In the same way, there would be too much conflict between the existing selling organizations to allow their activities to be pooled.

The other three factors, however, can be pooled. The railroads will look after the docking in the United States but the business of exporting coal is too young to attract the capital of individual American companies into the uncertain field of dock-building in foreign countries. As a result, other docks must be obtained. In many cases, these are already in the hands of the English.

Shipping is uncertain. Therefore, it has been proposed to leave production unrestrained and selling on the other side unrestrained. At the same time, it is suggested that a few of the large corporations combine to look after financing, ocean transportation and foreign dockage. A powerful corporation of this character could make contracts with those in control of ships, which would provide for the carrying of coal in any quantity to any place. Temporary or permanent docks could be provided as needed and arrangements could be made with bankers, so that coal operators could get their money when their coal was dumped at tidewater. Under this plan, the inspection of the coal would be placed in the hands of the Bureau of Mines, thereby insuring the receipt at foreign destinations of coal conforming to Government specifications.

Uniform Bill of Lading Prescribed by the Interstate Commerce Commission

Proposals looking to a special form for bill of lading for coal shipments were dismissed by the Interstate Commerce Commission on Apr. 30, when in its bill of lading opinion, is said briefly: "We are not convinced, upon consideration of all the facts of record and the arguments made in advocacy of such bills, that they are essential. It is believed that the uniform bills prescribed will be adequate to care for any peculiar requirements of such traffic."

The opinion covering the matter of bills of lading is regarded as one of the most important ever issued by the Commission. It does not deal with the negotiability features of bills, those matters having been definitely taken care of by the so-called Pomerene Act. It discusses the fundamentals and history of the common law of the carrier's liability and its contractual exemptions from and limitations of liability, tracing the development of the law in this country down to the time when Congress, by reason of conditions that had come about and in view of the decisions of the Supreme Court sustaining the validity of contractual limitation in many important cases, found it necessary to enact legislation imposing certain specific duties upon

carriers respecting the issuance of bills of lading and making unlawful some of the exemptions and limitations of liability for which, under the common law, they had theretofore been free to contract with shippers.

The report is accompanied by forms of bills of lading which the Commission finds would be just, reasonable and lawful to be used upon the lines of all carriers subject to the act to regulate commerce.

Program of Convention of American Wholesale Coal Association

The main features of the program of the American Wholesale Coal Association's convention, which is to be held in Chicago June 3 and 4, have been decided upon. J. D. A. Morrow, vice president of the National Coal Association; James F. Callbreath, secretary of the American Mining Congress; John E. Lloyd and W. R. Coyle will discuss different phases of coöperation between different branches of industry. George Otis Smith, the Director of the United States Geological Survey, will deliver an address on "The Best Use of America's Coal." Gibbs L. Baker will speak on "The Wholesaler in Coal and His Taxes."

Government control is to come in for discussion as follows: Do the Wholesalers Want the Government to Help the Coal Trade in Any Way? by C. M. Moderwell. Subdivisions of the question will be discussed as follows: (a) To hold reserved coal land in reserve until needed—E. W. Parker. (b) To modify anti-trust laws with respect to the mining industry—E. W. Sims. (c) To help with the practical movement in conservation—Van H. Manning. (d) Do the wholesalers believe that politicians could be compensated in any way for thus serving the public purpose? That is, in exchange for help given the coal industry, is it necessary to give the politicians any power over coal; or should Government help be demanded as a right inherent in the coal industry?—L. Romanski.

Coal distribution in several of its phases is to be discussed by Gibbs L. Baker, E. M. Platt, J. V. Mayhew and D. C. Shoemaker. Railroad control is to be discussed by George H. Cushing.

A banquet will be held the night of June 3. Noah H. Swayne, F. S. Peabody and G. H. Cushing will be the speakers. The convention also will listen to the regular reports of officers and committees.

Suggests a Coal Policy for Alaska

In a report submitted to the Alaskan Engineering Commission, Andrew Christensen declares that the following must be considered in adopting a coal policy for Alaska:

1. Whether there should be any change made in the coal land leasing law of Oct. 20, 1914.
2. Whether there should be any changes made in the terms of the present lease and the leasing regulations under the law.
3. Whether or not the Government should undertake a thorough prospecting of all the leasing units in the Bering River and Matanuska coal field.
4. Whether the navy should undertake the mining of coal under the million-dollar appropriation.
5. To what extent if any should the Government undertake the mining of coal.
6. Should the Government interpose objections to the construction by private interests of railroads into the Bering River coal field.
7. If so what should be the policy of the Government with reference to furnishing the necessary transportation facilities for the Bering River coal.
8. What steps if any should be taken with reference to furnishing necessary transportation facilities for coal between Alaska and the States.

These questions are all vital to the success of the development of the coal industry in the Territory and should be given immediate and careful attention.

The Alaskan Engineering Commission itself is actively engaged in the mining of coal. Its mining work is in charge of Sumner Smith. The principal work is being conducted at Eska and at Chickaloon.

Believes Large Savings Possible in Mining and Marketing of Coal

By stopping the waste in the operation of coal mines, it is possible to cut the cost of production by 40 per cent. of what it was formerly. By avoiding waste in wholesaling, it is possible to cut the wholesaling cost 16⅔ per cent. under what it has been heretofore. The cost of retailing coal can be cut down 33⅓ per cent. These conclusions are those of George H. Cushing, secretary of the Wholesale Coal Association, who has made a careful study of the matter. To illustrate the principal waste in the retailing of coal, Mr. Cushing cites a personal incident:

"I have a friend in the retail business, and I have a house in the suburbs of Chicago. One winter I wanted to buy 20 tons of coal. I gave the order to my friend. His yard was in the south end of Evenston. I lived in the south end of Winnetka, 7½ miles away. The retailer took a $5000 truck and delivered those 20 tons of coal. In doing so, he drove his truck past the yards of 25 retailers and passed 35 public team tracks. On the day he delivered coal to me there was a delivery of coal from Winnetka to Evenston."

Regarding the anthracite situation, Mr. Cushing believes "it is going to stay down until autumn. We are going to have a shortage of anthracite next winter."

New Specification for Army Coal Will Embody Wage Scale Clause

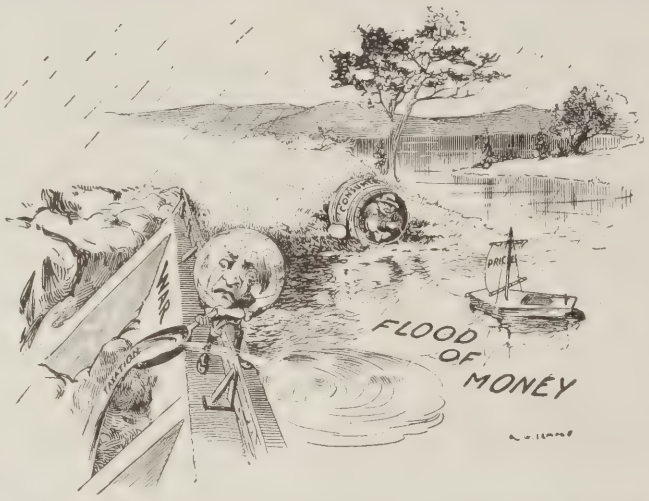
Because the War Department specification for 2,000,000 tons of coal for Army stations for the fiscal year, beginning July 1, contained no clause as to the wage scale of miners, it has been withdrawn. A new specification is being prepared which will include a wage scale clause. It is believed that the matter was an oversight and that the War Department had no idea of not recognizing a labor situation which other Government departments thought it wise to acknowledge. The contracts being made by the Bureau of Mines for fuel for the Government coal yards contain the following clause:

It is agreed that, whenever a change in the mining rate is accomplished or followed by a change in the same direction in the day-wage scale, for every cent of increase or decrease in the mining rate there shall be an increase or decrease of two cents in the price to be paid for the coal furnished under this contract; for every cent variation in the mining rate, not accompanied or followed by a change in the day-wage scale, there shall be a change in the price of the coal equaling the change in the mining rate; and should there be a change in the day-wage scale only, or should the mining rates change in one direction and the day-wage scale change in the other, the price of the coal shall be adjusted accordingly.

EDITORIALS

Still More Media of Credit

THE war added immensely to the currency and to the credit media of the nations. The world will try to ladle out the flood by making taxation large enough to gradually extinguish the debt. How large is that flood and how small is the ladle! Surely the task will be long. Meantime we have floated a further loan and increased still further the media of credit. We are even now incurring more indebtedness by the conduct, at a loss, of our railroad affairs; for that loss will have to be met either by a further loan or from taxation revenues, in which latter case it will prevent or delay the reduction of our debt. The other nations are facing a similar condition. The people are clamoring for social reconstruction on the top of the expenditures for the war. They are like the woman who, when her husband purchased an automobile, seriously crippling his financial standing, wanted to know why he did not also build her a home. The workers are saying, "If you expended so much on the wastes of war, why can you not expend a like amount on the construction work of peace or on the lowering of prices?"



CONSUMER (in the barrel)—It keeps on raining, and the old fellow makes slow progress ladling out the flood with his saucepan. A sure guess is that the good yacht "Prices" will sail even higher before long.

Because of such reasoning the nations are increasing their debts and their instruments of credit. They have programs which will make it hopeless for them to do much more than "break even" year by year. They are to be congratulated if they do not borrow further and heavily.

Thus to the stately wall of obligations erected during the war is added the flash-board built up during this reconstruction period. Will the flood subside? The better guess is that is will rather rise day by day. The small, but much deplored, national debts that preceded the war, were, as we all remember, but little reduced year by year.

For this reason we cannot expect lower prices, but may have to look with dread lest the prices rise higher than will serve merely to stabilize business.

Company propaganda is a little new. Just as the activities of the union in creating divisive sentiment were, when new, regarded as a crime, so the activities of the operator in creating a coöperative sentiment between capital and labor and emphasizing certain economic truths are regarded as offensive and improper. Yet surely the operator is justified in saying something in his own defense.

Our New Period Needs a New Press

PLAYING a popular chord is a favorite sport of newspaper men. They quite generally learn the kind of tune that takes the public ear, and they play it, whether they approve it or not. A sample of such subservience to the public taste is afforded by the following quotation from a leading Philadelphia paper.

"Petitions are being prepared, it is understood, to ask the county commissioners to raise the coal-land assessments in Northumberland County to somewhere near the real value of the properties. It is generally agreed that the present assessment of $17,000,000 on all anthracite owned in Northumberland would be entirely too low as compared with anthracite values which have advanced with leaps and bounds since the war started. If anthracite properties are to be assessed at what they are really believed to be worth, it is said, they would go up into the $10,000,000,000 or more. But this cannot be expected and if the assessment is raised to $50,000,000 it will probably be resisted in the courts.

"T. Ellsworth Davies, Scranton, mining expert, says there are 3,803,710,965 unmined tons of anthracite coal in Northumberland. Figuring this at $4, which is $2 under the lowest market price of $6 a ton, the valuation of the coal properties, it may be seen, would look like $12,000,000,000."

But why figure the value of the coal in the ground at $4 a ton when it is only rarely worth one-eighth of that price. But if it were really worth $4 as suggested, what would the capitalized value be of $15,214,843,860, payable in equal installments for 631 years and 10 months; for the coal, if all obtainable, would take that length of time to extract at the rate of production in the year before the war. Certainly, it would be prodigiously less than $12,000,000,000. All the coal that would be mined 100 years from today would have absolutely no present value, as any actuary would promptly assure us. Another consideration presents itself: The tonnage estimate is a marvelous calculation. If memory serves us, it sets the life of the anthracite region, at least of the Northumberland field, far beyond the bounds of any other estimate.

No attempt is here made to set out the actual status of the Northumberland field. That is best left to the experts who are acquainted most intimately with its conditions. All that has been done has been to indicate broadly how fallacious is the estimate of the

newspaper correspondent. No one can excuse a misrepresentation which overlooks all the many costs and puts the value of the coal under the hill at a figure $2 below the market price.

With three times as much currency as before the world war, it is easy to imagine what will happen as soon as business moves along with assurance and speed. Just now, money is not moving; but as soon as it gets active it is quite unlikely that prices of materials and labor, especially of the depressed nonunion labor, will remain at their present level.

Essentials of Bolshevism

BY REASON of his orderly, logical and careful presentation of his subject, Dr. Steinmetz, in an address delivered before the Editorial Conference, and printed on page 904 of this issue of *Coal Age*, admirably disguised the fact that he was advocating the essentials of bolshevism, which we believe are rightly defined as the advocacy of "the ownership by the worker of the tools of production." He carefully sifted out all the elements of class hatred, for such matters can find in him no answering spirit. They are not of the essentials of bolshevism, but an excrescence which is so common that we have come to regard it as inevitable.

Mr. Steinmetz does not believe in revolution but in evolution. He does not, after the manner of bolshevists, regard the manual worker as having an exclusive right to existence. His doctrine is not unlike that held by many of the largest and best of capitalists, though they might not accompany him on so long an excursion as he has taken. The system he advances might be called "industrial democracy," but it seems to go further and is in many ways safer, for an industry is better protected when the workingmen have a financial interest in its conduct than when they have merely directive powers without any financial risk to run.

The reader will enjoy Mr. Steinmetz's remarks. They sketch amazing possibilities of coöperation. Everyone would like to believe that what he has drawn is a symbol of something which may exist sometime, somewhere in the future.

The capitalist is not by any means adverse to a just and well-ordered existence when all will work together, as do the men on a college athletic team. There is no reason why, if that spirit and quality would enter into every one, any captain of industry should fear at all the advent of the industrial democracy that is being so widely heralded. If it is only like this, he will say, it cannot come too soon.

Some of us who have been on drives for the Red Cross, the War-Work Campaign, Liberty Loan, hospitals, orphanages, churches and what not, and felt with what ardent coöperation everyone—capitalist and workingman—is ready to respond to the demands of his fellow and the community, have on our return been ready to say: "Here is material for any kind of a republic—bolshevist, socialist, anarchist or what not." But, unfortunately, we are hampered all the time by the exceptional men, those who have no social spirit and in whose hearts are found only negative qualities. We could leave our doors wide open at night without fear of 90 per cent. of the passers-by. At least that portion would leave our goods wholly unmolested. What an argument for anarchy! Unfortunately, the other 10 per cent. might rifle the premises from end to end. What an argument for bolts and bars, and laws and capitalism!

Dr. Steinmetz admits that the advances should be made tentatively, and with care. He advises us to try it first on the older hands in the factory, because that is fair and prudent. Alas, the union objects to making fish of one and fowl of another. For a precisely similar reason, the union leaders are opposed to service pensions because they bind certain men to the corporation and make their interests inimical to the other men in the employ of the same corporation. Still, service pensions exist, though it is known that they do create this friction and prevent changes of employment and also cause discrimination between employees. In every scheme some faults may be found, and any scheme succeeds only if all parties approach it in the right spirit. All schemes must fail if their accomplishment is ventured in a spirit of suspicion and anger.

Unfortunately for Dr. Steinmetz's suggestion, those factories and mines that are moving along smoothly do not feel keen for so radical an innovation, even in small doses, while those business institutions that are alive with dissention are poor places in which to try it. In small concerns the difficulties are not trying enough for the owner to act, for there is always a better accord between employer and employed; and in large concerns the risks to be run are considerable, for the brotherhood feeling is hard to develop. Facts like these make experiments in bolshevism less likely than might be wished and somewhat hopeless if tried.

Industrial democracy and its associated schemes like political democracy demand not merely a new system, but a new people—men who understand economics and business, men who are open to improvements and changes, and will adapt themselves to them; an educated, coöperating and idealistic body of men. The qualities can be acquired, let that not be for a moment doubted. Democracy is a breeder of the qualities it needs for its perpetuation. It gives the strength and judgment required for its own consummation. We must move slowly upward toward a new day, whatever that day may be—a day when we shall be free as air and restrained only by our moral consciousness—anarchy—a day when we shall be regulated by the mind of the mass in every action we perform—socialism—a day of the new capitalism when every worker will own the machinery and direct his own employment—bolshevism—a day when we shall help direct our employment but not own the machinery of our trade—industrial democracy.

All the new isms are so strange and uncertain. No wonder some of us cling to capitalism with its dynamic urging toward maximum production and effort, and with its checks on unproductive operation. It is frankly based on what can hardly be called a virtue—self service—but its operation has been modified again and again by considerations of a nobler nature.

Steinmetz makes us think, and think kindly, and thoughts of this kind never are amiss. A kindly thought is in itself a revolution.

Proclaiming loudly the prevalence of graft, dishonesty and self-seeking, the advocates of industrial democracy, bolshevism, socialism and anarchy demand a new order which can only be successful if the crimes enumerated are banished from the human race and a reign of public spirit and self-sacrifice replaces ambition. Eras of trial must pass before we can hope for that consummation.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

While the labor situation seems marked only by trivial and local strikes and strike threats, and appears just now to be developing no new underlying policy, it must not be forgotten that the advocacy of the shorter day and shorter week and nationalization of mines is still proceeding. Because these aspirations do not, at the moment, cause strikes is no reason why they should not be viewed with apprehension and met by argument.

Some mine workers probably will say there should be no argument. They want both shorter time and Government ownership and they will have both or know why. They may be borne with, and with patience. The same position was at one time taken by the reactionary capitalist. "It is my capital," we have all heard him say. "They may take the job or leave it." "It is my labor," the workingman responds. "They may use it as I say or leave it." But no one can afford such an uncompromising stand. We, none of us, have the right to demand compliance to a new regulation without granting the party thus inconvenienced a parley and definite consideration. No one can lay down the law and say, "I have said so and that settles it." Neither labor nor capital must be arrogant, or the world in general which must be served by both will stand by neither, but by its own interests and rights.

ENTER THE CONSUMER, MASTER OF US ALL

If certain laboring men propose to act the drone, or profiteer, or restrict production, or oppose development, the great master, the consumer, will not brook that attitude. Only a consumer who, himself, in his employment, is already demanding equal ease, equal profiteering, equal restriction of product and is similarly opposing development will stand side by side with the laboring men in question.

We must all be citizens of a common country, working for one another, not conspiring against one another by unions and combinations to make each other pay more or receive less, unless, indeed, we happen to be victims of a real injustice, which cannot otherwise be righted.

But there are incidental items of news to record and discuss, and it is well to turn to them, as illustrating the progress of labor adjustment. On May 2, Charles P. Neill handed down a decision under which 200 contract miners of the Lehigh & Wilkes-Barre Coal Co. will receive much back pay for work done since 1917. The men had urged that they should be paid for the removal of rock in the robbing of pillars. Pillar work is, of course, less onerous than advance work. Everyone is looking for pillars to draw, and it is therefore quite the ordinary practice to let out such work without any of the compensations granted for solid mining. The company contended that when the agreement was made to compensate the men for taking rock from chambers, pillar robbing was not included.

NEILL MAKES ONE RULE FOR ROOM AND RIB WORK

However, the umpire decided that the miners in pillar work were entitled to the same allowances as men working in places which were more difficult to mine. The decision, not being before us, it may be presumed that it was based on the fact that express provision against the application to pillar work was not contained in the rate sheet.

On May 5 the umpire delivered another important decision to the effect that contract miners who were taken off their regular work for an emergency job should be paid the rate called for in their scale if the pay for the other job is less. In this mine, when two miners were pulled out to do emergency work, one was regarded as a miner and paid miner's wages and the other as a laborer and paid laborer's wages.

The umpire, however, made an altogether different ruling about those men who were called upon to perform laborers' duties in clearing away rock which fell in their own chambers. The contract miners of the Harwood Coal Co., whose scale was $3.30 per day, were paid only $2.68 for laborer's work and sought the difference; but this was denied them by the umpire. It may be pointed out that the work in question naturally fell to them. They were not chosen for the work by the company, and it was clearly one they were doing on their own behoof.

UMPIRE NOT A SHIELD FOR INCOMPETENT MEN

Mine workers cannot be expected to be reinstated in their jobs if the operators can show that they were discharged for incompetency, ruled Charles P. Neill, on May 8, in dismissing the complaint of Henry C. Singley against the Evans Colliery Co., of Beaver Meadow. Singley claimed he was promised $100 a month, but did not get the extra war allowance. The company proved that it had placed Singley in another position to that originally provided for him because he lacked experience for the job for which he had been hired, that he was finally dismissed, although paid his $100 wages while working in a subordinate capacity.

At the Drifton mine of the Lehigh Valley Coal Co. the miners have resumed work, the men being willing to leave the adjustment of the dispute to the officials and the company. On May 7 the Mount Jessup Coal Co.'s employees, to the number of 400, went on strike, leaving only the company men at work. The men claimed that their wages are being reduced, especially the wages of the contract miners. The committee denies that it has any inclination to the notions of the Bolshevists or Industrial Workers of the World. It declares, however, that whereas the wage formerly averaged $6 to $7 per day, with the reduction only $4.76 per day is earned. Torquato Natale and Giovanni Liberante are members of the miners' committee. The colliery affected lies in the storm center of the anthracite region—northern Lackawanna County.

Three hundred employees of the Racket Brook Coal Co. declared a strike on May 7 because the company refused to reinstate a motorman and brakeman who had been discharged.

FRANCOIS MINERS WANT NO RED FLAGS AROUND

Every now and again we see glimpses of the real saneness at heart of the West Virginia mine workers. Their strikes have been bitter, and the violence connected with them has, at times, aroused public apprehension. But the men are true-blue Americans, and revolutionary bolshevism and socialism with their red flags do not meet with any response from them. This was demonstrated on May 1 when some foreigners raised a red flag over their home near the Norwood plant of the Francois Coal Co., near Clarksburg, W. Va.

Patriotic miners were assembling at the company's tipple ready to march on the home of the Socialists when officers arrived and forced the foreigners to surrender the flag, which was torn to shreds. A few soldiers kept watch to see that no other red flags were raised during the day. A recent act of the legislature makes it unlawful for any person to display a red flag or even to have it in his or her possession.

For several days during the first part of May, traffic on the Kanawha River was suspended as a result of the strike among the boatmen. The shipment of coal in barges from a number of points along the Kanawha River was

consequently suspended. The boatmen went on strike because their wages were reduced a matter of $30 a month.

In our issue of Apr. 17, p. 720, appeared an article entitled "Should Binder Figure in Coal Thickness?" In it was described the difficulty in the Elkins field as to whether in arranging payment under the scale the thickness of the binder, which is not coal, should be regarded for the purposes of measurement, as if it really were coal. That difficulty still arouses opposition between the contending parties. The miners regard the binder as part of the coal, while the operators declare that the 5 ft. is for clean coal excluding binder. No agreement has so far been reached.

In Missouri, according to William H. Lewis, who is the State Labor Commissioner, there are approximately 40,000 men out of work. He adds that a large portion of these men belong to the mining industry. That, however, by no means necessarily means coal mining exclusively, for the coal mining industry is supplemented by the mining of lead and zinc. In Illinois, it is reported, 20,000 miners are out of work and 70,000 others are working only two days a week.

Labor Leader Found Guilty of Embezzlement

Emmet Moore, who had been entrusted with the funds of the local union of the Macon (Mo.) mine workers, admitted at his trial that he was short $5000 as was exhibited when the auditors went over his books. The case was tried before Judge Drain in the circuit court. Mr. Moore asked the court to allow him a few weeks to work in the mine, so that he could lay up enough money to take care of his wife and two children while serving his time.

Judge Drain allowed him until June to work in this manner, when a penitentiary term of probably five years will be passed on him. Moore has the sympathy of the men from whom he embezzled the money, as he comes of a family which now holds and will retain their respect.

The strike of the 6000 mine workers of the Central Coal and Coke Co. was settled on Apr. 26. Mr. Taylor announced that the trouble was an outgrowth of a change in the time for operating the cutting machines. Because of certain technical difficulties, the company contended that the cutting-machine force should start two hours later than the loading shift. The miners agreed that if both shifts started simultaneously, as they demanded, they would guarantee that the technical difficulty would be removed. It was so agreed.

Mr. Taylor remarks: "Dr. H. A. Garfield sent John L. Lewis, vice president of the United Mine Workers of America, here to confer with Alexander Howat, president of District No. 14 (Kansas), and John Wilkinson, president of District No. 21 (Oklahoma, Arkansas and Texas). He arrived here Tuesday (Apr. 22). I, as representing the Central Coal and Coke Co., entered the conference yesterday (Apr. 25) and this morning we reached an agreement. I submitted the understanding by long-distance telephone to Doctor Garfield, and he approved it, and in consequence the miners will return to work Monday morning (Apr. 28)."

Claim That Safety Powder Is a Handicap

But another strike is threatened in Oklahoma as a result of a dispute about the wage scale in the Hartshorne district. It is claimed that the "safety powder" used in some of the mines will not permit the men to produce as much coal as black powder. In some instances where safety powder is used the operators have raised the wage scale to make up for the decreased output per man. In the Hartshorne district no allowance is made for this. Secretary Eugene Ross is said to have remarked that the strike would not be called until President John Wilkinson, who is on a speaking tour, returns and fully investigates the grievances.

In our issue of May 1, p. 723, is recorded a mysterious strike in the Linton (Ind.) district, which resulted in the calling out of the militia and the declaration of martial law. It appears that into Linton were introduced some eight strike-breaking telephone girls to operate the switchboards of the Linton Telephone Exchange. The local Central Labor Union was believed to be taking steps to deport the girls.

A company of militia was brought to Linton from Terre Haute to take charge of the situation. Under orders of Governor Goodrich the town was given over into the charge and control of the military authorities.

When several hundred coal miners remained away from work on Apr. 29 Federal officials, fearing trouble, ordered another company of militia from Bloomington. Later the Evansville militia was ordered to aid the Terre Haute, Bloomington and Sullivan companies. Adjutant-General Smith also sent orders to Rockville for the mobilization of the militia at that place.

Some persons declared to General Smith that the miners had obtained a supply of rifles and ammunition and also had secreted whiskey which for martial weapons acts as a sure primer. This information made the officials anxious to have sufficient force on hand to insure order.

The Western Coal Operators' Association, by W. F. McNeill, their secretary, submitted a petition before the Federal Industrial Commission of Canada requesting an impartial board to deal effectively with the coal industry in the Western provinces of the Dominion. The operators backed up the secretary by the testimony of John Shanks, manager of the Brazeau Collieries; Jesse Gouge, coal operator of Drumheller, and W. S. Henderson, another operator of the same field. Mr. Henderson was quite willing to see nationalization of mines rather than an extension of the present chaotic condition, blaming the large foreign element for the frequent labor disturbances. The operators testified at length to the excellent accommodations afforded the mine workers—a long story requiring separate treatment, which will later be accorded it.

On Apr. 29 seven coal-owning peers of Great Britain began their testimony before the Government commission, Robert Smillie, president of the Miners' Federation, being the interlocutor. The commission is considering the question of nationalization of the mines and the large holdings of the coal land, the property of these peers, will be under inquiry. Among the peers are the Dukes of Hamilton and Northumberland, the Marquis of Londonderry, the Earl of Durham and Baron Dynevor.

Object to Any Wage Decrease

The men of the Clinton, Ind., field recently assembled in mass meeting and showed clearly their intention to back up the officials of their district and the international officials in the stand those officers intend to make against a reduction in wage. They believe an attempt may be made to reduce wages when the joint convention meets at the close of the war.

At the meeting Edward Stewart, the president of District No. 11, Secretary Mitch and Legal Counsel Harold Henderson of Terre Haute addressed the large crowd present, Board Member Jack Grange presiding.

President Stewart explained that many big users of coal are not stocking fuel as in the past, because they hope to buy cheaper coal after peace comes. These big coal users seem to expect that the operators will make an effort to reduce labor prices which were raised during the war to keep up with the high cost of living. But the mine workers announced during the war that they would not stand for any reduction, and they are sure that there is now no division in sentiment relative to that resolve. What they already have they are fully determined to keep.

Secretary Mitch declared that radicalism is much more justifiable in Russia than in the United States or Great Britain for laboring men are organized in these countries and can through these unions and the ballot protect their interests. He declared he did not believe many of the stories about the Russian bolshevists and thought a little radicalism did good, but he urged the laboring men of America to seek advancement of their living conditions by orderly, but persistent, progress.

Henderson declared that the legal department cost the mine worker only 10c. a month and was well justified because it resulted in better settlements. He urged the mine workers to refuse to sign any compensation papers unless so directed by the mine inspector, coroner or grand jury.

Over the Hills to the Poor House



In three months the United States Railroad Administration has accumulated a deficit of $192,000,000, which is equal to $768,000,000 a year—about three-quarters of a billion dollars. This is more than the United States Government expended during 1916 for all lines of its work, excluding the postal service.

To put it another way, the loss in running the railroads is more than the whole cost of running the United States Government before the United States entered the war. If the Government took over all industries and they were no more unfortunate than the railroads, the loss would be about 12 billions of dollars a year.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Firebossess as State Officials

Letter No. 4—Regarding the suggestion of Robert A. Marshall, *Coal Age*, Mar. 20, p 544, that the firebosses in a mine should be employed by the state, permit me to say that such a proposition must always be considered in connection with the state mining laws. It is reasonable to think that, whatever changes are to be made in the function of any official, such changes must conform with the requirements of the law, which may need to be amended in that respect.

Accepting the mining law of a state as unalterable, however, and as representing the standard of perfection required for the safe and efficient operation of the mines, the fulfillment of its requirements by a fireboss or other mine official will depend on his faithfulness and efficiency, which, in my opinion, will not be affected in any way, whatever the source of the official's authority.

Firebosses appointed by the state and firebosses appointed by mine operators are firebosses still, and are charged with whatever duties regarding the safety of the mine the law may require. A faithful and efficient fireboss will perform those duties with equal sincerity of purpose whether he is employed by the company or the state.

EMPLOYMENT BY THE STATE NOT PRACTICABLE

In the opinion of many firebosses, no doubt, their work could be more effectively performed if they were enabled to act under the authority of the state. But, the fact is overlooked that, under the prevailing operation of mines by private ownership, such a division of authority is impracticable. The fact is also overlooked that, if employed by the state, the function of firebossing would practically cease, as that official would then be acting virtually as an assistant to the mine inspector.

It appears to me that the employment of firebosses by the state would call for a similar employment, by the state, of all mine managers (foremen) and overmen (assistant foremen). This would mean, practically, the placing of our mines under state control.

By the present system, a fireboss is the "competent person" appointed by his employer, the mine operator, to carry out certain requirements of the mining law. Both the employer and the fireboss are then directly responsible to the state for the proper discharge of the latter's duties. The fireboss is simply a mine official acting under the authority of the state law and assisting the management in complying with the law.

On the other hand, as a state official, the fireboss would be the "competent person" appointed by the state to see that the requirements of the law were fulfilled in the operation of the mine. The state and the fireboss would then be directly responsible for the safe operation of the mine.

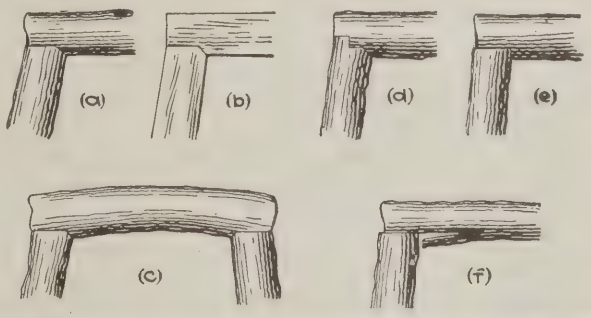
In conclusion, let me say that my contention is that the position of any mine official cannot be considered intelligently apart from the mining law under which he is acting, and I hold with Mr. Marshall's opinion that a fireboss should not be considered in any other capacity than that of a mine examiner.

Ladysmith, B. C., Canada. W. WESNEDGE.

Safety in Mine Timbering

Letter No. 1—I was much interested in the short article of Joseph R. Thomas, illustrating the right and wrong method of timbering in mines, *Coal Age*, Feb. 20, p. 349. I quite agree with Mr. Thomas that wrong methods of timbering have been the cause of many mine accidents resulting in great loss of life. On this account, there is growing need of more experience in the proper method of notching the collars and framing the legs to fit these notches in a timber set.

Referring to the illustration giving the right and wrong methods of notching timbers, in Mr. Thomas' article, permit me to say that I cannot agree with him that his Fig. 1, page 349, is a proper form of notch, as it does not give opportunity to develop the full strength of the timbers. In the accompanying figure, I have



RIGHT AND WRONG METHODS OF NOTCHING TIMBERS

shown the proper form of this notch, which gives a full bearing of the collar on the top of the leg. I like to call this a "slope" or "Welch" notch. The same notch is employed whether the timbers are round or unhewn as at *A*, or square or sawed timbers are used, as shown at *B*.

When it is possible to obtain a curved timber, the arched form of collar shown at *C* will give a greater strength than where a straight collar must be used. Here also I have shown the same form of slope notch just described.

Formerly, some timbermen employed the double notch shown at *D*. This, however, is not as strong as the slope notch, as the collar or crossbeam has to be hewed deeper to fit the second notch. The idea was to give a little greater resistance to side pressure, by providing a second notch.

The square notch shown at *E* is a wrong method of framing the timbers of a set. This form of notch is very apt to result in splitting the collar as shown at *F*. The slope notch first mentioned not only gives greater strength, but acts to prevent the splitting of the collar. To my notion, also, the slope notch is easiest

made and takes less time. In notching timbers, care must be taken to give a true bearing on the top of the leg, in order to develop the full strength of the set.

Terre Haute, Ind. JESSE HAMILTON.

Roof Conditions in Longwall Work

Letter No. 1—I am glad to respond to the invitation to answer further the inquiry of "Sandrock," which appeared in *Coal Age*, Mar. 27, p. 591, and presented the proposition of working a 3-ft. 4-in. coal seam, by longwall. The seam is described as being underlaid with 3 ft. of fireclay, while the roof consisted of 9 in. of hard sandrock overlaid with 3 ft. of soapstone, above which was more sandrock. I wish to give a little of my own experience and offer a few suggestions.

In 1906, I was superintending a mine in Derbyshire, England. The seam was known as the "High Hazel Coal," and the conditions were such as to be practically identical with those mentioned in this inquiry. From the experience gained in that field, I have no hesitation in recommending the use of the longwall system of mining in the present case.

The work should be carried forward in 300-ft. sections, separated by roadways. Each section formed a conveyor face and was kept a few feet in advance of the



SECTION OF LONGWALL CONVEYOR FACE

face next succeeding, so that the entire longwall face represented a series of steps, as I have indicated in the accompanying figure.

In driving the roads, the plan should be to take up the 3 ft. of fireclay underlying the coal and use it in the packs. Also, the roof should be ripped and the 9 in. of hard sandrock taken down and used for building the roadside packwalls, this being splendid material for that purpose. Taking up the 3 ft. of fireclay bottom will not only prevent the heaving of the roadways should the fireclay become wet, but the tracks will thus be lowered a sufficient distance under the loading platform of the conveyor to enable the coal to be loaded at once into the cars standing beneath the platform.

Allow me to suggest, here, that it is a good plan to drive a 20-ft. roadway, at the end of each conveyor face. This will allow ample space for building a good packwall on one side of the track and leaving an air-course behind the packwall, between it and the rib of the next section.

PRECAUTIONS IN TIMBERING A LONGWALL FACE

In order to obtain the best results in controlling the settlement of the roof, there should always be three rows of good props or posts set staggered behind the conveyor, or between it and the waste, as shown in the figure. If the floor is soft, these posts should be set on footboards. No timber should be permitted to remain standing in the waste when the back row of props is moved forward. In no case should the foot of a post be sunk in the fireclay, as that will always make trouble if the fireclay is soft. Should the condition of the soapstone roof be such as to require cogs, these should be built on a bed of slack 10 or 12 in. in thickness, the purpose being to insure the easy removal of the cog timbers as the face advances.

A "Sylvester post-puller," having a long chain, is ideal for this work, as the men doing the job are then well protected from roof falls. If the roof hangs for a considerable time after the back timbers have been withdrawn I would suggest making a good fall, back in the waste, about the middle of the face. For this purpose, it may be necessary to place one or more good shots in the roof.

In the foregoing I have taken it for granted that there is no seam of coal to be worked above the one mentioned. Should that not be the case, however, and it is necessary to provide for the future working of an overlying seam, I would drive a pair of roadways on 42-ft. centers. This plan should also be followed where there is danger of unsteady work, as at the present time.

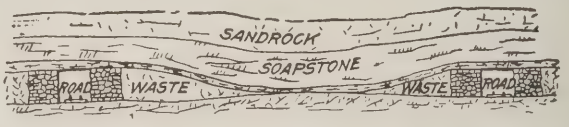
In the working of the High Hazel Coal, at Derbyshire, we tried a section by driving roadways on 42-ft. centers and building 12-ft. packs on each side of the roadway and ripping the top, instead of lifting bottom as I have suggested here. In that case, the fireclay left in the bottom heaved so badly that the roadways were completely blocked, at intervals of two or three weeks.

Our experience has proved that taking up the fireclay bottom eliminated the danger of the heaving of the floor of the roadway, and the best results were obtained by driving a single roadway at the end of each section or longwall conveyor face. When this bottom was taken up, the water naturally drained from the fireclay in the waste, and there was no heaving to cause any trouble. In the present case, if the plan I have suggested is adopted and superintended by a good man experienced in longwall work, I am convinced that it would be successful. ANDREW ORR BAIN.

McKeesport, Penn.

Letter No. 2—Referring to the proposition presented in the inquiry of "Sandrock," *Coal Age*, Mar. 27, p. 591, allow me to illustrate clearly the condition that is set up in the overlying strata, in longwall work that is properly conducted—a condition that serves to protect the roadways and prevent them from being closed by the settlement of the superincumbent strata on the roadpacks. The closing of the roads is one of the common difficulties encountered in this system of mining.

In order to make my meaning clear, I have drawn the sketch shown in the accompanying figure, which repre-



CROSS-SECTION A SHORT DISTANCE BACK FROM FACE

sents a vertical cross-section taken at right angles to the roadways approaching the face, but sufficiently far back from the face to show the final settlement of the roof on the packs.

It will be observed, as shown in the figure, that as the roof settles down solid on the packs, which must be well built, there is formed a kind of locking action of the roof strata. When this settlement has gone so far that the packs are squeezed into a thoroughly solid mass having almost the solidity of the rock itself, the roadside packs begin to feel the strain. But, at this

point, the locking action of the strata that I have mentioned causes the arching of the strata over the roadways, which protects them from being crushed by the great weight of the overburden.

In the present case, the 9 in. of hard sandrock overlaid with only 3 ft. of soapstone and then more sandrock makes a roof that will be hard to break as it settles on the packs. Certainly, as *Coal Age* has already stated in its reply to this inquiry, it is far better that there should be no break, but that the roof should settle gradually down on the waste. If the packs are well built, however, they will act to cushion the superincumbent weight and cause a gradual settlement, which will generally prevent a sudden break that would not only disturb the roadways but cause other trouble and delay the work.

Danger of Break Occurring in a Longwall Roof

Of course, there would be no objection to a break occurring in the roof, at a great distance back in the waste, where it would not affect the roadways or conditions at the face. However, should this occur, there must be plenty of strong wood chocks to prevent the break from extending to the roadways and the working face.

Stout timbers should be used as posts, the length of a post, in feet, not exceeding its diameter in inches. In other words, the diameter of the post should not be less than one-twelfth of its length.

Where the roof conditions were such that I had reason to fear that a break would occur to damage the workings unless something was done to bring down the roof in the waste, my plan was to drill holes in the roof, at or near the working face, long before such holes had to be shot. The holes should be charged and shot, only when they have receded a sufficient distance back of the timbers, in the waste.

The shooting of these holes would cause a roof fall in that area, which would relieve the pressure on the roadpacks. In closing, however, let me say that such an attempt to break the roof in the waste should never be made if it can be reasonably avoided, as will appear from the evident condition of the roadways and roadpacks. The latter will show when the strain on them is too great, and it is then that it will be necessary to break the roof by some means such as I have mentioned.

W. H. Luxton.

Linton, Ind.

Perils in Reconstruction

Letter No. 7—Speaking of the perils in the work of reconstruction following the great war, these do not appear to me as great as many seem to think. To my mind, they are overbalanced by the opportunities that are now offered to the average citizen in this country. These opportunities were never greater than at the present time.

The presence of such a large number of foreign-born citizens in America is one of the best testimonials to the fact that these appreciate the opportunities offered them. They have come here, primarily, to better themselves, and have found wages, living conditions and opportunities for their improvement so good that they have sent work back home and others have followed them across the great pond.

Because a few young Americans are profligate of their opportunities, live beyond their means and fail to accumulate money or property is no proof that the opportunity to do this is not present. America is, in some degree, a land of wasted opportunities, but these are here and within reach of all who will help themselves. I am glad to say that a large majority of persons living here do accumulate wealth and enjoy the blessings of life and the prosperity that this country offers in greater abundance every year.

Different Types of American Citizens

Let me attempt, briefly, to classify men in three types, respecting the use they make of their opportunities: First, there is the man who enjoys the average degree of health, both of himself and his family. Every young couple who are thus blessed with health can, with reasonable care and industry, quickly save enough to own their own home and accumulate other assets such as Liberty Bonds and stocks in paying investments. If their choice lies in that direction, they can, besides, soon own and enjoy the luxury of an automobile, without indulging in the doubtful experiment of buying it on the installment plan.

A second type of individual is represented by the lavish spender, who is blessed with the same good health and to whom the same opportunities are open of accumulating wealth. Instead, however, of adopting the pay-as-you-go plan, in respect to personal and family expenses, and laying by their small savings until they are able to purchase what they desire without burdening themselves with discouraging debts, this young couple become impatient. At 25 or 30 years of age, they want the same luxuries that their parents were able to enjoy only at the age of 45 or 50. With this class, homes are bought and heavily mortgaged; automobiles are purchased on the installment plan; and these pleasure seekers continue to struggle along under heavy burdens that eat up their small income as fast as it appears. The result is that they become discouraged and their chances for future happiness and contentment are sadly marred.

The Handicap of Ill Health

Finally, there is the third type represented by the man who must struggle along under the incubus of ill-health, either of himself or his family, or both. Truly, this type needs our sympathy. Their small savings are swept away by the expense of doctors' bills, hospital charges, medicines, and other necessities. We can hardly say that the same opportunities for the accumulation of wealth and property are open to this class of unfortunates.

I might mention a fourth type, which, however, is rare. It is represented by the individual who, though not particularly characterized as industrious or saving in his habits, is obviously lucky. Everything seems to turn into money in his hands, not so much because of his ability; it seems to be pure luck or chance. There are, of course, a few far-sighted and exceptionally good business men who manage to accumulate wealth in a few years that other hard working, industrious people are unable to save in a lifetime. It is these exceptional cases of lucky ventures and business ability that give rise to the complaints so often heard of "unequal opportunities."

In striking a general average, the unfortunate, struggling class that I have mentioned are offset by the fortunate and lucky type. But, certainly, the average man and family in America fare well; and it is only a

minor percentage of men who fail to accumulate a reasonable competency whereby they are able to maintain a higher grade of living than is generally possible in other lands.

Let me suggest that young people, and especially young couples, both American-born and foreign-born, starting in life, will do well to think seriously of the opportunities that are before them. All right-minded native and foreign-born citizens alike, I believe, do appreciate these opportunities to a marked degree and refuse to be led by the attempts to malign and underestimate the best country on earth. America is not without her faults, but they are far outweighed by her many virtues. Let us, then, look at the brighter side and cooperate with Uncle Sam to make this country what it ought to be, the chief among the nations.

Clinton, Ind. FOREIGN-BORN CITIZEN.

Letter No. 8—Concerning the future of America, many people are under the impression that, as soon as peace is assured, there will be an exodus of labor from this country that will affect the mining of coal more than any other industry. In this connection, kindly allow me to recite, briefly, a few interviews I have had recently with prominent foreigners in this locality.

On each occasion, I would put the matter squarely before the person, by asking a direct question, the answer to which would reveal the man's attitude in respect to his choice between this country and his homeland. Following are a few of these interviews:

Now that the war is over, if a suitable government were to be established in your own country, the same as that in the United States, would you go back there to spend the remainder of your days?

To this question the common reply was as follows:

I have three, four, five or six children born in this country. They have not only learned the English language, which they speak, but are getting an education here that they could not get if they were to be taken back to where I was born. They would not have, there, the same opportunities that they have here in America.

INHERITANCES OF FOREIGNERS UNCERTAIN

Again, talking with others concerning the land or property that they were likely to fall heir to in the old country, I would ask:

Have you given any serious consideration to the question of going back and taking possession of this property that will be yours?

In answer to this question, the man would invariably reply:

It is true that my father had a large farm before the war, but everything may now be gone. The place is undoubtedly run down; it would require lots of money to start all over again and maybe it would never pay after all. No, we would rather stay in America, because we know that the money we have been able to save here would be largely spent in going back and starting life over again in the old country and, in so doing, we would be deprived of many pleasures that we now enjoy.

Again, speaking of the wage question, I would often ask:

Supposing that your country would offer you wages more than what you receive in this country, and gave you good assurances and inducements to return home, and these assurances appeared good to you, then what?

After some hesitation, the answer would come about as follows:

Well, you see it is like this: The wages and inducements to return might appeal to me and some others; but the most of us would conclude that there are other things to look at and consider. For instance, our children are born here in America. They are growing up and have become attached to this place. Whenever we mention to them anything about going back to the old country, for the purpose of testing their feelings in the matter, they say, "You can go if you will, but we are Americans and will stay here where we were born."

ATTITUDE OF THE FOREIGN-BORN TOWARD BOLSHEVISM

In addition to these personal interviews with many of our foreigners, let me cite further a conversation I overheard between a few foreigners only the other day. They were discussing the form of government proposed by the Bolsheviki element. One of the speakers said with emphasis:

There is no need for such a form of government, as long as wages remain within reason and men can work every day so that they can provide their families with the necessities of life. If capitalists in this country realize, which a good many of them do, that all the working man wants is an honest living, things are bound to move along smoothly. But, once they begin to increase their profits and squeeze the working man, they will sow the seeds of discontent and the two elements will be at loggerheads and strikes and lockouts will follow, which will give Bolshevism a start."

The war has revolutionized the world and capital and labor have coöperated on the same level to win the victory that is ours today. Both of these elements have been brought closer together at terrible costs. If they coöperate now as they did in the war, there will come the time that both will go hand in hand to accomplish whatever they undertake.

As far as the coal-mining industry is concerned, wages appear satisfactory to the majority of the men; but should the attempt be made to lower wages, without a reasonable reduction in the cost of living, we would face a dangerous situation. There are intelligent foreigners who are able to influence and sway their fellow countrymen. It is when these, who are more intelligent, feel rightly that they are hard pressed that the greatest danger arises in respect to labor and its relation to capital. Common sense and feeling for others must prevail in order to secure coöperation and prosperity. LEWIS R. THOMAS.

Edwardsville, Penn.

Efficiency of Mine Officials

Letter No. 9—Since this discussion was started by William Gorman, *Coal Age*, Jan. 16, p. 159, I have been wondering how much of the good advice offered in these letters mine officials will take to themselves. Every mine official from the president down is efficient in his own estimation, and only in the eyes of the close observer is their inefficiency apparent.

While this is a general rule, there are, of course, notable exceptions. Wonder has been expressed that any mine management should select a barber, a store clerk, an accountant or other trade worker to fill a responsible position in the operation of the mine, and mistakes have been made, undoubtedly, at times, in this direction.

It is a trying ordeal for a mine foreman to feel that his boss, the superintendent, is a man with whom he cannot discuss mine matters on a broad practical basis, because of the latter's lack of experience in coal mining. I recall one instance where a clerk was taken from

a store and placed in charge of three mines, as superintendent. On receiving an order for certain supplies for one of the mines, the new superintendent called up the foreman and demanded to know what he was going to do with "cap-pieces." The foreman's explanation of their use in the mine left the superintendent still in doubt as to whether the foreman was not putting one over on him as a joke.

A mine superintendent must know the mining business from A to Z and be able to decide the class of equipment that is best fitted for the conditions with which he has to contend. Most mining men will agree that mine equipment and supplies are the chief factors in producing cheap coal. The proper location of the surface plant, distribution of power, arrangement of tipple and hoisting and haulage systems adopted are other important factors. But *cars, oh, cars!* It is truly disheartening when one thinks of the numberless types of mine cars in use, many of which are ill-adapted to the conditions existing in the mine where they are to be used.

Inspection by an Efficient Superintendent

Perhaps nothing will be more instructive, in this connection, than to follow one efficient superintendent about, on the occasion of his first tour of inspection after taking charge of a mine. Early Monday morning finds him entering the engine room. His cordial greeting is followed by a few direct inquiries, and the engineer explains that "No. 3 boiler was cut out yesterday and found to be so thickly coated with scale as to require much hard work before it can be fired again."

The superintendent remarked that the cost-sheet had informed him of the trouble, and, walking into the boiler room, he at once secured a sample of the scale for analysis. This done, he continued, "Now, John, can you suggest any other trouble here?" The answer came quick, "Yes, our coal is the 'road cleanings,' a mixture of fine coal, bone, slate, sand and clay. We are charged with good coal, but that is what we get, and the cinders that form make it necessary to clean the fires too often to get even fair results."

The superintendent then asked to see the flues, and John opened the door exposing the ends of the boiler tubes and the flues to view. These were found to be thickly coated with soot. In reply to an inquiry, John said the practice was to clean the flues once every two weeks; but promised, hereafter, to clean them twice a week. Further inspection showed steam escaping from leaky pipe joints and valves. In the generator room, sparks were flying from the commutators and the voltmeter indicated from 150 to 175, instead of 250 volts, of all of which the superintendent made mental note and, after a little private talk with the engineer, left the place and proceeded to the tipple.

A Trip Through the Mine

The first thing that caught the superintendent's eye at the shaft head was the wasteful manner of oiling the mine cars as they came out of the mine. Two boys stood, one on each side of the track, and as the cars passed they squirted oil at the car wheels. The rails and timbers were literally smeared with oil. He did not linger here, however; but, calling for a lamp and empty cage, was lowered to the shaft bottom where he found the foreman waiting for him. His greeting was, "Hello, James, how are you? You said something about poor ventilation and I want to see what is the matter."

Passing through a door at the shaft bottom, on the way to the air shaft, the superintendent noticed that the door was poorly hung and that it swung the wrong way so that it leaked much air. Further on, passing up the main airway, stoppings were observed that were poorly built and also leaked air. Breakthroughs were small and obstructed with loose coal, and tool boxes often stood in them. Canvas curtains were used to deflect the air, instead of doors. The result was that, practically no air reached the face.

But ventilation was not the only thing that interested this observant superintendent, on his first tour of the mine. Waste of supplies and material was evident everywhere. Rails, props, ties, boards, canvas, spikes and nails were scattered here and there along the entry. Reaching a place where the men were drawing pillars, rails were seen partly buried under a fall of rock.

At another place, workmen were busy tearing up rails, leaving the spikes where they were drawn. James explained that they would go back later and pick them up; but the superintendent's suspicions were now fully aroused and he pushed on, going further into this place that had been abandoned. Here he found curved rails, parts of switches, timbers, track ties and spikes, all of which should have been gathered up and used again. In another place, a keg of spikes was found, three-quarters full, standing by the track. James explained that it was the custom to set a keg of spikes around, in that way, where they would be handy.

The Young Foreman Given Another Chance

The foreman, James, was a young man. It was his first position as mine foreman and he had been there but six months. In view of these facts, the superintendent decided to talk matters over with him and give him another chance, believing that he would be able to make him a good foreman. Before leaving the mine, therefore, he took James into his confidence, told him his plan and instructed him to rebuild his doors and stoppings, clean up his airways and remove all obstructions from breakthroughs, besides gathering up all waste material that was scattered about the mine.

One feature that was characteristic of this superintendent was his fairness. He treated all men alike, but referred all their complaints to the foreman. He would not tolerate a news carrier. His foreman was the man on the job. In my opinion, a superintendent's success depends on organization. While he must have a system, it should not be an ironclad rule, not to be broken. Neither should it be too flexible. He must have a complete working plan extending from his office throughout the plant to the trapper boy.

We have all heard of the "white-collar" efficient superintendent. I know one of that type that produced cheap coal for a short time, coming on the job when there was a full supply and plenty of everything needful in stock. During his two years of office, he required little new material. He ran the mine so short of supplies that his foreman was obliged to take rails from one part of the mine for use in other sections where they were needed at once. Tracklayers would spend half a day at a time running through old works with a spikebar and bucket, hunting enough spikes to lay a switch, and spikes were frequently drawn from the main track to help out. These are facts gleaned from my own experience, in charge of mines.

Osceola Mills, Penn. S. D. Hainley.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Working an Old Mine

I am writing to ask for some information and advice in regard to one of the old mines still working in this vicinity. The situation is about as follows:

The coal in this mine is 5½ ft. thick and very soft, so that it is easy to roll off the ribs on the butt entries. Overlying the coal is a tender stone, which varies from 1 in. to 6 ft. in thickness, in different parts of the mine. The roof strata above this stone may vary from 10 ft. to 100 ft. in thickness, while the entire overburden reaching to the surface has an average depth of 1500 feet.

The mine has been opened on an eight-entry system, from which cross-entries were driven to the right and left and butt headings turned off these, parallel to the main heading. This is an old mine and the distance from the entrance to the main butt headings, now working, is about 7 miles, while the distance measured across the mine, from the face of the crossheadings on one side, to the same on the other side of the main entries is about 5 miles.

From time to time, there has been considerable trouble due to the development of a squeeze in the workings. I would like to ask what would be a fair thickness of the barrier pillars that should be left between the butt headings and the main-line entries, for their protection? Also, what thickness of room pillars should be left when driving the rooms off the butt headings? Again, is there any way of stopping the progress of a squeeze that has already started, besides pushing the extraction of coal in that section of the mine where the weight is coming?

In the advance workings of this mine there have developed a few small gas feeders, and I want to ask if there is any danger of an explosion occurring on this account. How much air should be kept in circulation in abandoned workings generating a little gas.

Benham, Ky. STRAWBOSS.

One can form only a general idea of the situation in this mine, from the description given, which would seem to warrant the assumption, however, that there is some danger present that would call for the need of much practical experience and the exercise of good judgment in all future operations. The circulation of air, in every part of the mine, should be sufficient to keep all the working places, roads and travelingways free of gas. Each section should have its own ventilating current or air split.

All abandoned areas must be ventilated thoroughly or sealed with substantial air-tight stoppings. The thickness of barrier pillars flanking the main headings should not be less than 100 ft. Where rooms are driven 6 or 7 yd. wide, under the conditions mentioned, the thickness of the room pillars should not be less than 40 ft., making the room centers about 60 ft. The work should be in charge of an experienced foreman and examined frequently by competent firebosses.

When a squeeze has developed and gained much headway in a mine no amount of timbering can stay its progress, under 1500 ft. of cover. The only remedy to apply is the rapid extraction of pillars and the drawing of all timber that is still standing in adjoining and abandoned areas, so as to cause a good fall of roof. A few shots placed in the roof at chosen points will often prove effective in producing the desired result.

Gangway Driven in a Basin

Kindly give me a little information in regard to the best method of drawing pillars under the following conditions. The main gangway of our mine is driven in the basin of the seam, which pitches north and south, on each side of the gangway, the inclination being from 35 to 45 deg. Rooms have been driven to the pitch on each side of this gangway and extended to the outcrop or drift, which is composed of stones and clay.

Our problem is how to recover every pound of pillar coal possible and use as little timber as will make the work safe. The width of the pillars varies from 15 to 18 ft. and the length from 100 to 135 ft. The thickness of the coal varies from 10 to 16 ft. At times, the coal works very free and, again, it is quite hard. We have used almost too many props and double timbers on the roads, and yet have not been entirely successful in supporting the roof. What we desire is to get the opinion of *Coal Age* and its readers in regard to the best means to employ to recover the largest amount of coal in drawing back the pillars. LUZERNE.

————, Penn.

This inquiry is a fair sample of many that come to *Coal Age*, from correspondents expecting to receive some helpful suggestion or advice, but omitting to give the most essential data affecting the proposition. As a rule, these incomplete inquiries are ignored or sent back with a request for more information that would enable an intelligent answer to be given. We present this proposition, however, just as it has come to us, believing that this will do more to show the need of correspondents stating all the conditions surrounding the case when asking for help.

Before any answer can be given to this inquiry, it must be known what is the depth of cover and character of the strata, overlying the seam, nature of the floor, width of rooms, etc. The inquiry should be accompanied with a sketch showing both the plan of the workings and a cross-section taken at right angles to the gangway.

It is not necessary to state, here, that the mining of coal in a seam varying from 10 to 16 ft. in height and pitching from 35 to 45 deg. is attended with danger, and will require the utmost of skill and experience to insure safety and avoid accidents. We shall be glad to receive any suggestions or information that our practical readers feel disposed to give, in respect to drawing pillars on steep pitches. It will be necessary, however, to assume conditions conforming to mining practice.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Bituminous (Penn.) Mine Foremen's Examination, Apr. 8-10, 1919

(Selected Questions)

Ques.—What measures would you take to secure the best possible results from a fan, the capacity of which is limited and the demands upon which are close to its capacity?

Ans.—Clean up the airways and remove all obstructions to the flow of air, by enlarging the breakthroughs and crosscuts so that they will have the same sectional area as the airways. Wherever possible, shorten the course of air travel and split the air current wherever this can be done to advantage.

Ques.—In a shaft 300 ft. deep, an entry 7 ft. high and 10 ft. wide is turned off from the bottom. The shaft is full of water and overflowing. What is the pressure per square inch and the total pressure, in short tons, on the face of the entry?

Ans.—The static pressure due to a 300-ft. head of water is $300 \times 0.434 = 130.2$ lb. per sq.in. The total pressure on the face of this entry is therefore $130.2 \times 144\ (7 \times 10) \div 2000 = 656.208$ short tons.

Ques.—What dangers may arise from bituminous coal dust, in dry and dusty, nongaseous mines, and what precautions would you take to insure safety?

Ans.—The dry finely powdered dust of bituminous coal is often highly inflammable and easily ignited when suspended in the mine atmosphere. This is liable to happen when accumulations of dust are allowed to gather at the working face, particularly where the coal is blasted after being mined with machines.

To avoid the danger arising from the ignition of a cloud of dust, all fine coal and dust must be loaded out and not permitted to accumulate in the rooms. Strict regulations must be made and enforced, in regard to blasting. The safest plan is to employ shotfirers who are competent men and whose duties would be to inspect, charge and fire all holes drilled by the miners. The shotfirers should be authorized to refuse to charge and fire such holes as, in their judgment, are unsafe. The work of the shotfirer should be done after all the men have left the mine.

Ques.—In an airway 5 ft. wide at the top, 10 ft. wide at the bottom and 6 ft. high, the anemometer reads 280 ft. per min.; what is the quantity of air passing per minute?

Ans.—The average width of this airway is $\frac{1}{2}(5 + 10) = 7.5$ ft., and its sectional area $6 \times 7.5 = 45$ sq.ft. Then, assuming that the given anemometer reading has been taken in a way to obtain a fair average velocity of the air current, the quantity of air passing in this airway is $45 \times 280 = 12{,}600$ cu.ft. per min.

Ques.—What is the purpose of stoppings and what materials would you use in their construction, in nongaseous mines?

Ans.—The purpose of mine stoppings built in the crosscuts or breakthroughs, in entry pillars, is to prevent the air from short-circuiting at such points and conduct it forward to the last crosscut at the head of the entries. Stoppings are also built in entries or other passageways or airways to close off or seal such openings, in order to prevent the escape of any gases that may be generated in such places.

Stoppings in mines should be built of incombustible material, such as refuse stone or slate, brick or concrete. Temporary stoppings are often constructed of a double wall of slate, having the space between the two walls filled with sand or road dirt to prevent the leakage of air through the stoppings. When well built, this makes a good temporary stopping. The permanent stoppings on the main haulage roads, in a large mine, should be built of brick laid in cement, or concrete.

Ques.—Of two airways, intake and return, which, in your opinion, should be the larger? State fully.

Ans.—When considering ventilation alone, the answer to this question should state that the return airway should always have the larger sectional area, because of the increased volume of the return current, which has a higher temperature and contains varying quantities of gas generated in the workings. The volume of the return current is also expanded somewhat by the relief of the pressure due to the mine resistance, as this pressure is always greater on the intake than on the return airway.

However, there may be conditions to be considered, when driving the main haulage roads and airways in a mine, that would call for a larger sectional area to be provided on the haulage road, to make necessary allowance for the obstruction of the air current by reason of the presence of loaded and empty cars that are constantly being hauled out and into the mine. Also, allowance must generally be made for a safe clearance at the side of the track, on all haulage roads.

Taking these considerations into account, in a mine where haulage is performed on the return airway, there is hardly a doubt but that this airway should have the larger sectional area. This is commonly the case in nongaseous mines. In gaseous mines, it is the usual practice to make the intake airway the haulage road, and, in that case, the sectional area of this airway may require to be equal to if not greater than that of the return airway.

Ques.—What is the capacity of a double-acting plunger pump, if the plunger is 20 inches in diameter, stroke 40 inches, and revolutions per minute 25?

Ans.—The sectional area of the plunger is $0.7854 \times 20^2 = 314.16$ sq.in. Multiplying this by the length of stroke (40 in.) and dividing by the number of cubic inches in a gallon (231) gives for the plunger displacement, each stroke,

$$(314.16 \times 40) \div 231 = 54.4 \text{ gal.}$$

At a speed of 25 r.p.m., a double-acting pump makes 50 strokes per minute, and the plunger displacement is therefore $54.4 \times 50 = 2720$ gal. per min. Then allowing 85 per cent. efficiency at the water-end, the discharge of this pump is $0.85 \times 2720 = 2312$ gal. per minute.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Survey of the Export Coal Trade of Great Britain

[British (Government) *Board of Trade Journal*, Mar. 13, 1919.]

The British export coal trade, like all British industries, was for over four years organized entirely for war purposes. Not only was the total production of coal seriously reduced by the enlistment of large numbers of skilled miners, not only were important markets cut off by military operations, but the export trade to such markets as were still open was governed entirely by naval and military considerations. Export to France was increased and the needs of Italy were met as far as shipping facilities permitted. Large shipments of coal were made to naval strategic points. On the other hand, distant markets, like South America, were almost entirely sacrificed.

That past condition of things has now to be reversed. How far that is possible depends upon factors which can be indicated but not measured. Much depends upon the state of Europe within the next few years, upon whether it is disturbed or peaceful. Much depends, too, upon the effective competitive power of those countries, which, owing to the special circumstances of the war, and particularly owing to war prices, have been able to enter markets formerly closed to them. It is unnecessary to emphasize the importance of the coal export trade both in itself and in its relation to general commerce; in bulk it is by far the greatest of British exports, and it enables food and raw materials to be imported at cheap return freights. If it is reduced, general commerce will be proportionately hampered.

It is not the purpose of this article to provide answers to the numerous questions that arise, but to furnish some of the materials necessary for answers. In the various tables that follow, the course of the export trade during the war is shown, and the situation at the beginning is contrasted with that at the end. It will be seen not only how the trade has changed as between countries, but also as between classes of coal, and this will help the estimation of the chances of recovery. The progress of the new exporting countries is also discussed, and, finally, particulars are given of the export coal trade of Germany, the United Kingdom's greatest rival in 1913.

Production and Consumption

The British production and export of coal during the six years, 1913-1918, have been as follows (in long tons):

Year	Production Tons	Export Tons	Bunkers Tons	Left for Home Consumption Tons
1913	287,430,000	73,400,000	21,032,000	192,998,000
1914	265,664,000	59,040,000	18,536,000	188,088,000
1915	253,206,000	43,535,000	13,631,000	196,040,000
1916	256,375,000	38,352,000	12,988,000	205,035,000
1917	248,499,000	34,996,000	10,228,000	203,275,000
1918	227,987,000	31,753,000	8,756,000	187,378,000

It should be noted that coal retained for home consumption includes coal for naval and military purposes as well as coal for industrial and domestic uses. The bunkers on former merchant ships taken by the Admiralty are covered among naval purposes.

The trend of things may be shown by expressing the figures for 1914 and subsequent years in percentages of 1913:

Year	Production Per Cent.	Export Per Cent.	Bunkers Per Cent.	Home Consumption Per Cent.
1913...	100.0	100.0	100.0	100.0
1914...	92.4	80.4	88.1	97.5
1915...	88.1	59.3	64.8	101.6
1916...	89.2	52.2	61.8	106.2
1917...	86.5	47.7	48.6	105.3
1918...	79.3	43.3	41.6	97.1

Coal is also classified for export purposes according to its uses, and the particulars are as follows:

Year	Anthracite Tons	Steam Tons	Gas Tons	Household Tons	Other Sorts Tons
1913	2,976,000	53,619,000	11,528,000	1,770,000	3,507,000
1914	2,389,000	42,634,000	10,080,000	1,490,000	2,447,000
1915	2,227,000	31,151,000	7,275,000	1,041,000	1,841,000
1916	2,000,000	27,890,000	6,469,000	377,000	1,616,000
1917	1,384,000	28,322,000	3,700,000	152,000	1,438,000
1918	1,162,000	26,050,000	3,081,000	149,000	1,311,000

The particulars furnished with regard to production do not permit a comparison to be made with the kinds of coal exported except in the case of anthracite, the production of which was: In 1913, 5,195,000 tons; 1914, 4,719,000 tons; 1915, 4,712,000 tons; 1916, 4,644,000 tons; 1917, 3,799,000 tons; 1918, 3,820,000 tons. The corresponding quantities of anthracite retained for home consumption were: In 1913, 2,219,000 tons; 1914, 2,330,000 tons; 1915, 2,485,000 tons; 1916, 2,644,000 tons; 1917, 2,415,000 tons; 1918, 2,658,000 tons. Up until 1917 the home consumption of anthracite increased, and though there was a falling off in that year the consumption was still higher than in 1913. In 1918 the consumption again showed an increase and was greater than in any of the five preceding years.

Destination of Exports

Exports of coal according to destination are summarized below. (A statement given later in this article presents the figures in greater detail.) These figures do not include either coke or patent fuel exported, items that in certain cases (for example, that of France) represents a notable addition.

Exported to	1913 Tons	1914 Tons	1915 Tons	1916 Tons	1917 Tons	1918 Tons
European allies	33,995,000	28,014,000	25,863,000	25,133,000	24,931,000	22,065,000
Enemy countries	10,436,000	6,330,000	10,000	6,000	40,000	19,000
Neutrals	23,488,000	20,297,000	15,221,000	11,404,000	4,555,000	4,712,000
British possessions	5,481,000	4,399,000	2,441,000	1,809,000	5,470,000	4,957,000
Total	73,400,000	59,040,000	43,535,000	38,352,000	34,996,000	31,753,000
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
European allies	46.3	47.4	59.4	65.5	71.2	69.5
Enemy countries	14.2	10.7	.....	.....	0.1	0.1
Neutrals	32.0	34.4	35.0	29.8	13.0	14.8
British possessions	7.5	7.5	5.6	4.7	15.7	15.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

The markets lost on account of military operations—Russia, Belgium, Roumania and the enemy countries—took, in 1913, about 18,717,000 tons; but in 1918 only 128,000 tons were sent to Russia and a small quantity to redeemed Turkish territory. Exports to Portugal fell to one-eighth and exports to Portuguese African colonies to less than one-sixth of the prewar figures. On account of submarine troubles in the Mediterranean, exports of coal to Italy were in 1915 and 1916 only about 60 per cent., and in 1917 and 1918 only 42 to 43 per cent., of the annual prewar exports. Exports to France, Algeria, French African colonies and Tunis formed only 19.7 per cent. of the total coal exports from the United Kingdom in 1913, but rose to over 55 per cent. in 1917 and 1918.

Exports to France were 37 per cent. higher in 1917 than they were in 1913, and even in 1918 they were 29 per cent. higher. The distribution of coal to Algeria and Tunis was notably affected by convoy arrangements in 1917, and the same cause explains the very large increase to French West Africa in that and the following year. The exports to France and French African possessions rose from 14,473,000 tons in 1913 to 19,269,000 tons in 1917, or a 33 per cent. increase; but quite apart from the temporary loss of French mines, the special distribution resulting from war causes will plainly not be reproduced under peace conditions. The case is different with Italy, where normal supplies were reduced through the state of war, though the need for coal had increased. France, Italy and their African possessions took 24,125,000 tons, or 32.9 per cent. of the total British exports of coal in 1913; in 1917 they took 23,410,000 tons, or 66.9 per cent.

Neutral Markets—British Possessions

Trade in 1918 with the countries which were neutral in 1915 was only about one-fifth of what it was in 1913; however, this marked some recovery from 1917, when it was a little less than one-fifth. The trade with all these countries fell off progressively during the war, as military and naval demands increased and shipping difficulties became greater. Exports to Scandinavia were in 1918 only 33 per cent. of the 1913 quantity; to Netherlands and Java, a little over 4 per cent.; to Spain and the Canary Islands, under 12 per cent.; to South America, under 9 per cent.

Exports to British possessions (including Egypt) formed 7.5 per cent. of the total exports of coal from the United Kingdom in 1913; in 1917 they were almost the same in quantity, but 15.7 per cent. of the total. Thy had, however, in 1916 fallen to 1,809,000 tons from the 1913 figure of 5,481,000 tons. The exports to Gibraltar and Malta in 1917 were nearly three times what they had been in 1913 and nearly five times the 1916 figure; exports to Egypt were in 1917 only half their 1913 total, but nearly double that of 1916. Exports to these Mediterranean destinations formed very nearly 83 per cent. of the total exports to British possessions in 1917, and were plainly determined by naval policy. Exports to Canada, West Indies and Falkland Isles also showed increases over 1913, for the same reason. On the other hand, exports to Aden fell from 181,000 tons in 1913 to 23,000 tons in 1917; to India, from 179,000 tons to 7000 tons; and to Ceylon, from 240,000 tons to 13,000 tons. In 1918 exports to India were 1350 tons; to Aden and Ceylon, nil.

This brief review of Great Britain's coal export trade may be summed up by saying that from the outbreak of the war exports were sacrificed to military and naval necessities and to the need of rendering assistance to France and Italy, and this sacrifice was coincident with a loss of nearly three-fifths of the bunkering trade (part of which, however, was made good by an increase in Admiralty requirements), and with a continuous and heavy draft on the quantity "available for home consumption" by the naval and munition authorities.

The prospects of an early recovery of the export trade in coal are affected by many considerations. Until the production of coal approaches the prewar level there will be a competition between home industry and

foreign countries for certain classes of steam coal. The demands of countries subjected to the ravages of war will depend on the rate at which their industries can be restored and their own mines can be put in full effective operation. Political considerations may also affect trade for some years to come. Neutral countries will be able to resume their demands for certain classes of coal, but their requirements in others will depend on the condition of world commerce. Certain expanded exports from the United Kingdom will certainly return to their prewar level, since the expansion depended on naval policy.

A further factor has still to be considered—the entry of the United States into markets from which it was previously practically excluded on account of the greater cost of the American coal. Despite the cessation of war conditions, that footing may still be maintained on account of the increased cost of production of coal in the United Kingdom and the greater expense of operating British ships. The most striking advances in the American coal export trade (other than that to Canada) were in European and South American markets.

The effects of the entry of the United States into the war and of the preoccupation of ships for purposes other than the coal trade are strikingly shown by the heavy decrease of United States exports to Europe in 1916-17, a decline which was accentuated in the following 12 months. Exports to Italy formed 79.2 per cent. of the trade in the two prewar years and 75.8 per cent. in the three following years taken together, although the average annual exports of the latter period were three and a half times those of the former. Comparing 1916-17 with 1912-13 and 1913-14, there does not appear to have been a very abnormal increase in the exports to Italy, and in 1917-18 they fell to 201,000 tons; but this, in turn, may have been due to war conditions.

The increase in exports to South America is more serious. The diversion of British tonnage to other routes and special needs for coal gave the United States coal exporters their opportunity, and in 1916-17 their shipments to South America were four and a half times what they were in 1912-13, while those from the United Kingdom in 1917 were only one-ninth of what they had been in 1913. On the other hand, in 1917-18, when the United States also felt the demand for shipping, exports from that country to Argentina fell to 248,000 tons and those to Brazil to 625,000 tons, while those to Uruguay rose to 109,000 tons. For those three countries together there was thus a fall of 37.4 per cent. compared with the previous year. The return of the diverted British ships to the South American trade will help to restore the balance, but it is plain that strong competition will have to be faced.

Exported to	1913 Tons	1914 Tons	1915 Tons	1916 Tons	1917 Tons	1918 Tons
European allies:						
Russia	5,998,000	3,088,000	43,000	5,000	1,075,000	128,000
France, Algeria and Tunis	14,250,000	13,394,000	18,628,000	18,096,000	18,715,000	17,166,000
French African colonies	223,000	148,000	165,000	219,000	554,000	507,000
Belgium	2,031,000	1,169,000	.....	.....	.....	4,000
Portugal	1,202,000	1,049,000	917,000	794,000	248,000	147,000
Portuguese African colonies	387,000	306,000	316,000	309,000	198,000	59,000
Italy	9,647,000	8,625,000	5,789,000	5,710,000	4,141,000	4,054,000
Italian African colonies	5,000	17,000	5,000	.....	.....	.....
Roumania	252,000	218,000	.....	.....	.....	.....
Total	33,995,000	28,014,000	25,863,000	25,133,000	24,931,000	22,065,000
Enemy countries:						
Germany	8,952,000	5,257,000	.....	.....	.....	.....
Aystria-Hungary	1,057,000	564,000	.....	.....	.....	.....
Bulgaria	57,000	80,000	.....	.....	.....	.....
Turkey*	370,000	429,000	10,000	6,000	40,000	19,000
Total	10,436,000	6,330,000	10,000	6,000	40,000	19,000
Neutral countries:						
Sweden	4,563,000	4,250,000	2,660,000	1,646,000	614,000	1,051,000
Norway	2,298,000	2,462,000	2,643,000	2,308,000	1,059,000	1,251,000
Denmark and Iceland	3,139,000	3,165,000	3,209,000	2,367,000	878,000	1,086,000
Netherlands and Java	2,053,000	1,750,000	1,804,000	1,346,000	377,000	88,000
Spain and Canaries	3,649,000	2,940,000	2,068,000	2,408,000	812,000	429,000
Greece	728,000	579,000	309,000	168,000	18,000	41,000
China	26,000	10,000	.....	.....	.....	.....
Mexico	20,000	2,000	.....	.....	.....	.....
South America	6,910,000	5,004,000	2,499,000	1,131,000	762,000	60,000
Other foreign countries	102,000	135,000	29,000	30,000	35,000	10,000
Total	23,488,000	20,297,000	15,221,000	11,404,000	4,555,000	4,712,000
Total foreign countries	67,919,000	54,641,000	41,094,000	36,543,000	29,526,000	26,796,000
British dominions:						
Europe	1,223,000	810,000	638,000	718,000	3,055,000	2,905,000
Africa†	3,367,000	2,796,000	1,476,000	938,000	2,001,000	1,916,000
Asia	682,000	585,000	203,000	68,000	105,000	1,000
Australasia	.....	5,000	.....	.....	.....	.....
North America	119,000	128,000	35,000	16,000	177,000	70,000
South America	43,000	44,000	75,000	61,000	59,000	43,000
Other British possessions	47,000	31,000	14,000	8,000	73,000	22,000
Total	5,481,000	4,399,000	2,441,000	1,809,000	5,470,000	4,957,000
Grand total	73,400,000	59,040,000	43,535,000	38,352,000	34,996,000	31,753,000

* Including territories formerly Turkish, but now in the occupation of the allies of the United Kingdom.
† Including Egypt in all the years specified.

Production in South Africa and India—Germany's Trade

The output of coal in South Africa in 1913 was 7,858,000 tons; it rose to 9,775,000 tons in 1917 to meet the special demands for coaling ships at Durban and Delagoa Bay. That particular requirement for ships diverted to the Cape route has now ceased, and the South African coal will have to face the competition of the dearer but better British coal. It is worth noting that, notwithstanding this increase in output, British exports to the Cape rose from 65,000 tons in 1913 to 162,000 tons in 1917, the increase being, of course, due to naval policy; on the other hand, the trade to Mauritius, which had been 40,000 tons in 1913, fell to 1302 tons in 1917, and this trade might well be captured by the South African coal mines.

Exports of coal from British India rose from 722,000 tons in 1913-14 to 829,000 tons in 1916-17. Competition between British and Indian coal seems to threaten only in the Ceylon market. The extent to which India appears to have become self-sufficient during the last five years may also be gaged by the fact that the exports of coal from Japan to British India fell from 180,000 tons in 1913 to 29,000 tons in the first 11 months of 1918.

Chief Foreign Purchasers of British Coal

How far the import coal trade of France and Belgium may be affected by imposing on Germany an obligation to supply coal for a period until the French and Belgian mines are restored it is at present impossible to say, and what may be the effects of any such decision or of any transfer of coal fields on the ability of Germany to supply coal to the Netherlands and elsewhere is equally obscure. The disappearance of the great Russian market, even temporarily, is another enormous factor, but there appears to be no reason to suppose that in the markets where German and British coal formerly met in competition the competitive power of British coal masters will be relatively impaired in the future. The chief foreign purchasers of British coal during the past six years are tabulated at the top of this page.

Finally, the recuperative power of the German coal trade must be taken into account. In 1913 the chief exports from Germany were as follows, those from the United Kingdom being given for comparison:

Exported to	From Germany, Tons	From United Kingdom, Tons
Austria-Hungary	12,153,000	1,057,000
Netherlands	7,218,000	2,018,000
Belgium	5,728,000	2,031,000
France	3,242,000	12,776,000
Russia	2,103,000	5,998,000
Switzerland	1,639,000	.....
Italy	892,000	9,647,000
Spain	279,000	2,534,000
Denmark and Iceland	220,000	3,139,000
Sweden	178,000	4,563,000
Roumania	131,000	252,000
Other countries	791,000	29,385,000
Total	34,574,000	73,400,000

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
Apr. 29	Amer. S.S. Barabos	Mollendo, Peru	2,348	940
Apr. 30	Amer. S.S. Felix Taussig	Rio de Janeiro, Brazil	7,760	1,540
May 2	Amer. S.S. Saxon	Rio de Janeiro, Brazil	2112	913
May 3	Am. Sch. Hauppauge	Rio de Janeiro, Brazil	1,931	....
Sewalls Point				
Apr. 28	Dan. S.S. Hugo	Santiago, Cuba	1,878	102
Apr. 29	Amer. S.S. Calaveras	Havana, Cuba	3,299	408
May 1	Amer. S.S. Lake Stirling	Havana, Cuba	2,406	384
May 3	Amer. S.S. Anna	Santiago, Cuba	1,132	301
Newport News				
Apr. 28	Swed. S.S. Hermes	Havana, Cuba	2,150	186
Apr. 29	Dan. S.S. Henry Tegner	Nuevitas, Cuba	2,079	165
Apr. 29	Br. S.S. Pakeha	Wellington, N. Z.	4,809	1,798
May 2	Swed. S.S. Harald	Havana, Cuba	2,268	147

HAMPTON ROADS COAL DUMPINGS

April, 1919

	Gross Tons
Norfolk & Western R.R.	485,340
Virginian R.R.	202,983
Chesapeake & Ohio R.R.	235,873
Total	924,196

Promises Early Relief in Tonnage Situation

Export circles were much interested in the recent statement by H. C. Hoover, Food Administrator, that after July 1 many of the ships now carrying foodstuffs to Europe could be released for export trade. In response to inquiries from its members, the American Manufacturers' Export Association took this matter up with John H. Rosseter, Director of Operations of the United States Shipping Board. Mr. Rosseter, who, it will be recalled, issued a statement several weeks ago promising adequate American shipping facilities within thirty days, again asserts that a more liberal assignment of vessels to commercial trades has not only been accomplished, but that this movement will continue with in-

creasing importance during the present month.

Mr. Rosseter's statement given to the Export Association follows:

"Due to the urgency of earliest possible shipment, it has been necessary for some months past to assign every available ship to the service of the Food Administration. As indicated some weeks since, we confidently expect to pass the peak of this requirement within the next few days. We have now practically reached that point, and during the past week have happily been able to begin a more liberal assignment of vessels to commercial trades. This movement to the support of commercial lines will continue with increasing importance during May, and it is expected that with the return of ships from Europe and new tonnage coming from builders we will be in a position during June to take good care of the commercial berths so long neglected.

"In the same way we hope to be able to provide tonnage for the movement of coal, for which there is a large and insistent foreign demand. As also to provide more tonnage for cotton, which movement has been badly congested and very poorly served during the past sixty days."

American Coal Exports in March

Exports of coal, as reported by the Department of Commerce, for March, 1919, and the figures for March, 1918, as finally revised, are as follows:

(In Tons)

	Mar., 1918	Mar., 1919
Anthracite	397,358	117,805
Bituminous	1,223,137	554,037
Exported to:		
Italy	2,473	17,197
Canada	849,282	352,883
Panama	21,959	5,290
Mexico	13,971	5,429
Cuba	170,087	38,107
Other West Indies	45,213	21,548
Argentina	25,623	8,670
Brazil	27,323	60,296
Chile	None	6,934
Uruguay	5,999	3,660
Other countries	61,207	34,023
Coke	141,213	33,749

Practically the only coal imported originates in Canada. In March, 1918, 118,003 tons were imported. In March of this year, the imports were 68,965 tons.

Important Modifications of Bunker Regulations

As a further modification of the bunker rules and regulations, the War Trade Board announced on May 2 that the issuance of trip bunker licenses to vessels of all flags has been discontinued and that time bunker licenses are now being issued to all vessels regardless of flag, valid until revoked, authorizing such vessels to secure in the United States or its possessions bunker fuel, port, sea and ship's stores in appropriate quantities, whenever said vessels are engaged or about to engage in trade to any part of the world, except Germany and Soviet Russia, unless a permit to trade with said countries is issued by the War Trade Board or by the Inter-Allied Trade Committees at Copenhagen, The Hague, Christiania, or Stockholm, or by the Allied Blockade Committee at London.

The War Trade Board also announced that the execution of Bunker Form B-4, which is an agreement required by Sec. 5 of General Rules No. 1, and Bunker Forms B 5-a and/or B 5-c, which are agreements that vessels will return to the United States, have been discontinued. Furthermore, owners and time charterers of vessels are notified that all outstanding commitments and guarantees previously made by virtue of the execution of said agreements are hereby canceled and released, and all owners and charterers are hereby relieved of any and all their obligations thereunder.

Switzerland during the third quarter of 1918 imported altogether 322,643 metric tons of coal (as against 311,570 tons in the corresponding quarter of 1917), 17,347 tons of lignite (301 tons in 1917), 211,671 tons of coke (191,842 tons in 1917), and 83,217 tons of briquets (as against 116,124 tons in 1917. The bulk of the coal (251,640 tons in 1918), lignite (17,316 tons), coke (196,392 obtained from Germany, and only comparatively small quantities of coal from France (23,915 tons) and Belgium (43,656 tons), and of briquets (83,200 tons) was tons in 1918).

Plans to Export Large Volume of American Coal

Means whereby a large volume of American coal can be exported will be found within the next few weeks, it is believed in Washington. An interdepartmental committee, brought into being by the foreign trade adviser of the State Department, soon will recommend a plan to be followed in this connection. The plan itself already has been drafted and revised carefully by a subcommittee of twenty, which includes the Government's principal coal specialists.

The plan now is ready to be placed before the main committee. It is believed, in view of the painstaking care of the subcommittee, that the plan will be approved in practically the form recommended. The subcommittee declines to discuss or give out any information regarding its recommendations, but it is understood that some opposition from the coal operators is anticipated to a portion of the plan.

The coal industry has not been consulted at this writing, but it is expected that representatives of the industry will be called in before the plan is put in final form.

The Government is in a position to exercise an important control over coal exports through its control of shipping. The operators are without official information as to the work of the interdepartmental committee, but their representatives in Washington are a unit in declaring that they are willing to coöperate in any way that will allow exporting to begin. Their aim is to eliminate the present stagnation in the industry by exporting the largest possible volume of coal. There is no tendency to quibble over details. All they want is ships. Once the tonnage is assured, there will be no delay in forming the export association, it is declared.

Foreign Freight Rates

W. W. Battle & Co.'s coal trade freight report under date of May 12, states that the Shipping Board at the present time allows American shippers to charter foreign steamers to carry coal from United States ports to ports on the East Coast of South America on rates, and that this decision may enable American shippers to regain some of the Argentine coal business, which they recently lost.

There are a number of sailing vessels offered for coals to East Coast South American ports at the Chartering Committee's maximum rates, and also a few sailers asking for transatlantic coal. An outside steamer, about 7000 tons coal capacity, was recently offered at $27.50 net form, for coals to Genoa, June loading. Freight market conditions are practicaly the same as a week ago.

The Chartering Committee's rates are as follows:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge. Rio, $19.50 net, 1000 tons dis.; Santos, $19.50 net, 1000 tons dis., or $21 net, 600 tons dis.; Buenos Aires, $18.50 net, 1000 tons dis.; Montevideo, $19.50 net, 750 tons dis.; Pernambuco, $18.50 net, 500 tons dis. Bahia, $18.50 net. To Nitrate Range, $16.50 gross prepaid.

Coal Prices in Germany

The enormous increase in the price of coal in Germany is causing anxiety in industrial circles says Algemeen Handelsblad, of Amsterdam, Netherlands, under date of Mar. 30, 1919. The disorders in the coal industry, the increase in the cost of production due to lack of rolling material, the continued strikes and enormous wage increases granted to the miners along with shorter working hours, have made necessary another large increase of the coal prices, averaging 20 to 30 marks per metric ton. [The par value of the mark is $0.238. At the end of March, 1919, the mark was quoted in neutral markets at about 9 cents.] A comparison with the former prices will show the meaning of these figures. Lump coal, for example, cost 13.50 marks per metric ton before the war. At the beginning of September, 1918, or shortly before the revolution, the price stood at 29.40 marks, or more than double the prewar price. At the beginning of January, 1919, the price was raised to 44 marks. The present quotation is 64 marks, or nearly five times the prewar price. Coke was quoted at 17 marks in July, 1914; at 30 marks in September, 1918; at 58.85 marks in January, 1919; and is now quoted at 88.85 marks. The price of coal briquets has increased from 13.75 to 66.10 marks. If we may believe the mine owners, even these enormous price increases are hardly sufficient to cover the increase in the cost of production.

This assertion may well be true, for the State might have exercised its power of veto and refused its consent to such enormous price increases. The increase in the price of coal will naturally increase the cost of production in all other industries. Price increases have already been announced in the iron industry. The steel syndicate has not taken any steps in this direction as yet but will be compelled to follow, as both of its principal materials—coal and iron—have risen in price. An increase of steel prices will force the machinery industry and kindred branches to raise the prices of their products. The endless screw will thus be tightened still further.

An effort will doubtless be made in Germany to counteract the influence of these higher prices by increasing wages. As this process continually leads to new demands, the ability of the German exporting industries to resume competition in the markets of the world will grow less and less, notwithstanding the advantage which the exporters derive from the depreciation of the mark.

Mining Congress and Export Problems

A meeting of the committee appointed by the Committee on Export of the American Mining Congress met May 9, at 10.30 a. m. in New York City. The session was extended till 1.30 p. m., during which time Allen Walker, of the Guaranty Trust Co., submitted three or four plans that had been adopted by various industries. One of these plans seemed to the committee to be well suited to the needs of the coal industry.

Thomas F. Farrell, who has just been elected chairman of the Foreign Trade Committee of the National Coal Association, commonly known as the Committee of 27, while interested in the plan presented, was not disposed to take any action till his committee had met and declared its point of view in the matter of coöperation with the other members of the American Mining Congress' committee. However, Mr. Farrell made the statement, in the course of the meeting, that he believed a solution of the matter might be found along the lines of the plan submitted by Mr. Walker.

The National Coal Association was represented by Charles S. Allen, who filled the place of G. M. Dexter, then out of town. Mr. Allen expressed himself quite favorable to the plan. Another meeting of the committee will probably be called toward the close of this week, the Committee of 27, which was scheduled to meet May 13, having meantime, doubtless, expressed its attitude in the matter. For the prior action of the American Mining Congress, see page 867 of the issue of May 8.

Brazil's December and January Coal Imports

Vice Consul A. I. Hasskarl, of Rio de Janeiro, reports that coal imports into Brazil in December, 1918, amounted to 48,315 metric tons (1 metric ton = 2204.6 lb.) compared with 51,676 tons in December, 1917, and 38,930 tons in the corresponding month in 1916. Of these shipments, the United States supplied 32,365 tons in 1918, 51,676 tons (the total imports) in 1917, and 37,964 tons in 1916; the remainder was British coal. During January of the present year, 52,357 tons were shipped into Brazil, of which 49,323 tons came from the United States and 3034 tons from the United Kingdom. In the corresponding month in 1918, total imports amounted to 19,552 tons, all from the United States; in 1917, imports totaled 31,102 tons, 29,264 tons coming from the United States and the remainder from the United Kingdom.

COAL AND COKE NEWS

EDITED BY ALEX MOSS

Harrisburg, Penn.

On May 7, a new workmen's compensation bill, which is understood to be agreeable to all forces, was introduced by Senator Smith of Dauphin. The bill was one of four relating to injured employees which were drawn by the Attorney General. They were immediately reported from committee and read for the first time before the session was adjourned.

The compensation measure reduces the period of waiting before compensation begins, from 14 to 10 days. Another provision of the bill provides 60 per cent. of the average salary, fixed at $10 to $20, instead of the present 50 per cent. On the new percentage basis, the minimum compensation would be $6 a week and the maximum $12.

The new measure further provides that the period of free treatment be increased from 14 days to 30. In case of major and minor operations, a sum not to exceed $100 is allowed and an additional amount for hospital treatment.

Another of the bills introduced by Senator Smith provides for the creation of a Bureau of Workmen's Compensation within the Department of Labor and Industry, which leaves the bureau under the Labor Department as heretofore. There has been a movement under way for some time to create a separate department of Workmen's Compensation, but it is evident that it is not the administration's desire to do so at this time.

Another bill provides for the appointment of a Director of Rehabilitation, who shall care for maimed employees in such a way as to make them fit for other work.

The fourth of the bills would license corporations carrying their own compensation insurance. Companies carrying their own insurance would have to pay a sum equivalent to 2 per cent. of the premium paid insurance companies.

Charleston, W. Va.

All signs point to a general recovery from the slump which began the first of January in the central southern coal fields of West Virginia. Production is gradually growing larger, as demand became more pronounced during the closing days of April. The last-named month was somewhat better from the standpoint of production than was true of March. May 1 brought many additional inquiries for coal, indicating a somewhat more buoyant market. As a consequence mine owners not only felt much encouraged over the outlook, but were able in a number of instances to resume operations, thus cutting down the number of idle mines. Indeed, some fields were able to produce up to 65 and 70 per cent. of their normal output.

For several months mine owners have been encouraged with orders that enabled them to run their mines for as much as two days a week. Orders are now sufficient to keep many mines going four days a week. With increased activity in and around West Virginia mines, a labor shortage is beginning to be felt. During the period of idleness covering four months, there has been an exodus of miners from the state, and the general scarcity of labor may prevent as large a production as might be expected even when conditions reach normal again. The car question has not begun to bother operators so far to any appreciable extent, although it is learned that coal is blocked somewhat at certain forwarding junctions, especially insofar as the lake movement is concerned.

The last days of April and the first week of May saw a growth of encouraging proportions in the shipments of coal to the lakes, although the movement to the lake regions was far from being up to that usually observed this late in the year. Still, from some sections, there was five or six times as much coal being shipped to the lakes as was observed at the outset of April, but some districts were faring better in that respect than others. Heavier shipments to tidewater indicated during the first five days of April a larger volume of export business, but West Virginia operators are not optimistic as to the growth of the export trade to large proportions as long as no effort is made to supply sufficient ships. Still there was undoubtedly more export business in April than during March.

The drive made to force down the price paid for railroad fuel was still contributing somewhat to the uncertainty which has done so much to retard a quicker return to normal conditions, and the volume of railroad fuel shipments around the first of May seemed to be somewhat lighter than was true during the last half of April.

Fairmont, W. Va.

Shipments from the Fairmont field, and in fact from all parts of northern West Virginia, during the first six days of May, indicated a healthy revival in the demand for coal from the northern part of the state, both in eastern and western consuming areas, the only fly in the ointment being the low price at which some operators were selling their coal to railroads in the east. Shipments had jumped to 824 cars a day by May 2, the heaviest loading since early in January, on the Monongah division of the Baltimore & Ohio. On the same date more coal was being mined and shipped to Curtis Bay than at any time during the year, some of it for export markets. Even lake shipments continued to grow in volume. There was also apparent an increase in orders for railroad fuel, shipments on May 2 being larger than at any time since the latter part of March. Total shipments for April reached 14,101 cars, or 1586 more cars of coal than were loaded and shipped in March. As the month of May progressed, a steady decrease in the number of idle miners was discernible. Complaint is being made against the Baltimore & Ohio for withholding information as to how much coal it is buying.

George T. Watson, assistant to the president of the Consolidation Coal Co., commenting on present and future conditions in the industry, predicts that there will be an acute car shortage within the next few months unless steps are taken by the railroads to renew their equipment or unless new equipment is added. He is of the opinion that the next few months will witness unexampled activity in the coal trade.

George T. Bell, executive vice president of the northern West Virginia Operators' Association, has advised members of the association that he has learned that the present practice of railroad fuel agents asking bidders on railroad fuel to revise their bids or to submit new bids after the bids are supposed to have been closed, is admittedly followed for the express purpose of obtaining lower bids.

Du Quoin, Ill.

Current reports state that the Chicago, Burlington & Quincy R.R. is planning to increase its equipment and storage yards in Williamson and Franklin Counties in order to make more room for handling coal from Herrin, West Frankfort and Christopher. It has purchased 2500 acres of land near Cambon and intends to sink a large mine at that place and also erect a roundhouse with better water facilities to supply the locomotives in that district.

A new coöperative store has been opened in this city by the local unions of the miners employed at the Security, Paradise and Majestic mines, with J. W. Gibson as store manager. The coöperative store idea has become popular among the miners of southern Illinois, and a number of these stores have been started in an attempt to reduce the high cost of living.

Announcement has been made by State Mine Inspector Frank Rossbottom that the conference between miners' representatives, operators and school authorities, which was to be held in this city Friday, May 9, for the purpose of discussing "vocational education" for the miners, has been postponed until June 6.

PENNSYLVANIA

Anthracite

Jermyn—The large breaker of the Delaware & Hudson colliery here was closed on May 2 for an indefinite period. It was stated that mining operations will continue at the colliery and that coal will be sent to the Powderly breaker at South Carbondale. It is believed that the Jermyn breaker will be abandoned.

Lykens—Announcement was made on May 7 that the Susquehanna Collieries Co.'s offer to sell its Lykens Valley holdings rather than submit to an increased assessment had been withdrawn with the expiration of the month of April. Officials said that they would still consider an offer to sell if a purchaser turns up.

Honesdale—The Howard Coal Co. has sold its holdings in the large culm dump along the old Gravity roadbed to P. J. McDonald, of Scranton, who has been working it on the royalty basis for some time. It is estimated that there are over 100,000 tons of coal in the pile. The consideration is said to have been $50,000.

Carbondale—It is reported that the Tip Top Coal Co. has voluntarily ceased mining operations on the mine fire tract in this city, and that the breaker and other equipment is now being removed from the property. The lessee of the tract, George W. Tappan, concluded to cease operations, it is said, after the city filed the petition asking for an injunction to restrain him from further mining on the tract.

Minersville—The Pine Hill Coal Co. has started to clean out Wolf Creek in accordance with its agreement with the borough officials, and other coal companies of the region will coöperate at once. These corporations have agreed to clean out the streams, as the culm has swept over Minersville, seriously blocking sewers and drains and even backing water from the sewers back into the houses, creating a most unsanitary condition.

Hazleton—Mine Foreman Adam Lesser and his assistant, John Hurley, of the Upper Lehigh colliery, claim that they have smashed to smithereens the record of Harry Lewis, of the Primrose mines of the Lehigh Valley Coal Co., whose feat in running a slope for five years without a single fatality has been given wide publicity. In the 25 years that both men have been in charge at Upper Lehigh, that colliery has had just two fatal accidents. In that time the mines produced 2,880,000 tons of coal, or 1,440,000 tons per fatality.

Hazleton—The Hazleton and Mahanoy Division of the Lehigh Valley R.R. reports that coal tonnage traffic during April had climbed to between 65 and 70 per cent. of the volume handled during the war and severe winter rush of last year. This is about the maximum, inasmuch as the stripping and culm bank sources of supply that ran totals so high last year are now almost depleted. The railroaders are getting steady employment and the outlook for work all summer, both on the coal division and in the mines, is excellent.

Pittston—An unusual case, growing out of the sale of four acres of coal land in 1882, on which suit was started in 1911, has just been decided by Judge Fuller (Luzerne) in the suit of the executors of Theodore Strong, late of Pittston, against Abram Nesbitt, of Kingston, in which the court sustains the exceptions to the report of the referee and enters judgment for the defendant. Apart from the fact that it is over 37 years since the coal was sold and eight years since the suit was started, the proceedings reveal the value of the coal from the fact that although only $2411 was paid originally the plaintiff received $9601 in royalties. The case was highly complicated. It seems that the four acres of coal land sold under a certified road, the title of which Mr. Nesbitt had obtained through a patent from the Commonwealth, and he had what was con-

sidered a good title until the decision of the Supreme Court in 1898, when it was decided that certified roads were not exempt from the general rule that abutting property owners owned to the center of the highway. At this time Mr. Strong had leased the coal to the Delaware, Lackawanna & Western Railroad Co., but by the decision of the company itself became the owner of the coal because it owned the abutting property. Then the executors of the Strong estate brought suit to recover the money originally paid and were awarded the full amount by the referee, with interest amounting to $7612.

Pottsville—This is the richest coal city, not only in the United States, but in the whole world, according to a report made by W. C. Monroe and W. F. Sekol. These engineers stated that there is 80,000,000 tons of coal under Pottsville, in well authenticated veins, the coal being more than 200 ft. in thickness. It is premium quality, much of it being of the famous Lykens Valley red ash. There are 22 veins above the Mammoth and four veins below. More than this, Sekol and Monroe stated that Pottsville is the center of the great anthracite basin and that of the 53 billion tons of coal remaining unmined in this region, 41 billions are in this section.

Freeport—The Beal Coal Co. will build an up-to-date tipple this summer at its new mine now being opened at this place. The tipple will have a capacity of 600 tons a day.

Bituminous

Indiana—The Coal Run Mining Co. has moved its general offices from the Elwood Building, Rochester, N. Y., to the Savings and Trust Building here. Among the officials to be transferred are John O'Connor, treasurer, and L. W. Robinson, Jr., general manager.

Uniontown—There has been no noticeable improvement in work in the Connellsville coke region the past week, though a few small accumulations seem to have been disposed of at a reduced price. In the central and western Pennsylvania bituminous fields there has been considerable improvement, due partly to the Lake trade.

Brownsville—Following the strike at the mines of the Vesta Coal Co., when the men decided to return to work the mines were closed down by the company and are now idle. This company is a subsidiary of the Jones & Laughlins Steel Co.

The H. C. Frick Coke Co. has closed down the ovens at its Buffington and Footedale coke plants. It is rumored that this company will close all its operations for sixty days.

Pittsburgh—On Monday, May 5, at the annual meeting of the stockholders of the United Coal Corporation, the proposition from the J. H. Hillman Sons Co. for the mutual operation of the properties of the former company and other operations, and the change of the name of said company to the Hillman Coal and Coke Co. was acted upon favorably, the change to be effective June 1. J. H. Hillman, Jr., president of the Hecla Coal and Coke Co. and the Thompson-Connellsville Coke Co., was elected chairman of the Board of Directors, and T. W. Guthrie, president of the United Coal Corporation, was elected president. What changes, if any, will be made in the operating personnel has not yet been announced.

Waynesburg—In addition to the sales and transfers of coal land recorded on p. 885 of the May 8 issue of *Coal Age* are the following sales of coal land to the Cumberland Coal Co.: J. R. Nutt, Cleveland, Ohio, eight tracts in Whiteley township, consideration, $292,308.40. T. B. Seamans, Uniontown, one-seventh interest in six tracts in Cumberland and Monongahela townships, 562.46 acres; consideration, $62,-104.12; G. S. Harah, Uniontown, one-seventh interest in nine tracts in Cumberland and Jefferson townships, 595,716 acres; consideration, $42,456. Chalissa Roberts, one-eighth interest in a tract in Cumberland township, 24 acres; consideration, $1. Carl C. Minor, one-eighth interest in tract in Cumberland township, 59 acres; consideration, $1. Arley W. Kisinger, one-eighth interest in tract in Cumberland township, 158 acres; consideration, $13,833.21. Thomas W. Wright, one-eighth interest in a tract in Cumberland township, 9.19 acres; consideration, $1. Other transfers to the Cumberland Coal Co. include Charles H. Jordan, coal underlying a lot in Jefferson borough; consideration, $250; Susan V. Young, one-half interest in 181 acres, Greene township; consideration, $64,751.75. Irving H. Cottom, of Fayette County, has sold an undivided 25-1767th interest in 16 tracts in Richhill township to Harry A. Cottom, of Brownsville; consideration, $3000.

WEST VIRGINIA

Huntington—A loss of $50,000 was sustained by the Island Creek Coal Co. at its No. 2 plant at Holden recently, when the tipple at that mine was destroyed by fire. It is the intention of the company to rebuild the tipple without any delay. A. R. Beisel is the president of the Island Creek Company.

Whipple—The New River Coal Co. is understood to be arranging plans for the erection of new coal tipples at its properties at Whipple, Lochgelly and Summerlee. At the present time the company has a daily production of about 12,000 tons.

Bluefield—The Coalwood plant of the Carter Coal Co. is to be the scene of numerous improvements during the summer months, plans being now under consideration for the erection of a steel tipple and automatic hoist as well as for the construction of a number of dwellings for miners. The shaft at which the tipple is to be built constitutes the entrance to about 1900 acres of coal.

Macdonald—Full speed ahead are the orders at all the operations of the New River Co.—15 in all—in Fayette and Raleigh Counties, and as a result the company is getting out about 12,000 tons of coal a day. Orders on hand will make it possible to operate on a full-time basis for the next month, and by that time it is believed further orders will enable the company to keep its mines on a full-time basis indefinitely.

Charleston—A deal of as large a magnitude as has been recorded in this section in some time was that through which the General Underwriters, Inc., acquired the control of the Penn-Virginia Coal and Coke Co.'s holdings of the Black Band Fuel Co. for $100,000. The purchase includes leases for coal, oil and gas to the Paint Creek Collieries Co. and the South Penn Oil Co., 500 shares of Kanawha Central R.R. stock at the par value of $100, together with the mining equipment, etc. It is regarded as certain that under the new ownership there will be extensive development of the Black Band property in the future.

Huntington—Further impetus was given to production in the Logan field at the beginning of May through a continued increase in lake orders, the total increase being 7000 tons, the coal loaded ascending from 131,000 to 138,000 tons, bringing the ratio of production up to nearly 50 per cent., or, to be exact, 46 per cent., as against 38 per cent. for the previous week. There was a most pronounced reduction in the total production loss from 211,000 tons to 162,000 tons, or a difference of 49,000 tons. Still, as might have been expected, the "no market" loss was still running high —144,000 tons. Other sources of production loss did not amount to more than 5 per cent. That production is still far below normal is shown by the fact that at this time last year the output was at the rate of 200,000 tons a week—a difference of 62,000 tons.

Clarksburg—The Corons Coal Co., successor to the Commercial Coal and Coke Co., has purchased from Floraneus Reynolds' estate at Hepzibah a tract of approximately 100 acres adjoining the tracts of the Short Line R.R. The consideration was $20,000. Much of the land is underlaid with a fine grade of Pittsburgh coal. The company already owns considerable mineral rights in the tract in question and has a mine in operation.

INDIANA

Petersburg—Following the orders for a strike at the Muren mines, south of this city, on the Southern R.R., the Muren Coal Co. has ordered its mines closed down for three months. The Muren company has turned its contracts over to the Ayrshire Coal Co. and has closed its general store until the mine reopens for business. The miners employed by the Muren company struck following a disagreement over petty matters.

Indianapolis—An increase of 25c a ton in the price of Pocahontas shoveled lump has been announced by the Indianapolis coal dealers, making the price $8.25. According to the principal dealers, this is the only grade affected and no further changes in coal prices are likely during the remainder of the summer. At the beginning of April some dealers were charging $7.75 for Pocahontas shoveled lump and some $8. Those charging the $7.75 advanced to $8 and the added advance to $8.25 is now uniform with all the larger companies. To offset this, the summer price of coke is $9.75 a ton as compared to $12 a ton during the winter months.

ILLINOIS

Buckner—A disastrous accident in which one man was killed and three were seriously injured, happened at the Old Ben Coal Corporation mine at this place late Saturday night, May 3. John L. Devot was instantly killed and William Grean, Leslie Greyhouse and Edward Clark were the injured. The four men were ascending on the cage when the engineer seemed to lose control of the levers and hoisted the cage up into the sheave wheels. Devot fell back down the shaft, which was over 600 ft. deep, and the other three men escaped death by falling into the coal chute.

Royalton—The north mine of the Franklin Coal and Coke Co. broke its record last week when 3947 tons of coal were hoisted in eight hours. During the day 1470 pit cars were hoisted. Following the day's work the company gave a banquet to all of the employees of the mine.

Harrisburg—The O'Gara mine No. 12, which is one of the chain of mines controlled by the O'Gara Coal Co., of Chicago, has received orders to close down for an indefinite period. No reason is stated for this order.

Westwood—The U. S. Fuel Co. is planning the erection of a new modern steel tipple at its Vermillion mine at this place. It is expected that the structure will be completed before the end of the year.

Benton—The project of creating a network of electric lines in Franklin, Williamson and Saline Counties, comprising the southern Illinois coal belt, is being revived. It was checked by the war. Before the war, W. H. Schott, of New York, was instrumental in having lines built connecting Eldorado, Harrisburg and Carrier Mills. Extensions were projected to Marion, White Ash, Johnston City, West Frankfort and Benton. It is stated that the revived project will include Christopher, Herrin, Buckner, Ziegler, Royalton and Hurst, and back to Marion, completing a loop of all the principal cities in the coal belt. The lines would touch about 60 mines and would provide transportation for the miners and additional outlets for the coal.

New Douglas—The Madison County Mining Co. announces that it has struck a 7½-ft. seam of excellent coal near here. The seam is believed to be the same as that at Sorento, Ill.

Benton—The Franklin County Mine Examiners' Association has been organized for the purpose of systematizing the work of the examiners and of securing reforms in the mining industry tending to make conditions in the collieries safer to all employees.

WASHINGTON

Mendota—The Mendota Coal Co. is understood to have completed arrangements for the electrification of its local coal-mining properties. The proposed installation calls for a 100-kw. engine-driven generator, 440-volts, three-phase, and approximately 100 horsepower in motors for the operation of the hoist, fans, pumping machinery and other apparatus. The company maintains offices at Centralia, with plant at Mendota.

Foreign News

Montreal, Que., Can.—The Century Coal and Coke Co., Ltd., of Montreal; the Quebec Coal and Dock Co., of Quebec; the Toronto Coal and Dock Co., of Sault Ste. Marie; the Colborne Coal and Dock Co., of Port Colborne, and the New Ontario Dock Co., of Sault Ste. Marie, have consolidated under the name of the Century Coal Co., Ltd., of Montreal. The new corporation has an available capital of $2,500,000 and plans extensive alterations and additions to dock and storage facilities.

Personals

Thomas Simpson, of Belleville, Ill., has been elected County Mine Inspector for St. Clair County by the Board of Supervisors.

N. S. White, formerly mine foreman of No. 7 mine of the Anita Coal Mining Co., has been made superintendent of the Horatio mines of that company, at Punxsutawney, Penn.

Capt. J. A. McIntosh, who has been in the service overseas with the tank corps, has returned to his former position in the engineering department of the Ohio Brass Co., Mansfield, Ohio.

T. V. Bush, for many years in charge of the Coal Department of the Chesapeake & Ohio Railway Co., will take charge of traffic matters for the Raleigh Coal and Coke Co., of Cincinnati, Ohio, effective May 15.

C. C. Fenwick, general mine foreman for the Anaconda Copper Mining Co., Coal Department, at Sand Coulee, Mont., has severed his connections with that company to take charge of the Darby Coal Co.'s works at Darby, Mont.

James Biers has resigned as superintendent of the Horatio mines of the Anita Coal Mining Co. at Punxsutawney, Penn., to become representative for the Hulburt Oil and Grease Co. Mr. Biers' headquarters will be at Indiana, Penn.

John Vose, Sr., has resigned as mine superintendent of the Sangamon mine of the Wilcoxson Coal and Coke Co., of Chicago, Ill., after continuous service of 31 years. Mr. Vose is the oldest mine superintendent in point of service in the State of Illinois.

T. J. Dawson, formerly in charge of the Department of Mines of the Superior Pocahontas Coal Co. and the Collins-Mayo Colliery Co., is now general superintendent of the mines of the Raleigh Coal and Coke Co., of Cincinnati, Ohio. Mr. Dawson's headquarters will be at Raleigh, W. Va.

J. C. Hill, formerly of the Car Distribution Department of the Chesapeake & Ohio, at Thurmond, W. Va., and later with the Fuel Administration, at Charleston, W. Va., has recently been placed in charge of shipping at the Raleigh offices of the Raleigh Coal and Coke Co.

W. J. Culleton, superintendent of the Phillips plant of the H. C. Frick Coke Co. at Phillips, Penn., has been promoted to be superintendent of the Ronco and Leckrone plants of the same company with headquarters at Leckrone, Penn. Mr. Culleton has been at the Phillips plant for several years, and is succeeded at this mine by M. A. Burriss, of Footdale, Penn.

J. P. Brennen, president of the Thompson-Connellsville Coke Co., of Uniontown, Penn., has resigned as active head of the corporation. He has been connected with this and other coke companies for the past forty years and has been called "The dean of coke industry in the Connellsville region." Mr. Brennen has not announced his plans for the future, nor has his successor been named.

H. H. Morris, of Huntington, W. Va., has been appointed as a shippers' representative on the Central Territory coal and coke committee of the U. S. Railroad Administration, whose headquarters are in Pittsburgh. This committee fixes the rates on coal and coke from Pennsylvania, Kentucky, Virginia and West Virginia to western points. Mr. Morris heads the West Virginia Standard Coal Co. He is also heavily interested in the Kentucky Elkhorn Byproduct Co. and is a director in the Central Coal Association.

Obituary

Charles Manhart, a widely known mine operator of Galena, Kan., died recently after an activity of twenty years in the Galena mining fields.

T. Ellsworth Davies, prominent as a mining engineer and coal operator, died suddenly at his home on May 7. As a consulting engineer Mr. Davies had been in much demand, besides being the consulting engineer for the county commissioners of several of the anthracite-producing counties.

Coming Meetings

American Wholesale Coal Association will meet on June 3 at Cleveland, Ohio. Secretary, L. Romanski, Chicago, Ill.

Illinois Mining Institute will hold its annual meeting May 22, 23 and 24. Secretary, Martin Bolt, Springfield, Ill.

National Coal Association will meet May 21, 22 and 23, at Congress Hotel, Chicago, Ill. Secretary, J. D. A. Morrow, Washington, D. C.

Illinois and Wisconsin Retail Coal Dealers' Association will meet at Hotel Nelson, Rockford, Ill., June 4 and 5. Secretary, I. L. Runyan, Chicago, Ill.

International Railway Fuel Association will hold its annual meeting May 19-22 at the Hotel Sherman, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

Retail Coal Dealers' Association of Texas will hold its annual meeting on May 19 and 20 at Fort Worth, Tex. Secretary, C R. Goldman, Dallas, Tex.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 10 in the Keith and Perry Building, Kansas City, Mo. Secretary, C. N. Fish, Leavenworth, Kan.

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind. Secretary, J. W. Paul, Pittsburgh, Penn.

Kentucky Mining Institute expects to hold its annual meeting this year on May 30 and 31 at Lexington, Ky. Secretary, C. W. Strickland, Huntington, W. Va.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

American Society of Mechanical Engineers will hold its spring meeting at the Hotel Statler, Detroit, Mich., June 16 to 19. Secretary, Calvin W. Rice, 29 West 39th Street, New York City.

American Institute of Electrical Engineers will hold its annual convention at the Lake Placid Club, Adirondacks, N. Y., June 24 to 27. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Industrial News

Chicago, Ill.—The Fischer & Hayes Rope and Steel Co., manufacturers of wire rope, manila rope and accessories, have moved to 741-745 West Van Buren Street.

Knoxville, Tenn.—The Coalfield Coal Co., Knoxville, plans to start work shortly on rebuilding its burned tipple and coal-handling plant. C. W. Henderson is treasurer of the company.

Nevo, Ky.—The Rose Creek Coal and Coke Co. has recently filed notice with the Secretary of State of an increase in its capitalization from $20,000 to $100,000, to provide for general business expansion.

Lexington, W. Va.—The Perkins Coal Co. has been incorporated with a capital of $25,000 to engage in the development of coal properties in the Lexington district. J. E. Strickler is the principal incorporator.

Chicago, Ill.—L. V. Este, Incorporated, industrial engineers and accountants, for a number of years located in the McCormick Building, have removed their office to the Century Building, 202 South State St.

Providence, Ky.—The Pluto Coal Co. has been incorporated with a capital of $50,000 to engage in the development of coal properties in the Providence section. W. Scroggins, Andrew Bogg and S. C. Turner are the incorporators.

Birmingham, Ala.—The Kershaw Mining Co. has been incorporated with a capital of $50,000 to engage in general coal-mining operations in Walker County. C. G. Kershaw is president and T. M. Porterfield is secretary-treasurer.

Chicago, Ill.—The American Steam Conveyor Corporation announces the appointment of N. B. Stewart as district representative in charge of the St. Louis territory. Offices have been opened at 708 Merchants-LaClede Building, St. Louis.

Nashville, Tenn.—The Nashville Retail Coal Dealers' Association has been incorporated under the general welfare laws of the State of Tennessee. Fred B. Cassetty, H. H. Perry, J. L. Hales, A. J. Lucas, H. M. Levell and A. D. Andrews are the incorporators.

Athens, Ohio—The Canaan Coal Co. has taken bids for the erection of a new one-story boiler plant at its local works, estimated to cost $10,000. The structure will be about 38 x 39 ft., and will be used for increased capacity. Morris Peterman, Rector Building, Columbia, is architect for the company.

Columbus, Ohio—James G. Young, traffic manager of the Columbus Chamber of Commerce, who was secretary of the Franklin County Coal Committee during the war, has been made a member of the Central Territory traffic committee of the U. S. Railroad Administration, with headquarters at Chicago. He will look after coal interests on the committee.

Altoona, Penn.—Two giant steel coal cars of a new design have been completed at the Pennsylvania's steel car plant. The first of the cars weighs 74,000 lb. and has a capacity of 220,000 lb.—110 tons. The second car is known as Class H26, with a weigh. of 82,000 lb. and a capacity of 210,000 lb.—105 tons. Both cars are carried on six-wheeled trucks.

Columbus, Ohio—Announcement was made of the award of Hocking Valley Ry. contracts aggregating about a quarter of a million tons as follows: Essex Coal Co., Columbus, 214,000 tons, at $1.95; Franko Coal Co., Zanesville, 25,000 tons, at $1.95; Cambridge Hocking Coal Co., Columbus, 11,000 tons, at $1.90. In all, there were 21 bids submitted for the business.

Pittsburgh, Penn.—The Pioneer Coal and Coke Co., with headquarters in Pittsburgh, has named Charles F. Colbert, Jr., of Brownsville, Penn., as its general manager. Mr. Colbert for the last eight years had been assistant general manager and sales manager of the Alicia mines of the W. Harry Brown interests. Those mines were recently sold to the Pittsburgh Steel Company.

Columbus, Ohio—Ohio's war record for coal production, recently made public by the department of investigation and statistics of the state industrial commission, shows 48,849,226 tons of coal mined in Ohio in 1918, or 6,000,000 tons more than in any previous year in the history of the state. Belmont County alone produced 12,165,253 tons, or one-fourth of the state's total production.

Okeeffe, W. Va.—The C. L. McPherson Coal Co., recently incorporated under Delaware laws, with a capital of $150,000, is arranging for the development of about 140 acres of coal properties in the vicinity of Okeeffe, to have an initial capacity of about 200 daily, to be increased ultimately to 500 tons. C. L. McPherson, North Fork, W. Va., is president; M. F. Christian is manager.

St. Louis, Mo.—In an opinion recently handed down in the United States Circuit Court of Appeals, a judgment of $600,000 has been set against the United Mine Workers of America to the Coronado County Mining Co., of Sebastian County, Arkansas, for alleged damage caused by members of the union in a strike raid on the property of the company at Jamestown, Ark., and has been conditionally upheld.

New York, N. Y.—The Wilkes-Barre Coal Co., with offices at 123rd St. and East River, makes the interesting announcement that it has taken over a large mine in West Virginia producing one of the best grades of bituminous coal, and that the output is offered to consumers in cargo lots. The company states, also, that it will deliver this coal in any quantity by auto truck to consumers in the metropolitan district. Low prices are quoted for contract or spot delivery. A company expert is available to users who desire specific information regarding burning qualities of the fuel, prices, deliveries, etc.

New York, N. Y.—Work has been started upon a building which it is planned to make the national home for all trade associations now located, or which will locate in the future, in New York City. Among the advantages which are expected from this plan are: Closer coöperation between allied industries; greater convenience for business men desiring to see several associations; special advantages for coöperative meeting rooms, and added prestige due to having a high-grade building devoted to the interests of business men, in the heart of the hotel, railroad and subway terminal districts of New York. The name of the structure will be the National Association Building. It will be ready for occupancy the latter part of next January. Further information may be obtained by addressing Willard C. Brinton, consulting engineer, 17 W. 44th St., New York City.

Chicaga, Ill.—Circuit Judge Harris, acting on the petition of the Latham Coal and Mining Co., has ordered suspension of operation of the mine and appointed Harry G. Adams, of Chicago, as receiver. E. C. Lutz, secretary of the company, reported to the court that the company was solvent, with $25,000 more assets than liabilities, but the company has lost $19,000 in the past year, the officers are liable for $13,000 in obligations and there is $19,000 due for materials and supplies. Mr. Adams, who was formerly with the Jones & Adams Coal Co., has taken charge of all property, assets, credits and collect accounts and is notifying creditors to file statements within 30 days. He will dispose of personal property not needed in the conduct of the mine and will raise money to meet the payroll. The company's bills receivable amount to $15,000. The company states that $65,000 is needed to put the business in a safe and competitive condition.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Railroads Buying At Satisfactory Prices—Bituminous Industry Awaits General Business Activity—Elimination of Government Control Will Restore Confidence—Anthracite Operators Busy—Domestic Sizes in Excellent Demand

GOVERNMENT attempts at price-stabilization came to an end with the recent resignation of the Industrial Board of the Department of Commerce. The failure of the board to bring the steel producers and the Railroad Administration together had been discounted by the soft-coal industry weeks ago, for it had refused to enter into any negotiations looking to a fixed price for fuel until it received certain assurance that Director General Hines would consider himself bound by any agreement entered into.

It must be stated in all fairness, however, that, contrary to the impression that seems to be prevalent, there is no deadlock in the matter of coal purchases by the railroads. Sales are being made from day to day at prices that seem equally satisfactory to both the railroads and the operators. The price range of coal for railroad use is from $2.55 to roads in New England to less than $2 for roads radiating from Pittsburgh. Between these two extremes is a price of $2.35 for Pittsburgh district coal, while the low figure is for fuel from the Panhandle district of West Virginia.

Judging from the manner in which industry has died off since the signing of the armistice, one would incline to the belief that the major part of American business was the making of war and the manufacture of war materials. The steel industry, for example, a large consumer of coal, at the present time is demanding little fuel, as it is operating only at about 55 per cent. of capacity. Other consuming industries, however, are expanding somewhat, but what the country needs in order to bring about a new era of prosperity is the elimination of all Government control of industry. The return to private ownership of railroads and other public utilities, with the opportunity to operate them at a reasonable profit, will go far toward instilling that confidence without which we must continue to stagnate industrially.

The bituminous coal operators, therefore, are marking time, awaiting in common with others the time when our Government officials arrive at a new understanding. The din and turmoil of battle seem to have so dulled and benumbed the senses of the powers that be that they do not realize conditions have changed. During the war, the Government was the largest customer that industry had, and everything possible was done to bring about a high degree of standardization and centralization. These policies were all right then, but they are all wrong now. The demise of the price-fixing board seems to presage the return of the competitive basis of doing business, and in this direction lies progress—for coal as well as other basic materials.

Shipments of bituminous coal to the lakes have reached important proportions. Operators are rushing coal forward in anticipation of transportation troubles later in the season.

Demand for anthracte is active, and dealers are complaining that coal is not coming fast enough. The stove and egg sizes seem to be the choice of the larger number of consumers, though there is also a good inquiry for broken, chestnut and pea. Due to overproduction, the steam sizes of anthracite are selling at somewhat lower prices than have prevailed for some time, quotations being from 12 to 20 cents per ton lower on the coal produced by the so-called independent companies. The larger operators are storing their surplus of the small sizes. The total quantity of hard coal shipped from the mines in April amounted to 5,224,715 tons, against 3,938,908 tons in March and 3,871,932 tons in February.

WEEKLY COAL PRODUCTION

The production of bituminous coal in the United States during the week ended May 3 is estimated at 8,051,000 net tons and is a considerable improvement over the output of the week preceding. Compared with the same week of last year, however, the current week's production fell 3,324,000 net tons behind. For the calendar year to date, the output of bituminous coal is estimated at 143,773,000 net tons as compared with 189,447,000 net tons during the same period of 1918. The daily average production during the week ended May 3 is estimated at 1,342,000 net tons as compared with 1,356,000 net tons during the period Jan. 1 to date, and 1,787,000 net tons during the corresponding period of last year.

Production of anthracite during the week ended May 3 is placed at 1,695,000 net tons as against 1,401,000 net tons during the week ended Apr. 26 and 1,960,000 net tons during the week of May 2, 1918. For the calendar year to date the production of anthracite is estimated at 25,357,000 net tons and is approximately 25 per cent. below the output during the same period of last year, estimated at 33,134,000 net tons. The daily average per working day during the current week is estimated at 282,000 net tons as against 234,000 during the week preceding, and 239,000 net tons for the calendar year to date.

Shipments of bituminous coal from the tidewater harbors to all points during the week ended May 3 are estimated at 397,684 net tons as compared with 453,074 net tons during the week preceding. Decreases occurred during the week at all harbors with the exception of Baltimore, at which harbor the increase was slight. Loading at Hampton Roads fell behind the most—approximately 37,000 net tons, or 30 per cent.

The tidewater shipments to New England during the week ended May 3 are estimated at 84,066 net tons as against 102,789 net tons for the week ended Apr. 26. The decrease is entirely attributed to the falling off in tonnage loaded at Hampton Roads, the current week's loading amounting to but 28,122 net tons as against 56,455 net tons during the week preceding. During the same week of 1918 total tidewater shipments to New England amounted to 331,470 net tons.

Production of beehive coke in the United States during the week ended May 3 is estimated at 296,163 net tons, and is an increase of approximately 34,000 net tons or 13 per cent. over the production for the week preceding. However, production during the week ended May 3 is but 50 per cent. of the output of the corresponding week of last year. During the current week improvement occurred in production in Pennsylvania, West Virginia, Washington and Utah, while in all other states the output fell even below the output during the week ended Apr. 26. For the calendar year to date the production of beehive coke in the United States is estimated at 7,498,379 net tons as compared with 10,086,351 net tons for the same period in 1918. The daily average for the coal year to date is estimated at 70,738 net tons, while for a similar period last year it was recorded at 95,154 net tons.

Bituminous coal dumped at lower lake ports during the week ended Apr. 26 is estimated at 397,474 net tons and is slightly in excess of the tonnage dumped during the same week of last year, estimated at 370,204 net tons. For the season to date bituminous coal dumpings amount to 958,499 net tons, and is nearly 50 per cent. in excess of the tonnage dumped during the same period in last year.

BUSINESS OPINIONS

Dry Goods Economist—It is evident that business is in a stable condition. From all centers orders for goods are being received and with these orders are many statements showing that consumers are buying liberally and also that they appear well supplied with funds. The course of prices of many commodities is slightly downward, while some other goods have advanced. Where advances occurred they have, as a rule, been due to the payment of higher wages to operatives.

Marshall Field & Co.—Current wholesale distribution of dry goods is slightly less than for the corresponding week a year ago, when there were especially large shipments. More merchants are visiting the market frequently and all report excellent retail business. Orders from road salesmen are in excess of the corresponding week last year for both immediate and future delivery, particularly for fall. Collections are satisfactory.

American Wool and Cotton Reporter—The Boston wool market remains strong and active but buying in the West, or at least the Middle West, has practically ceased for the present on account of the high prices asked by the growers. In the foreign markets the prices are strong. A slightly increased demand from the mills

for cotton continues, but many in the trade do not look for particularly good business until the present feeling of unrest has disappeared. The two prominent factors in the cotton market are peace prospects and the weather.

The Iron Age—Pig iron statistics for April show that that industry is rapidly adjusting itself to the shrinkage in iron consumption. No less than 54 furnaces blew out last month, leaving 212 active as May came in, against 372 on Sept. 1 last year when the peak was reached. In April the output was 2,478,218 gross tons, or 82,607 tons a day, against 3,090,243 tons for the 31 days of March or 99,685 tons a day. Capacity active May 1 was 75,860 tons a day for 212 furnaces, against 93,165 tons a day for the 266 furnaces in blast on April 1. Production at the opening of this month, estimating charcoal iron, was at the rate of 28,000,000 tons a year. This compares with an actual output of 39,052,000 tons in 1918. Not since May, 1915, when there were the first signs of a war demand for American steel, has pig iron production been at so low a rate as today.

Atlantic Seaboard

BOSTON

Market almost featureless. Little inquiry and no change in prices. Bulk of railroad fuel not yet purchased, although one of roads has announced successful bids. Quality grades still firm. Some operators get conservative as to season commitments. Inferior grades slow. Smokeless coals unchanged. Anthracite shipments not sufficient to meet demand on retailers. Slow movement coastwise. Demand continues strong.

Bituminous—The general situation continues without material change. Competitive bidding for railroad fuel tonnage seems to have had very little effect upon current quotations, and the market is as featureless as at any time since January. The differential in favor of all-rail coals is still holding Pocahontas and New River down to a minimum tonnage, confined for the most part to territory immediately accessible to tidewater. There is quiet buying of the better grades from central Pennsylvania, and steam-users long accustomed to the smokeless grades from West Virginia are testing Cambrias and Somersets in the effort to find what they would consider to be satisfactory substitutes. For this reason there is a somewhat better demand for the coals classed as "No. 1," and whatever firmness there is in the present market can be directly attributed to this kind of inquiry.

Stocks are still large and buyers are proceeding very cautiously. It takes constant combing for the different agencies to disclose any contract buying, and spot business is even harder to get than a month ago. So frequently have concessions been made for April and May orders, that buyers expect even lower prices for June and July. It can hardly be said, therefore, that the market in New England is to any extent stabilized.

There is only scattered inquiry and for relatively small tonnages. A large number of manufacturers whose stocks are gradually being depleted are taking advantage of the dull coal market by conducting tests of the different brands of fuel oil now being vigorously pressed on this market. A tonnage which has been estimated as large as 750,000 has been already supplanted by fuel oil. The differential in cost is in favor of the latter, but undoubtedly the largest element in making the change is the continued difficulty large employers have had with labor in their boiler rooms. Oil can be used with a minimum boiler force and for this reason alone is bound to make inroads on coal the next few years. Oil distributors have comprehensive plans for storage at strategic points, and some interesting developments can be looked for. Prices of coal have known no material change the past fortnight. The high volatiles are still in very light request and aside from gas-producing grades there is almost no business for coals of that character. The Fairmont district especially is suffering from the very narrow and restricted market that prevails in this territory

Only one of the New England railroads has announced the successful bids for locomotive fuel for the period ending March 31, 1920. The Boston & Albany awarded 635,000 tons in all to several different shippers, the highest price on Pennsylvania coal being $2.55 per net ton f.o.b. mines. One block of 65,000 tons was bought at $2.15 per net ton, although this was on a coal that takes a 25c. higher rate from the mines. The only price above $2.55 was on Pocahontas, 100,000 tons at $2.75, this to be freighted by water from Norfolk and required for special use on a suburban circuit. While bids have been submitted more than once, no results have yet been announced by either the New Haven or the Boston and Maine, both of which roads have negotiations pending.

The fancy grades on the central Pennsylvania are still being firmly held at previous quotations. Buyers continue to discriminate in favor of these quality grades and it is increasingly difficult to find outlet for even the medium coals from the Clearfield region. Inferior grades continue to be offered in ample volume, but with almost no takers. A certain tonnage is being moved over the New York and Philadelphia piers, buyers being attracted by low figures, but even through this channel the demand is noticeably less than a month ago.

On Hampton Roads coals the situation is practically unchanged. There is a wide variation in price between the offerings of different shippers. Coastwise freights, whether by steamer or barge, are on the basis of $2 to Boston, and as the market stands at present the inquiry for these coals inland is very light and is confined to those consumers who insist upon smokeless and coking coals even though they must pay a high differential for their use. Inland distributors are offering contracts at prices that range from $7.60@$7.90 per gross ton on cars Providence or Boston. So far, however, selling efforts on this basis have had little result.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@$2.75	$2.75@$3.25
F.o.b. Philadelphia, gross tons	4.27@ 4.95	5.95@ 5.50
F.o.b. New York, gross tons	4.62@ 5.29	5.29@ 5.85
F.o.b. Alongside Boston (water coal), gross tons	6.10@ 6.85	6.90@ 7.55

Georges Creek is quoted at $3.20 per net f.o.b. mines.

Pocahontas and New River are being quoted at $4.69@5.14 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $6.89@7.24, and on cars Boston and Providence at from $7.60@7.90, per gross ton.

Anthracite—Retailers throughout New England are getting increasingly anxious as the season advances. Much publicity has been given to the difficulty of getting forward coal in sufficient volume, and throughout New England the public is insisting that orders be filled promptly. This is particularly true on egg size, which manifestly will not be needed until next season; but the retail dealers in Boston, for instance, are taking all the orders that come and are trusting to deliveries later on to make good their promises. Many buyers felt at the opening of the season that domestic sizes would come forward much as in a normal year, and that the proportion shipped in April would be relatively large. That was not the case, however, and several large distributors in this market got as little as 5 per cent. of their yearly requirements. Present receipts are by no means sufficient to enable retailers to make anything like the deliveries their trade calls for. Some already have all the business they can comfortably take care of for three to four months ahead. The slow movement of anthracite barges is causing some anxiety, but distinctly there is a better feeling over the outlook now that the Reading fleet is being operated exclusively from Philadelphia. A heavy tonnage comes to this market through that channel, and anything that speeds up the loading of these barges will materially increase receipts at this end.

NEW YORK

Anthracite situation strong, with heavy demand for the domestic sizes. Some so-called Independents quoting coal at slight advances. The anthracite steam sizes quoted at slight decreases, owing to overproduction. Movement in bituminous slow and quotations show much variation. Mines have much idle time.

Anthracite—The situation remains practically unchanged. Demand is active, but the supply of coal is not so large as dealers would like to have it. Production is heavy, but producers and sales agents are endeavoring to distribute the coal impartially, and other parts of the country are just as anxious to secure fuel as is this market, hence the complaints from the local dealers that they are not receiving coal as fast as they would like to get it.

Reports from the coal fields indicate prosperity for the workers. Most of the so-called Independent operations are working full time, their owners in the majority of instances having orders booked ahead for domestic sizes to carry them into July. Practically the same is true of the larger companies, but it was said early this week that all of their operations are not working steadily.

Some wholesale dealers look for a let-up in demand during July and August, with a resumption of activity in early September, which will continue well into the winter.

The lack of supplies is reflected in the cars of anthracite dumped at the local tidewater docks during the seven-day period ended May 9, reports showing 6462 cars dumped as compared with 7022 cars the previous week, a decrease of 560 cars.

Stove and egg are in heaviest demand by the local trade, but there is a good call for broken, chestnut and pea. Orders are plentiful and dealers are heavily booked for future delivery. The product of the so-called Independent operators is being quoted in some cases at slight advances over the regular company schedule.

The anthracite steam sizes are easier than the larger coals, due to their heavy production and the approaching warm months. Quotations are from 12 to 20c. off on Independent product, the larger companies storing their surplus.

The retail situation shows much activity. Much complaint is heard of slow deliveries from the docks, many retail yards having scarcely any of the domestic sizes on hand.

It is said that the formation of another large company to take over several of the present retail yards is about completed, and that it will soon be prepared to begin deliveries.

Several of the City Departments have opened bids for fuel supplies, among them the Board of Education, which requires about 125,000 tons of anthracite and bituminous coal to heat the schoolhouses during the year. Quotations for furnishing and delivering the various sizes to the school buildings range from $10.22 to $12.05 per ton for broken; $10.22 to $12.29 for egg; $10.22 to $12.30 for stove; $8.90 to $10.47 for pea; $7.12 to $8.92 for buckwheat No. 1; $5.89 to $7.94 for buckwheat No. 3, and $7.19 to $9.10 for soft coal, according to Boroughs and places of delivery.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports, are as follows:

	Mine	Company Circular
Broken	$6.05	$7.90
Egg	5.95	7.80
Stove	6.20	8.05
Chestnut	6.30	8.15
Pea	4.90	6.65
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The local bituminous market shows little activity. Demand is slow, consumers showing no inclination to stock up. Mining is slow, reports received here being to the effect that many of the openings are idle several days a week, some because of the lack of orders and others because of the attitude of the workers, who, after a couple of days of idleness, refuse to report for work the balance of the week. This may prove to be the salvation of the industry, however, in view of the heavy tonnages thrown back on the market because of the substitution of oil for coal.

It was reported here early this week that one big concern which at one time had an estimated consumption of 500,000 tons of coal annually has now discontinued the use of coal entirely and hereafter would use oil. Similar reports are frequently heard concerning other concerns, but using smaller tonnages of coal.

The danger of a runaway market and higher prices next fall does not cause many of the large consumers to enter the buyer's market for large blocks of coal. They seem willing to take their chances in the open market in securing coal at lower prices and many of them have so far neglected to close contracts for their future supply.

The all-rail trade is in good shape and shows more activity than the tidewater. There is a heavy demand and considerable coal is being put away for future use.

Operators are being approached daily with offers of low prices for coal, but they

are in the main holding strong for prices which will cover the cost of production.

Contract coals are moving steadily, but the spot market is quiet. There is a fair tonnage handled over the local docks, but the dumpings for the week ended May 9 show a decrease from the previous week's dumpings, 5133 cars having been handled as compared with 5955 cars the previous week.

Quotations show a wide variety of prices, much depending upon the urgency of the situation. While the accompanying tabulation shows no change from last week, quotations of various shippers on certain grades for immediate shipment were in some cases slightly lower.

The quotations for the various coals at the mines, net tons, for spot delivery and contract, follow:

	Spot	Contract
South Forks	$2.90 to $3.25	$2.95 to $3.50
Cambria County (good grades)	2.75 to 2.95	2.95 to 3.25
Clearfield County (good grades)	2.50 to 2.75	2.80 to 2.95
Reynoldsville	2.50 to 2.75	2.75 to 2.95
Quemahoming	2.65 to 2.85	2.95 to 3.10
Somerset County (best grades)	2.65 to 2.85	2.95 to 3.10
Somerset County (poorer grades)	2.00 to 2.35	2.50 to 2.75
Western Maryland	2.25 to 2.75	2.50 to 2.75
Fairmont	2.00 to 2.25	2.35 to 2.50
Latrobe	2.10 to 2.25	2.25 to 2.40
Greensburg	2.25 to 2.35	2.35 to 2.60
Westmoreland ¾ in.	2.60 to 2.75	2.60 to 2.75
Westmoreland run-of-mine	2.35 to 2.60	2.35 to 2.65

PHILADELPHIA

Anthracite demand continues extra strong. Dealers grow impatient at slow deliveries. New business not being sought. Production below normal. Enough stove business for entire summer. Nut not far behind. Pea shows some signs of strength. School coal awarded. Steam sizes in fair call, but smallest sizes go to storage. Bituminous drags along. Good coals in fair demand. Little spot grade. Some improvement in contracting.

Anthracite—There is a growing tenseness of feeling at this time between the retailers and the operators. This is due on the part of the former to their strenuous efforts to obtain shipments to meet the number of orders which have been placed on their books. As a result many of the dealers are becoming unreasonable, as they are insisting upon coal all at the same time. For the moment they have apparently lost sight of the fact that the mines do not produce enough coal in April and May to allow them to fill all their orders and also stock their yards, as some dealers are trying to do. A few years ago we saw coal arrive in the city on the morning of Apr. 1 at that month's price. This was when the stocks in the storage yards were drawn upon during the last few days in March and the coal loaded and started to market on the last day. The retailers are losing sight of the changed conditions and are making miserable the lives of the selling agents.

It is, of course, no use to remind the dealers that the markets of the country lost almost 4,000,000 tons in February and March, after the spring prices were announced, simply because the retailers were afraid to stock coal at that time. Nevertheless this is a fact, and the buyers of coal are feeling the result of it now, for it is tonnage lost that cannot be made up. When the buying actually started a great amount of business was taken from the retail men with the distinct understanding that shipments would be slow, and now some of them are calling daily and demanding immediate consignments.

The result of the rush during the past few weeks has been that the operators are refusing all new business for egg, stove and nut and most salesmen have been instructed by their houses to solicit no new orders for these sizes. For the present at least there appears no hope of increasing the production at the collieries, and due to various celebrations in the region on account of returning soldiers, the tonnage to date this month has been away below normal.

Stove is by all odds in greatest demand, and if all the orders recorded are bona fide the output for all summer has been sold. Chestnut, too, is very active, but a greater amount of it continues to arrive here. Some shippers appear to be longer on egg than others, but as a whole the market is short of it, as the demand is unusual. Pea has strengthened and all the best grades are in fair demand here. There may be concessions in price by some of the smaller operators, but there is no sharp price cutting. As a matter of fact we have heard of some shippers compelling customers to take a certain quantity of pea in order to receive stove and nut. The fact that one of the heaviest buyers of this size and who was the first to announce a substantial reduction in the retail price when the break came earlier in the spring, has recently advanced his rate 75c. a ton, shows the market has improved. Others have advanced from 25c. to 50c. Yet in the face of this improvement one of the largest companies is still unable to move its entire production to market and continues to place some tonnage in the storage yards. Speaking of pea, it is also worth mentioning that the bids for fuel for the various school houses of the city, including 25,000 tons of pea, were practically all based on circular prices. Where concessions were made the differences were slight. The dealers' bids for hauling were, however, much lower than anticipated, the competition being surprisingly keen. Whereas much of the hauling was done around $2 last year bids as low as $1.40 were received this season.

The big producing companies are quite optimistic as to the future for the large sizes. Their officers say the demand is sure to carry them through June and perhaps well into July. Undoubtedly the dealers will want to go into the fall with full stocks, so will continue to buy after all their orders on hand have been filled. We know quite a few dealers who intend to stock heavily on nut coal in place of pea, and will not altogether neglect this latter size either, but will store a much reduced tonnage of it.

It is believed that there will be many days this summer when the dealers will be out of certain sizes, for the demand from other territories for fuel is also very strong. The demand for family sizes is great from all districts, and while operators have made substantial shipments they are hopelessly short of the demand.

There is a fair demand for steam coals, but buckwheat is the only size that is really active. As it now stands, the production of this size is just about absorbed and no more. Rice, which has of late shown signs of improvement, has failed to hold it this week. At this writing there is actually more of this coal than the trade is able to take, and as a consequence a good tonnage is once more being sent into storage. Naturally barley has also failed to improve, and the piles of this size in the storage yards grow and are causing much anxiety to the companies.

The loss of broken coal tonnage has been general, as many of the gas companies have gone on coke. Some producers profess that this does not embarrass them, as they would rather break this size down and get better prices as family coal. It appears that the concerns most affected are those having a coal of a fragile nature which when broken down creates a heavy percentage of the extremely smaller sizes.

The prices per gross ton for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.80	Buckwheat	$3.40	$4.45
Egg	5.95	7.80	Rice	2.75	3.65
Stove	6.20	8.05	Boiler	2.50	3.50
Nut	6.30	8.15	Barley	2.25	3.15
Pea	4.90	6.50			

Bituminous—The condition of soft coal is indifferent. There are some shippers who actually claim they are sold up, while others are making but very short time. Of course, as has been the case right along, the good coals find no difficulty whatever in making a market. A large proportion of this production continues to go into the New England market on contract orders.

Some shippers also report a more satisfactory condition as to contract inquiries recently, a number of fair-sized consumers having closed for their tonnages this past week. All concerns are still receiving many inquiries and more than a usual number have seemed to actually want coal lately.

There have practically been no price changes during the past week and they rule about as follows:

Georges Creek Big Vein	$2.90 @ $3.00
South Fork Miller Vein	2.90 @ 3.00
Clearfield (ordinary)	2.75 @ 2.90
Somerset (ordinary)	2.55 @ 2.70
Fairmont lump (ordinary)	2.40 @ 2.50
Fairmont mine-run	2.15 @ 2.25
Fairmont slack	1.90 @ 2.00

BALTIMORE

Soft-coal market uneventful, Fair prices maintained on best grades with cutting on other coals. Contract-making almost dead despite possibility of coal shortage. Hard coal men fairly busy.

Bituminous—There is no snap to the market here. What trading there is, is generally on a basis of fairly good prices for the best coal, with some sharp cutting at times on the less desirable grades. The nature of these sales, at prices considerably off the lowest rates offered on contract, is such that there is no general inducement for consumers to get under cover. For that reason the purchasing in the open market is about the only sign of activity.

Coal men are beginning to point out to their clientelé that the production of soft coal at this time is so far below consumption, and the distribution of mine labor has been so wide to other industries, that when the end of summer comes there may arise a situation where it will be difficult to make contracts to assure a fuel supply.

A feature of the market here is that the jobbers are planning for a vigorous business this fall. All the old clouds of Government regulation for jobbers, even to the point of their suppression, have gone, and the mines and consumers are both turning more than ever to the middlemen to help out. Several new names are noted in the coal-brokerage business, and none are apparently disappearing. The export movement was not so heavy last week. The total loadings on foreign coal cargo carriers was but 9349 tons, largely due to light reporting of bottoms at the piers.

Anthracite—The anthracite market continues fairly active. Dealers report that they are still delivering on orders received in April as the receipts from the mines did not enable them to put out in their hauls the tonnage they could otherwise have delivered. Some large anthracite contracts are now being made, as there is no advantage in holding off as in the cheaper spot market for soft coal. The city has awarded a contract for 15,230 tons for some municipal departments, to the Chesapeake Coal Co. for a total of $158,552.

Lake Markets

PITTSBURGH

Railroads buying coal steadily. Railroad coal price stabilization plan dead. Lake shipments of gas coal heavy. Market prices unchanged.

The idea still seems to survive in some quarters that there is a deadlock, or a near deadlock, in the matter of coal purchases by the railroads. The fact is that purchases are being made from day to day, at prices that seem equally satisfactory to the railroads and to the operators who make the bids. The coal price stabilization plan of the Industrial Board was tabled long ago, until it could be seen whether the Industrial Board could bring the Railroad Administration to an indorsement of the steel prices the steel producers had quoted, and with last week's positive and final failure of the steel producers and the Railroad Administration to get together, the coal plan died a natural death. Leading Pittsburgh coal operators had already practically forgotten it.

The railroads radiating from Pittsburgh are buying Pittsburgh district coal at various prices, according to quality, the highest price being the regular $2.35, which as reported last week was done on a contract for 1200 tons a day to Apr. 1, 1920, between the Pennsylvania Lines East and the Pittsburgh Coal Co. For shorter periods the railroads would be unwilling to pay as much, thus agreeing with the belief expressed by operators that coal prices will be higher next fall and winter than this spring and summer. The lowest prices paid have been for Panhandle coal, which in some cases is understood to have gone to railroads at less than $2.

The steel industry is consuming less and less coal each week. Its average operation was 65 per cent. of capacity in April, against 77 per cent. in March, and the rate this week is hardly above 55 per cent. Some other consuming industries, however, are expanding their operations somewhat.

Lake coal shipments have now reached important proportions, and in the case of high-grade gas coal there is almost a rush to get coal forward, in anticipation of possible transportation difficulties late in the season.

Production in the Pittsburgh district continues at about 50 per cent. capacity. The market remains quotable as follows:

Byproduct coal, largely nominal, mine-run, $2.35; high-grade gas coal, slack, $2.10@2.20; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $2.60@2.70; steam, slack, $1.90@2; mine-run, $2@2.35; all per net ton at mine, Pittsburgh district.

TORONTO

Rush of orders for hard coal continues. Dealers behind in deliveries. Shipments from mines light. Bituminous quiet. Industrial conditions unsettled.

There is a continued heavy demand for anthracite, consumers being anxious to lay in stocks before prices are raised. Shipments from the mines are light and supplies in the yards depleted. Dealers are considerably behind with deliveries, and new orders are only accepted subject to the price prevailing at the time of delivery. Bituminous is not much in requistion and dealers have ample stocks on hand. The industrial situation is considerably unsettled owing to extensive strikes in the metal and other trades, which have a tendency to further restrict the demand.

Quotations for short tons are as follows:

Retail:	
Anthracite, egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	8.25
Slack	7.25
Domestic lump	10.00
Cannel	11.50
Wholesale f.o.b. cars at destination:	
Three-quarter lump	6.00
Slack	4.75 to 5.00

BUFFALO

Small change in coal situation. Bituminous prices being cut. Anthracite in great demand. Lake shipments keep up fairly well in spite of complaints of scarcity.

Bituminous—Jobbers confess that trade does not improve, but continue their predictions of good business before long. Some of the districts, especially Ohio, are cutting slack prices. Some low figures are reported. Allegheny Valley, which was expected to be the first to reduce prices, claims that it is holding firmer than any other district. There was a shadow of car shortage, especially in grain and flour carriers, a short time ago, but that has about disappeared. Buffalo is loading 300 to 500 cars of grain a day for export. They can come back with coal, if needed, and thus relieve the open coal cars.

Bituminous prices are fairly strong, except slack, as follows: Thin-vein Allegheny Valley all grades but slack, $4.65; Pittsburgh and No. 8 lump, $4.45; same, mine run, $4.20; all slack $3.80, per net ton, f.o.b. Buffalo.

Anthracite—The heavy demand on the part of householders continues. Some days the distributors find it almost as heavy as it was during the big shortage. Egg has been especially scarce. An effort is made to keep up the lake shipments, though the local and rail demand would take it all if allowed to do so.

It looks as if the cellars will be well provided with supplies when the fall trade sets in. At the same time operators and shippers find it hard to keep up the supply.

The amount of anthracite loaded for the lakes for the week was 105,400 net tons, of which 23,700 tons cleared for Fort William, 19,500 tons for Milwaukee, 15,400 tons for Duluth and Superior, 14,100 tons for Chicago, 8500 tons for Hubbell, 7935 tons for Green Bay, 7000 tons for Waukegan, 3500 tons for Houghton, 2100 tons for Port Huron, 825 tons for the Sault.

Freight rates have been readjusted at 90c. to Port Huron, Sault, 52½-60c. to Chicago, 47½c. to Waukegan, Milwaukee, 42½c. to Duluth, Fort William, Hubbell, Portage, Marquette, Green Bay.

CLEVELAND

Virtually the only semblance of life in the local bituminous coal market is given by the lake trade. Steam-coal users are meeting spot needs only. The April movement of coal to Lake Erie ports was 30 per cent. ahead of April, 1918, but the May report may not be so favorable.

Bituminous—Coal operators here more and more are reaching the conviction that business is not being held up by the Peek-Hines controversy over steel-rail prices, but is awaiting the definite news that the Government has taken its hand off all business. The threat that Washington may at any time exercise the control within its power is said to be the underlying cause of the present dullness. Capital, naturally timid, will not bestir itself so long as the war powers of the President continue, is the statement. Whether the iron and steel industry, the largest single consumer of coal in northern Ohio, will gain anything like normal activity this summer, not to consider the fact that 1920 is a presidential year and history may be expected to repeat itself in presidential year dullness, is receiving serious consideration. The number of operators fearing subnormal conditions in the coal market for a period of at least months is growing fast. Operators are well agreed, however, that excessive production costs will serve to keep prices up regardless of slack demand.

With the lake trade taking mostly prepared sizes and very little slack, the piles of slack at eastern and southern Ohio mines become larger daily. Large buyers who have declared they would take slack again about the middle of May have made no move so far to make good their promise. Slack from $1.45 up is plentiful. Railroad fuel is moving at $2.10 and $2.15. Mine-run, which held at $2.35 during the war, now ranges as low as $1.90. The price of No. 8 ¾-in. lump for lake shipment continues to hold at $2.30 to $2.40.

Domestic consumers are showing a remarkable appetite for Pocahontas and anthracite, considering the holdover tonnage from last winter. The spur of advancing prices and the advertising campaign being carried on by the Pittsburgh Vein Operators' Association of Ohio has had a good effect upon the domestic trade, if not upon steam-coal buyers.

Lake Trade.—To May 1 Lake Erie car dumpers loaded 1,067,501 tons of bituminous coal for shipment to the upper lakes. Fuel coal handled in April amounted to 52,717 tons, making the grand total 1,120,218 tons. To May 1, 1918, the docks handled 860,797 tons of cargo coal and 30,249 tons of fuel coal, making the 1918 April total 891,046 tons. Duluth and Superior are said to have received 308,200 tons of bituminous and 78,500 tons of anthracite to May 1. Lake Erie docks are handling from 1700 to 1800 cars of bituminous a day now. Some carriers are coming down light for coal, so scarce are iron-ore cargoes. Many cargoes of coal loaded at Lake Erie ports are being held there pending an improved iron-ore market.

The following are coal prices in Cleveland, net ton delivered:

Anthracite:	
Egg	$10.85 to 10.95
Chestnut	11.15 to 11.25
Grate	10.95
Stove	11.05 to 11.15
Pocahontas:	
Forked	8.50 to 8.75
Lump	7.75 to 8.00
Mine-run	7.20
Domestic bituminous:	
West Virginia splint	7.05 to 7.15
No. 8 Pittsburgh	6.10 to 6.35
Massillon lump	7.15 to 7.25
Steam coal:	
No. 6 slack	4.30 to 4.40
No. 8 slack	4.70 to 4.85
Youghiogheny	4.90 to 5.10
No. 8 ¾-in. lump	5.35 to 5.50
No. 6 mine-run	4.40 to 4.50
No. 8 mine-run	4.70 to 4.85

DETROIT

Inactive demand and scattering sales of small size are features of the bituminous trade in the Detroit market.

Bituminous—Procrastination is seemingly the favored policy among Detroit buyers of steam or domestic coal of the bituminous type. Jobbers and wholesalers report business is unsatisfactory. The orders received are of small size and are coming in irregularly, in many instances suggesting that buyers are endeavoring to fill in temporarily, that they may be able to defer placing a larger business until a later period.

Unusually large stocks remaining in storage yards of the larger industrial plants and held by many of the retailers are said to be primarily the cause of the general indifference to bituminous coal, though among some of the buyers the unsettled general business outlook and a theory that prices may be lowered are also factors tending to delay placing orders.

Considerable of a reduction from Fuel Administration prices is apparent in quotations reported by some of the dealers as effective at the mines on short ton shipments. Splint or gas lump from West Virginia is quoted at $2.56 a ton, three-quarter lump $2.50, mine run $2.25, and slack $2, though prices are described as approximate. On Hocking lump the price is about $2.50, on mine run $2, and on slack about $1.50. Coal of good quality from other Ohio sections is said to carry about the same price. Smokeless lump and egg is scarce, and dealers are getting just about any price they place on it, while mine run of the same description brings about $2.75.

Anthracite—Domestic buyers are not coming into the market for anthracite as rapidly as dealers would desire, although warnings have been given repeatedly that prices will be higher to those who put off buying until later in the year. Most of the larger retail yards seem to have a comfortable supply of the prepared sizes, though receipts have not been of large proportions.

Lake Trade—Vessel managers are experiencing difficulty in obtaining cargoes for loading vessels for the downbound trip from the head of the lakes, with the result that a few carriers have been sent down without cargo to load coal. This, however, is regarded as unprofitable by the vessel-men. The cargo scarcity is having the effect also of delaying the start of numerous vessels which usually share in the coal trade and is the cause also of quite a number of vessels that have loaded coal being held in Lake Erie ports to await a brighter freight outlook.

COLUMBUS

There is a better feeling in the steam trade in Ohio territory. Inquiries are more numerous and some few contracts have been closed. Railroad contracts have also been announced. The domestic trade remains quiet, except for fancy grades.

The steam trade is now attracting the bulk of the attention of producers and shippers alike. While the price question is still unsettled, still there are some signs of an agreement between purchasers and sellers. Inquiries are more numerous, indicating that reserve stocks are being depleted and that purchasing agents will be in the market. Some of the larger users still have large surpluses, but in many cases it is of inferior coal and they are trying to buy some better fuel in order to mix with the poorer grades.

The demand for the small sizes is still slight, which is causing an oversupply of screenings. With the opening of the lake season that situation was not improved and, if anything, was made worse. Low prices are being asked for screenings and in some cases it has become a drag on the market. But taking it all in all, the steam trade is in slightly better shape than was the case several weeks ago and producers look for a continued improvement.

Railroad business has been booked around $1.90 and $1.95 for mine-run. A fairly large tonnage was purchased at those figures. This is expected to be a moral force to bring about general contracting as it has set price levels which are expected to maintain for some time. Some of the idle mines in the Hocking Valley and Pomeroy Bend have been opened, and this is proving an incentive to sales managers to hustle for business.

The lake trade is becoming more active, although there is no great movement as yet. Dock owners are shipping a larger part of the tonnage moving. Some lake agreements have been entered into with prices left blank, to be supplied when stabilized prices are arrived at. It is not believed that any great lake movement will develop before June 1.

Production has been slightly better in all of the producing fields of the state. This is especially true of the Hocking Valley and Pomeroy Bend fields, where the output is estimated at 40 per cent. of normal. Eastern Ohio is producing about 42 per cent. while Crooksville and Cambridge are credited with about 35 per cent. In mining sections there is a growing scarcity of labor, which is expected to become more acute as the season advances.

CINCINNATI

Market still quiet, though domestic demand is picking up. Stocks of smokeless coals running low. No contract activity.

The coal situation here is still quiet, although domestic demand increased somewhat during the past week. The trade in general, however, remains below normal. Prices were well maintained, and in some quarters the opinion prevails that prices will increase before the end of the summer season. There is a plentiful supply of bituminous coal on hand in this vicinity, but the smokeless grades are running low. In fact, the demand for smokeless coal is

much greater than the supply, and the local dealers are experiencing some little trouble in supplying the demand.

There is not much activity in contracting, dealers as well as consumers still remaining a little cautious. The local dealers are using every available means to get the consumer to buy, but so far have not been able to stir up any great amount of sales. They fear that this will result in a serious shortage when the buying begins, as it will again be a problem of transportation.

LOUISVILLE

Mines reporting fair domestic business, but dull steam demand. Retailers carrying fair stocks, but unable to develop spring stocking orders. Outlook for big fall rush at high prices.

The mines of Kentucky are operating on a fair percentage basis, but are short on orders for mine-run and nut and slack. A large part of the business has been on clean block coal. However, the retailers are rapidly loading up and are beginning to stop shipments, as they are unable to make deliveries and get rid of the surplus.

Railroads have been playing around considerably before placing contracts. The Louisville & Nashville has made most of its contracts for the season, but the Seaboard, Southern and other lines are still to be heard from.

Production in the mine sections is holding up very well, but are expecting duller movement if the retail situation does not change. Prices are firm and showing no change, although some steam coal is being quoted at under regular figures.

Quotations at mines:

	Eastern Kentucky	Western Kentucky
Block	$2.90@$3.25	$2.60
Egg	2.75@ 2.90	.....
Run-of-mine	2.35@ 2.40	2.35
Nut and slack	2.00	2.05

BIRMINGHAM

Buying of steam coal continues light, while movement to railroads has fallen off during past week. Domestic sizes about sold up through the year. Production shows a decline.

There is little inquiry or demand for steam fuel in this market, the accumulation of stocks in the hands of consumers still being sufficient to meet their restricted needs. There has also been a slump in the movment of contract coal, principally among the railroads, which are now taking about the minimum tonnage required in their agreements. Prices remain stable on basis of the Government schedules in effect as of Jan. 31, which are as follows per net ton mines:

	Mine-Run	Prepared	Screenings
Big Seam	$2.45	$2.75	$2.40
Black Creek and Cahaba	3.45	3.75	3.10
Corona, Pratt	2.85	3.05	2.45

Inquiry for domestic sizes has not slackened and there is a scarcity in this grade of fuel to meet present demand. Practically all sizes have been sold up through the remainder of the year and into the first quarter of 1919 in many instances. Prices are as follows per net ton mines:

Carbon Hill	$3.15
Corona	3.40
Big Seam	2.90
Black Creek and Cahaba	3.85@4.50
Montevallo	5.00

Operations at commercial and domestic mines are about on the same schedule as has been in effect for the past several weeks. Only a small percentage of the collieries of furnace companies are running, as iron production is at a very low ebb in this district. The Woodward Iron Co. is preparing to start up one or two stacks to supply some off-grade iron needed on contracts, which will necessitate an increased coal production from their mines.

Coke

CONNELLSVILLE

Prompt furnace coke stiffer still. Bottom about reached unless coal declines materially. Foundry coke demand improved.

The stiffening in the spot furnace coke market has continued. This represents in part the taking off the market of a few thousand tons of coke by a large coke and furnace interest which had labor trouble at its Vesta mine, and in part the closer djustment the coke operators have effected of production to contract requirements. Prompt coke, however, is still available at not above the $4 price commonly recognized in settling for May deliveries under contracts, and usually at somewhat less.

A considerable range of prices obtains on contract deliveries. Two or three contracts remain unadjusted at the old $6 Government price. The remaining contracts that had been written subject to "last Government price" were adjusted some time ago to $5, but it does not seem that further adjustments have been made. Contracts calling for monthly adjustment of price whenever Government control should be removed have been adjusted approximately as follows: February, $5; March, $4.50; April, $4.25; May, $4.

Any further decline in coke prices of any moment would depend on the coal market. If coal is maintained in the neighborhood of $2.35, furnace coke is hardly likely to go much below $4, as that price does not allow any profit for converting coal into coke.

There has been a distinct improvement in the demand for foundry coke, and particularly of the better grades. Very good grades are obtainable at $5, and it is held that it pays foundries to use such coke rather than the cokes that can be picked up at $4 and $4.25. The market is quotable as follows: Spot and prompt furnace, $3.75@4; spot and prompt foundry, $4.25@5, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended May 3 at 133,606 tons, a decrease of 1756 tons.

Buffalo—The trade is still quiet, waiting for the iron movement to grow. It is believed that the time is not far off, but till it arrives it will not be easy to sell coke. Quotations, f.o.b. Buffalo, are $7 to $7.25 for 72-hour foundry, $6.60 for 48-hour furnace and $6.10 for off grades.

Middle Western

MILWAUKEE

The coal market continues quiet. Dealers urge consumers to buy and predict higher prices later on.

The coal market continues quiet, with only a fair demand. The announcement of the new scale of prices on May 1 elecited little comment, and it is evident that consumers fully realize that they are in for a continued period of high-priced fuel. The coal dealers have started a campaign of newspaper publicity in an endeavor to induce their customers to put in their supplies for next winter as early as possible, the prediction being advanced that prices will be higher later on. Coal cargoes are reaching port at the rate of three or four per day, the receipts from this source since the opening of navigation aggregating 113,303 tons of anthracite and 245,485 tons of bituminous. The Central Coal Co., which has not handled lake coal for several years, confining its business to Illinois rail coal, has received one cargo thus far over its dock. This company handles the fuel supply of the Chicago, Milwaukee & St. Paul Railway Co.

ST. LOUIS

An unusually quiet market with an impatiently waiting trade ready for the storage season, which it is hoped will soon open. No country demand for anything but a little anthracite, and the city steam and domestic is at a standstill.

The quietness that prevailed a few weeks ago is nothing compared to the unusual quietness that is prevalent now in the local trade. The only coal that is moving at all of domestic sizes is a little anthracite, which is going to a few dealers in the country. This is about the only thing that the country trade is calling for.

There seems to be an absolute shutdown of industrial plants outside of St. Louis, judging from the small amount of steam tonnage that is moving. The country trade never stores coal early and the result is that such coal as is moving is confined to St. Louis and one or two of the larger cities adjacent.

The steam business in St. Louis proper is at low ebb. There is so little demand that every time a buyer is in the market for a car or two of coal there are anywhere from 10 to 40 who are willing to cut the price a little under the previous price in order to get the business. The prices that were maintained a few weeks ago, which were to cover the cost of production in the Standard field, are utterly disregarded at the present time by the majority of operators. Coal is selling for far below cost of production, and how long this will continue is problematical.

The mines in the Standard field are working anywhere from one to three days a week. In the Mt. Olive field conditions are somewhat better and prices are pretty well maintained. In the Carterville field of Williamson and Franklin Counties, as well as in the Du Quoin field of Perry County, there has been some improvement the past week in the call for domestic sizes, this being mostly from points in the far north, evidently for storage purposes.

Steam sizes are in exceptionally good demand, all of the smaller sizes of nut and screenings bringing practically the top price for the better grades of coal.

The present prevailing prices per net ton f.o.b. mines are:

	Williamson and Franklin County Association:	Mt. Olive and Staunton	Standard
Lump, egg and nut.	$2.75	.....	.....
Washed Nos. 1 and 2 nut	2.85	.....	.....
Independent:			
Lump, egg and nut	2.55	$2.55	$2.00@2.25
Washed Nos. 1 and 2 nut	2.85	.....	.....
Mine-run	2.35	2.20	1.60@1.75
Screenings	2.20	2.05	1.15@1.30
3-in. lump		2.30	.....
2-in. lump		.....	1.75@1.90
2x6 egg		.....	1.85@2.00

Williamson-Franklin County rate to St. Louis is $1.07½; other rates $0.92½.

Coal and Coke Securities

New York Stock Exchange Closing Quotations May 12, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com	(BB)	150	151
Burns Brothers, Pfd	(BB)	99¾	112
Central Coal & Coke, Com	(CK)	55	...
Central Coal & Coke, Pfd	(CK)	63	...
Colorado Fuel & Iron, Com	(CF)	44⅞	45⅛
Colorado Fuel & Iron, Pfd	(CF)	...	122
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com	(EH)	29	30
Elk Horn Coal, Pfd	(EH)	...	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, Pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	55	55⅓
Pittsburgh Coal, Pfd	(PC)	87	88
Pond Creek Coal	(PD)	17	17⅓
Virginia Iron, Coal & Coke	(VK)	63	65

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	...
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74½	74¾
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	90¾
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99¼	101
Lehigh Valley Coal, Gtd. Int. Red. to 4½, 1933	79¼	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	84	88
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	88	88½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	80	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	91½	92½
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85¼	85½

COAL AGE

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The Coal Business of Tomorrow

By Floyd W. Parsons

WHAT is the nature of the situation we are approaching? That is the question common in the minds of all coal-mining people. Like most of our important basic industries, the coal business is caught in the cycle of a great change. Not only is this true in the social side of the industry, but it is also a fact in the physical end of the mining business.

In many famous coal regions, such as Cambria and Clearfield Counties in Pennsylvania, the original areas are practically worked out. Operating companies are now going over their acreage, taking out pillars and working low-grade thin seams. Some beds are being worked that wouldn't have been looked at five years ago. All of this means high operating costs and a lower grade of product.

Ten years ago the Freeport seam near Pittsburgh, in Allegheny County, sold for $50 per acre; recently this same coal sold for as high as $700 per acre in blocks. In southern West Virginia, no longer than a decade ago, coal leases were made on a royalty basis of 6 to 10 cents per ton; now they range from 25 to 30 cents per ton. Many great industrial companies, especially large steel corporations, are experiencing difficulty in getting a supply of the proper grades of coal. Some of them have already decided that the only solution for their fuel problem is to secure acreages of inferior coal and carefully prepare it at the mine.

We know now that the mining waste of the old days was appalling and unnecessary. But nevertheless it was in keeping with those prodigal times. The railroads are largely responsible for the conditions that existed. Coal fields were opened chiefly to get freight tonnage for the roads. These carriers also fixed the price and dictated the point where the coal should be sold, so as to reap the benefit of a long haul and a high freight rate. Is it any wonder that mining was an unprofitable industry when in reality it was a sort of subsidiary business carried on to fatten the treasuries of great transportation systems?

But that time is no more. High-grade coals are growing scarcer daily. No new fields are being discovered, and none will be. The people understand at last the value of our coal heritage. The Government, acting as the representative of the people, will see that no further reckless wastes are permitted. Higher prices, urgent industrial needs and the competition of fuel oil will necessitate the application of science to every phase of mining. The entrance of America's largest financial interests into the coal business further insures a new and greater degree of stability in the industry.

The coming decade will see greater advances in coal mining than ever before, but the progress will not be along the same lines. The tomorrow of the colliery owner will be replete with developments having to do entirely with the art of utilizing fuel, and not so much to do with the art of producing it. The problem will be to redeem all the values locked up in the coal rather than to simply mine and wastefully burn the native article. Instead of shipping all our output in bulk by rail, we will save millions of dollars worth of valuable coal products and transmit the remaining energy of the fuel by wire to the point where the power is needed. Private interests must at last give way to national economy.

If coal operators continue to be indifferent to the methods of coal consumption, the immediate future lies dark ahead. Oil from Mexico has replaced one million tons of coal in New England since the war ended. This same competitor threatens the whole coal business of the Atlantic seaboard. The Mexican oil fields are one of the prizes of the world. It is only necessary to turn a few valves to increase the output of Mexican oil 400 per cent. Gas is the perfect fuel, but it cannot be transported long distances. Oil, therefore, at present is our supreme fuel. This would not be the case if no heat were lost in burning coal. The time has come when colliery owners must lock arms with science if they intend to march to victory.

IDEAS AND SUGGESTIONS

Robbing Pillars in Anthracite Mines

By Joseph R. Thomas
Assistant Mine Foreman, Plymouth, Penn.

Robbing pillars in the anthracite mines sometimes presents many difficult problems to the mine foreman and the men actually engaged in the work. An important and most difficult thing is to safeguard the lives of the workmen from falls of roof and rib. In order to eliminate these accidents as far as practicable, it requires a careful daily inspection of all working places while the men are at work. The person making the inspection gives instructions to the miners in regard to setting the necessary props and other timbers. But as the work of drawing pillars progresses it is sometimes found rather difficult to keep the workings supplied with pure fresh air. When pillars are taken out the sectional area of the opening is increased many times what it was previous to the work of robbing. Therefore, the velocity of the air is reduced so low that the smoke caused by the blasting hangs for some time before it is carried away. Furthermore, where robbing is carried on in more than one lift that is ventilated by the same split it is found increasingly difficult to maintain sufficient ventilation.

The cost of timbering in drawing pillars is so high in some seams in the anthracite region as to make robbing almost profitless to the operator. It is in these bad seams that the mine foreman is confronted with many perplexing conditions, in order to produce the coal at the lowest price per car possible. In order to do so he must be constantly on the lookout for miners who do unnecessary propping and timbering in order to make high wages. And permit me to say that it is right here that the foreman has to use his best judgment in regard to safety and cost; the foreman should be thoroughly acquainted with the nature of the roof that is to be supported, for sometimes he has to censure the miners for doing unnecessary timbering. Then the miners will come back at him and say: "The roof is bad." "Me 'fraid to work that place, me no stand lotse props." What is left for the foreman to do but to use his best judgment and try to explain to the miners the best possible way to protect their lives and at the same time reduce the number of props used daily.

It is evident that one prop or set of timbers that is properly placed may be equivalent to half a dozen that are set in a hurried and improper manner. Where props are use extensively it is sometimes found advisable, in case the roof is of a broken-up nature, to use extra long cap pieces on the props. For while the cap piece itself does not hold the roof, it offers a good warning to the miner that the weight is getting heavy on the props. And it is my opinion that where it is not necessary to support the roof in order to protect the surface plant, much of the timber employed could be recovered and used the second or third time. By adopting some means of drawing the timber and allowing the roof to fall, the weight would be decreased on the pillars and the work of robbing would be much safer for the miner and cheaper for the company. The increasing cost of timber will in time necessitate the greater use of steel and cement props for supporting roof at other points in mines than shaft bottoms and partings.

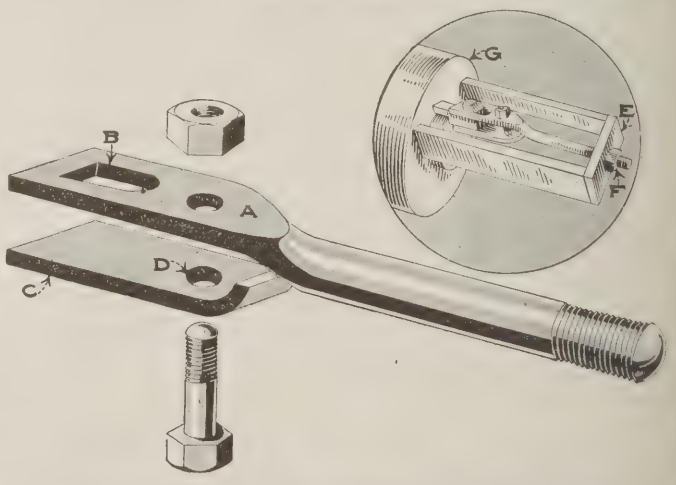
In flat or moderately inclined seams the pillars can be extracted much more easily than in seams pitching from 20 to 30 deg., other conditions being favorable. As the work of drawing pillars involves considerable expense for timber, I would like to hear what others have to say on this subject in the columns of *Coal Age*, and I would also like to know whether there is any machine or apparatus for drawing timber from worked out areas. I hope to receive the advice of others who have had considerable experience in this line of work.

[The "Sylat" post puller, made by W. Sylvester, of Parkersburg, W. Va., is used not only to pull props but also to afterward drag them away without danger to the workman.—Editor.]

Practical Key Extractor

By Charles H. Willey
Concord, N. H.

The key extractor here shown is made with a bolt of suitable size and strength for the key that is to be extracted. The illustrations give both detail and working views. To make the device calls for no great amount of skill. The bolt is heated and flattened to half thickness, and the flattened section (*A* Fig. 1) is offset a little. A hole to fit the key head is drilled and filed at



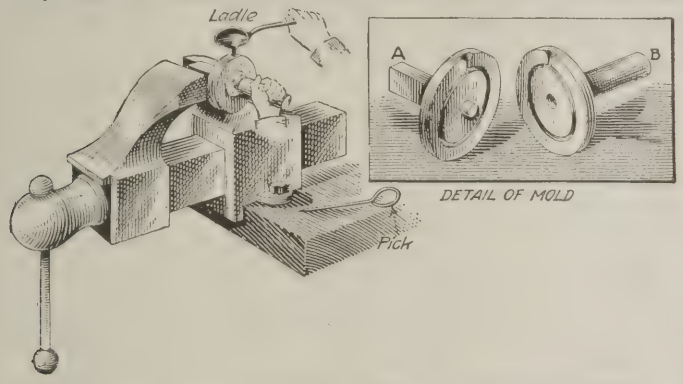
DETAIL AND WORKING VIEWS OF AN EFFICIENT KEY EXTRACTOR

B and a small strap made of flat steel, as at *C*, is also made, and holes drilled for bolting these two parts together, as at *D*. In operation the slotted part is placed over the key head with the strap on the under side, and then the two are bolted together. Suitable distance pieces and the strong back *E* are put in place, and while tightening up the nut *F*, hammer blows are struck on the hub at *G*. The key will respond to this device almost every time.

Homemade Lead Gasket Outfit

By J. L. Ball
Amsterdam, Ohio

At all mine plants where water-tube boilers are used, some arrangement should be made to have a gasket-making outfit to furnish lead gaskets for the handhole plates. Notwithstanding that some composition gaskets give good service while in use, it is impracticable to employ them more than once. Furthermore, should the feed water be of such a nature as to necessitate frequent washing out, or turbining, of the tubes, these purchased gaskets constitute quite an item of expense. On the other hand, lead gaskets give excellent satisfaction; they can be used time and time again by remelting



DETAILS OF A HOMEMADE LEAD GASKET OUTFIT

them and remolding; and aside from the initial expense for apparatus and lead, the cost for making them is small. With a little experience a man can mold enough gaskets during his spare time to last quite a while. Though lead deteriorates, still, if care is exercised in saving all scrap and old gaskets, it is not often necessary to use new metal.

The outfit shown has been used for several years and has been copied (with modifications to suit local conditions) by engineers at various mines and manufacturing plants. The mold is readily constructed as follows: It is made from two pieces of ½-in. sheet iron which can be turned up in a lathe, the faces being machined so that they form a perfect joint when placed together; otherwise the hot metal would work out through the joint of the mold. The size of the mold depends on the size of the boiler handhole. If the boiler has 4-in. tubes, then the handhole will be slightly larger. In this case the mold will be about 6½ in. in extreme diameter. As shown in the illustration, the two parts of this mold are practically duplicates of each other. A square-cornered shallow circular groove is formed in each face, about ⅜ in. wide and $\frac{1}{16}$ in. deep, the inside diameter of the groove being 4¼ in. and the outside diameter 5 inches.

Each part of the mold, as shown in detail, has a handle. The handle *A* is made of a ¾-in. bolt flattened so that it can be held in a bench vise. It is screwed through one part of the mold. The projecting end is machined free of threads and is used for a dowel or centering pin, snugly fitting a hole in the other part of the mold. The handle *B* can be made of wood, asbestos, or any other substance that does not conduct heat readily. When assembled the two parts of the mold are held in position as shown. An aperture is provided in the mold for receiving the molten metal, a passage ½ to ¾ in. wide and the same depth in each half of the mold as the depth of the gasket mold, being large enough.

Having a mold, crucible and lead, small ladle and a small pick, we are ready to begin operations. The pick shown in the illustration is used to free the gasket from the mold. A small ladle is preferable for pouring, as it can be handled more easily than a large one. After the lead has been melted, it is good practice to submerge the mold in the hot metal until the mold is hot enough to prevent the lead from chilling when it is poured. If the mold is heated to the same temperature as the molten metal, the lead will not "freeze." A little experience will familiarize anyone with these small but quite important details. However, success depends upon the following point more than anything else: When pouring, work fast. Do not forget to oil the mold after using it; this will keep it in good condition until the next time it is to be used. Schemes of this kind not only may save money for manufactured supplies, but there are often odd times when men about a plant can fill out a day on a little job of this kind.

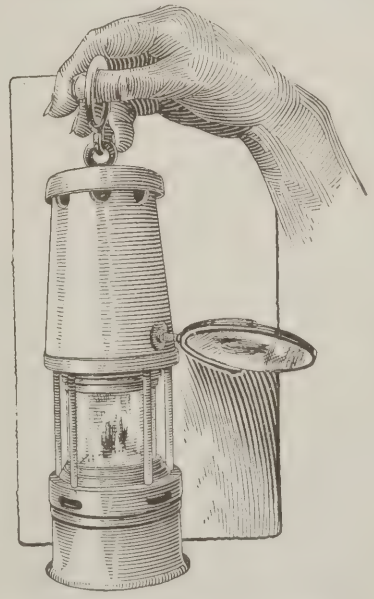
To Counteract Effect of Acid Water

Slaked lime, introduced into the breaker "wash water" cistern at regular intervals, is the latest method being tried at several anthracite collieries to counteract the acids and effect a saving of shaker plates and chute linings. Where the fall of coal in transit through the breaker is not too great, it has been found practical to use terra cotta plates, 1¼ x 12 x 24 in. for chute lining. They give better results than tank steel and are practically acid-proof. They cannot be used where heavy lumps are handled at high speed.

Mirror Attachment for Safety Lamp

By Gaston F. Libiez
Peru, Illinois

When testing for gas with a small flame on the safety lamp, it is difficult to watch the flame with a lamp raised to arm's length, as for instance, when testing in



SMALL MIRROR REFLECTS ANY MOVEMENT OF FLAME

a roof pocket. A small tilting mirror attached at the side and over the glass-protecting standards, as shown in the accompanying illustration, will reflect any movement of the flame without tilting the lamp.

Reserve Coal Deposits Are Blocked Out at Government Mine at Eska, Alaska*

By Sumner S. Smith
Alaskan Engineering Commission, Eska, Alaska

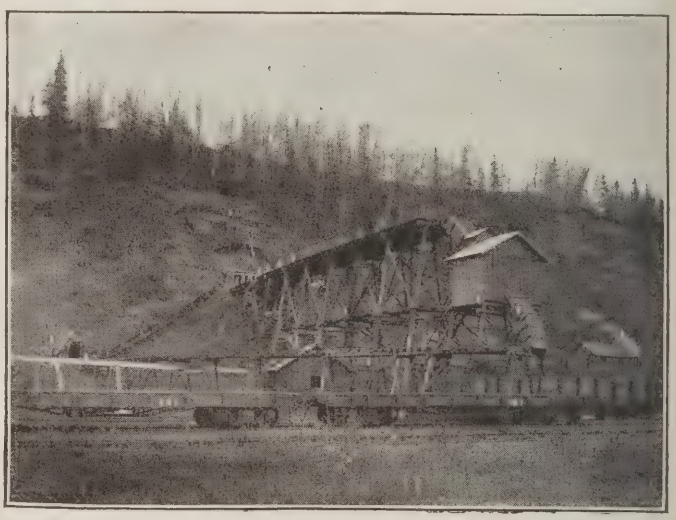
SUFFICIENT reserve coal deposits have been blocked out at the coal mine operated by the Alaskan Engineering Commission at Eska, Alaska, to insure an adequate fuel supply for several years. Further prospecting continues in order to determine the regular areas of both the Eska and Chickaloon mines and to discover, if possible, other and better beds of coal. The output at present has been raised to a point high enough to insure an ample supply of fuel for all operation and construction purposes and to build up a surplus large enough to protect against delays due to interrupted traffic and accidents at the mining property.

Five additional acres have been cleared in the Eska townsite, three new houses completed and a gravity water system installed. The electric light plant has been moved from its location on the townsite to a point near the Eska mine opening and a 25-hp. boiler added, giving a power capacity large enough to care for all lights and operate the three fans, which are steam-driven. The high-line grade has been ballasted and the cleaning plant completed.

The general structure at Eska is synclinal although there are faults parallel to and at various angles to the axis of the syncline which obscure much of the structural detail. The surface of the area under consideration slopes gently toward the south, the waters of Eska Creek, which drop approximately 400 ft. in three miles, cutting a valley from 20 to 200 ft. below the general level of the ground. As the coal measures were folded and broken long before the formation of the present topography, the beds are not parallel to the surface. They appear in the bluffs which form the sides of the creek as a series of rather distorted semi-circles, one above another, the lower portion of the arms being concealed by the débris on the bank and in the creek bottom.

There is no doubt that the drainage of this field has followed, in many instances, the lines of least resistance created by fault zones and it therefore follows that the pioneer mining which has naturally started upon the outcrops exposed by stream valleys will, in general, be in the most disturbed portions of the district. A particular example of this can be noted on the Shaw East or Emery maps where the overlying Emery bed has been thrown down opposite the Shaw and Eska. Here the Shaw and Eska on the west side of the fault dip about 45 deg. while the portion of the Emery opposite them is nearer the center of the syncline and has a dip of about 10 deg. On a map showing the surface topography it can be noticed that a small stream follows the approximate course of this fault. Toward the westward the structure seems to be more regular and probably attains its maximum uniformity under the Eska conglomerate.

The prospecting has consisted of churn drilling, open-cutting, driving a few crosscuts and sinking some shallow test pits. At the face of the Maitland the bed was cut off by a fault when the property was taken over by the Commission, so this entry was driven through the fault in an effort to locate the coal. When the entry had passed through the break it was noted that the movement of the ground had been such as to throw the extension of the bed east of the fault above the entry. The surface above this point, and to the eastward, was laid off in 200-ft. squares, and churn drilling started in an effort to locate the extension of this bed and obtain accurate information regarding the structure. Some 35 holes were sunk, the total drilling amounting to about 2300 ft. The results thus obtained were plotted on plates of glass which represented planes at right angles to the strata. The ground, however, was too irregular to draw accurate conclusions from the results of the drilling, although several coal beds



VIEW OF SURFACE PLANT AT CHICKALOON

were intersected which will be prospected later from the David workings. The drilling was difficult owing to the large number of boulders, and with the light rig used it was impossible to attain a depth much over 175 ft. The greater portion of the time the holes were much under that figure.

On the southern limb of the syncline the outcrops of the Maitland, Emery and David have been exposed on the east bank of the creek, and on the west bank the outcrops of the same beds have been opened on the northern limb of the syncline.

A prospect shaft about 50 ft. deep and crosscut just north of the townsite, which were driven to check some of the drill holes, opened the Shaw bed on the southern limb of the syncline, while several unnamed beds to the westward have been exposed by open cuts along the creek banks.

Inasmuch as there are six different beds all of different thickness under exploration at Eska, and as the dip varies from 10 deg. to 60 deg., no one method

*Reprinted from *Alaska Railroad Record*, Vol. III, No. 20.



TYPES OF COTTAGES AT ESKA COAL MINES

of extraction can be applied to the entire series. However, all the coal so far produced has been recovered by the room-and-pillar method, the room width, in general, being 20 ft. with 30-ft. pillars between. There have been slight variations to this rule occasionally, due to the faulted or broken condition of the ground. All of the rooms are run on sights, and where the beds are parallel the pillars of the upper beds are kept vertically over those of the lower.

In new developments the practice is to drive the main haulageway and airway on the coal, the airway being about 30 ft. above the entry. An 8-ft. chute, 4 ft. of which is used for a manway, is driven every 50 ft. to connect the entry and airway, providing for ventilation and supplying storage room for the coal.

The rooms are turned off the airway opposite each chute. For 15 ft. they are driven up 8 ft. wide and then widened to 20 ft., at which measurement they are driven to the boundary.

The standard entry is 6 ft. wide at the top, 9 at the bottom, and 6½ above the rail. These measurements are in the clear.

Round timbers are used on the entries with 2 x 6 sawed lagging, the sets being placed on 6-ft. centers. In the rooms and pillars split cottonwood posts are used and have proved very satisfactory.

No coal is shot off the solid, but is undermined or cut at one side of the room before any shots are fired. The room-and-pillar method, with the rooms driven straight up the pitch, was adopted because the demand for coal was acute and this offered the greatest immediate supply. At some future date it will be possible to experiment with other methods, although the recovery so far has been excellent; and it is doubtful if any other method would give as satisfactory results, as the system is flexible and lends itself readily to the varying conditions met underground.

The methods of handling the coal from the face to the entry vary according to the thickness of the coal and the dip of the bed. When the pitch is steep enough for the coal to run on sheet iron, a chute is carried up the room with a manway and the coal is drawn from the chute into mine cars on the entry. Where the dip is low and the beds thin, small mine cars are installed to save brushing top or bottom. A sheave with a brake is fastened near the face of the room, a double track laid from the switch on the entry, and the weight of the loads used to pull the empties to the face. At several points where the dip is variable, a combination of the two systems is necessary, the small mine cars being emptied into a large loading chute on the counter and the coal transferred to larger cars on the main entry.

Owing to the excessive cold and the resulting difficulty of keeping the tracks underground free from ice during the winter months, the main haulageways have been made the return airways. During the winter of 1917-18 the only fans available were too small to overcome the natural draft, the result being that the cold air entering the main haulageway froze the water in the chutes and along the tracks. This lessened the production and practically doubled the cost of operation.

To ventilate the west side of the mine a 200-ft. crosscut was driven which intersected the main haulageway about 150 ft. from the portal. Two doors were placed on the haulageway between its portal and the intersection with the crosscut and a 3 x 2-ft. Jeffrey all-steel, double inlet, exhaust, reversible fan erected at the portal of the crosscut.

During the winter the air is taken in the counter gangway and distributed by three splits to the Eska, Shaw and Martin beds. This raises the temperature of the air considerably above the freezing point and keeps the temperature along the main workings fairly constant both winter and summer. The water is drained to a sump in the crosscut near the fan and the exhaust from the fan engine turned into the sump. This raises the temperature of the water to a point where it can be conducted to the outside without danger of freezing the drain boxes. The fan is driven by a 5 x 5-in. engine taken from an old Star drill, and under the present conditions has a capacity of about 15,000 cu.ft. of free air per minute. During the summer the air is admitted to the workings by chutes driven to the surface, the natural ventilation acting directly with the fan.

On the east side of the creek the old Shaw entry was extended to the surface and a 4 x 2½-ft. Jeffrey, all-steel, double-inlet, exhaust, reversible fan erected at its portal to ventilate the Emery, David and possibly a portion of the Maitland workings. The air for the David will be taken through the David airway and for the Emery through the Shaw counter. The fan is driven by a 6 x 7-in. vertical engine and has a rated capacity of 50,000 cu.ft. of free air per minute.

The Maitland is ventilated through a back entry on the coal which taps the main haulageway about 50 ft. from the portal, the intake air coming into the



VIEW OF SURFACE PLANT AT ESKA

mine through room No. 5, which is open to the surface. The air current is produced by a Western Blower Co. fan, which has a 24-in. intake, driven by a 5 x 5-in. engine taken from an old Star drill. This has a capacity of about 2000 cu.ft. of air per minute during the winter when conditions are most severe. The arrangements as regards drainage in the Maitland and Eska east drifts are similar to those on the west side, and all the fans are fitted with explosion doors.

During the summer a 20 x 40-ft. building was erected for a power plant near the mine entrance on the east side of the creek. The electric lighting plant which was formerly situated on the townsite was moved to the new building and a duplicate boiler added. The plant now contains two 42-in. vertical boilers which furnish steam for the fan and dynamo engines. The electric lighting equipment consists of a 15-kw. generator belted to a 7 x 8-in. Clark engine, the current being distributed at a pressure of 220 volts.

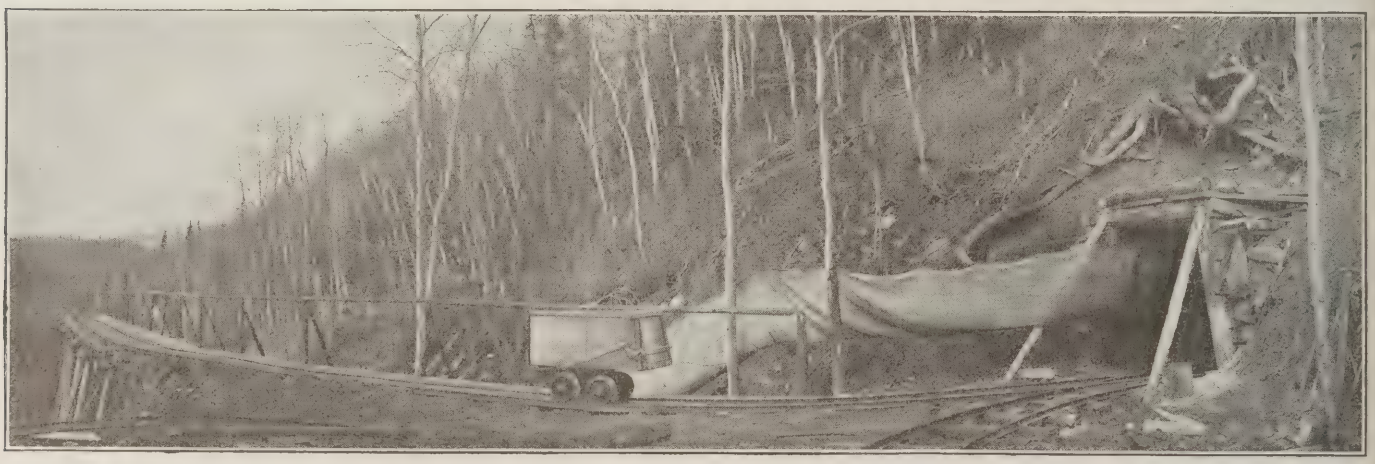
The coal from the mine is hauled over a highline some distance to the cleaning plant, where it passes over a ¾-in. grizzly to a picking table. As the grizzly did not remove all the undersize a 3-ft. section of ¾-in. slotted screen was set in the upper end of the table to take out the balance. The coal chutes are so arranged that the under and over-size may be loaded in the same or separate cars according to the use to which the fuel is to be put. As the coal is quite friable the undersize is the purer of the two products before the lump is cleaned and makes a good grade of fuel for power-plant work. It could be considerably improved by washing, but the present developments do not warrant the expense of installing such a plant.

During the year the Martin and Eska west entries have each been driven over a thousand feet and chutes raised from the Martin entry to the Shaw counter. From the Eska east a connection has been made with the Emery east on the northern limb of the syncline and a crosscut started that will tap the David in the same relative position. The latter beds are parallel to and underlie the Maitland. On the east bank of the creek the outcrops of the Maitland, David and Emery have been pinched up on the southern limb of the syncline, and on the west bank the same beds have been found on the northern limb. The outcrops of the Eska and several unknown beds have been picked up to the south and west, but as the extent of those beds has not been determined, the available tonnage cannot be estimated.

Considering only those areas that are above the present levels, there was on Jan. 1, 1918, approximately 22,000 short tons of coal available. During the year the commission has mined some 56,000 tons and on Jan. 1, 1919, there were 145,000 tons available for mining from the present openings.

The system of cost accounting is exact and comparatively simple. All material coming to the mine, whether from the main commission store or from private contractors, as the mine timbers are secured, is charged into a mine stores account. The storekeeper is directly responsible for all material and equipment, and issues the same only on the requisition from proper authority, such requisition showing where the material is used. All the material used is charged from the mine stores account direct against the place where it is used. All explosives are distributed to the place of use and record made of the same by a licensed powderman who reports such distribution daily. All material and equipment used must be requisitioned and a daily report of its use made by the foreman in immediate charge of the work.

With the exception of monthly bills from other departments the exact distribution of costs is obtained daily and is so arranged as to show at any time the material and labor entering any job, its progress at any date, and its present status.



SHAFT ENTRANCE OF THE ALASKA ENGINEERING COMMISSION MINE AT CHICKALOON

During the year there have been eight slight, five serious and no fatal accidents. There were approximately 57,000 man-shifts worked both surface and underground. The time lost due to accidents amounted to 30½ shifts for the slight accidents and 148 shifts for the serious.

At the time of the influenza epidemic one of the bunkhouses was converted into a temporary hospital. There were 55 cases, three of which developed into pneumonia and resulted in the death of those afflicted.

ALL HOISTING ENGINEERS are familiar with the stretching which takes place in new wire ropes on slopes and shafts, and the reason is obvious. A bundle of spiral springs will stretch much more than would a bundle of the same number and size of straight wires. Under tension these springs stretch out. This action is interfered with somewhat on account of the wires and strands being tightly twisted together. However, if the core is of hemp the strands press down upon this elastic center and the rope stretches more or less. There is no special objection to this, for the engineer recognizes that it takes place and changes the landing marks on his rope or dial accordingly.

Preparation of Bituminous Coal—I

By Ernst Prochaska
Benton, Illinois

SYNOPSIS—*Coal must be sold for more than it costs to produce, else the producer goes out of business. Preparation either raises the selling price or increases sales. Many types of preparation plants have been tried, some with success and others without it. For best results it would appear that final screening should be done after washing.*

THE existence of every coal mine depends solely upon the selling price of its product exceeding the cost of production. It may be feasible to operate a washery or a screening plant in connection with a coal mine if the better price obtained for the cleaner coal equals the cost of operation; or these plants may be operated at a loss, if thereby part of the mine output can be made salable or its sales increased.

Under the last named conditions, however, the preparing plant is only a necessary evil put in to satisfy the consumers. The management will be inclined therefore to make this plant as small and as simple as possible. If, however, the difference between the selling prices of raw coal and prepared coal is greater than the cost of preparation, the preparation equipment is coöperating with the mine to get a bigger profit for the whole mining plant; and the management will energetically use every effort to improve the method of preparation, to increase the difference between cost and selling price by decreasing the cost of preparation and by producing a high-grade prepared coal.

Early Preparation Plants Forced Upon Operators

The foregoing facts are now well known, but it took a long time before the coal industry was fully convinced. The first preparation plants were not installed for the purpose of increasing the profits of a mine but were forced upon the coal industry by the demands of the consumers for a better product. The first demands for cleaner coal were made by the blast-furnace men who wanted a coke with less ash. This demand for a cleaner coal was restricted to comparatively few localities, and it was only after it had been thoroughly demonstrated that the greatest benefit accruing from coal preparation lay in the possibility of increasing the value of the coal and thereby the selling price far above the cost of preparation, that the coal industry took hold of this problem.

Besides the visible advantage of a larger profit, the economic question of the fuel supply commenced to be understood. It was plainly visible that a properly functioning separation plant could permit the mining of a coal bed, the coal from which on account of its large percentage of impurities could not be sold in the raw state. The experience with coal-preparing plants has established the following maxims:

1. The preparation of coal shall, by the cleaning of the raw material and the production of suitable and well screened sizes, secure a maximum price per ton of output.

2. To arrive at this result three points must be kept in view: (a) Highest possible purity of coal; (b) smallest possible loss of coal; (c) small cost of production.

3. As the foregoing three demands are conflicting, it will be necessary for the proper and economical installation of a preparation plant to find in each case the best relation between the three factors.

The maxim of loading the coal as clean as possible has been known and practiced to a greater or less extent since coal has been mined. As early as the first quarter of the last century slate was picked out of the coal in the mine and gobbed. The miners' wages were adjusted according to the purity of the coal loaded, and docking has been in use for the last 50 years.

Dry separation is usually accomplished with screens and the methods of screening can be separated into two groups: The first deals with screens for the purpose of making lump coal and screenings only; the second deals with screens that classify the product into lump, egg, nut and different sizes of screenings. The first group belongs solely to the dry separation process, whereas the second group belongs to it only if all the coal is prepared in a dry state. If a washery is connected with the mine the classification screens belong properly to the washing plant.

Mechanical Preparation of Fine Coal

At present the preparation of the fine coal is carried on with water, and mostly in jigs. But in the beginning many processes were devised to avoid the use of water, and even now many inventors are working on the solution of a dry separation process. The wet separation always has had a decided advantage.

Before we enter into the description of this process we must consider the development of the classification of fine coal. Two different opinions in regard to the proper way of carrying on screening has always existed: (1) Screening from coarse to fine and (2) screening from fine to coarse. There also exists the question of whether it is better to screen before washing or to wash first and then screen.

In the beginning screening from fine to coarse was preferred. It was the shortest method and had the advantage that the dust was removed on the first screen plate, or that having the smallest perforations. But it had the drawback that the fine screens wore out quickly on account of the large mass of coal passing over them, and furthermore this large mass of big coal did not permit perfect screening. Both these disadvantages became greater as the quantities to be handled increased. In the sixties of the last century the practice reversed itself completely and most screening was done with concentric revolving screens. This method, however, did not remain long in actual practice. The demand was for a method of screening that would give output, durability and simplicity combined. These three demands were fulfilled by the shaking screen and later by the vibrating screen.

As long as jigging was performed on hand jigs nobody thought about classifying the coal. This, however, was not because the operator was convinced of the cor-

rectness of his method, but because at that time only the simplest and cheapest pieces of apparatus were used. Later on, after the jigs were improved, it was found that the separation was not particularly close and lack of sizing was blamed therefor. Since in ore dressing plants close classification was considered necessary, this was followed also in the coal washeries.

At first this was carried too far, and even the fine coal was divided into three or four sizes. But later on it was found that this close sizing produced too tight a bed in the jigs and it became necessary to mix in some nut coal. Nevertheless sizing apparatus remained a part of the equipment of every washery. The screening of the coal, however, was troublesome and made the washery complicated. Later on the coal was not so closely sized and some washeries were built to treat unsized material. The demand for well-screened washed coal, however, made it necessary to screen the coal after washing and consequently the coal was only screened into two sizes before wet treatment. Baum was the first to use the slogan "Washing before screening." Stewart also washed coal from 3 in. in diameter down without further sizing. In fact the great majority of coal washeries in America are washing unsized coal.

The knowledge gained by past experience can be condensed into the following paragraphs:

The jigging of bituminous coal can be carried on successfully without preparatory sizing.

Experience has shown that the separate washing of the fines facilitates the washing process and gives slightly better results. It has been proved, however, that coal finer than 20 mesh can not be improved by washing and should, if low enough in ash, be mixed with the washed coal; or if too high in ash used for other purposes.

The advisability of sizing the larger pieces of coal before washing must be judged for each installation separately.

To produce a perfectly sized washed coal screening after washing is necessary.

The whole question, where favorable raw coal is involved, it not of decided importance. It must be determined in most cases by considering the cost of installation and operation, the space required and at disposal, and the most suitable general arrangement of the plant.

Washing of Coal

The following types of apparatus have been used for the washing of coal: Trough washers, ascending current washers, jigs with stationary and with moving screens, concentrating tables, air separators, centrifugal separators, separators using dense liquids, separators taking advantage of the different shapes of the particles, and chemical washers. The results obtained with these methods and types of apparatus can be summarized as follows:

Trough washers are only adapted for the very fine coal or for the removal of fireclay and mud.

Ascending current washers deserve the credit of having opened the eyes of the coal operators to the benefit derived from improving the coal by washing, but on account of low efficiency they have been supplanted by jigging which owing to its simplicity and satisfactory efficiency is far ahead of all other methods.

Tables are being used especially for the fine coal to good advantage, and the results obtained with them are highly satisfactory.

Air separators are important for the purpose of removing and collecting the dust.

Centrifugal separators can not compete with the other methods, but centrifugal force is used to some extent for the drying of coal.

Dense liquid separators have proved failures.

Separation according to the shape of particles is to be considered only in special cases. It can be used as a preparatory process.

Chemical washers have not been sufficiently tried out in actual practice, but they appear to be cumbersome and costly.

The products resulting from the foregoing operations, if wet processes only are considered, are washed coal from 3 in. down and dirty wash water containing fireclay and sludge. It always has been clear that both of these products need further treatment before they can be used to the fullest advantage. The washed coal must be dewatered and the wash water must be clarified and the sludge removed. This clarification must be carried on to such an extent that the water can be either returned into the system to be used over again or that it can be let run away without polluting streams and natural water courses.

Dewatering of the Washed Coal

The dewatering of the larger sizes of washed coal is comparatively simple and easy. It is usually carried out on dewatering elevators, which are used to elevate the washed coal into the loading bins. Further dewatering is also carried on on the screens that are employed to size the washed coal.

The dewatering, or rather drying, of the fine coal is a much more difficult problem. Fine coal if wet forms a dense, compact mass which contains too much water for use in either coke ovens or boiler furnaces. The wet coal has also the further disadvantage of freezing solid in the winter time. The excess water increases the weight of the coal and most consumers object to paying coal prices for moisture. The drying of the fine coal has for a long time been a sore point, and even now it presents great difficulties. For this reason it was proposed to screen out all coal below $\frac{1}{8}$ in. and mix the raw fines with the washed fuel.

This method offers the simplest solution of the difficult drying problem, but can only be used if the ash and sulphur content of the washed coal are thereby not materially increased. This, however, is hardly to be expected, as no material improvement can be accomplished by washing fines below 10 mesh. If, however, the addition of the raw fines should increase the ash and sulphur in the washed coal above a desired amount, it would be better to load the fines in the raw state, or to use them for fuel purposes.

There are at present four methods of drying coal particles smaller than $\frac{1}{2}$ in. in diameter: Dewatering pits, centrifugal dryers, heat dryers and filters.

Dewatering pits have been used to some extent. They required considerable ground space, are costly to install, and the operation expenses are also rather high. The dewatering of the coal is only effective to a certain depth, as the material in the lower portion of the pits acts as a filter bed and must in some instances be removed and rewashed.

Centrifugal dryers are at present the most satisfactory apparatus with which to dewater coal. The operating costs are reasonable and the coal is dewatered to a fairly satisfactory degree. The only objection to this

type of dryer lies in the fact that it produces too much sludge. This requires additional apparatus for its recovery.

Drying by heat can not be considered on account of the high cost for fuel.

Filtering can only be considered for very fine coal and sludge. It should, however, give good results. Up to the present time no extensive filtering plants have been installed in any of the coal washeries.

(To be continued)

Some Items That Enter Into the Cost of Producing Coal

The many little factors that enter into the cost of producing and marketing coal have been rather clearly defined during the last few years. As a result of investigations made by the Fuel Administration, the operators, during the war period, were obliged to submit itemized monthly reports of the tonnage and cost of producing the coal shipped from their respective mines. The major part of the expense in producing coal is incurred in mining, haulage, pumping, ventilation, timbering and supplies. It is with the item of supplies that this article will deal.

The Victor American Fuel Co., with eight producing mines in the State of Colorado, submitted a statement recently showing some of its sundry expenditures during the year 1918. This company produced 1,142,891 tons of coal last year, which is about one-tenth of the total tonnage of the state. Machine-mining has not progressed to the same extent in Colorado as it has in other states. The company in question in 1917 mined around 700,000 tons of coal by hand and 200,000 by machine. The Victor-American operations using hand mining exclusively in 1917 were Ravenwood, Bowen, Gray Creek and Wadge; these mining largely by hand were Delagua and Pinnacle, and those mining largely by machine were Chandler and Radiant.

This company used 130 horses and mules, 28 electric motors and 20 electric mining machines in the year 1918. The total capacity of the eight mines is 6250 tons per day, and the largest producer of the group is Delagua, with 2500 tons; Pinnacle follows with a capacity of 1000 tons. The tonnage of the various plants for 1918 is as follows: Delagua, 555,688; Chandler, 177,013; Pinnacle, 130,143; Bowen, 102,143; Ravenwood, 58,876; Radiant, 43,474; Wadge, 40,004, and Gray Creek, 35,549. All these mines are nongaseous. Chandler is a shaft mine, the seam being 461 ft. below the surface; the other plants are either slope or drift operations. In 1917 this company had 916 inside employees.

The Victor-American statement referred to distributes certain expenditures for its eight operations under 36 items. The accompanying table gives a selected list of these items. The figures in the table represent these items reduced to a cost-per-ton basis of the coal produced at each mine in 1918. As local causes affect such costs, a better plan would be to give an average covering several years. For instance, in a certain year enough rail may be purchased to nearly last during the following year. Such matters as hay and oats also may vary somewhat; thus at Delagua, a greater number of mules are used for haulage than at mines like Pinnacle and Wadge, where so much of the haulage is mechanical.

Operators should find this table interesting for comparison with their own costs, making due allowance for differences of coal field and section of country. The statements made as to the equipment of the various mines and their capacity should throw quite some light on the subject. Where there is considerable variation in the cost per ton for the same item among the several mines, there is a special reason for it. Thus, in the case of mine timber and ties, the cost varies all the way from 3½c. to 27c. per ton of coal produced. Unless there was an unusual or temporary demand for the excessive use of timber at some mine, we would expect to account for this irregularity by the fact that large quantities of timber and ties had been purchased looking ahead to future requirements. Similarly in the case of rails and fastenings. In this connection custom differs among operators. Some companies charge up the full amount of a big purchase of equipment at the time the bill was settled, thus cleaning up the account at once. Others distribute the cost of such purchases over a greater or less period of time. By this latter method the monthly cost sheets do not show such wide variation in the cost of producing coal. They more nearly represent the true condition of affairs.

There is also considerable difference in the totals of the cost of supplies per ton of coal at the various mines, the average being $0.2295 for the eight mines. In five of the operations the total runs from 10½ to 17 or 18c., which would seem to give a fair idea of the cost per ton of coal produced for the items charged.

SOME ITEMS ENTERING INTO THE COST OF PRODUCING COAL AT THE MINES OF THE VICTOR-AMERICAN FUEL CO.
(Costs reduced to cents per ton of production for 1918)

Items	Gray Creek	Delagua	Bowen	Ravenwood	Chandler	Radiant	Pinnacle	Wadge
Babbitt	$0.0019	$0.0008	$0.0003	.....	$0.0003	.....	$0.0003	$0.0010
Belting (rubber)	.0012	.0001	.0020	$0.0001	.0002	.....	.0004	.0036
Belting (leather)	.....	.0002	.0805	.....	.0002	.....	.....	.....
Bolts (carriage and machine)	.0053	.0023	.0036	.0012	.0043	$0.0017	.0028	.0083
Cars and repairs (mine)	.0014	.0114	.0088	.0012	.0142	.0066	.0123	.0240
Car door (boards)	.0060	.0004	.0026	.0040	.0017	.0054	.0023	.0058
Cement	.0031	.0007	.0049	.0013	.0053	.0026	.0031	.0258
Brattice (lumber)	.0038	.0015	.0037	.0054	.0067	.0181	.8023	.....
Drills (twist)	.0011	.0002	.0003	.00001	.0002	.0003	.0002	.0005
Harness supplies	.0012	.0016	.0018	.0007	.0018	.0028	.0003	.0016
Hay and alfalfa	.0470	.0061	.0100	.0125	.0043	.0253	.0062	.0126
Lamps (carbon)	.0017	.0004	.0007	.0002	.0005	.0005	.0003	.0010
Lamps (Mazda)	.0001	.0001	.0001	.....	.0002	.....	.0006	.0005
Lamps (Edison-mine)	.....	.....	.....	.....	.0015	.....	.....	.....
Machine repair parts	.....	.0018	.0027	.0063	.0094	.0434	.....	.0121
Oats	.0185	.0136	.0098	.0327	.0182	.0344	.0013	.0190
Packing	.0003	.0001	.0003	.0004	.0008	.....	.0108	.0049
Pipe and fittings	.0149	.0013	.0062	.0003	.0057	.0025	.0008	.0470
Mine timber and ties	.0660	.1096	.0334	.1698	.0891	.2711	.0 99	.0489
Rails and fastenings	.0018	.0157	.0036	.0356	.0009	.0719	.0292	.1137
Shovels	.....	.00004	.....	.....	.....	.0002	.0003	.00005
Valves	.....	.0004	.....	.0003	.0007	.0011	.0020	.0113
Waste	.0016	.0004	.0004	.0003	.0008	.....	.0004	.0009
Totals	$0.1769	$0.1687	$0.1057	$0.2723	$0.1665	$0.4879	$0.0158	$0.3425

The Future of Peat as a Fuel—II

By J. B. C. Kershaw
Colwyn Bay, North Wales

SYNOPSIS—*Raw peat, even when commercially dry, is hardly a satisfactory fuel for power purposes. Various methods have been employed for carbonizing and gasifying this fuel, in efforts more or less successful; one successful method of burning peat so far as steam generation is concerned is by powdering it and burning the powder in suspension. Gasification and powdering appear to be the routes of improvement along which may be expected the greatest future progress in peat utilization.*

MANY processes have been devised and patented for carbonizing peat in closed retorts or ovens, the aim being to obtain a more condensed and marketable form of fuel than is obtained by briquetting, or by machine treatment of the raw peat. In these processes the air-dried machine-treated peat, obtained as described in Article I, is employed as the raw material for a further process of enrichment, artificial heat being employed to drive off the remaining moisture and some of the hydrocarbon gases.

None of these processes has yet obtained general application, for the simple reason that, in the majority of cases, the increase in the calorific value of the chief product—peat coke—and the value of the recovered byproducts is not sufficient to cover the cost of the additional treatment. Under special conditions as regards the market for peat coke, and for the creosote, light oils, acetate of lime and other byproducts, the peat-carbonizing processes can be worked successfully, however, and both in Norway and Germany there are installations of this type in actual operation. The processes are distinguished as "dry" or "wet" carbonization processes according to whether dry heat or superheated steam is employed.

The Jebson process of dry carbonization is based upon the application of electrically produced heat and was first worked upon an industrial scale in the years 1901-1902, near Bergen, in Norway. So far as I am aware it is still employed at this place, but it does not appear to have made headway in any other locality.

The peat, dried as far as possible by the sun and air, is molded into suitably shaped blocks and is placed in retorts the walls of which are covered with asbestos or other non-conducting material unacted upon by the gases which are produced when the peat is heated. The charge of peat is then raised to 450 deg. C. (842 deg. F.) by means of electric resistance coils placed inside the retort in contact with the raw peat, so that the heat produced in them is transmitted directly to the charge, without any losses by convection or radiation.

By this means some of the difficulties of heating the charge of peat are overcome but the method is applicable only where electric power is available at a low cost, as is the case in Norway. The gas produced is used to dry the blocks of peat before they are placed in the retort, in a long heating chamber operated upon the countercurrent principle. The tar obtained is worked up for the usual byproducts of the peat-coking process.

The Ziegler method of carbonizing peat in closed retorts was brought out by Dr. M. Ziegler in 1892, and has been worked successfully since that year at several localities in Germany and Russia. The peat in this case is carbonized by the application of artificial heat, obtained by burning the gas given off from the retorts. Where the process is most successfully operated the surplus gas suffices to generate power for operating the dredging and pulping machines by aid of which the peat is won from the bog, while the waste heat of the gas which passes away from the retorts is also utilized to dry the peat blocks before carbonizing.

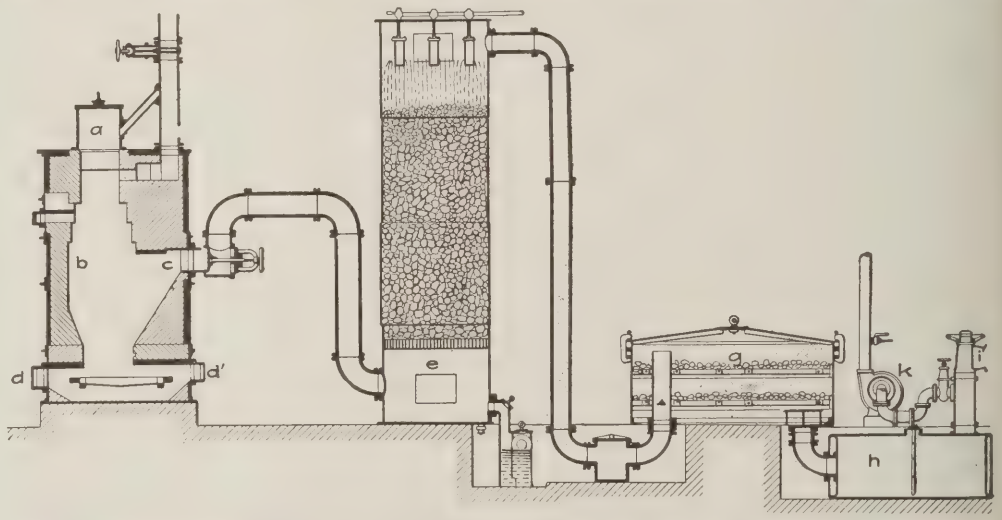


FIG. 7. SECTIONAL ELEVATION OF PEAT GAS PRODUCER, SCRUBBER, DRIER AND FAN—GAS OUTLET AT SIDE OF PRODUCER

As regards the output of solid fuel by the dry coking process, about one-third of the weight of the raw peat charged into the retorts is obtained as a "peat coke," specially suitable for blacksmithing and metallurgical work, on account of its low content of sulphur and ash. According to an estimate made by Dr. Ziegler, the yield of byproducts from a plant coking 100 tons of air-dried machine peat each 24 hours will be as follows: Creosote oil, 3100 lb.; acetate of lime, 1320 lb.; sulphate of ammonia, 900 lb.; paraffin wax, 715 lb.; pitch, 440 lb.; light oils, 280 gal.; heavy oils, 95 gal.; methyl alcohol, 65 gal.

This estimate, however, is only correct for the peat found in the locality where the plant which gave this yield is situated, and it is important to note that the financial success of the Ziegler process is highly dependent upon the character and the purity of the peat charged into the retorts. The existence of good markets near at hand for the peat coke and byproducts of

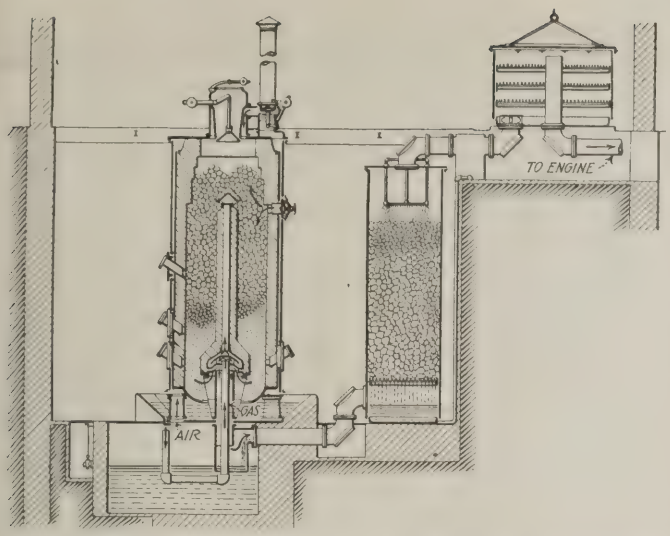


FIG. 8. SECTIONAL ELEVATION OF PEAT GAS PRODUCER, SCRUBBER AND DRIER—GAS OUTLET AT BOTTOM OF PRODUCER

the process is also a *sine qua non* of its successful operation. The Ziegler plants erected in Europe were at Oldenburg and Reuerberg, in Germany, and at Redleino, in Russia; but the last named is reported to have not achieved a permanent success, owing to lack of demand for the byproducts.

That the Germans are still devoting attention to the dry distillation of peat is shown by the fact that as recently as 1916 a patent was granted to Limbers (No. 302,322, Nov. 3, 1916), for an improved form of retort in which the heating is to be effected in three stages by means of heated non-oxidizing gases, which pass over and through the mass of fuel.

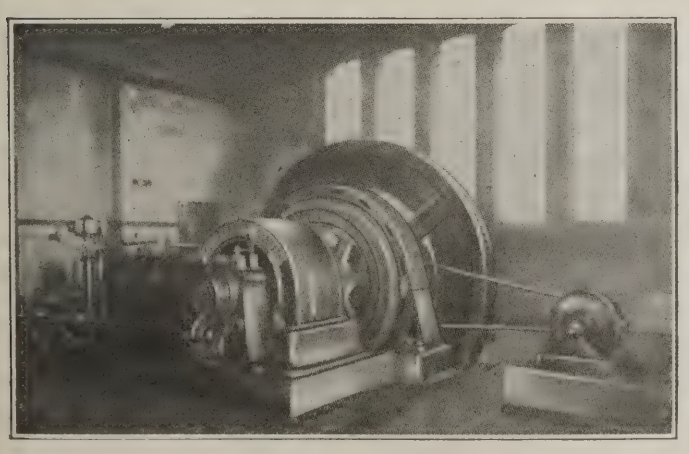
The "wet" carbonizing processes depend upon the use of superheated steam under considerable pressure for raising the temperature of the peat to 300 to 400 deg. F. It is doubtful if any real carbonization occurs at this temperature, and it is much more probable that the hardening effect of the treatment upon the peat is due to the breaking down of some portions of the cell structure, and to the fact that more of the water and moisture can be expelled afterward by mechanical pressure than is the case with ordinary machine peat.

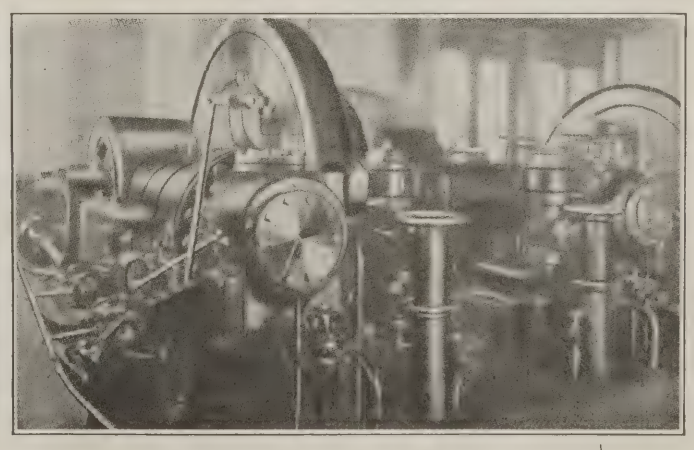
The most noteworthy of these processes of peat carbonization was the Ekenberg process, which was brought out in 1904 and was tried upon a working industrial scale in Sweden. The wet carbonizing furnaces used in the trials consisted of a series of iron pipes about 36 ft. long, through which the wet peat, in the form of finely divided pulp, was forced at a pressure of 150 lb. per square inch. Each tube was double, and the peat pulp after passing down the large outer tube returned along the inner smaller tube and thus gave up some of its heat to the incoming pulp. The outer tubes projected for half of their length into the firebox of the furnace and were heated here to the required temperature by coal or gas. Ekenberg claimed that this heating under pressure destroyed the cells of the slimy hydro-cellulose compounds, which inclosed a large proportion of the water contained in the peat, and that after submitting the material to his process the greater portion of the water could be expelled by mechanical pressure alone.

The water-free carbonized peat tested 11,000 B.t.u. per lb., and the cost of production was estimated to be from $1.60 to $2.10 per ton, according to whether machine or hand labor was employed for winning the peat from the bog. Although the Ekenberg process received an extended trial in Sweden, and was much discussed by engineers, having been the subject of a paper read by the inventor before the Iron and Steel Institute in 1909, I believe that it is not now in operation, the costs having proved excessive.

A modification of the process has, however, been introduced into France, and has been operated successfully in the development of the peat deposits at Ille-et-Vilaine. The following description of the process is taken from an article by Messrs. Galaine, Lenormand and Houlbert which appeared in *Comptes-Rendus*, of Sept. 3, 1917:

The peat is first treated in presses of the Mabille or Aurep type, which give a pressure of 710 to 1420 lb. per square inch and easily reduce the original water contents of from 80 or 90 to 60 per cent. The partially dried peat blocks, or turves, are then placed in a suitable carrier and are introduced into horizontal autoclaves, where they are heated by steam to 160 deg. C. (320 deg. F.) for a period of 25 minutes. On removal from the autoclaves the hot briquets may be a second time passed through the press, but this is not essential. They dry quickly in air down to 20 to 25 per cent. of water, but it is better to place them in a heated chamber for the final stage of the process. The final product is quite different in physical and chemical properties from briquets of ordinary peat, and the authors have given it the name of "tourbon." They regard it as a half-formed coke, and state that its heat value is about 13,000 B.t.u. per pound, or considerably higher than that of dried peat. As the hydro-cellulose compounds have





FIGS. 9 AND 10. VIEWS IN ENGINE ROOM OF PLANT SHOWN IN SECTION IN FIG. 7

been destroyed by the temperature attained in the autoclave, the product does not absorb more moisture after it is once dried.

An approximate analysis of the anhydrous *tourbon* obtained from the peat deposits of Châteauneuf, at Ille-et-Vilaine, gave the following figures: Volatile matter, 60.3 per cent.; fixed carbon, 36.6 per cent.; ash, 3.1 per cent.

By arranging the autoclaves in batteries, with suitable arrangements for making use of the heat of the exhaust steam, it is possible to carry out the process with an extremely high efficiency as regards utilization of the heat, the figures varying from 85 to 91 per cent.

Gas producers have been designed in recent years that can be operated quite successfully with solid fuels containing up to 35 per cent. of water, and this fact has led engineers to devote considerable attention to the possibilities of utilizing peat in gas producers. The fact that the low temperature obtaining in the producers favors the production and recovery of ammonia is another point in favor of the complete gasification of the peat, since the average nitrogen content of many

driving a modern gas engine, will yield the same amount of power at the engine shaft as one ton of good coal employed for steam raising and power generation in an up-to-date steam-driven power plant. In support of this statement the following figures are given, taken from an actual test carried out in Germany in 1911, with a 300-hp. suction gas producer and engine, using as fuel a peat testing 23.4 per cent. moisture, 4.2 per cent. ash and 7108 B.t.u. per pound.

The consumption of peat during the test was 2074 kg. (4560 lb.) at full load and 1736 kg. (3820 lb.) at half load, the consumption per horsepower being 0.99 kg. (2.18 lb.) and 1.45 kg. (3.2 lb.) respectively. The gas obtained from the producer at full load tested as follows: H, 17.15 per cent; CO, 15.85 per cent.; O, 1.02 per cent.; CO_2, 12.34 per cent.; N, 52.2 per cent. The calorific value of the gas was 120.2 B.t.u. per cubic foot. Assuming the air-dried peat could be delivered into the producer from the bog at a cost of $1 per ton, the cost of fuel per kilowatt-hour in this plant was only 0.154c., which is a far lower figure than could be obtained with any other fuel.

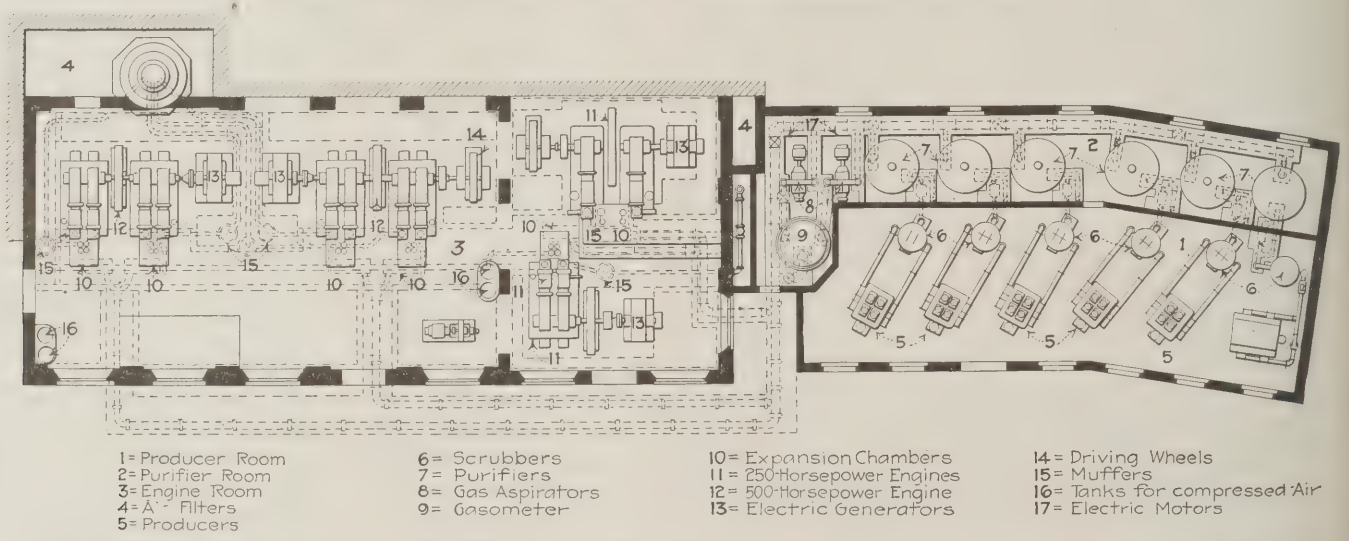


FIG. 11. PLAN OF ENLARGED POWER STATION AT VISBY, IN GOTHLAND, SWEDEN; GAS PRODUCER PLANT AT RIGHT, POWER PLANT AT LEFT

peat bogs is higher than that of the ordinary coal measures. Many forms of special producer and plant for the gasification of peat and recovery of the ammonia have been patented and tried upon an industrial scale in Europe during the past decade. Before the war there were quite a large number of these peat-gas power plants in successful operation in Germany, Sweden, Russia, Austria, Italy and Ireland.

The type of gas producer that has proved most satisfactory with peat is that known as the double combustion-zone producer, the gaseous products that collect above the charge of fuel being drawn (or forced) downward through the incandescent carbonaceous matter, in order to decompose the larger portion of the tarry vapor contained in these gases before they are used in the engine. Practical tests have proved that more power is obtained by this simple gasification process than when byproduct recovery is carried out. The decision as to whether there will be any economic gain by separating the tar and recovering the ammonia must depend upon local conditions, the amount of nitrogen contained in the raw peat and the size of the plant.

Under the best conditions one ton of peat gasified in a double-zone, suction gas producer, and utilized for

Some typical installations of peat-gas power plants will now be described. Fig. 7 shows a section of a peat gas producer with the gas outlet at the center of the producer. Fig. 8 shows one of the down-draft type with the gas exit at the bottom.

One of the earliest installations of a peat gas producer to be erected was that at Skabersjo, in Sweden. This plant was started in 1904 and enlarged in 1906 and, so far as I am aware, is still in operation. A large peat bog exists in this locality at a distance of only three miles from the town, which is supplied with electricity for heat and power purposes from the generating station at the bog. Fig. 7 is a sectional elevation of the producer, scrubber and fan, and Figs. 9 and 10 are views of the engine room. The original installation was designed to produce 150 hp. This proving to be quite successful, the plant was duplicated in 1906 and increased to 300-hp. capacity.

Only 750 tons of air-dried peat are required per annum to give this power, and there is consequently little difficulty in obtaining the peat from the bog, with the aid of the local farmers, during the working season, which in this locality lasts from Apr. 15 to Sept. 1. The power for working the dredger and pulping ma-

chine is obtained from a 35-hp. motor, supplied with electric current from the central generating station.

Two Koerting suction gas producers, specially designed for peat gasification, are installed at this station, with two 150-hp. Koerting gas engines of the twin horizontal single-acting type. These engines are direct-coupled to three-phase alternators which generate current at 3000 volts for transmission to the town of Skabersjo, where it is sold to consumers, for lighting purposes, at 9 cents per unit. The air-dried peat was delivered (before the war) to the producers at a cost of only $0.80 per ton, whereas bituminous coal at this place costs $3.80 per ton.

Another successful and larger peat-gas power installation, equipped with Koerting producers and engines, is in operation at the cement works situated at Visby, in Gothland. The original plant here was erected in 1908 and consisted of one 250-hp. producer and gas engine of the horizontal single-acting type, but in 1911 when Fernald[1] visited the plant, the equipment was being increased to 1500 hp. Fig. 11 shows the plan of the enlarged power station.

The peat-working season on the bog at Visby extends from Apr. 15 to Aug. 8, and all the peat required for the winter's use should be dry and in the storage bins by Oct. 1 of each year. The peat machine originally used in 1908 required 42 hp., and when worked with a squad of 10 men it produced 60 tons of "dry" peat per day of 10 hours. The term "dry," applied to this peat, was somewhat misleading, as it still contained 25 per cent. or more of water, according to the weather conditions prevailing when it was harvested.

With this machine the peat was excavated by a bucket dredger and conveyor, was passed through shredding and mixing devices, and was then delivered into the cars in a pasty mass. It was transported in this state to the drying fields and was dumped into a frame on the ground. It was finally rolled and divided into bricks by means of a bladed roller and a 3-in. disk cutter operated by a workman. This "dry" peat contained 25 to 40 per cent. moisture, and the bricks measured 8 to 10 in. in length, 4 in. in width and 2 in. in thickness, and weighed 1¾ lb. The cost of this peat when collected at the bog ready for delivery in cars to the gas producers, was $1.36 per ton.

Ireland—The most successful example of an industrial power-plant operated with peat, in Ireland, is that of Hamilton, Robb & Co., at Portadown, County Armagh. This plant has a capacity of 400 hp. and has been in continuous operation since 1911. The equipment consists of two Crossley gas producers, specially designed for the gasification of wet peat, and two Crossley gas engines. The peat is obtained from a bog 12 miles distant from Portadown, and after air drying is transported to the works by water carriage. The gas producers are worked on the suction principle, and no attempt is made to recover any byproducts, although scrubbers are employed to remove the tar that has escaped destruction in the producers. The composition of the gas is as follows: H, 18 per cent.; CO, 19 per cent.; CH_4, 1.6 per cent.; CO_2, 7 per cent.; N, 54 per cent. The calorific value of the gas is 140 B.t.u. per cubic foot. During a test run of six hour's duration, made in October, 1911, with a load of 250 hp., the consumption of peat amounted to 2.55 lb. per b.-hp.-hr. From these figures it is calculated that if peat were delivered at the producers at a total cost of $1.20 per ton, power could be generated at this plant with an expenditure for fuel of 0.124c. per b.-hp.-hr.

Some difficulties have been experienced at this Portadown plant with the tar, but by increasing the amount of wash water (used for cleansing the gas by spraying) to 7 gal. per b.-hp.-hr., this trouble has been overcome, and the engines can now be run for three weeks without cleaning the valves.

About 100 tons of peat tar are produced annually at the Portadown works. As no outlet has yet been found for it, the Swedish and German methods of converting it into gas would appear to be more advantageous, especially as, according to Pegg, 5 per cent. of the weight of the raw peat is recovered in this form. Figs. 12 and 13 are views of the producer plant at Portadown.

Gasification with Recovery of the Ammonia

The peat-gas power plants described above are worked without recovery of the ammonia. It is now advantageous to consider whether better economic results could be obtained by adding an ammonium sulphate plant to an installation of producers and gas engines. In a paper read before the Liverpool section of the Society of Chemical Industry, in November, 1916, Professor Baly discussed this question at considerable length, and many of the figures that follow are taken from his paper. As an example of the amount of sulphate of ammonia that can be recovered from peat, the tests made with producers of the Mond type, at the works of the Power Gas Corporation at Stockton-on-Tees, may be quoted:

	German Peat	Italian Peat	English Peat
Moisture content	40 to 60 per cent.	15 per cent.	57.5 per cent.
Nitrogen content	1 per cent.	1.58 per cent.	2.3 per cent.
Gas from one ton of theoretically dry peat	35,000 cu.ft.	60,000 cu.ft.	90,000 cu.ft.
Heat value (B.t.u. per cu.ft.)	150	166	134
$(NH_2)_4 SO_4$ per ton of theoretically dry peat	70 lb.	115 lb.	215 lb.

The German engineers, Frank & Caro, have devoted considerable attention to the problem of adapting the Mond producer to the gasification of peat, and a large installation of this modified type of the Mond gas producer was at work in northwestern Germany on the Schlweger bog before the war. Their method of overcoming the special difficulties caused by the use of peat containing 50 to 70 per cent. of moisture is to increase the temperature of the drying zone of the producer to 250 deg. C. (482 deg. F.). According to Baly, this increase gives an intensive combustion of the coke, an increase in the size and temperature of the combustion zone, and consequently an almost quantitative recovery of the nitrogen as ammonia.

The total amount of steam used should not exceed, however, half the weight of the peat gasified. Baly gives the following figures, as typical of the results obtained with the Mond producer (as modified by Frank & Caro) when working on peat containing 50 to 60 per cent. of moisture. One ton of theoretically dry peat gives from 88,000 to 92,000 cu.ft. of gas. Of this total 39,000 cu.ft. is used in the producers for the air steam blast, leaving 49,000 to 53,000 cu.ft. as surplus. From this surplus gas 700 to 750 hp.-hr. can be developed The recovery of nitrogen as ammonia is from 70 to 85 per cent. of that contained in the fuel, and the yield of tar is from 3 to 6 per cent.

As regards the cost of power, Baly states that the

[1] "Producer Gas Power Plants—Developments in Europe." U. S. Bureau of Mines, Bulletin 4, 1911.

original figure given when the process was first brought before the public was 0.12c. per hp.-hr., but in 1911 figures were published for the Schlweger bog plant that showed that all the expenses were covered by the value of the recovered byproducts. At this date the capacity of the plant was 6000 kw., and each ton of theoretically dry peat produced 1000 hp.-hr. and 90 lb. of ammonium sulphate. Peat containing up to 70 per cent. of water was used in the producers. The tar obtained was distilled to secure paraffin wax and neutral oils.

A peat-gas power plant using a method similar to the modified Mond method of working is also in operation at Codigoro, in Italy. The peat, after preliminary drying and crushing, is charged into a producer 30 ft. high, having the combustion zone near the bottom. The combustion is regulated by a hot air and steam jet, and the plant is said to recover, as ammonium sulphate, three-fourths of the nitrogen in the raw peat, or 170 lb. per ton. The original plant treated 1500 cu.ft. of peat per day, and produced 50 tons of ammonium sulphate per month, with electrical energy equivalent to 800 hp. The plant has recently been enlarged, and according to the latest figures is now treating 17,000 tons of dried peat annually and producing 10 to 12 tons of ammonium sulphate per day.





FIGS. 12 AND 13. VIEWS OF PEAT GAS PRODUCER PLANT AT PORTADOWN, COUNTY ARMAGH, IRELAND

Although powdered peat has not been long before the public as fuel for steam-raising purposes, many engineers, including myself, believe that this method of utilizing this fuel will expand rapidly, and that it will take the place of the older method of briquetting the peat before burning it for power purposes. The advantages claimed for powdered peat are that it is easily produced and that it burns with an intensely hot flame, owing to its high percentage of volatile matter.

The method of producing peat powder varies In Sweden the peat is dug, machined, spread on the bog to dry and cut into bricks, in the manner customary for briquetting. The air-dried bricks contain 50 per cent. of water, and are crushed to a coarse powder in specially built machines. This powder is then dried in rotary dryers. In Canada a novel system of collecting peat powder has been tried, based on the use of pneumatic collecting machines. The cleared and smooth surface of the bog is lightly scored by a harrow, and after a few hours' exposure to wind and sunshine the thin layer of peat powder becomes dried down to 30 per cent., or less, of moisture. This dried dust is then collected by air suction, the collector being operated electrically and mounted on rails.

A collector of this type can gather (on a favorable day) 40 to 50 tons of air-dried peat, at a cost of only $1.44 per ton. After screening, the moisture content, if desired, can be still further reduced by artificial drying.

A further advantage of peat powder as a fuel is that it can be handled and transported more cheaply than briquets, when employed for steam-raising purposes. There is said to be no danger from self-ignition, although this seems doubtful.

The only figures covering the efficiency of peat powder as a fuel are those published by Ekelund, who stated that 1.2 tons of peat powder, containing 15 per cent. of water, was equal in evaporative effect to one ton of the best coal. The cost of producing peat powder in Sweden, in 1911, was given as $2.06 per ton.

In 1913, or just before the war, the Finnish Government made a grant of $48,000 to the Turf Fuel Co. to aid it in erecting a factory for the production of "dust peat" near the railway station at Rychimyaki. This arrangement was based on the experience gained on the Stockholm-Rimbosk Ry., in Sweden, on which line the locomotives since 1911 had been worked with the new form of fuel. The war of course stopped these contemplated developments in Finland, but there will now be a considerable expansion of the powdered-peat industry in Scandinavia, northern Russia, Canada and other countries, where the climatic conditions are favorable.

For large central stations for electric-power generation the production of gas from the partially dried peat in gas producers of the double combustion-zone type and the use of this gas in large gas engines is certainly the most economical and practical method of utilizing the peat.

For steam generation and the heating of large furnaces generally the use of powdered peat offers many advantages over the briquetted form of the fuel, in addition to the greater cheapness of production. Therefore, in those countries where the surface of the bogs and the climatic conditions favor the production of peat powder, developments for producing this form of the fuel in large quantities may be expected to occur.

For domestic heating purposes the machine-made brick or briquet is the cheapest, and I do not believe that the more elaborate processes used to produce a peat coke, or *tourbon*, will be found to pay their working expenses in those districts where peat must be sold in competition with coal.

The author's thanks are due to the Acting Director of the United States Bureau of Mines for permission to reproduce Figs. 7, 9, 10 and 11 from Bulletin 4, published by the U. S. Department of the Interior before the war, giving information and views of various producer gas power plants in Europe.

Convention of National Retail Coal Merchants' Association

Special Correspondence

SYNOPSIS—*The second yearly meeting of the retailers, held at Buffalo, May 14-16, proved most profitable and interesting to those present. Many excellent addresses were given, and a decided effort was made by the leaders to imbue the members with a new feeling that would supplant the old feeling of selfishness. Coöperation was the keynote of the proceedings.*

THE National Retail Coal Merchants' Association held its second annual convention in Buffalo on May 14-16, following the initial one held at Pittsburgh last year. Hon. W. Albert Smoot, of Alexandria, Va., the president of the association, was too ill to attend and his place was taken by John E. Lloyd, of Philadelphia, first vice president. The program was varied and interesting, bringing out men of note in the trade.

Only a morning session was held on the first day, the rest of the day being spent at Niagara Falls, closing with a supper at the Prospect House on the Canadian shore. The chairman of the local committee of entertainment, Albert H. Tracy, Jr., was suddenly taken severely ill and the arrangements were taken up by J. W. Noble.

The chair spoke briefly on coöperation and said that it was bound to take the place of the old selfishness in trade, which had worked a great deal of harm for a long time. It would be a splendid thing if the coal dealer, handling as he does one of the vital necessities of the world, could take the lead in this movement.

John M. Daly, of London, Ont., vice president of the Canadian Retail Coal Association, spoke as the "mouthpiece of the trade across the border." He said that the American fuel administration had been of wonderful help to Canada during the coal shortage, in spite of the fact that the dealers disliked to make reports of their sales, for it put them on an equal basis with the consumers in the United States. He complained only of the shortage, and said the mines should be made responsible for weights. He referred feelingly to the great sacrifice that Canada had made in the war. It was as great in personal losses as those of the United States, though the population was only equal to that of New York State.

The credentials committee found only about half of the affiliated associations represented, but further reports finally placed most of the 25 in line.

The nominating committee presented the names of 21 delegates as suggestions for directors. They were later elected without change, and are as follows: For three years—W. A. Smoot, Alexandria, Va.; Charles B. Staats, Albany, N. Y.; Walker Cottrell, Richmond, Va.; Wellington M. Bertolet, Reading, Penn.; Samuel Munter, Indianapolis, Ind.; John M. Daly, London, Ont.; A. P. Smith, Denver, Col. For two years—John E. Lloyd, Philadelphia, Penn.; W. A. Clark, Boston, Mass.; W. Hamilton Smith, Washington, D. C.; James C. Tattersall, Trenton, N. J.; Wallace G. Phinney, Boston, Mass.; Thomas Cossey, Danville, Ill.; William Bartrim, Kansas City, Mo. For one year—B. M. Watts, Baltimore, Md.; W. T. C. Berlin, Memphis, Tenn.; Milton E. Robinson, Chicago, Ill.; Albert E. May, Rochester, N. Y.; Richard J. Wulff, Brooklyn, N. Y.; Edward Schiewe, Detroit, Mich.; Arch. Coleman, Minneapolis, Minn.

"Wholesale and Retail Relations" was taken up at the Thursday morning's session by Arthur E. Rice, commissioner of the Coal Merchants' Association of New York. He said that the three branches of the trade should be brought together, instead of each trying to do business at the expense of the others. The organizing of the national association was a long step toward the accomplishment of this result. Much had been done by the Pittsburgh convention of that body. What constitutes a retail dealer should be sharply defined, and no other should be allowed to distribute coal. As to car weights, the wholesaler should be responsible for that, and he should give up that responsibility only on delivery. The operators who send out impurities in coal were reminded that the consumer is buying substitute fuel in quantity, and that crude oil is supplanting coal in a great many localities. The speaker was sure that many difficulties had been brushed aside so that the three branches of the trade could be brought together and much good accomplished.

Defines Function of Retail Dealer

Committee reports followed, and J. C. Tattersall, of Trenton, N. J., on invitation from the chair, told of the card system in use by his local association. By it the dealer could refer to every sale made in the city and note the price paid. Consumers were not allowed to get more than six months in arrears.

George H. Cushing, managing director of the American Wholesale Coal Association, spoke in the afternoon on "The Function of the Retail Dealer." After defining "function," he said the retailer's duty was to buy coal in car lots and sell it in less than car lots; to sell when it was wanted, and to furnish what was wanted. He said the retailer was a merchant, a warehouseman, a cartman and a banker, and should know what each of these branches contributed to his business as a whole. Sometimes one produced a profit while another did not. Speaking of the retailer's many bosses—those he bought of and those he sold to—he was sure that an effort to reform them would be difficult, so that it would be easier for the retailer to reform himself. No retailer really owned his business. He owned only the machinery of it. Mr. Cushing closed by referring to the establishment of a system of banks that were prepared to relieve merchants of doing any part of their own banking, by giving credit to buyers direct.

The address on "Coöperation in the Coal Trade," by E. W. Parker, director of the Anthracite Bureau of Information, wound up the regular program of the day. Mr. Parker said that the advance in the price of anthracite since 1913 was only 51.5 per cent., while nearly

everything else had advanced much more. Milk, which was the highest on his list, had advanced 163 per cent. One reason, the speaker thought, for more complaint of the high price of coal than of most other things, was that it was sold by the ton, while other commodities sold by the pound or dozen. Proceeding to show the mining cost of anthracite coal, he asserted that one advance of 35c. a ton was all that the Government would allow against an advance of 45c. to the miners.

The convention took up the subject of advertising and an enthusiastic indorsement of it was the result. Many reports of success were made. A general and continuous use of the daily papers, for the purpose of keeping the public informed on the state of the coal trade, was advocated by every speaker.

The regular banquet of Thursday, given in the convention hall, was largely attended. Enjoyment of the informal kind, with music and dancing, took the place of set speaking.

The Friday session was confined to the forenoon, as some of the speakers on the program did not appear. Peter Beck, of Harvey, Ill., read a short paper on "Sales to Employees," in which he argued against the practice. He was aware that it was an effort to keep the men more satisfied and prevent strikes. All selling of coal or anything else below what it should bring was demoralizing to the trade and did nobody any good in the end.

The customary resolutions, thanking the local trade for the fine entertainment it had given the visitors, were adopted. It was also found proper to remember the members of the association who were ill, of whom there was an unusual number. The resolution asking the operators to reduce the sizes of anthracite brought forth an animated general discussion. All agreed that there were too many sizes, but some took the view that the convention as a whole was not called on to discuss the matter. A resolution to refer the matter to the executive committee was lost. The plan was to call lump and large pea extra sizes, and to include two between them. Of steam sizes it was held that three were enough. In this form the resolution was adopted. The convention put itself on record as opposed to the gross ton.

The directors announced the election of the following officers: President, John E. Lloyd, Philadelphia; first vice-president, Peter Beck, Harvey, Ill.; other vice presidents, W. A. Clark, Boston; T. Percy Bryan, Kansas City, Mo.; W. Hamilton Smith, Washington, D. C.; Charles D. Staats, Albany, N. Y.; H. D. Jones, Chicago; treasurer, Samuel D. Crowell, Philadelphia.

The officers, with the following appointed by the president, make up the executive committee: W. A. Smoot Alexandria, Va.; R. R. Yeagley, Indianapolis; W. T. C. Berlin, Memphis, Tenn.; W. M. Bertolet, Reading, Penn.; W. B. Phinney, Boston; A. F. Rice, New York; J. Harry West, Baltimore; Walker Cottrell, Richmond, Virginia.

The final address was given by Stanley B. Houck, who had come from Minneapolis to be present the last day. He began by referring to the bolshevists and socialists as being always posted on their beliefs and principles and ready to fight for them. The coal association should take a lesson from them, and the members should not only know what they wanted, but be ready to take off their coats and defend it. When they went to Washington to ask for anything, they should know what they wanted and work together. He has known cases to come up before the Interstate Commerce Commission when nothing was accomplished because the petitioners, though all wanting the same thing, could not agree to present their views as a unit.

A point of vital interest to the convention was presented by W. L. Noble, of Buffalo. He had gone with a delegation to the Larkin plant to inquire into the report that the company was selling coal to its employees at cost. This was denied by John D. Larkin, Jr., but with the admission that it was being sold at a reduction of $1 to $1.25 below the local price by a coöperative association of the employees. The delegation tried to get Mr. Larkin to stop the practice or to oppose it in some way, but failed. Mr. Noble said that he did not think enough coal would be sold in this way to hurt anybody's trade, but the moral effect was bad; for if one sold in that way others would. He promised to watch developments and report.

At 1 o'clock the convention came to the end of its program, having completed an interesting and profitable meeting. The convention adjourned with a rising vote of appreciation of the work of the president, John E. Lloyd.

Kentucky Mining Institute Meeting

The annual meeting of the Kentucky Mining Institute will be held at the Phoenix Hotel, Lexington, Ky., June 6 and 7. President Meguire will open the meeting on Friday, June 6, at 1:00 p.m., after which the following papers will be read: "Zinc and Lead in the Kentucky-Illinois Fluorspar District," by A. H. Reed; "Human Engineering," by M. L. Fellmer; "Gas and Coal Dust in Mines," by Col. A. G. Burrell; "Chemistry of Coal," by Major A. C. Fieldner; "Schedule Rating of Coal Mines for Workmen's Compensation," by H. M. Wilson; "Safe and Dangerous Practices in Coal Mines," by D. J. Parker. At 8:00 p.m., after the luncheon, the following papers will be read and discussed: "Depreciation and Depletion," by C. D. Burdick, and "Has the Metal Industry Any Lessons for the Coal Industry?" by R. Dawson Hall.

On Saturday morning, at 9:00 o'clock, Frank Morris will read a paper entitled "The Activities of the National Safety Council," followed by "Storage Battery Locomotives in Mine Work," by J. Appleton; "Mine Rail Bonds," by C. C. Beck; and "Permissible Explosives," by J. E. Miller. In the afternoon, at 2:00, a first-aid contest will be held for the "Institute Placque," won in 1917 by the team of the Stearns Coal and Lumber Co. The contest will be conducted under the regulations of the American Red Cross. Teams desiring to compete are asked to file the names and addresses of the team members, and the company they represent, with C. W. Strickland, Box 910, Huntington, W. Va., not later than June 2.

Referred to the Anti-vivisectionists

A cruel use of men to safeguard the lives of canaries and mice has been discovered by Emery R. Hayhurst, consultant in industrial hygiene, Ohio State Department of Health. In a recent report published in *The Ohio Public Health Journal*, February, 1919, p. 67, he says: Afterdamp "has rather more effect on canaries or mice than upon men, so that the latter have been used as test animals."

Dirt in Coal*

THE ash content in coal varies widely in different localities and frequently there is considerable variation in the same locality under different conditions of mining and preparation. The normal amount of ash may be considered as that found in the face sample of the seam proper; the excess ash is that which is added from the roof or bottom in the process of mining and which is not eliminated before the coal leaves the mine.

Lump coal made over a 1¼ in. screen usually shows the normal per cent. of ash, while the 1¼ in. screenings in most cases show one and one-half times the percentage of ash contained in the lump. This is due to various causes. Where mining machines are used they occasionally drive the cutter bar into the fireclay bottom, either by a failure to properly set the machine, which is gross neglect on the part of the machine operator, or through the cutter bar striking an uneven area of bottom clay under the coal seam, which is unavoidable.

Another factor enters here: The bottom bench of a coal bed frequently contains a greater proportion of ash than the upper benches, and undercutting in this bottom bench is one cause of increasing ash in the screenings. These undercuttings from a 6-ft. seam amount to about 7 per cent. of the output. Where the coal bed lies under a shale covering or roof, it frequently occurs that a portion of this cover comes down and mixes with the coal, as a result of heavy blasting and scaling off due to air striking it. This shaley substance easily slacks and finds its way into the screenings.

The ash content in screenings can be reduced nearly to that of the screened lump by the use of a jig gravity washer, with an ample water supply and a convenient place to deposit the refuse. However, the washing of screenings has been considered too expensive while the price of all coal was low, but since prices have gone 60 per cent. and more upward, and will probably remain so, it may be well, and at the same time profitable, to eliminate the excess ash by washing in the vicinity of the mines, thereby saving the use of cars for and the long haul on inert material amounting to about six mills per ton-mile to points where coal is finally consumed.

The following table showing ash and B.t.u. content of coal from a bituminous mine in the Central West district illustrates how the ash content of screenings can be reduced by washing:

	Ash	B.t.u.
Dry or unwashed screenings	22.61%	8,895
Washed screenings	14.05%	10,085
Lump	12.39%	10,499

The excess ash in mine run and prepared sizes, made over a 1¼ in. screen, consists chiefly of blue band, sulphur band, sulphur boulders, or lenses from the vein; and from the roof, slate, shale and rock which frequently comes down with the coal as a result of improper blasting or lack of proper timber. This foreign matter can easily be removed by hand by the miner at the working face when loading into mine cars, or by having men or boys working on picking tables or belts while the coal is passing to the railroad car.

The performance of this work can be supervised by regularly assigned fuel inspector. He often finds the mine manager or superintendent letting his miners become lax in cleaning coal at the face and using too much powder for blasting, or the dock boss and slate pickers on the tipple becoming dilatory in their work, the result being increased ash. A protest to the proper mine official by the inspector usually brings about a correction; again in other cases rejection of the coal will bring about results.

The Illinois Central R.R. is using a system of close inspection with suggestions to the mine superintendents on the ground while the coal is being loaded. As a result of this effort, the impurities removable by hand picking and based on actual carload tests have been reduced from an average of 2.733 per cent. in the year 1911 to an average of 1.535 per cent. in the year 1917, or a net reduction of 1.198 per cent., which applied to a consumption of 4,000,000 tons of coal used annually represents 47,920 tons less ash, requiring the use of 958 fifty-ton cars to move. The transportation cost of moving this excess ash an average distance of 266 miles, based on an "out of pocket" cost of five mills per net ton-mile, equals $63,733.60 per annum. This, however, is but a lesser saving.

Taking the established estimate of increase in efficiency due to reduction in ash of 1½ per cent. for each reduction of 1 per cent., the saving from this source—that is, the increased evaporative efficiency—with coal at a delivered price of $3.68 per ton equals $264,518.40, or a total saving of $328,252 per annum. What the measure of the economies following from reduced engine failures and reduction in engine-house expense amounts to is difficult of computation.

Waste Due to High Ash in Coal

The total bituminous coal mined in the United States last year in round numbers approximates 585,883,000 tons, of which the railroads of this country consumed about 30 per cent., or 175,764,900 tons. Now assuming that if 1.198 per cent. of the excess dirt or ash had been removed at the mines, it would have reflected a saving of 42,193 cars, and the consequent expensive burden entailed by transporting and handling this "fuel parasite" through the regular channels to the refuse piles at some terminal points.

The Bureau of Mines has received repeated cases of complaint from coal consumers generally during the past year wherein the ash content in coal that normally runs 6 to 8 per cent. has increased to 12 and as high as 18 per cent.; now, if we assume 5 per cent. to be a fair average of the increase in ash, it would mean 585,883 carloads of burden to be handled on the entire output for last year.

The higher per cent. of impurities, especially sulphur in the form of iron pyrites, in coals running high in volatile matter, is a dangerous element in storing mine run or screenings, as these coals often ignite spontaneously when sufficient moisture is available to cause oxidation of the sulphur. This causes a rise of temperature sufficient to ignite the smaller particles of coal, which when properly mixed will start the whole pile burning. However, I have never experienced this effect where screened lump coal, free of all slack, was stored.

*Paper presented before the International Railway Fuel Association by L. J. Joffray, general fuel inspector for the Illinois Central Railroad.

The effective combustion of coal depends largely on the nature and per cent. of impurities it contains, especially so if the ash has a tendency to clinker, which is dependent on the percentage of silica, iron and lime in its composition. Tables I and II give analyses of coal and ash used in ten burning tests from ten different mines in Illinois and Indiana.

Table I gives the usual proximate analyses of the coals. Table II gives analyses of the ash. By referring to the column showing the clinkering and non-clinkering coals and then making a review of the ash table, we

TABLE I. ANALYSES OF COALS

Test Number	Moisture, Per Cent.	Volatile Matter, Per Cent.	Fixed Carbon, Per Cent.	Ash, Per Cent.	Sulphur, Per Cent.	B.t.u.	Clinker
1	3.37	31.31	55.19	9.63	0.64	12,325	No
2	6.02	30.00	53.50	10.30	1.30	12,136	No
3	4.61	31.35	54.05	10.00	1.19	12,368	No
4	2.92	33.10	51.25	12.73	2.96	12,389	Yes
5	4.99	39.22	43.99	11.80	4.43	11,768	Slightly
6	3.41	37.12	45.62	13.85	4.02	11,842	Yes
7	5.13	37.70	44.31	12.80	4.52	11,693	Yes
8	2.86	36.04	43.14	17.96	4.58	11,124	Yes
9	8.49	34.87	48.16	8.48	1.47	12,251	No
10	4.68	38.59	44.24	12.49	4.50	11,921	Yes

observe that the coals with non-clinkering ash are low in both sulphur and lime. In burning they did not clinker in a dazzling white fire of an approximate temperature of 2900 deg. F., while the ash in the clinkering coals fused at a firebox temperature of approximately 2200 deg. F. This indicates clearly that when the sulphur and lime content exist in high proportion to the silica, iron and aluminum oxides, it is the direct cause of the ash fusing at the lower temperature.

The bottom line of Table II shows the fusing point of the sulphur and the different oxides. From this it will be seen that by taking each element separately the fusing point is at a higher temperature than is usually obtained in the furnace of a boiler. However, by combining these elements in proper proportion with the sulphur, fusion at a much lower temperature take place.

The conditions of these ten experiments as to draft, etc., were identical in each case. However, I have since

TABLE II. ANALYSES OF ASH

Test Number	Sulphur (S) Per Cent.	Silica Oxide (SiO_2), Per Cent.	Iron Oxide (Fe_2O_3), Per Cent.	Aluminum Oxide (Al_2O_3), Per Cent.	Calcium Oxide (Lime), (CaO) Per Cent.	Magnesium Oxide (MgO), Per Cent.	Color of Ash
1	0.64	59.0	3.1	31.0	5.6	1.3	White
2	1.30	55.2	8.3	26.6	7.3	1.3	White
3	1.19	56.1	8.1	27.2	5.4	0.9	Light Gray
4	2.96	45.4	25.3	16.9	11.6	0.8	Reddish Gray
5	4.43	49.1	32.2	13.5	4.5	1.4	Reddish Gray
6	4.02	35.1	22.4	10.2	30.8	1.5	Reddish Gray
7	4.52	43.3	24.1	9.0	19.9	1.2	Reddish Gray
8	4.58	44.8	20.3	18.6	16.4	1.5	Reddish Gray
9	1.47	45.8	20.2	28.3	5.4	0.0	White
10	4.50	27.1	52.3	14.1	4.4	1.2	Dark Gray
Fusing Tem.°	239	3227	2840	3416	3452	3882	

observed that either one of the coals containing the clinkering ash will give better results both as to combustion and reduction of slag in the ash by increasing the draft, which increases the flow of air through the fire bed and has a tendency to keep the temperature of the fire below the fusing point of the ash. Hence it is always good policy to assign the clinkering coals to a lower class of service, such as switch engine, local freight, and other light runs. However, when considering the possibility of burning the low grade clinkering coals to profitable advantage, such should not be construed so as to minimize the responsibility of those who are assigned the duty of eliminating all impurities.

Mine Owner Held Not Liable for Injuries From Dynamite

In the case of Richards vs. Fleming Coal Co., decided by the supreme court of Kansas on Mar. 8, the mine operator is held not liable for injuries to a shotfirer from an accidental explosion of a charge of dynamite, the reason being that the servant at the time of the injury was violating the law concerning the use of the explosive in coal mines.

A law of Kansas (1909 Ch. 175) makes it an offense for anyone to use dynamite in a coal mine except under such rules as may be agreed upon between the employer and employees, with the approval of the state mine inspector. It appeared that the dynamite was generally used at the mine in question by exploding it by means of a plunger electric battery, and that such a battery could not explode the charge accidentally. The plunger battery got out of order and the servant was directed to use a dry cell. While arranging the wires and carrying a small charge of dynamite, the wires came in contact with the dry cell and caused an explosion.

The court denied the contention that the law was unconstitutional on the ground that it delegated power to the operators and miners to make rules which might vary with different localities. It was also held that the statute applied to a strip-pit mine as well as to one with underground workings.

The Storage Battery Returns to Peace

Announcement has been made by the Electric Storage Battery Co. that the United States Government has given it a release on the "Ironclad-Exide" storage battery and that this product is now ready to take its accustomed place in those phases of industrial life where a storage battery of this character is an important factor.

Some items of the paraphernalia of modern warfare are not generally listed in the histories. For instance, the storage battery is used in battleships to furnish auxiliary power, not only for the intricate system of inter-telephone communication which keeps every department in touch with every other department, and for the lighting of cabins and gun decks, but for the actual operation and firing of the guns themselves. It also stood as a reserve behind the powerful searchlights with which the submarine chasers were equipped. Electrical accumulators, also, provided the power for undersea operation of Uncle Sam's submarines.

In almost every field of war activity storage batteries had their important corner. They were used on airplanes to provide ignition and starting power, and for the operation of the important landing lights. They furnished the vitality for the field wireless; put the punch into the starting and lighting of officers' automobiles; operated the electric locomotives and electric industrial trucks used in munition plants and on loading platforms; provided auxiliary power for the raising and sighting of our big coast defense guns, as well as that behind the operation of the lighting and telephone system of fort, army post and cantonment.

It is one of the strongest proofs that the world is again right to see our boys coming home; it is no less a cheering sign to see many units of the machine of war disassembled and taking up their old work.

What Price Should the Coal Operator Charge the Boiler-Room Coal Account?

By C. W. Hippard
Urbana, Ill.

SYNOPSIS—*A few years ago many operators knew little about the details of the cost of coal production and preparation at their plant. The Federal Government monthly expense reports have tended to change all this. With the distribution of coal-production expenses, much information was gained. The following article takes up one phase of mine operation—the boiler-room coal. It is worthy of discussion, as it is an important item in the running expenses of a mine.*

PROMINENCE was given to the subject of the cost of coal production and preparation by the requirement of the Federal Government of a monthly expense report from all coal operators. Furthermore, in this day of scientific management, a cost-accounting system is an essential part of every up-to-date business. There has been considerable discussion about many of the details of colliery cost accounting in which was included the price the coal operator should charge the boiler-room coal account. There are several ways of solving this problem; either by charging the boiler-room account with the coal used at some definite price per ton, or by ignoring it altogether.

Formerly, it was common practice to take no account of fuel burned under boilers at the mine. It is not always easy to arrive at the exact price per ton which should be charged for this fuel; it may be an inferior grade of coal, which is not marketable. Furthermore, the weight of coal thus used is rarely known unless a special effort is made to ascertain the facts in the case. However, boiler-room fuel is an actual expense and should be charged. A company should know just what operating expenses to charge up to each department; if the costs are too high, the situation should be carefully investigated to see where costs can be reduced. There are a number of ways of arriving at the price which should be charged for boiler-room coal, and the various methods are all open to discussion; for the purpose of comparison, each is here given and commented upon.

First, considering the cost-of-mining price method. The plan of adopting the cost of mining as the price per ton to charge for coal appears logical. Some charge the actual cost of mining the coal, while others include overhead. The method of charging the actual cost of the coal has the advantage that it does not permit of a profit on coal used at the mine to appear on the boiler-house account. The disadvantages are that the cost of mining varies from day to day and discrepancies are introduced when a fixed price is used. Then, as is often the case, a grade of coal may be used which is sold in the market for a price which is less than the cost per ton of mining the entire output. Thus, when screenings are used under the boilers at the mine, the mining price should not be charged, as screenings sell for an amount less than the cost per ton for mining the entire output. On the other hand, the coal used in the colliery boiler room lessens by just that amount the tonnage which might be sold at a profit in the market, so the coal used in this way might be viewed in the light of a loss. This has led some people to believe that coal used at the mine should be charged at the market price.

This brings us to the second, or the market-price, method. This has the appearance of being a logical method, but fundamentally it is not. Thus, when there is a shortage of railroad cars for transportation, should all the coal produced at the mine be considered as having a value equal to the market price? The only coal for which a market price can be obtained is the amount which can be shipped to market. On the other hand, when there is a big car supply, the coal used at the mine should be worth the market price; for if it were not needed at the mine, it could be shipped to market. At all events the market price is variable, and a variable cost for mine boiler coal should be avoided if possible.

Third, let us consider the local trade price. Some operators consider that boiler-room coal should be charged at the same price as coal sold in wagon lots at the mine to local trade. Probably the only advantage of this method is that the price is likely to be fairly constant.

A fourth method includes a price compared with purchased power. The price of boiler-room coal may be calculated on the basis of comparison with power which may be purchased at a mine from an independent power company. This method is not generally adopted in accounting, as far as known. But at least one operator has been heard of who took a bid of a power company to supply power, and compared the offer of the power company with the amount he had been paying for the power generated in his own plant. Thereafter the operator considered the furnishing of coal to his boiler room as a contract at a definite price.

In reviewing all the methods considered, my conclusion is that the best plan is to ignore the cost of boiler-room coal in the cost accounting. Such items as waste of coal at the mine, discarding of impurities, difference between mine and railroad weights, among others, should be taken care of automatically. One advantage of keeping separate records of the items just noted might be the effect such a system would have on the management; any loss traced directly to some cause would tend to be remedied, or at least reduced to a minimum. Some of the comments here made do not agree with theoretical accounting practice, and I would welcome a discussion of the various methods by the readers of *Coal Age*.

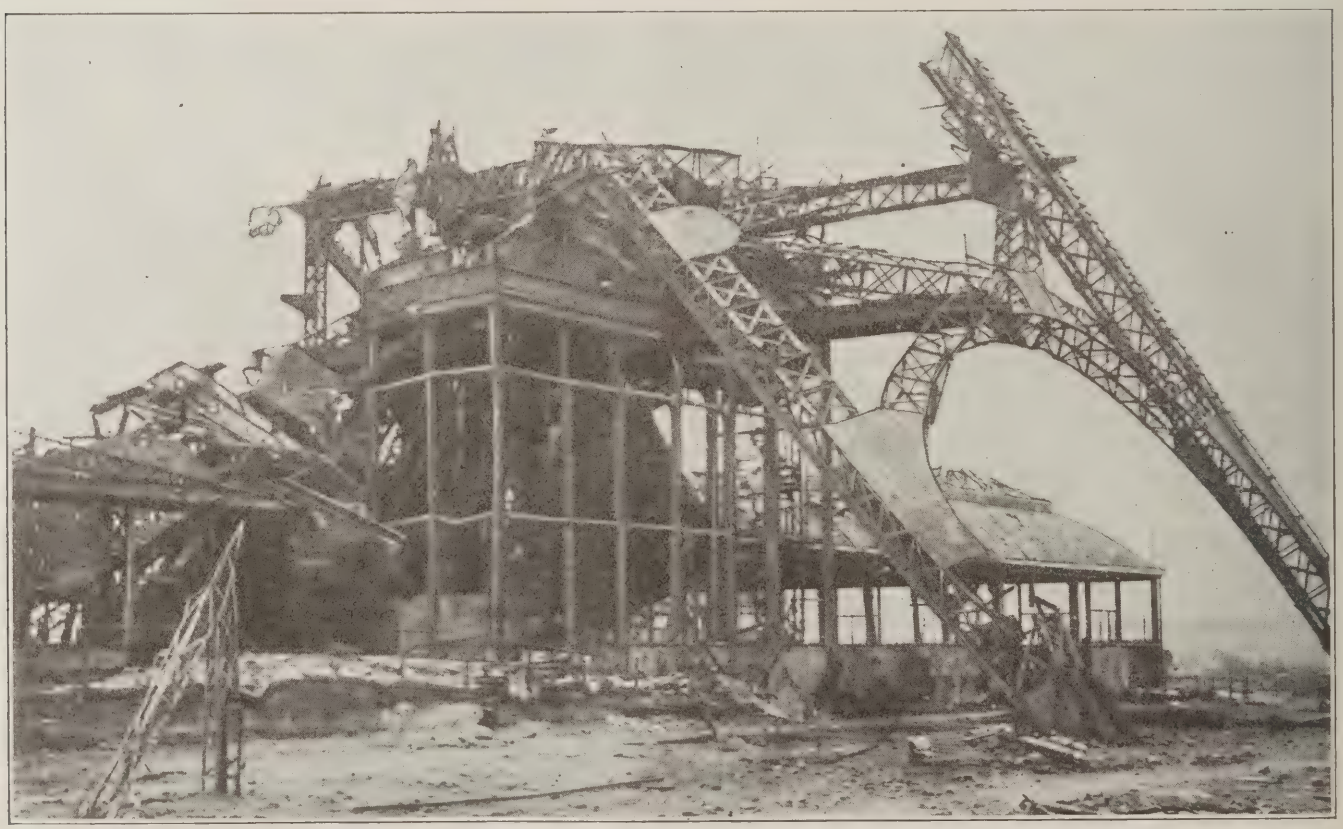
An authority on boiler practice has stated that in addition to the necessary and usual pressure gages and draft gages on boilers, it is also necessary to have a steam flow meter for the purpose of showing the amount of steam being delivered by each individual boiler. Steam flow meters indicate at once those boilers which are not up to the average. With this information changes can be made in drafting fires, to equalize conditions.

SNAPSHOTS IN COAL MINING



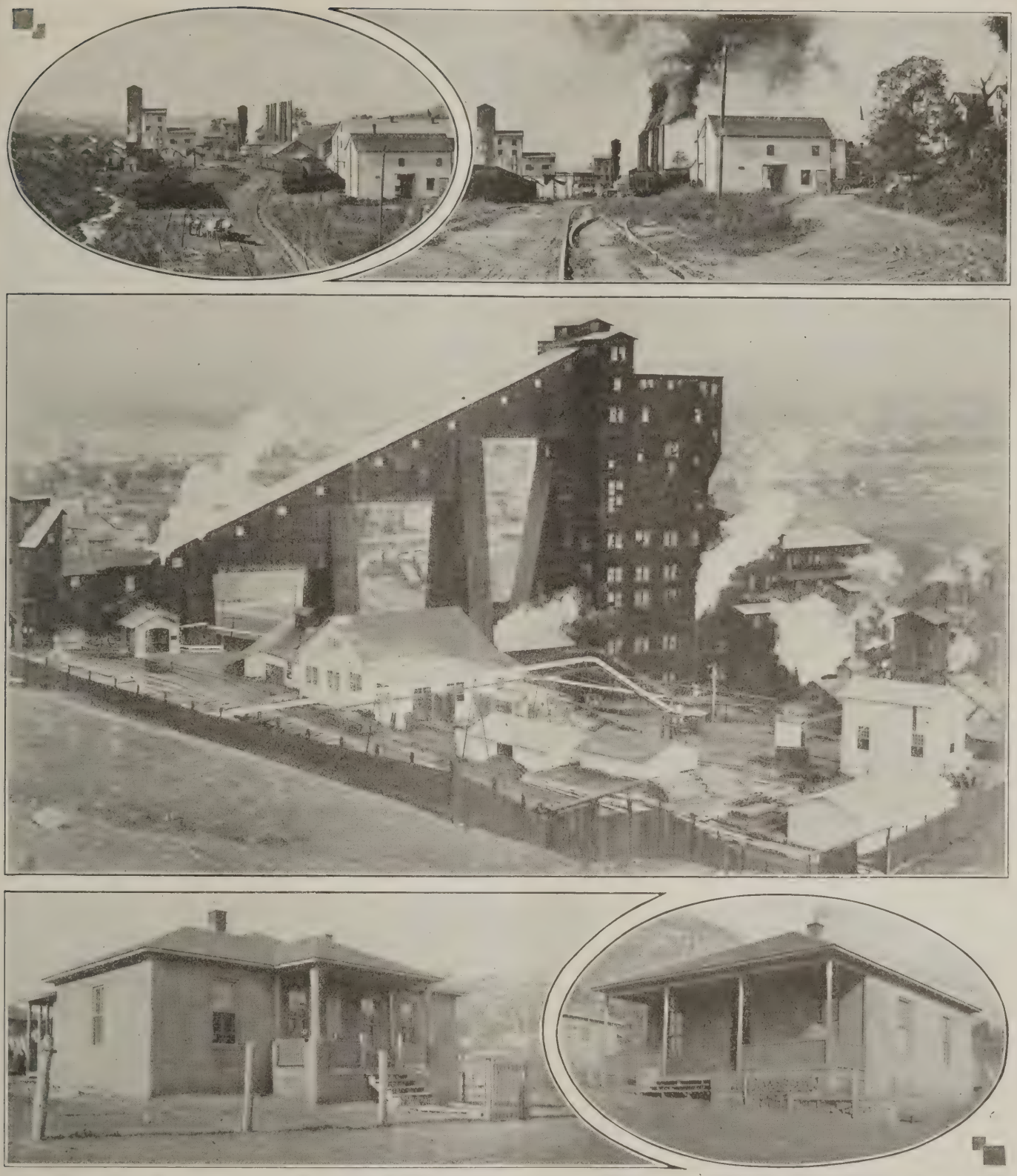
CUTTING PEAT IN A BOG IN SOMERSET, ENGLAND

It has been pointed out by experts both in America and in Great Britain that a mixture of peat and coke forms an ideal fuel for kitchen use. In England peat is used almost entirely in the districts where the bogs are found, and a new bill recently introduced in Parliament would facilitate the cutting and distribution of peat in greater quantities.



WHAT THE GERMANS LEFT OF THE COAL MINES OF LENS

As the British drove the Germans from the industrial centers in the north of France the latter wantonly destroyed every manufacturing plant. The coal mines, however, appear to have met with particular vengeance, for these were demolished completely. The photograph was taken in the autumn of 1918 and affords an idea of what the structures in the Lens region now look like.



TOP—VIEWS OF THE MANIFOLD MINE OF THE YOUGHIOGHENY & OHIO COAL CO., MANIFOLD, PENN.
CENTER—SURFACE PLANT AT THE FORTY FORT COLLIERY OF THE TEMPLE IRON CO., FORTY FORT, PENN.
BOTTOM—COMPANY HOUSES OF THE STAG CANON FUEL CO. AT DAWSON, N. M.; HOUSES OF THE TYPE SHOWN RENT FOR $2 PER ROOM PER MONTH

WILL PAY $5 FOR THE BEST MINE PHOTOGRAPH

A READER can oftentimes obtain more information from a rapid glance at an illustration than from a laborious reading of paragraph after paragraph of mere descriptive matter. The illustrations accompanying the write-up of a new mine plant for instance, help to convey the story. Used in conjunction with a well prepared article, illustrations are an invaluable aid to proper understanding. All this is by way of preamble to a confession. *Coal Age* is meeting with ever-increasing difficulty in procuring photographs that will be of general interest and technical value to colliery men. So we want to enlist the aid of every reader of this paper in this matter. To stimulate interest, the editor of *Coal Age* will pay $5 each week for the best photograph sent in by any subscriber. Prints submitted must be for the exclusive use of *Coal Age* and must not have been previously published. All photographs not awarded the $5, but accepted for publication, will be paid for at a liberal space rate. The sender's name and address, with a brief description of the picture, must accompany each photograph. All prints will be returned, if desired.



Would Divorce Railroads from Ownership in Coal Properties

Before the railroads are turned back to their owners, the American Wholesale Coal Association is urging the members of the congressional committees interested to include in the new statute a provision that the railroads are to be returned to private owners only when they have freed themselves from any control of coal property; any interest in coal lands or coal mines; any connection with banking houses or syndicates which hold coal lands or which own coal mines in the interest of any railroad corporation. "We believe," says the letter to the congressional committees, "that before coal can be put in that position of independence which will allow it to adopt effective means of reform, there must be a complete divorcement of the coal industry and the carriers. We believe the time to make this divorcement complete is when the railroads are returned to private control. We ask you to take this suggestion into account when framing the new laws regulative of the carriers."

Little Hope for Export of Large Volume of American Coal

The allocation of ships in July for the exporting of coal will be too late to be of real service in the present coal situation is the opinion expressed by representatives of operators in Washington. If ships could be supplied immediately, a large tonnage of coal could be moved out of the country, to the advantage of all concerned. The foreign trade committee of the National Coal Association is now negotiating with the Shipping Board in connection with the entire export program.

Due to the inability of operators to work their mines to more than 65 per cent. of full-time capacity, many are of the opinion that there will be little high-grade coal available for export. The shortage of labor, as well as its general inefficiency at this time, has so reduced production that it is believed domestic contracts will take practically all of the output. If it were announced today that even a few ships were to be allocated for coal exports, it is believed that a scramble for contracts would begin at once on the part of coal users.

Operators who are interested in the export trade lament the fact that the negotiations are still in a conversational stage. It is pointed out that operators took up the export matter before the ink was dry on the armistice, but that they were estopped absolutely from carrying out any plan by the official statement that ships would not be available for an indefinite period. Officials now, however, are taking a different attitude and are anxious to start the coal movement. They now find that coal operators, in the face of an almost certain demand at home for their entire output, are more inclined to be deliberate and certain of their ground before taking action. The uncertainty as to the labor situation at the expiration of the Washington wage agreement is another factor having an important bearing on the situation. It is regarded as practically certain that a situation will develop which will militate further against production.

Owing to the prospects of increased demand, the operators were not greatly disappointed when the stabilization program of the Industrial Board failed to materialize. As matters stand at present, the coal industry, it is held, needs no stabilization.

"Tuckahoe" Completes First Year of Service

On May 15, the steel cargo carrier, "Tuckahoe," completed its first year. The "Tuckahoe" has had an eventful career in the coal-carrying trade. She had the distinction of having been launched 27 days after the laying of her keel. While she was diverted to transatlantic use during a portion of the year, most of the time was spent in carrying coal. She now is en route from Norfolk to Rio de Janeiro with such a cargo.

The "Tuckahoe," which is a vessel of 3667 gross tons, broke all monthly records in the coal-carrying trade the first month in service with a total of four cargoes of coal from Norfolk and Baltimore-Boston, 19,000 tons in all. The fastest round trip during the war in this trade was made by the "Tuckahoe" in seven days as against the average time of 14½ days. Her slowest round trip was 12 days. This was due to a change of crew in Boston, delaying her four days in port.

Would Have Engineers Receive Broader Business Training

Encouraged by the nation-wide interest in the movement to incorporate in all engineering courses a greater amount of business training, the Bureau of Education has called a general conference on the subject to be held in Washington June 23 and 24. It is expected that representatives of every technical school in the country will be in attendance, as well as many others who are interested in the subject. The sessions will revolve around these major topics: (1) Business training for the engineer; (2) engineering training for commercial enterprises; (3) significance of the war experience for engineering education; (4) training of the engineer for oversees engineering projects.

Curricula suggestions will be submitted to the conference as follows:

First, that a minimum number of hours in business training, to be determined by the committee, be required in all engineering courses. In respect to this suggestion it was recommended at the Washington committee conference that from 12 to 18 semester hours be required in all engineering courses on the following subjects: General economics; cost accounting; business organization; business law.

Second, that a curriculum providing for a minimum of 15 to 30 units in business economics be incorporated in all engineering courses and offered on an elective basis. In respect to this suggestion the Washington committee conference recommended that electives be encouraged in connection with all engineering courses in the following subjects: Labor and employment problems; statistics; corporation management and finance; political science; marketing, including advertising and salesmanship; psychology; scientific management; transportation. It was further recommended that economic phases of engineering subjects be emphasized wherever possible in engineering instruction.

Third, that a curriculum in commercial or industrial engineering, permitting full and proper emphasis upon engineering subjects, be offered in the School of Commerce, with degree to be given in that school.

Fourth, that a five-year combined engineering and commercial course be prepared. It was recommended at the Washington committee conference that no action be taken at this time on curricula suggestions Third and Fourth.

Consumption of Army Coal in 1918

Much attention is being paid in Washington to the report, now being released chapter by chapter, of the Assistant Secretary of War, Benedict Crowell, reviewing the main activities of the War Department during the period of hostilities. He refers to coal as follows:

During the months of hostilities the American public was constantly informed in advertising literature that fuel would win the war, and indeed fuel would win it, and did win it, in the sense that without fuel or with any grave shortage of fuel we could not have won. In this sense there was no more important commodity contributing to success in the great drama than coal.

America began keeping the records of coal mining in the year 1807. Woodrow Wilson was inaugurated President of the United States in 1913. In the 106 years between 1807 and 1913, and including those years, American mines produced a total of 9,844,159,937 tons of coal. In the succeeding five years of President Wilson's administration American mines turned out 2,960,938,597 tons of coal, almost one-third as much as was mined in the entire 1807-1913 period, and almost one-fourth of all the coal mined in the United States since records have been kept.

The American coal miners in 1918 met the war emergency by producing 150,000,000 tons of coal more than they had dug in 1914. The shortage of coal in the winter of 1917-18 was due not to the inability of the mines to produce the required tonnage but to inadequate railroad transportation facilities and severe weather.

The war-coal project was in the hands of the United States Fuel Administration, but the office of the Quartermaster General assisted in the effort. Army officers were stationed at the offices of the various district representatives of the Fuel Administration throughout the country. These officers kept in constant touch with the factories making war supplies and saw to it that coal was diverted from less essential enterprises to the munitions factories. This service operated with such excellent effect that very few manufacturers working on Government contracts were compelled to suspend operations because of the lack of fuel, and those who did have to suspend were able to resume again within a few days.

During the summer of 1918 the usual seasonal slack in the demand for fuel was taken up by the action of the fuel branch in absorbing practically all of the excess coal in the United States and storing it at Army posts, camps, and stations. This action kept the mines working at maximum capacity during a period when there is normally a curtailment in output. Of course, at the time there was no realization that the fighting was to end so soon, and this policy was adopted in preparation for unchecked industrial activity during the winter of 1918-19.

The Army itself was a heavy user of fuel, requiring it not only at its various manufacturing establishments but also at the great camps for heating purposes. The following table shows the Army purchases of fuel for the calendar year 1918:

	Amount	Cost
Anthracite coal (tons)	710,304	$4,362,237
Bituminous coal (tons)	2,706,737	11,711,335
Total	3,417,041	16,073,572
Coke (tons)	9,576	80,643
Wood (cords)	786,177	5,178,161
Total fuel	.....	$21,332,376

This is a complete statement of the fuel purchases for the calendar year 1918, and includes all Army camps, posts, hospitals and stations in the United States. The fuel branch maintained the policy of keeping on hand at the camps a three months' supply of coal as insurance against possible shortages in the market.

Coal in Northeastern Utah

Coal was found in northeastern Utah on Lost Creek near Devils Slide many years ago, but it has been mined only because fuel is scarce in that region. Reports received from different sources have indicated that the beds discovered may be a part of a good coal field, so the United States Geological Survey sent one of its members to examine the region. The examination proved that the coal along Lost Creek occurs in thin, irregular beds, which are separated into several benches by bone and shale partings, and that it is subbituminous and cannot compete with the coal of higher rank which is found in vast deposits in other parts of Utah and in Wyoming, although it is of considerable value to the residents of small towns and ranches nearby.

The Lost Creek coal field is in Morgan County, Utah, 12 miles northeast of Devils Slide, on the main line of the Union Pacific R.R. For many years small quantities of coal have been mined and hauled by wagon to Croydon, a small town 9 miles southwest of the field, and to ranches on Lost Creek. The coal burns well in stoves and open fireplaces, but contains a high percentage of ash and "slate." It carries so much moisture that it rapidly falls to pieces on exposure to the air.

Geologists describe the coal-bearing rocks as belonging to the Wasatch formation, a Tertiary deposit laid down on the upturned and eroded edges of much older (Jurassic) beds. The Wasatch is composed of three parts—an upper and a lower conglomerate and an intervening series of beds of sandstone and shale. The coal was deposited on the surface of the lower conglomerate.

A copy of Bulletin 691-L, "Geology of the Lost Creek Coal Field, Morgan County, Utah," by Frank R. Clark, describing the rocks and coal resources of this region, may be had on application to the Director, U. S. Geological Survey, Washington, D. C.

EDITORIALS

Preparation of Bituminous Coal

WE PRINT on page 943 an article by Ernst Prochaska on the "Preparation of Bituminous Coal." This is the first of a series of articles on this subject, dealing mostly with the problem of coal washing.

While anthracite has been washed or mechanically picked for years, the advisability of subjecting bituminous coal to a similar treatment is in many instances an open question. In some cases the ridding of screenings of a few per cent. of ash by means of the coal jig increases the moisture content to such an extent as to largely nullify any benefits secured. In such an instance washing may be inadvisable.

On the other hand, some coals respond readily to the washing process and are consequently more desirable and efficient—and thus more salable—washed than unwashed. With the return to peace comes peace competition and, in an industry where the supply often equals or exceeds the demand, the operator will do well to avail himself of every means possible to insure a market for his product. There may be circumstances under which it might be advisable to wash all or a part of the output of a mine, even though no direct or tangible profit can be traced to the washery's operation.

Those operators who have been or are now considering the installation or operation of a coal washery will welcome these articles by Mr. Prochaska. While not exhaustive, they shed much light upon a subject that many of us understand only imperfectly.

McAdoo says that some railroad wages were scandalously low under private management. They were; and why? Because the Interstate Commerce Commission made rates inadequate. When the Government took over the railroads, rates were increased immensely; but even then the railroads were run at a loss.

The Integral Part

WE ONCE read a book in which a reporter, who had just interviewed a man of progressive ideas, said: "Why! That man's plans will take a thousand years to materialize." He wondered, as we did, how any man could look forward to so far-distant a future with any desire to aid in accomplishing the things which could not do him the remotest possible good.

And yet there is a certain type of mind that works with the full knowledge that what it strives to accomplish cannot, by any chance, come true within a lifetime. But in spite of that knowledge, such a one will work on, believing that he can hasten the coming of the thing desired, and knowing that with his help it will arrive a bit sooner. So he is willing to do his own, the integral, part with full faith.

That, we suppose, is the proof of a really unselfish ambition.

It seems as though most of us want something more tangible, and at least more nearly at hand than that which is not to be realized within a thousand years.

However, don't we all work unselfishly—to a certain extent? Do most of us see the final use that is made of our labors? For example, take those of us who help dig the subways of the big cities. Not many find that the great systems serve us, individually, after they are finished: but we have helped make it easier for those workers who have long distances to travel day after day.

Another instance: Consider those who are spending their days on some company's books, keeping accounts straight. They do not see the goods arrive and depart, though they figure on them, and speak of them daily; nor do they often see the actual money that is involved in the various transactions.

So, too, are we who work in the mines simply integral parts, expending the energy that comes to us, so that life may be made better for others and, eventually, for all those who are to come after us. Just as the men who make the tools we work with do not witness the use of their products, so we do not see the great boats that are propelled across the ocean, the great mills that produce the woolens we wear, nor many of the things that contribute to the world's good, though all these things have life partly because of our energies. But we do, nevertheless, know that we are helping in the great advance, the great march of progress, and that others are doing things for us—to lighten our work.

There are many working for us at the very time this is being written, and just at the moment this is being read. There are men even now who are trying to perfect experiments which will make the undercutting, the drilling and all the rest of it easier for everybody.

Let us try to do our part with a conscience. Let us try to make our output a product so clean and so solid in worth that those who use it will say: "Someone has done his job well, knowing that it would be appreciated. He must have been thinking of us."

Government regulation should regulate. It should not merely cut off the peaks of profit while leaving all the valleys of loss, but it should provide and assure an even return. If the public is to be umpire, it must be a fair umpire and not a prejudiced one. A guaranteed profit of 6 per cent. is one thing, a maximum profit of 6 per cent. is another.

Coal Export Waits on Shipping

GIVEN enough ships and a sufficiently low ocean freight rate, American coal producers not only can export a large volume of coal, but, what is more to the point, by so doing can bring to life the now listless coal industry. To make this latter statement clear, it must be remembered that not all the fuel mined here is suitable for export. In fact, the American coals that have found favor in foreign markets come from the

Pocahontas and New River fields of West Virginia. If we could export a large tonnage of this fuel, it would mean that coal mines in the Middle West would be enabled to work more regularly than they do now. Instead of demanding and receiving Eastern coals, consumers in Indiana and Illinois, for example, would be forced to burn fuel produced from mines in their respectives states.

The exporting of a large volume of coal, therefore, would stimulate the coal industry at home. Due, however, to a lack of bottoms and prohibitive ocean freight rates, American coal exporters find themselves in a peculiar, if not unpleasant, situation. Not only are they unable to accept or consider the many inquiries for coal coming from abroad, but, what is worse, they are compelled to stand by futilely and watch the trade they have succeeded in building up with South America slip back to England.

Already more Welsh than American coal is being unloaded at South American ports, and unless some concrete action results from the conferences now being held in Washington relative to the export of coal, Great Britain will regain most, if not all, of the South American coal business she lost during the war.

Although the prices of American coals at Hampton Roads are considerably lower than the prices of Welsh coals at Cardiff, this advantage is wiped out because it costs the American shipper $8 or $8.50 a ton more to ship his coal to South America.

Enough ships must be allocated for coal exports, and at rates that will enable us to compete with British shipping, if our foreign trade in coal is to be more than a dream.

If Walker D. Hines is willing to give the public transportation at a loss of $768,000,000 a year, why should not the steel corporations and the coal companies be equally generous with their money and give steel and coal to the railroads at a loss? The answer is easy: Walker D. Hines makes himself a good fellow with the money of the public, while the wicked steel and coal barons must spend their own.

Don't Yawn in Company; It's Impolite

TO YAWN in company is unbecoming and rude to those who happen to be present. Then, again, it's catching. However, it certainly is a relief to one's feelings.

Here is some more advice: Don't predict a business depression in company. It's unbecoming—the gloomy man is never liked. It's rude—a man who has no faith in the ability of his fellows to meet a little hesitation in business by plain reasoning and a gust of enthusiasm is a poor citizen.

And it's catching—most men don't think. They catch the "glooms." Conditions don't create them. It's the discouraging man who says, "Steel, yourself! It's not going to kill you," who robs the public of its courage. When a man who has the "glooms" appears, the thoughtless catch the disease by ordinary infection, and even the thoughtful get it by a process of false argument. "Surely," they say, "this man has seen something that I haven't seen. He knows his own particular business better than I do, and that being so he has been convinced that troublesome days are ahead. He is probably correct in his judgment or he would not have formed it."

Like as not, the man to whom the thoughtful men refer never saw a wraith himself but saw another man who had caught a glimpse of a third man who had been introduced to a fourth man who thought he had seen a wraith and was shaking with fear. So the word passes along that there are troubles ahead.

Thinking up what would come "after the war" has been a favorite parlor game since 1913. Most of the guesses have been wrong, and forfeits have been piling up. Between the hopeful, who imagined a new heaven and a new earth for labor and capital, and the depressed, who visioned a Dante hell for both, there lies an even course for sober men. Prices and wages are staying up or gently increasing. There is every reason for confidence. If only the wage and price reductionists would cease yawning in public and repeating to the assembled company: "I worked so hard yesterday. I knew I would be sleepy today."

It has been clearly proved that the Interstate Commerce Commission, as a body, was incompetent and unfair in handling the railroad tariffs before Government ownership was established. The incoming Congress should provide a successor with more judgment and force of character.

Six-Hour Day Only a Temporary Cure

A SIX-HOUR day might for a while create a decreased productive capacity, and so help the Middle West coal operations to obtain steady time. As a result the manufacturers of the Middle West would have to burn Middle West coal. Soon, however, there would be a large development in West Virginia and central Pennsylvania, because those regions could not fill their orders for high-duty coal without such development. Eventually the new mines in those regions would be so numerous that they could fill all the orders placed with them, and the Middle West business would return to its present stagnated condition.

The six-hour day is a temporary cure; it could not provide a permanent relief. Shortening of time and restricting of output are like morphine—they need renewal. They create a need as well as fill one. Take a little of them and you soon need more. If the hours are to be shortened or output restricted it should be for the improving of the physical, mental and moral well-being of the workingman, and not as an economic expedient; for, as such expedient, it will never be a success. It will produce an excess of mine development even in the Middle West, and so create a condition that will negative its own effect.

When we reduce hours let it be done by all together. Let the mine worker work as long for the shoemaker and the garment worker as they work for him. Let them exchange hour for hour. The mine worker is the brother of the shoemaker and garment worker and should give labor for labor to these men. Democracy demands it and fairness requires it.

Get your idle dollars working. Repairs, long delayed, should now be completed. During the war it was a virtue to delay repairs, to have shabby and even disorderly works. Now is the time to spend the money thus saved in putting plant and property in proper working order.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

When the war is over and a bituminous coal contract is made, let it be one so flexible that it will endure. Let it not be an ironclad contract that does not recognize changes in cost of living, but an agreement which will be automatically revised with changing values of the dollar.

The price of coal is none too large, but it is now, and will be always, a function of the wage paid. If that wage be raised, the price will rise, so why worry. If an increase is justified by a raised living cost let it be, not merely conceded after a struggle, but given as a matter of course.

Let a wage-revision feature be provided in the bond, as is already the case in British Columbia. Every agreement should be so worded as to avoid contingent injustices; then the tendency to break labor contracts will be checked. Some day the Government will order that the dollar have a certain relation to the cost of living as Prof. Irving Fisher advises, or will require that debts should be repaid and interest given in accord not with the face of the promise, but with regard to the real value of the money at the date of payment, as has been advocated by conservative economists in Breat Britain.

Arrangements like these will make strikes less frequent, will render business more steady and will secure to the saving working man, as well as the capitalist, the full value of his savings.

Only Local Strikes Now Occur

In every region the strikes and disagreements now occurring are of a purely local character and do not bode any general disturbance. Fortunately they are few in number. On May 10, 300 employees of the Racket Brook Coal Co., who suspended work to compel that concern to reinstate a motorman and brakeman, returned to work leaving it to their grievance committee in session with the company officials to settle the dispute. The Racket Brook miners, however, had really another matter for which they desired a favorable settlement.

Certain of the miners had been working in the Keystone workings where the area is under pressure and the coal easily removed. They demanded pay for solid-coal mining where such coal was encountered. The company apparently regarded all the work as the equivalent of pillar work, and as easy mining, and therefore payable at pillar-coal rates. The grievance committee could not get a hearing as to the complaint. The reinstatement difficulty only added to the friction experienced with regard to the rating of the work in the crushed area. In the final upshot the motorman, Kreech, was reinstated with pay in full and many other provisions made.

Miners Want Work on Idle Days

In the Hazelton region the miners are not disposed to lay down to the day workers and do not approve of being idle whenever the breaker is closed down. They have informed the C. M. Dodson Coal Co. that if they are not permitted to cut coal on idle days they will go on strike, tying up the Beaver Creek colliery indefinitely. They claim that they cannot supply the drivers if they are not given a chance to get coal ahead.

Umpire C. P. Neill, of the Conciliation Board, has handed down a decision in the case of certain miners employed at the Enterprise colliery in the Schuykill region. They held that they were entitled to share in an increase of $2 per day granted to the inside men of this particular colliery. Umpire Neill declares the men are contract miners, and as such are not entitled to share in the increase.

The protesting miners claimed that they were company men, while the company contended they were contract miners and as such were entitled to the 40 per cent. increase given to this class of employees.

Some parts of central Pennsylvania have been working very slowly. A report of May 12 says that the Rochester & Pittsburgh Coal and Iron Co.'s mine, Helvetia, has been averaging only one day a week and that the men are moving away to places where better time can be secured. Eriton, a mine operated by the Northwestern Mining and Exchange Co., a subsidiary of the Erie R.R., is receiving many of these men. Being owned by a large railroad without many mines to supply it with coal it has always had an enviable reputation for steady work. Some men are going to Onondaga mine near Sykesville, but there the lack of houses prevents any great influx of men.

Object to Low Railroad Coal Prices

President Keeney and Secretary Mooney of District No. 17 have addressed the following letter to Walker D. Hines, the Director General of Railroads:

"Upon information at hand we are compelled to protest vigorously against the action of the Baltimore & Ohio R.R. in contracting for coal at less than the government price. In information given out by Fuel Agent Foos, of the Baltimore & Ohio R.R., under date of Apr. 21, we find the following with an additional statement that there are some other contracts which have not been acknowledged and which will be given out later: The Franklin Coal and Coke Co., 300 tons per day at $1.75; Central Fairmont Coal Co., 100 tons per day at $2.00; Big Run Coal Co., 200 tons per day at $1.85; New England Coal and Coke Co., 250 tons per day at $1.90; Berryburg Coal Co., 50 tons per day at $1.85; Fairmont Big Vein Coal Co., 200 tons per day at $2.10; Meyersdale Smokeless Coal Co., 100 tons per day at $2.15; Big Chief Mine, 100 tons per day at $1.90.

"The Chesapeake & Ohio Railway Co. has two fuel mines of their own in this district, namely: Dorothy, W. Va., and Eunice, W. Va. Since the depression in the coal industry these mines have run practically every day, and other mines in their immediate vicinity are idle.

"We feel that, regardless of the fact that these mines belong to the Chesapeake & Ohio Railway Co., the work should be more evenly distributed to other mines in that vicinity and that they should be given the opportunity to produce their proportion of the fuel consumed by the railroad. The prices quoted above are all less than the government price, set by the United States Fuel Administration, and are below the cost of production, based on the wages now being paid.

"If the railroad administration maintains its attitude by signing contracts for prices below the cost of production, it is only a matter of time until the operators signing such contracts will undertake to reduce wages and thereby bring about industrial disputes, which is just what we wish to avoid, if possible."

Local Disagreement Closes Mine

The Park City mines in Utah are reported all closed as the result of a strike. About 1000 mine workers in that region want a six-hour day and a wage of $5.50 a day. Park City is in Summit County, 21 mi. east-southeast of Salt Lake City. Little has been stated of it as a coal center, and the area referred to by the name of the Park City district may be an extension of the Cumberland, Wyo., field to the northeast. The pumpmen in the Ontario mine, it is said, left their pumps unattended, May 7. Flooding of the mines is likely to follow.

The Miner Cannot Live Unto Himself Alone



The miner produces coal for other workingmen to use for heating their houses. Some of it is used to feed boilers, which make the steam that, in its turn, drives machinery that manufactures what workingmen will use. Knowing that this is true, the workingman realizes that he must not raise wages out of proportion to living costs. If he does, the real (or ultimate) consumer of his coal, who is another workingman like himself, will not only have to pay more for it and for what is produced through its use, but will have to pay more than he should.

Discussion by Readers

Waste of Coal

Letter No. 5—A short time since several letters appeared in *Coal Age,* relating to wastefulness in the mining and marketing of coal. There is a great difference, in respect to waste, among the several mines, owing largely no doubt to the different conditions existing in those mines. To a very considerable degree, however, undue waste can be attributed to the negligence of miners and mine officials, improper methods of mining, or a reckless desire to produce a large tonnage regardless of the future working of the mine.

While some mines are recovering relatively 100 per cent. of the coal in their property, others are extracting little more than 50 or 60 per cent. In most of the latter cases, a far greater percentage of extraction could be obtained if more time and care was given to the preparation of a proper working system, adapted to the particular conditions at hand.

The desire of the management to produce a large tonnage quickly often leads to the unwise robbing of pillars that are needed for the protection of adjoining workings and results in the loss of much coal that can never be recovered. The same is true when a foreman is desirous of making a good showing on his daily tonnage sheet. If it were not for these reckless methods, many mines could increase their percentage of recovery 20 or 25 per cent.; but, to do this, more attention must be given to a uniform development.

Advantage of Estimating Coal in Acres

The custom too largely prevails of estimating a newly acquired coal property as containing so many acres. If the property in question was estimated on a tonnage basis, it would have the effect of emphasizing the fact that it is important to send every ton of that coal to the surface. In the estimation of *acreage,* a pillar more or less left in the mines and lost appears of little significance, being so small a fraction of the acre that it is ignored as inappreciable. But, when it is remembered that this small pillar left behind means a loss of 200 or 300 tons of coal, the fact has a deeper meaning.

Again, estimating in *acres* suggests to the mind the purchase price per acre; while estimating in tons involves the price per ton that the coal will bring when loaded at the tipple. Mining men know that there is a vast difference between the value of coal in place and its market value after it has been mined.

Consider for a moment the loss of a single pillar left in the mine and representing a value of $200 or $300 and then think of the larger loss resulting when many of these pillars are lost beyond recovery, through improper methods of mining or undue haste in increasing the output of the mine. The attitude of many a coal operator, in this respect, is quite similar to his habit of thinking that the coal burned under his boilers costs him nothing.

In this connection let me urge that every foreman be made to estimate the coal in the supporting pillars in his mine, by its value on the tonnage basis. It will give him a greater incentive to get out every ton of coal in such pillars; and he will put forth more strenuous efforts to do this, knowing that the track, power and drainage lines, timbering and other requisites are all at hand, and every ton of coal recovered from the pillars is so much clear gain. The lack of thoroughness in coal mining is the great underlying secret in the matter of waste that we are considering.

Wasteful Methods of Burning Coal

There is a great deal of truth in the fact often mentioned that a far greater waste of the energy of coal occurs in its transformation into power. Some are even inclined to hold the opinion that it is needless to trouble oneself about the loss of coal in mining when such wasteful methods are employed as are in use at present for the production of power. Few people realize how large a percentage of the energy of the coal burned in the furnace passes up the stack, instead of being utilized in the production of steam. This loss, however, is the engineer's problem and in no way concerns the waste of coal in the mines.

The incident cited by Joseph R. Thomas, in his letter on this subject, *Coal Age,* Jan. 16, p. 160, illustrates in a striking manner the large loss of coal that often occurs through the negligence of miners. He instanced two men working in adjoining rooms and mining their coal under like conditions. One of these men produced 43 more cars, in driving his chamber, than the other whose failure to do the same represented a loss for which no excuse could be offered. It is a difficult matter to discuss the needs of uniform methods of mining with men unless they can be brought to see the advantage to them on the tonnage sheet.

F. C. Sanner.

Piney Fork, Ohio.

Exhaust from Steam Pump

Letter No. 5—Referring to the inquiry that appeared in *Coal Age,* Mar. 20, p. 549, relative to exhausting a steam pump into the suction line, let me give a little of my own experience in that matter, which may be of interest to some readers.

Starting from the foot of the shaft, in our mine, the main entry was driven on a considerable dip, which continued for a distance of 500 ft. As the entry advanced, sumps were sunk in the floor near the face, and a small pump was located at the shaft bottom to draw the water from the entry and discharge it into the sump in the shaft, under the cage.

This pump was a small double-acting pump, having a 2-in. suction and 1½-in. discharge. It was supplied with steam through a 1-in. pipe line run down the shaft. The plan worked well, for a time, until the entry had advanced so far that the pump gave poor service, owing to the increased length of the suction line. It was then moved to the foot of the dip, 500 ft. distant from the shaft. The former suction line now became the dis-

charge, and a new sump, 4 x 5 ft. and 3 ft. deep, sunk just below the pump, improved the service.

What was peculiar about this arrangement was the fact that I could pump water into the sump or out of it as I chose. I ran a short pipe, from a tee in the discharge line, to the sump. Another short pipe was run from the suction line into the sump, while the exhaust port of the pump was fitted with a pipe that entered the suction line about 4 ft. from the pump. Suitable valves were provided in these pipes so as to control the action of the pump in any manner desired.

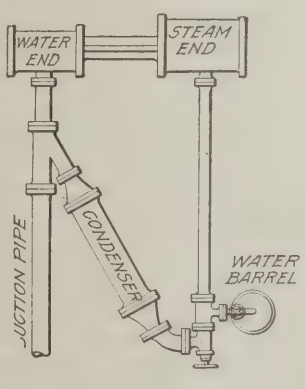
In starting the pump, the valves were arranged to exhaust directly into the sump; but when the pump had caught the water and was working properly the exhaust was turned into the suction line. It frequently happened that the steam exhausted into the sump while starting made the water very hot. But, in that case, I could pump it out and fill it again with cold water. The scheme worked well and all the trouble I had was that it was necessary to watch and stop the pump before it got out of water. If this was not done, the hot exhaust steam would find its way into the discharge line, expanding and throwing the pipe out of line.

Shelburn, Ind. R. J. PICKETT.

[The plan outlined by this correspondent appears to have for its chief object the cooling of the water in the sump, from time to time, by allowing water from the discharge line to flow back into the sump. The scheme is open for discussion.—EDITOR.]

Letter No. 6—The discussion of the question of disposing of the exhaust steam from a pump located in a mine recalls a scheme that I employed some years ago to get rid of the steam exhausted from a pump located at the foot of a mine slope.

In that instance, I adopted the plan shown in the accompanying sketch. We utilized a 9-ft. length of old pipe of twice the diameter, or four times the area, of the suction pipe of the pump and rigged it up to serve as a condenser. The arrangement is illustrated in the figure. It will be noted that the exhaust pipe, from the steam-end of the pump, is connected with one end of the condenser, the other end of which is joined to a Y in the suction pipe, at a point from 6 to 9 ft. away from the water end.



The position of the condenser, as shown in the sketch, was such as to cause the steam exhausted into it to assist the flow of water in the suction pipe. Entering the pipe at an angle of 45 deg. gave far better results than if this connection had been made at right angles, or in other words, if a T had been used instead of a Y connection.

In order to start the pump properly, it is necessary to have two valves on the exhaust pipe. When starting, and until the pump has caught its water, the valve leading to the condenser is closed and the other valve opened, which permits the steam to exhaust into the water barrel shown in the figure. But, after the pump has started and is drawing its water the first valve is opened and the second closed. The steam is now exhausted into the condenser and passes into the suction pipe as water.

I found that this arrangement not only got rid of the steam, which was a great annoyance in the mine, but the capacity of the pump was greatly increased, in respect to the height of the suction lift. I consider this arrangement very practical PUMPMAN.

McKeesport, Penn.

Longwall Work in Low Seams

Letter No. 1—Referring to the proposed modified longwall system described by Charles Martin, *Coal Age*, Mar. 20, p. 520, permit me to say that I cannot understand his reference to "big, heavy cumbersome machinery to be moved in following up the face," in a regular longwall system. It hardly seems possible that he can refer to the common belt conveyor that is so generally used on a longwall face in working a low seam of coal. There is no difficulty in moving such a conveyor forward, the work requiring a minimum of labor.

Instead of using a belt conveyor, Mr. Martin suggests installing a small rope haulage on each heading, for the purpose of operating a scoop having a capacity of 1 ton of coal. According to his description, the scoop is to be drawn back and forth along the face, by means of ropes operated by the hoist.

This reference recalls to my mind a "Thompson conveyor" that I saw working very successfully in a mine, some years ago. It consisted of from four to six low pans or slips made of sheet steel and supported with angle iron. Each pan was 5 ft. long and 2½ ft. wide, and these were coupled together and hauled back and forth, along a 300-ft. face, by means of a light haulage rope, after the manner of a main- and tail-rope system. One rope was attached to the front end of the first pan and the other rope passed over a tail sheave and was then attached to the rear end of the last pan.

SCOOPS NOT ADAPTED TO SOFT OR UNEVEN BOTTOM

This scheme worked successfully, in the case mentioned, because the bottom was smooth and presented no obstruction to the sliding pans. My great objection to the use of a scoop, in the manner described by Mr. Martin, is that if the floor was at all soft or uneven it would interfere with the success of the operation. Again, if the seam contained partings that had to be separated from the coal, there would be more or less of such foreign matter picked up by the scoop and loaded out with the coal. That would be particularly true if the scoops were to be loaded after the manner of the scrapers commonly used in grading and excavation work on the surface.

One of the advantages claimed for Mr. Martin's proposed method is the oblique face he has mentioned and which is shown in the cut on page 520. For my part, I fail to see the necessity for it, and believe there would be danger of the roof pressure crushing the coal at the angle where the two oblique faces meet. It might even happen that the settlement at this point would bind and hold fast the cutterbar of the machine. The cost of working would also be greater by this method than with a single 300-ft., straight, longwall face extending between the two main roads or headings.

In over 20 years' experience in longwall machine mining, I have found no difficulty in controlling the fracture of the roof when operating a 300-ft. face between two main haulage roads. I believe that it is all a question of systematic timbering and building the necessary

wood chocks on a bedding of slack about a foot in thickness. These chocks are taken down and carried forward as the face advances.

Regarding coal-cutting machines, let me say that the longwall machine has a decided advantage over the shortwall machine, for this work, as it requires only a clearance of 2½ to 3 ft., in width, along the face, as compared with the 6-ft. clearance required to operate a shortwall machine.

Referring once more to the plan illustrating Mr. Martin's proposed method, I cannot see how the roadway marked "line room" is going to be kept in good condition to serve as a return airway, unless a solid pillar of coal is left between this road and the longwall section. In the description, no mention is made of the thickness of the seam or the character of the underlying and overlying strata, or whether the mine is dry and gassy or the workings wet, all of which have a considerable bearing on the best method of mining in the longwall system. ANDREW ORR BAIN.

McKeesport, Penn.

Roof Conditions in Longwall Work

Letter No. 3—In answer to the inquiry of "Sandrock," *Coal Age*, Mar. 27, p. 591, regarding the conditions presented by a hard sandrock roof, in mining coal by the longwall system, I desire to submit the following as a result of my own experience in mining coal by longwall, under conditions somewhat similar to those he has mentioned:

Wherever practicable, in the working of a low seam such as this, at least 2 ft. of roof should be taken down and built into uniform packs on each side of the roadways leading to the working face. If there is sufficient material for the purpose, an extra pack 6 ft. wide should be built about midway between adjoining working places. These packs in the gob or waste, however, must not be made too solid, as that would have the effect to throw too great a weight on the roadpacks and the working face, which would have a tendency to cause the floor to heave on the roads and might produce a disastrous break in the roof, at the face.

DANGER IN DISTURBING BOTTOM LIABLE TO HEAVE

Whenever the floor in a mine has a tendency to heave it should be left strictly alone; because, when once broken, the heaving will continue to increase and may be so rapid, at times, that great difficulty will be experienced in keeping the track in shape and maintaining the necessary headroom for the cars to travel. This applies particularly to a fireclay bottom, where the mine is wet.

An important feature in the proper control of the roof, under the conditions here described, is to withdraw all posts and other timber from the waste. My practice is to build cogs only at the face, my experience is that few if any wood packs should be built, in longwall work, with the idea of leaving them in permanently. The wood packs sometimes built alongside the roadways offer a much greater resistance to the roof than stone packs, which tends to throw more weight on the face than is necessary to break the coal, and presents the danger of causing a break in the roof at the face.

Where stone packs are built uniformly, in the manner in which I have described, and no timber is permitted to be left in the gob, the result will be that the roof and floor will come together gradually back in the waste, which is absolutely essential in all successful longwall work.

Let me state, here, that wider packs must be built and more roof taken down on main haulage roads than in the working places. However, my experience is that these packs should all be built of stone, in order that a small uniform resistance will be presented everywhere and better results be obtained in the settlement of the roof. In my opinion, everything depends on this uniformity of the packwalls protecting the haulage roads and working places. HARRY MARSON.

Martins Ferry, Ohio.

Panel System of Mining

Letter No. 4—Kindly permit me to refer to the letter submitted by a mine foreman of Clinton, Ind., which appeared in *Coal Age*, Apr. 10, p. 680, and discussed the panel method proposed by R. J. Pickett, in the issue, Feb. 27, p. 419, regarding which he asked for suggestions.

While this foreman, in discussing the driving of entries and rooms in panel mining, offers much sensible and friendly criticism and makes many good suggestions that are practical, his idea of driving rooms only 22 ft. wide could not be applied to our mines here in Sullivan County, under the present agreement with the United Mine Workers of America.

In Indiana, entries are driven under what is known as the "Syndicate system," by which three men will drive two entries and turn the roomnecks, to do which they will be given the exclusive use of a mining machine. Syndicating a room, however, is considered contrary to the agreement with the union and is not tolerated.

CONDITIONS IN SULLIVAN COUNTY, INDIANA

But, the 18-ft. air-course proposed by Mr. Pickett would be considered as a room and not an entry, and trouble would also arise, under the present agreement with the union, regarding the suggested 22 ft. for the width of rooms. In Sullivan County, it is customary for two men to work two places, from 25 to 30 ft. in width, with tracks laid at the center of each place. Any less width than that last mentioned would require the giving of an extra place to every two men, and this would certainly operate as a disadvantage in the daily production of coal, or the tonnage per man.

Referring to Mr. Pickett's inquiry, I believe the operation of which he has charge is in the No. 5 vein, in Sullivan County. Inasmuch as I have had some experience, myself, in working that vein in the same county, I may be permitted to offer my views on his present system and the changes he proposes to make. Let me say, first, however, that I agree fully with the suggestion of the Clinton foreman, that the driving of an 18-ft. air-course, with only a 10-ft. pillar to protect it from the old workings, would certainly invite a squeeze that would prove expensive. Furthermore, the driving of such an air-course would also act to retard the development of the room entries, since the rooms would be driven nearly as fast as the entries.

In describing his present method of working, Mr. Pickett states that cross-entries are driven off the main headings, about 1000 ft. center to center, thereby giving space for the turning of 22 rooms on 40-ft. centers, besides making allowance for solid pillars of coal protect-

ing the cross-entries. It is possible for a Sullivan longwall mining machine, such as Mr. Pickett states he is using, to cut about 20 places in a single shift. But, in my opinion, by the proposed method of working, it will hardly be possible to keep that number of places going on a single heading, owing to the slow development.

To illustrate, let me say that two men work in two 25-ft. rooms and two entrymen are driving a 12-ft. entry and an 18-ft. air-course, asuming, for argument, that this is permitted under the agreement with the union. Now, assuming that both men mine and load an equal amount of coal, it is evident that the places will advance in the inverse ratio to their widths. This being the case, the total width of entry and air-course being 30 ft. and that of two rooms 50 ft., while the rooms are advancing 30 ft., the entries will advance 50 ft. Assuming that work is started in the first two rooms as soon as these are turned and that the rooms are to be driven, say 180 ft. from the point they are widened out, to the pillar flanking the next air-course, it is evident that the entrymen will be only 300 ft. in advance of the last room turned, when the first two rooms are finished. But such an advance will only allow for the turning of eight rooms on 40-ft. centers.

A Better Plan Suggested

In my view, there are two exceptions to Mr. Pickett's present panel system. Let me suggest that, instead of turning cross-entries off the main entry on 1000-ft. centers, this distance be increased to 1200 ft. Then, allowing for 100-ft. pillars protecting the cross-entries on each side of this block, there will be room for driving 26 rooms on 40-ft. centers.

Again, let me suggest the driving of room headings off both entries of each pair of crossheadings. For example, the crossheadings being driven east and west, drive No. 1 and No. 2 N off the 2 E or 2 W, as the case may be, and also drive Nos. 1 and 2 S off the 3 E or 3 W to meet the corresponding entries driven north. In my opinion, this system would not only give ample room to keep the machines running at full capacity, but would expedite the recovery of coal from the last room on the heading, which is now difficult to secure. The system would also speed up development and reduce the cost of upkeep on roads and entries.

The chief disadvantage, in the method I have mentioned, is the increased length of haul on the entries driven south; but this objection is more than balanced by the rapid development and increased output of the mine.

In conclusion, I may say that our roof, in this vein, about 6 ft. above the coal, is impregnated with marsh gas and contains quite a little water. Instead of pulling pillars, therefore, every effort is made to avoid caving the roof; and, because the fireclay bottom yields readily to the softening action of water and heaves, it is important to keep the workings well drained by providing an adequate pumping equipment. MINER.

Sullivan County, Ind.

Efficiency of Mine Officials

Letter No. 10—I have been greatly interested in the letters that have appeared recently in *Coal Age*, relating to the efficiency of mine officials. While I cannot say that I agree with everything that has been written, no doubt exists in my mind but that there is ample room for greater official efficiency in coal mining.

As remarked by Thomas Hogarth, in his excellent letter, *Coal Age*, Mar. 13, p. 504, "A good superintendent shows his ability by the foremen he employs." In Colorado, the state mining law compels the employment of a man as foreman, who holds a first-class certificate. It may chance, however, that the holder of such a certificate does not prove to be a good foreman. He may have the knowledge of what should be done, but not possess the ability to successfully direct his men and secure the best results.

When a foreman fails, the superintendent has an opportunity to show his own ability to supervise the work, as it is not always an easy task to displace a foreman after he has once been given charge of a mine, unless it should happen that the mine inspector would find fault with him.

Yes, the superintendent must not only select the right man to act as foreman, as Mr. Hogarth has said, but he must get the right kind of material and supplies for the mine, and know how to keep the men satisfied. In a word, he must possess the knowledge required to operate the mine in compliance with the law and get results.

Speaking of a superintendent's wearing a "white collar," to my mind, is not material to the question of his efficiency. The real work of a superintendent is to so organize and control his men as to get results. Our great General Pershing demonstrated *his* ability as an organizer and a leader of men. He was not the kind of man that would shoot a hole in a barn and paint a target around it, but by plugging a bull's eye in the target already painted he has proved his marksmanship. That's efficiency in any leadership, and gold medals and white collars cut little figure one way or the other.

Examination for Superintendents

In the operation of coal mines, it is my honest opinion that superintendents should be compelled to pass an examination before a state mining board—not to say that that would make them more efficient as mine superintendents—but it is often necessary for a superintendent to act in the capacity of mine foreman, in the latter's temporary absence from the mine.

For a superintendent to act as mine foreman, however, would not be in compliance with the Colorado mining law, unless he was already in possession of a first-class mine foreman's certificate as required by law. It is true that our law, at present, grants a mine superintendent the privilege of acting as foreman if he can prove his ability to perform those duties; but it would save a lot of argument on this question if the law provided for the certification of superintendents.

Mention has been made of "a barber," in one instance, and "a grocer," in another instance, becoming efficient superintendents of large mines. In my opinion, it is the education and knowledge of the man that fits him for this position. One of the most successful superintendents in this part of the country was formerly a machinist. His education had taught him the general principles of mining, including surveying, reading of maps, and accounting of labor and supplies. This knowledge, together with his ability to organize and lead men, resulted in the coal coming out of the mine in a way that satisfied the men higher up.

I fully agree with the suggestions that have been made that the superintendent should have no favorites, but should treat all men alike and refer all complaints

to his foremen. A superintendent's interfering with a foreman's decision, or in other ways assuming the duties that are the foreman's can only do harm. It has often caused a good foreman to quit his place.

Let me say, in closing, that the mine officials' "Round Table," for the discussion of matetrs pertaining to mining, is a great factor in increasing official efficiency. A man with 90 per cent. brains and 10 per cent. common sense cannot prove efficient in a mine; he must have 50 per cent. brains and 50 per cent. common sense, and the round table helps to make such men. It is there that John Jones can show Jack Smith his method of calculating a switch; while John Smith, in turn, will show his friends how that switch must be laid in the mine.

In the monthly or semimonthly meetings of the mine officials, the efficient superintendent will lead in all discussions, and thus be able to develop the best thoughts and ideas of each man present, and give to all the same aim and object. It has been my good fortune to come in contact with superintendents of this class, who appreciate the suggestions of their men concerning any improvement in the getting out of the coal.

Farr, Colo. ROBERT A. MARSHALL.

Letter No. 11—After reading with deep interest the letter of J. T. Jones, *Coal Age*, Mar. 20, p. 548, I beg to differ with him in regard to the opinion he has expressed that coal operators only consider that official efficient who produces a large tonnage of coal at a low cost of operation, without regard to the actual conditions surrounding the work.

Observation has led me to believe that coal operators and the higher officials of companies, today, know just what conditions are confronting their men in charge of the underground work. To me at least, it is inconceavable that any intelligent officer of a large coal company will expect a man whom he has placed in charge of a mine where he knows there are peculiar difficulties to be encountered, to make the same showing that is made in another mine that is reaping the harvest of its palmy days.

It is my belief that the management of coal mines determine the efficiency of their under-officials in accordance with the results they are able to produce in varying conditions. They are fully aware that coal can be produced with greater economy and safety in some mines than in others. From the abundance of literature published by mining companies on "Safety First," it is quite evident that it is the honest purpose of the management to keep their mines in a safe and healthful condition while producing a maximum tonnage at a minimum cost. Their plans and instructions show that due consideration is given to the lives of their men and the protection of property.

EFFICIENCY SHOWN BY ABILITY TO PERFORM

The proof of efficiency on the part of any mine official is readily estimated by observing the manner in which he meets the difficult problems that are constantly being presented in the operation of a mine. Contrast, for a moment, two officials in charge of mines working under widely different conditions. Let us say that the superintendent, at one of these mines, has been fortunate enough to break all preceding records in the daily output of the mine. At this juncture, however, he is suddenly puzzled by conditions that have developed underground, regarding a heavy squeeze, which threatens to close an entire section of the mine; or it may be an unexpected outburst of gas occurs in a portion of the workings. Suppose, now, that the superintendent's lack of practical experience in handling either of these conditions renders him helpless to cope with the present situation, the mine would then be forced to suspend operations for a time or until the difficulty can be overcome.

Compare the instance just cited with the situation at another mine where the superintendent is not only capable of producing a fairly high daily tonnage, but has, besides, the ability to safely handle all the difficult problems that are liable to arise in the mining of coal. In comparing these two cases, one can see plainly that the more efficient foreman or superintendent is the one last named. With such a man in charge, there is no need of going outside the organization for assistance to insure the safe operation of the mine.

The casual onlooker can readily determine the relative degree of efficiency of two or more officials in charge of mines, by observing how often or how seldom they are taken to task by the management for the results obtained. The more frequent visits of the higher officials to some mines than to others shows their greater anxiety in the one case than in the other; or it may reveal a greater lack of confidence in the men in charge of the one mine than in those at the other mines.

OBSERVATIONS OF A GENERAL MANAGER

My attention was called to this fact through a conversation with a general manager of a large coal company. In speaking about the visits he paid to his different mines, he said, "It all depends on the colliery superintendent and foreman. I am very proud of the team of officials I have at ——— mine, because I know that everything must be all right with them, as their production shows it and the amount of supplies consumed is very low."

"Moreover," he continued, "the mine inspector's reports were such that I had to sit up and take notice. Just think of it—not a man has been injured in that mine for a whole year; and the report of men being idle, owing to unfavorable or unsafe conditions in the mine, is lower than at any other colliery the company operates."

From these statements, it appears to me that "efficiency" should be the middle name of the superintendent and foreman of the mine just mentioned. It is apparent that they are men who are constantly observing and trying to improve conditions bearing on the daily production of the mine, as well as improving the working conditions, which is and always should be the most important item in every industry, and is generally known as the "conservation of man power."

Allow me to close, then, by saying that the true efficiency of mine officials must be determined by taking into consideration something more than their ability to produce a large tonnage at low cost. Any broad-minded manager, in discussing the efficiency of his under-officials, will ask, "How are they producing the coal? What conditions are the men working under? What evidences are there that the men are satisfied?" The answer to these questions will determine the degree of efficiency of the men in charge at the mine.

Plymouth, Penn. JOSEPH R. THOMAS.

[This letter will close the discussion on "Efficiency of Mine Officials"—EDITOR.]

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Effect of Hoisting on Ventilation

We have under consideration, at the present time, a proposition regarding which I would like to have an expression of opinion, by *Coal Age* and readers who have had actual experience in a matter such as I am about to mention.

The upcast shaft, at our mine, is 10½ x 16½ ft. in section and 360 ft. deep. The air current passing up this shaft has a velocity of 1000 ft. per min. It is proposed to equip this shaft for hoisting coal and to employ self-dumping cages for that purpose. The bottom area of each cage will be 6 x 10 feet.

In turning over this proposition in my mind, the question has arisen, What effect will the movement of the cages in the shaft have on the quantity of air in circulation in the mine? It is estimated that the proposed tonnage of this mine will require making 1000 dumps in 8 hours, which will necessitate hoisting at the rate of 30 ft. per sec. I want to ask if this arrangement will interfere with or tend to lessen the quantity of air that is now passing up this shaft. OPERATOR.

Pittsburgh, Penn.

This is a question that has often been asked and must be answered with due regard to the existing conditions. The correspondent has given the sectional area of the shaft and the area of the bottom of each cage, and it is clear that this is a double hoistway, one cage ascending as the other descends the shaft. He has not stated, however, whether the floor of the cage is solid or formed of slats or bars that would permit the passage of air through the floor and present less obstruction to the air current.

Again, it is not stated what form of partition divides the two hoistways, whether this is made of solid planks completely separating the two compartments of the shaft, or whether cross-buntons are used, spaced at wide intervals apart. These details have an important bearing on the question of what effect the movement of the cages in the shaft will have on the circulation of air in the mine.

It is the experience of the editor, in the operation of a mine in the west where a double-compartment hoisting shaft was used as an upcast for the mine and there was ample room between the cages and the shaft curbing and the bottoms of the cages were slatted that there was no perceptible obstruction to the air current passing up the shaft. But, in that case, the two compartments of the shaft were separated by an open partition formed of buntons spaced six feet apart.

In another instance, where the cages fitted quite snugly in the shaft and the compartments were separated by a solid partition wall of planks, the effect on the circulation was such as to necessitate opening the bottoms of the cages and removing many planks from the partition in the shaft.

Theoretically, in a double-compartment hoisting shaft, the air is churned back and forth between the two compartments, as the two cages act alternately to retard and to assist the flow of air, up the shaft, which would suggest that the result of the moving cages on the circulation in such a shaft is *nil*.

Practically, however, it can be said that everything depends on the open partition and the amount of space between the cages and the shaft-curbing. The latter appears to be ample in the case presented in the inquiry of this correspondent.

Laying a Room Switch

Kindly describe the manner of locating a frog on an entry when laying a room switch where the rooms are turned at right angles to the entry, and say how far back on the entry should be the point of switch.

What number of frog should be used in laying such a switch where a gathering motor is to be used and it is necessary to take the motor to the faces of the rooms? Is there any formula that will give the dimensions necessary in laying this switch? W. G.

———, Penn.

It is common mine practice to use a No. 3 frog in laying a room switch where the room is turned at right angles to the entry. When the switch is properly laid, and the track well ballasted, a gathering motor will pass over this frog without difficulty.

Start by sliding the frog along on the near rail of the entry, to such a position that there will be a good clearance for the car at the corner where the outby rib of the room intersects the rib of the entry. This corner can be rounded to a considerable extent, ordinarily, without endangering the support of the roof over the roadway. The distance from this rounded corner to the point of frog must be equal to half the gage of the track, plus half the width of the car, plus the desired clearance.

Thus, allowing a clearance of 6 in., the width of the car being 5 ft. out to out, and the track gage, 3 ft., the distance from the coal to the point of frog must be 4½ ft. In a 10-ft. entry the point of frog will generally be about on line with the outby rib of the room. Rounding the corner will assist in reducing the sharpness of the curve passing into the room, beyond the frog.

The distance to be measured back on the entry, from the point of frog to the point of switch, is usually taken as equal to twice the gage multiplied by the number of frog. Thus, for a 3-ft. gage and a No. 3 frog, the distance would be $2 \times 3 \times 3 = 18$ ft. This is practically the length of the lead rail of the switch and the middle ordinate of this curved rail is about 9 in.

After passing the frog, the curvature of the rails must be increased to enable the car to clear the inside rib, in the mouth of the room, and bring the room track in line with the straight rib. There is no formula for calculating the amount of this curvature, which can only be determined on the ground, by making the curve as uniform as possible.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Miscellaneous Questions

(Answered by Request)

Ques.—The total ventilating pressure in a mine, the sectional area of which is 48 sq.ft., is 374.4 lb.; what is the reading of the water gage?

Ans.—The sectional area of the airway being 48 sq.ft., the unit of ventilating pressure is 374.4 ÷ 48 = 7.8 pounds per sq.ft. and, since 1 in. of water gage corresponds to a presure of 5.2 lb. per sq.ft., this pressure will give a water-gage reading of 7.8 ÷ 5.2 = 1.5 in.

Ques.—The volume of air passing through a mine is 150,000 cu.ft. per min. A test of the return air shows 0.35 per cent of methane; what amount of gas is given off in 24 hr., assuming conditions to remain unchanged?

Ans.—From the reading of the question, it must be assumed that the circulation given is the quantity of air entering the mine. Then, since the test of the return air shows 0.35 per cent. of methane, the proportion of fresh air in that current is 100 — 0.35 = 99.65 per cent. Therefore, 150,000 cu.ft. is 99.65 per cent. of the return current, and the total quantity of air and gas in the return is 150,000 ÷ 0.9965 = 150,268 cu.ft. per min. The quantity of gas given off each minute is, then, 150,268 — 150,000 = 268 cu.ft., and the quantity generated in 24 hr. is, therefore, 268 × 60 × 24 = 385,920 cu.ft.

Ques.—(a) What is meant by horsepower on the air? (b) If the volume of air entering a mine under a 2-in. water gage is 84,615 cu.ft. per min., what is the horsepower on the air?

Ans.—(a) The horsepower on the air is the total effective work concerned in producing the circulation of the air current, estimated on a basis of 33,000 ft.-lb. per min. as the equivalent of one horsepower.

(b) The effective work performed in the circulation of an air current is equal to the quantity of air passing, in cubic feet per minute, multiplied by the unit pressure or the pressure per square foot producing the circulation. In the case given, the effective work is 84,615 × 2 × 5.2 = 879,996, say 880,000 ft.-lb. per min., and the horsepower on the air 880,000 ÷ 33,000 = 26⅔ hp.

Ques.—An anemometer registers a velocity of 30,000 ft. per hr., in an airway 5 x 8 ft. in section. What is the volume of air passing per minute, and how will you ascertain whether the anemometer is in good working order?

Ans.—The velocity given as 30,000 ft. per hr. is 30,000 ÷ 60 = 500 ft. per min. The sectional area of this airway is 5 × 8 = 40 sq.ft., and the quantity of air passing is therefore 500 × 40 = 20,000 cu.ft. per min.

In order to ascertain the correctness of the anemometer, it should be sent to the factory where it was made, to have its calibration checked in an accurate manner. A rough test may be made in the mine by selecting a straight and uniform stretch of airway and applying the smoke test.

A distance of 100 yd. is first measured along an airway in which a fair quantity of air is passing. The operator, holding the instrument at the intake end of this measured distance, sets off a little flash of powder, while an observer at the other end of the measured distance notes the exact time between observing the flash and the first smell of powder that reaches him, and signals the operator. The latter then takes the exact reading of the instrument, which should correspond to the distance measured if the instrument is correct.

Ques.—In a lever safety valve, the whole length of the lever is 30 in., the distance from the fulcrum to the valve stem, 3 in., diameter of valve 2 in.; what weight must be put at the end of the lever to have the valve blow off at a pressure of 40 lb. per sq.in.? Also, where should this weight be hung on the lever so that the valve will blow off at 30 lb. and again at 20 lb. per sq.in.?

Ans.—The area of the valve is $0.7854 \times 2^2 = 3.14$ sq.in. For a pressure of 40 lb. per sq.in., the total pressure on the valve is $40 \times 3.14 = 125.6$ lb. Now, to ascertain what weight will be required on the end of the lever to balance this pressure, it is necessary to apply the principle of moments, which makes the product of the weight (W) into the length of the lever equal to the product of the total pressure on the valve into the distance of the valve stem from the fulcrum. Thus,

$$30\ W = 3 \times 125.6 = 376.8$$
$$W = 376.8 \div 30 = 12.56 \text{ lb.}$$

Again, to find the distance this weight must be hung from the fulcrum, in order that the valve shall blow off at 30 lb. per sq.in., we have by the same principle of moments, calling the required distance x,

$$12.56x = 3(30 \times 3.14) = 282.6$$
$$x = 282.6 \div 12.56 = 22\tfrac{1}{2} \text{ in.}$$

For a blow-off pressure of 20 lb. per sq.in., we have

$$12.56x = 3(20 \times 3.14) = 188.4$$
$$x = 188.4 \div 12.56 = 15 \text{ in.}$$

Ques.—A fan driven by two coupled engines, having cylinders 18 in. in diameter, length of stroke 42 in., number of strokes 50, with 16.8 lb. pressure, giving 80 hp. and circulating 144,055 cu.ft. of air per minute gives an actual water gage of 3 in. Find the theoretical water gage.

Ans.—Assuming that this duplex engine, having the given dimensions and running at the given speed, under a mean-effective pressure of 16.8 lb. per sq.in., is developing 80 hp. when circulating 144,055 cu.ft. of air per minute, the theoretical water gage would be

$$w.\ g. = \frac{33{,}000H}{5.2Q} = \frac{33{,}000 \times 80}{5.2 \times 144{,}055} = 3.5 \text{ in.}$$

[Taking the given pressure as the mean-effective pressure in the cylinder, a duplex engine, having the above dimensions and speed, would develop only 45 hp., making no allowance for efficiency.

$$H = \frac{16.8 \times 3\frac{1}{2}\ (0.7854 \times 18^2)\ 50 \times 2}{33{,}000} = 45+ \text{ hp.}$$

As a matter of fact, in this case, however, the horsepower developed for driving the fan being given, the dimensions and the speed of the engine do not enter the solution and are misleading, owing to the fact that they do not give the horsepower mentioned.—Editor.]

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Coal Shipments to Scandinavia and Holland

The War Trade Board on May 14 announced that henceforth applications will be considered for licenses to ship coal to Norway, Sweden, Denmark or Holland without requiring the importer to procure an import certificate. Applications for such licenses should be filed with the War Trade Board, Washington, D. C. The details of these applications will be cabled to the Inter-Allied Trade Committee in the country of destination, and with their approval a license will be issued. Under the foregoing ruling, shipments of coal need not be consigned to any association, but may be made directly to individuals in the countries of destination.

Larger Exports of New River Coal

Mine owners operating in the New River district gave it as their opinion that there would continue to be a larger amount of coal exported during the next few months than had been possible in the last few monthly periods, stating that during the week ending May 10 there had been a large increase in the tonnage shipped to tidewater for consumption in European countries. The statement was also made by New River operators that ships were somewhat easier to obtain than had heretofore been the case, that being attributed to the fact that not so much food was now being exported and that ships had been released for the carrying of coal for which there was an urgent demand in certain countries overseas.

English Coal Market

Business, in a general way, has been virtually suspended in the various coal markets, states the *Iron and Coal Trades Review* of Apr. 25, and under the prevailing holiday influence the few movements recorded have had little bearing on future trade prospects. Owing to lack of production in the Tyneside area, the outlook for neutral customers shows no improvement as to prospects of supply, and although orders are being steadily booked, buyers have to take the risk of getting deliveries.

In Yorkshire and the Midlands production has been well maintained, and the railways have taken full advantage of the larger tonnage available to add to their stocks. There are expectations that the embargo on exports may soon be removed, and the strong inquiry for the allies and the neutral countries should develop into an active demand for district hards. The demand for all classes of small steam sizes is active, but supplies are short. Nut slacks are also in good request, but it is impossible to obtain extra lots with the distribution so closely controlled. The better supply of domestic coal has enabled good deliveries to be sent, both to London and the nearer markets. The quieter demand for furnace coke is still experienced, but the position is met with a reduced output, which is readily disposed of.

the South Wales district there is very little doing on both the anthracite and steam coal markets, as the majority of the collieries are not at work.

The Scotch coal trade is still very fully employed, although there is not the same pressure as has been the case recently. Export business all round is still very much restricted on account of the difficulty of obtaining licenses. Steamers are kept waiting for cargoes a long time.

Shanghai Coal Market

Under date of April 10, 1919, Wheelock & Co. report that there has been little or no business in Japanese coal in Shanghai for some time. The only thing worthy of remark, according to the report, is the large number of arrivals bringing in over 67,000 tons of coal, which is apparently the result of the cheaper freight now ruling. In Japan quite a lot of business has been done in the commoner kinds of coal for industrial use, and this has had the effect of hardening prices on this class of fuel.

The spot demand for Fushun coal has grown considerably of late and it is therefore becoming increasingly difficult to supply the demand for export.

Owing to requisitioned vessels being released by the British Government it has been possible to reduce quotations on Kaiping coal, and such reduction has been extended to present contractors. The demands for the better grades exceed the supply, consequently prices for these coals are very firm.

Coal Situation in North China

[*North China Star*]

The five northern coal-producing provinces of Manchuria, Chihli, Shantung, Shansi and Honan yield about 60 per cent. of the total output for China. Present consumption of coal in the northern provinces is small, the annual consumption being one twenty-fifth of a ton per capita, as against 3½ tons per capita in America. Demand for fuel for household and industrial purposes is steadily increasing in China as the standard of living rises.

Manchurian coal does not come into other provinces of China on account of prohibitive freight rates. In Chihli, mines near Chinwangtao produce anthracite which sells at $13 to $14 a ton in Tientsin. Estimated cost of production, $6.50. The Kailan Mining Administration near Tangshan sells coal in Tientsin at $7.50 a ton. Cost of production, including freightage, about $3.20. The Min Tou Kou coal fields, west of Peking, where there are two companies operating on modern lines, produce second-class anthracite selling at $9 and over. Cost to Tientsin, about $2.30.

Bituminous and anthracite coal are also shipped to Peking from mines along the Peking-Hankow and Shih Chia Chuang railways. There are many small coal mines operated by natives in this district supplying local demand. Along this route is the Ching Hsing mine, a former German property, acquired by Japan, which supplies a Chinese railway car company with coal.

The Peking Syndicate, one of the most important concessions in China, sells coal at $18 a ton to Peking and Tientsin.

Deposits of coal in Shantung Province, while not so good quality as in Shansi, are easily worked and have foreign machinery. These mines supply local demand along the Tsin Pu Railroad.

Exports of Coal and Coke During March, 1919

Districts:	Anthracite Coal, Tons	Bituminous Coal, Tons	Coke, Tons
Maine and New Hampshire	.....	3,401	28
Vermont	796	780	.....
Massachusetts	140	1,450	.....
St. Lawrence	29,011	55,699	529
Rochester	1,268	19,450	269
Buffalo	73,285	154,601	11,362
New York	904	140	390
Philadelphia	3,851	10,845	.....
Maryland	.....	25,835	2,333
Virginia	6,675	149,928	163
South Carolina	.....	6,120	.....
Florida	1,317	60	.....
Mobile	.....	2,090	.....
New Orleans	.....	1,733	25
San Antonio	411	1,042	2,801
El Paso	.....	1,094	2,369
Arizona	.....	746	6,736
Southern California	.....	21	.....
San Francisco	.....	50	404
Washington	.....	358	124
Dakota	39	3,888	107
Duluth and Superior	108	1,871	23
Michigan	.....	87,094	5,555
Ohio	.....	25,741	531
Total	117,805	554,037	33,749
Countries:			
France	.....	.....	274
Italy	6,675	17,197	.....
Netherlands	.....	26,743	.....
British Honduras	.....	90	.....
Canada	105,093	352,883	18,528
Costa Rica	.....	.....	12
Guatemala	.....	105	20
Honduras	.....	464	5
Nicaragua	.....	247	.....
Panama	.....	5,290	6
Salvador	.....	2,242	2
Mexico	411	5,429	12,316
Newfoundland and Labrador	140	.....	.....
Barbados	25	15,196	.....
Cuba	5,173	38,107	165
Dutch West Indies	.....	1,146	.....
French West Indies	.....	4,709	.....
Dominican Republic	288	497	10
Argentina	.....	8,670	229
Brazil	.....	60,296	77
Chile	.....	6,934	776
British Guiana	.....	1,939	.....
Peru	.....	2,187	1,329
Uruguay	.....	3,660	.....
Venezuela	.....	6	.....
Total	117,805	554,037	33,749

BUNKER COAL

Maryland	28,636
New York	154,527
Philadelphia	39,853
Virginia	143,735

The governments of Great Britain and Spain have recently concluded an agreement under which the former allows the export of at least 150,000 tons of coal per month to Spain; the quantity will depend on the available shipping and on the cost of freights.

The imports of coal into Egypt during 1918 totaled 501,780 metric tons, as against 461,987 such tons in 1917 and 916,509 tons in 1916.

Hampton Roads Coal Exports

NORFOLK

				Cargo	Bunkers
Lambert's Point					
May	6	Amer. S.S. Basaan	Pernambuco, Brazil	2,487	819
May	6	Ital. S.S. Titania	Gibraltar FO (Italy)	4,743	526
May	9	Amer. S.S. Sudbury	Gibraltar FO (Italy)	6,049	740
May	9	Amer. S.S. Oregonian	Rio de Janeiro, Brazil	6,705	1,421
May	10	Nor. S.S. Harriet	St. Georges, Bermuda	2,062	268
May	10	Nor. S.S. Port Antonio	Port Limon, Costa Rica	1,111	59
Sewall's Point					
May	5	Swed. S.S. Hermes	Havana, Cuba	2,255	155
May	6	Amer. S.S. Lake Butler	Santiago, Cuba	1,392	411
May	6	Amer. S.S. Tuckahoe	Rio de Janeiro, Brazil	4,185	824
May	7	Nor. S.S. Negus	Pernambuco, Brazil	3,696	839
May	9	Amer. S.S. Bay View	Havana, Cuba	2,118	286
May	9	Amer. S.S. Port Lobos	Rio Grande do Sul, Brazil	2,807	0
May	10	Nor. S.S. Kronstad	Rio de Janeiro, Brazil	4,000	1,456
May	10	Amer. S.S. Guildford	Venice, Italy	2,607	200
Newport News					
May	3	Nor. S.S. Heina	Rio de Janeiro, Brazil	3,765	1,304
May	5	Br. S.S. Justin	Pernambuco, Brazil	1,039	1,231
May	7	Amer. S.S. Lake Copley	St. Lucia, B. W. I.	2,950	365
May	8	Am. Sch. Carroll A. Deering	Rio de Janeiro, Brazil	3,505	.....
May	8	Amer. S.S. Lake Orange	Antilla, Cuba	2,448	299

COAL AND COKE NEWS

What Happened in April

[The bracketed figures in the text refer to the number and the page of the volume in which references to the matter noted may be found and should the reader desire further information he can obtain it in the place indicated.]

Apr. 1—Frank J. Hayes, president of the United Mine Workers of America visits the White House and announces that his purpose is to call on President Wilson in Paris and urge his coöperation in the securing of increased sales of American coal in Europe.—West Virginia celebrates the second anniversary of the establishment of an eight-hour day for the miners of the state, at Rivesville, W. Va. F. C. Keeney, president of District No. 17, delivers an address [XV, 720].

Apr. 2—It is reported that a United States exporting firm has obtained an order for 4,000,000 tons of coal in Italy—Director General Hines of the Railroad Administration refuses to pay "stabilized" prices for rail—Southern pine lumber manufacturers refuse to "stabilize" their prices.

Apr. 3—The Anthracite Coal Operators' Association holds its annual meeting at the Bellvue-Stratford hotel in Philadelphia, Penn., electing officers [XV, 775]—The annual meeting of the Canadian Associated Coal Dealers is held at Toronto, Ontario, when the coal situation was fully discussed. Officers were elected and resolutions adopted [XV, 732]—D. E. Adams, a leading coal merchant of Winnipeg, Manitoba, dies at Pasadena, Cal. [XV, 733].

Apr. 4—Governor Sproul of Pennsylvania declares increase in anthracite prices is justified, attacking, however, railroad rate inequalities and retail delivery charges. He also urges public fuel markets.

Apr. 8—The air shaft at the Harry E. colliery of the Forty Fort Coal Co. is destroyed by fire, endangering the lives of 50 men underground. On the evening of the same day, the washery of the Red Ash Coal Co is burned. Its value was about $100,000 [XV, 774].

Apr. 9—President John Braphy, of Central Pennsylvania or No. 2 district of the United Mine Workers of America, protests against the terms of the anti-sedition bill [XV, 836]—The Government files its brief in the Supreme Court of the United States in the case of the United States vs. the Lehigh Coal and Navigation Co. The case revolves around a payment of rebates [XV, 714].

Apr. 10—George N. Peek, on behalf of the Industrial Board of the Department of Commerce, denies that statement of Walker D. Hines, Director General of Railroads, to the effect that the stabilized prices of steel are too high.

Apr. 11—J. L. Lewis, acting president of the United Mine Workers, declares that the miners' organization will take drastic action unless Director General Hines changes his policy in regard to making coal contracts [XV, 773].

Apr. 12—The National Retail Coal Merchants' Association meets at the Fort Pitt hotel in Pittsburgh, Penn., and resolves to seek representation in Government schemes of distribution during reconstruction period and to encourage early buying of coal [XV, 773].

Apr. 13—The workers of the Clinton, Indiana, coal field show their approval of the attitude of the executive board of District No. 11 which protested against a cut in the price of coal to W. D. Hines [XV, 762]—The Victory Loan drive begins at 12 o'clock midnight.

Apr. 15—Director-General Walker D. Hines instructs the individual railroads that they must give all information as to tonnage in coal contracts to the mine workers' officials in the Pittsburgh district—The Jeanesville and Yorktown collieries of the Lehigh Valley Coal Co. start work after an idleness lasting since last February [XV, 774].

Apr. 16—The Miners' Confederation of Great Britain and Ireland meet in conference and approve by a large majority the report of the Sankey Commission [XV, 762]—All of the mines of the Central Coal and Coke Co., at Pittsburg, Kan., are idle, the 1200 miners not reporting for work following the strike order of the district president [XV, 762].

Apr. 17—Back wages under the Sankey award, approximating $25,000,000, are paid out by operators in Great Britain, by order of the Coal Controller, to virtually all of 900,000 workers in the mines of the United Kingdom. The back wages represents an advance of about 25c. per shift worked for employees under 16 and 50c. per shift for employees over 16, applied from Jan. 9, to Apr. 17.

Apr. 18—The strike of the coal workers in the Kansas, Arkansas and Oklahoma fields is extended by Alexander Howat, president of District No. 14, into Missouri. About 6000 men are now involved [XV, 823].

Apr. 19—The New York harbor strike, in its eighth week, is settled under an agreement reached at a meeting presided over by Mayor Hylan, by which the men return to work on a permanent 10- and 12-hr. day basis leaving the increase in wages to be settled by a committee of four representatives of the boat owners and four representatives of the strikers.

Apr. 20—Dr. H. A. Garfield threatens to revoke provision of agreement of November, 1917, unless Howatt orders striking miners of the Central Coal and Coke Company to return to work [XV, 762].

Apr. 22—Representatives of anthracite and bituminous coal producers of Pennsylvania enter protest against any increase in workingmen's compensaion at the second conference on the suggested amendments held at the state capital. Representatives of the miners support the amendment [XV, 835]—The resignation of the members of the Industrial Board, George N. Peek, chairman, is accepted. This action followed the failure of the conference arranged by the board between the representatives of the steel industry and those of the Railroad Administration—The Supreme Court of Pennsylvania decides that where employees of a coal company are sent to a hospital for treatment for injuries, by permission of a company, the latter is responsible for payment of the bills [XV, 884].

Apr. 23—President Wheelwright, of the National Coal Association, appoints a foreign trade committee of seven members to consider the formation of an export association under the Webb-Pomerene law for the coal industry. T. V. Farrell, of the Pocahontas Fuel Co., is chairman of the committee.

Apr. 24—The staff that supported Dr. H. A. Garfield in the work of the Fuel Administration holds a dinner in Dr. Garfield's honor at the Waldorf-Astoria, New York City. Dr. Garfield is presented with a bronze statuette [XV, 868].

Apr. 25—The child-labor provisions of the new revenue bill become effective and will tend to stop the employment of boys under 16 years of age in or about mines in any capacity. Violation of this law will subject the employer's business to a tax of 10 per cent.

Apr. 26—The strike of the 6000 mine workers of the Central Coal and Coke Co. is settled on the agreement that the mining machines and loaders start simultaneously [XV, 917].

Apr. 28—A company of militia is dispatched to Linton, Ind., when the mine workers quit work apparently to aid in an attempt to intimidate certain strike-breaking telephone girls whom the Central Labor Union was said to be planning to deport [XV, 823]—On the initiative of Robert Smillie, president of the Miners' Federation, the Government commission investigating the question of nationalizing the coal mines, subpoenaes seven coal owning peers. The coal owners will be questioned about the income or royalties they derive from their coal properties.

Apr. 29—Several hundred coal miners remain away from work in the Linton, Ind., district, adding to the disturbance started the day before. Federal officials order another company of militia from Bloomington [XV, 917]—A gas explosion in the Regal mine of the Majestic Coal Co., of Alabama, results in the death of 21 employees [XV, 885].

Apr. 30—Proposals looking to a special form for a bill of lading for coal shipments are dismissed by the Interstate Commerce Commission. It is believed that the uniform bills prescribed will be adequate to care for any peculiar requirements of such traffic [XV, 912].

Harrisburg, Penn.

Senator Davis of Lackawanna County has introduced a bill that will provide for the establishment of a Pennsylvania Anthracite Mine Cave Commission modeled after the plan of the Public Service Commission. The commission, consisting of a chairman and three members, at a salary of $5000 annually, to be appointed by the Governor.

The new measure requires every operator to accept or reject at his option the jurisdiction of the commission. If the operator or the corporation accepts, an annual sum equal to 1 per cent. of the gross value of all coal mined during the preceding year must be paid. Making this feature optional on the part of the operator eliminates the coal tax constitutionality question.

Every operator who accepts the jurisdiction of the commission is privileged to make application for permission to mine under streets and structures protected by law, and if the commission determines that no serious damage to life or great public harm will result, permission to mine will be granted, and the operator will not be liable for any penalties under the Davis bill, now in committee, or any act now existing.

The fund raised by the voluntary contribution section will be expended by the commission to pay all damages resulting from mine caves of every nature. This will mean 100 per cent reparation. In certain cases the money can be spent to prevent surface subsidence by erecting artificial support. Any person who is dissatisfied with any order of the commission may appeal to the courts under the same terms as an appeal is taken from the rulings of the Public Service Commission.

The operator, the measure provides, must take some affirmative action in regard to rejecting or accepting the jurisdiction of the commission. If he does not file his rejection in six months he is bound by the act. No new corporation shall be authorized to mine anthracite coal except on its agreement to come within the terms of the act.

The coal companies will be allowed under the provisions of the bill to cave-in the surface if such action does not endanger the lives of the public or cause great public inconvenience.

Uniontown, Penn.

Merchant operators of the Connellsville coke region seem to have reached rock bottom in their curtailment policy, but furnace interests continue to add ovens to the idle list. Five hundred ovens last week were put out of operation by the H. C. Frick Coke Co., but there is no confirmation in coke circles here of the report in the steel trade that the Frick company was contemplating a 60-day suspension of operations. On the contrary, ovens are now being banked for a week instead of being blown out, that fact being taken here to mean that officials are expecting an increased demand for coke at any time and

can more quickly increase production with ovens banked than with them dead. There were no more ovens blown out by the merchant operators during the week.

To what extent the operation of the by-product plant at Clairton has influenced the development of coal tracts in the upper Monongahela Valley is reflected in the report of lockages through lock No. 6 for April, which show that 10,297,000 bushels of coal was shipped down the river. Before the Clairton plant was built the coal traffic from the uper pools was negligible, although it had been developed to a high degree in the fourth and fifth pools. The Carnegie Steel Co. now has five steamers making daily trips to and from the sixth pool. By July 1 the Carnegie company hopes to have a number of other boats added to its fleet, and is said to be contemplating the doubling of river shipments to meet the increasing demands of the byproduct plant.

Inability of coke producers and consumers to reconcile their respective viewpoints as regards price made a sluggish coke market during the week ended May 17, which, however, is still strongly in favor of the producer. Consumers are offering from $3.75 to $3.90 for furnace coke, but producers are balking at anything less than $4. As a result of that condition there is now more than 500 cars of coke standing on track awaiting destination. On the week ended May 10 the region was virtually cleared of loose tonnage by a Pittsburgh steel interest being forced into the open market for its fuel supply by reason of a strike at its mines. The third cargo of foundry coke for South America, gathered in the Connellsville region since April 1, was collected recently and sent to the seaboard for export.

Charleston, W. Va.

For the first time in the last six months production has reached fully 100 per cent. in this territory; this statement is not applicable to the Kanawha district as much as to the New River field which is again being operated to capacity and the mines running steadily each week. That was the condition of affairs on May 15 and there was nothing to indicate that there would be any future slumps. Several factors operated to bring the output up to the capacity of the mines, one source of improvement being a much more fully developed export demand with sufficient ships to meet such orders as New River producers were able to handle; poor shipping facilities having heretofore retarded the shipment of a larger tonnage to foreign markets. Simultaneously with the increased export of coal was a better movement to lake points, although the shipments to such points have been increasing for the last few weeks, or since about April 20. Under such encouraging conditions about 200,000 tons of coal a week is being produced in the New River region. Difficulty has been encountered, however, in getting enough labor to man the mines so as to produce a capacity output, the shortage of miners being in the neighborhood of 25 per cent. This, however, is being overcome to some extent but labor will be scarce, it is predicted, within a short time. The increased demand for smokeless coal has of course had a tendency to make prices firmer and in fact to advance them somewhat, but slack is still selling below former levels and will continue to be sold at such figures until some of the present accumulation is disposed of.

Kanawha mining conditions had undergone a gradual improvement up to May 14, though production was practically at a standstill until the first of the month. Between the dates mentioned however, inquiries became more numerous and lake orders more plentiful; still even up to May 14, it is doubtful if the output of Kanawha mines was in excess of 50 per cent. of normal, mines not being in operation more than three days a week. Mine owners, as a rule, have been waiting to secure better prices before signing contracts. With the general market for coal much better, it is believed they will be able to command higher prices for their coal, and that in the near future they will be getting out coal on a larger scale.

Fairmont, W. Va.

Impetus was given to production in northern West Virginia to such an extent during the first half of the month that by May 15 the output of the mines in the northern part of the state was rapidly approaching capacity. In fact, by the date given, daily shipments had reached over 800 cars a day as against an average of between 500 and 600 cars a day for the latter part of April. Marked gains in the shipment of fuel for railroad consumption were scored during the week ending May 15 as against the first seven days of May. Such shipments constitute nearly a third of the total outgoing tonnage, although there had been quite a substantial growth in lake tonnage during the period above referred to; the total number of cars of coal to the lake from the opening of the lake season to May 8 having been almost 2000 cars. At the same time export shipments were steadily on the increase, as indicated by the growing number of cars going to Curtis Bay, a number of mines having been at work on export orders for the last month. The mines shut down had decreased in number as had the number of unconsigned coal loads on hand. Furthermore the number of cars supplied had dwindled by May 15 from 3000 to 1700 a day; the supply on the date given was still ample for the needs of the district, though it was apparent that a car shortage would develop in the near future.

Canada

Alberta—Judging from the returns showing the amount of coal mined in this province for the first three months of 1919, John T. Stirling, Chief Inspector of Mines for the province, estimates that there will be a decrease in the output for the year of about one million tons. The total production for the first quarter of 1919 was 1,424,683 tons as compared with 1,663,308 tons for the corresponding months of last year. The decrease is distributed generally throughout the province.

Nova Scotia—A bill introduced in the provincial legislature by E. H. Armstrong, Commissioner of Public Works and Mines, dealing with the dispute between Nova Scotia Steel and Coal Co. and the Dominion Coal Co. over submarine coal areas, makes the following provision: After an investigation the Government may make such orders and regulations as may be deemed expedient so that these coal areas may be worked to the best interests of the province. The Government is authorized to turn any area over to another lessee providing compensation is made to the present holder, either in cash or in other areas, or partly in both. This measure is strongly opposed by the Dominion Coal Co. on the ground that its title to its submarine areas is held under legislative sanction. The Dominion company considers that this title should hold as the areas in question contain millions of tons of excellent coal easily mined and suitable for metallurgical use; on the other hand, the areas proposed for exchange have not been proved to contain coal. It is further claimed that the company's security holders are interested and that the property pledged to them would not be changed without their consent.

PENNSYLVANIA

Anthracite

Wilkes-Barre — William Porter and Michael Skurtis were instantly killed on May 9, in the No. 5 colliery of the Lehigh & Wilkes-Barre Coal Co. by a fall of coal and rock.

Gordon—The Barry Coal Co., operating a large washery near this place, is reported to have placed an order for the smaller sizes of anthracite which should keep its plant going for many months.

Honesdale—P. J. McDonnell purchased a culm pile at Marble Hill from the Howard Coal Co., of Scranton, for $50,000. It is estimated that the pile contains 96,700 tons of culm and that it will take two years to remove it.

Hazleton—Charles P. Neill, of the Conciliation Board, ruled that mine workers cannot expect to be reinstated in their jobs when discharged for incompetency. This case was the complaint of H. C. Singley against the Evans Colliery Co., of Beaver Meadow.

Wilkes-Barre—A subsidence of the surface occurred over a portion of the mine workings of the Conlon Coal Co. along Carey Street in Plains on May 12. It caused a weakening of the foundations of St. Paul's convent and the walls supporting a number of private residences in the vicinity.

Scranton—The Scranton Surface Protective Association, through its vigilance committee, is investigating alleged unhealthy conditions caused in the West Park section as a result of mine caves. It is reported that sewer pipes and water mains were broken by recent caves; also that mine cave repairs, by the Delaware, Lackawanna and Western company, were made in a careless way.

More or less serious caves, as the result of mining in the Diamond bed of the Delaware, Lackawanna and Western company, damaged the homes of several families in the 600 block of N. Summer Ave. on the night of May 10. This disturbance is a continuation of settlement of surface which has been occurring in this neighborhood for several weeks. Pillars are being robbed in this section and the coal company is taking precautions on the surface over these workings to safeguard the inhabitants living there.

Pottsville—Representatives of the Philadelphia and Reading Coal and Iron Co. testified before the Lebanon County commissioners, sitting as a board of revision and appeal, that the company's coal land holdings aggregating 4519 acres in Cold Spring Township, Lebanon County, are worth from $35 to $50 per acre. The commissioners recently increased the assessed valuation of the land to $140,000,000.

Harrisburg—The bill drafted by the attorney general requiring self-insurers under the Compensation Act to pay a state license of two per cent. based on pay roll, was presented in the House on May, by Mr. Ramsey, chairman of the Mines and Mining committee. The bill is a duplicate of that introduced in the Senate. It is designed to furnish funds to operate the Compensation Bureau. The House passed on third reading the bill making the lawful ton of anthracite coal 2000 lb.; it now goes to the Senate.

The Supreme Court, in an opinion rendered in the case of Mrs. Bridget Clark, of Parsons, against the Lehigh Valley Coal Co., reversed the decision of the lower courts and the Compensation Board, and sustained the decision of the Referee, George Beemer, in awarding the widow $2500. There was a question of whether his death was due to natural causes, or from causes other than in the course of his employment, or if it was due to the noxious gases in the mine, causing vomiting and resulting in the rupture of a blood vessel.

Luzerne—The Carnegie Hero Fund Commission in its report for this year makes two awards for local acts of heroism which took place in 1917. An explosion occurred at the Hillman colliery of the Wilkes-Barre Anthracite Coal Co., at which time Leroy Winters was killed, David A. Cadwalder met his death in an effort to save Winters and John Harry made a vain attempt to rescue the men who died.

The commission awarded a bronze medal to the widow of Cadwalder, and also $10 a month with $5 additional for each of her five children while they are dependent upon her and not over 16 years of age. John Harry was awarded a bronze medal and $1000.

Bituminous

Russellton—The Republic Collieries Co. of this place, is making a number of improvements at its No. 2 mine, at a total cost of $300,000. The shaft is being enlarged and lined with concrete, and the wooden tipple is to be replaced by a steel structure. Frank Foye, of Brownsville, Penn., has the contract work.

Patten—The Barnes Coal Co., has a large crew of men clearing the land near their operations in the vicinity of this place. They are preparing a suitable site for the erection of 50 houses, two of which are completed. The foundations for ten have been laid and as soon as the land is in shape the others will be commenced. The houses are of brick construction and the greater number will be of the bungalow type.

Altoona—A. L. Anderson & Bros., Inc., Altoona contractors, have the construction of a 3900-ft. siding for the Cambria and Indiana Railroad Company. This branch line is to run to the new mine of the Commercial Coal Mining Co., at Red Mill, Blacklick Township, Cambria County. The coal company is preparing to develop the property by means of a slope, work on which was started by Foye Bros., of Ebensburg.

Uniontown—Stockholders of the Orient Coke Co. held their annual meeting in this place, elected officers and directors and in-

spected the company's plant in Redstone Township. R. M. Fry was re-elected general manager for the sixth consecutive year. The officers and directors re-elected were Julian Kennedy, Pittsburgh, president; Robert Bentley, Youngstown, Ohio, first vice president; J. W. Kennedy, Pittsburgh, second vice president; J. O. Miller, Pittsburgh, secretary-treasurer; R. M. Fry, Uniontown, general manager. Other directors elected were Julian Kennedy, Jr., and David Davis, Pittsburgh.

Johnstown—A number of local men are interested in the Sandford Coal Co. of which John C. Cosgrove is a prominent stockholder. This new firm is having a steel tipple erected and modern mining mechinery installed. Developments are being pushed rapidly, a shaft was sunk to coal recently and the mine is being opened up in the seven-foot seam of coal here. Electric equipment is being installed. Mr. Cosgrove is interested in other plants in this field; one mine is producing 2000 tons daily. The field controlled by Cosgrove and Co. consists of 8000 acres of high-grade seven-foot coal.

WEST VIRGINIA

Holden—A new tipple at the No. 2 mine of the Island Creek Coal Co. at this place will be erected at once to take the place of the old tipple which was destroyed by fire about the first of May. The fire damage was $50,000.

Bluefield—The Glen Alum Fuel Co.'s store together with its contents were completely destroyed by fire on the night of May 12. The loss is stated to be $60,000 partly covered by insurance. The origin of the fire is unknown.

Philippi—The large tipple of the Consolidation Coal Co. at Berryburg, Barbour County, was entirely destroyed by fire on the night of Wednesday, May 7, the loss being estimated at $40,000. As soon as practicable another structure was begun and a temporary structure was utilized for loading coal.

Clarksburg—Fire destroyed the tipple at the plant of the Southern Coal and Transportation Co., at Berryburg on May 9, entailing a loss of $20,000. It is believed to have been the work of incendiaries and officers are investigating the matter.

A deed in the county clerk's office states that the Corona Coal Co., successors to the Commercial Coal and Coke Co., purchased the Reynolds estate from Floraneus, for $20,000. This tract is at Hepzibah and contains approximately 100 acres.

Hinton—Development of the coal resources of Greenbrier County, heretofore almost untouched, is indicated by the prospecting under way at the present time and by the purchase being made of coal land in that county with a view to future development, the Canden Coal Land Co. just having purchased a large acreage near Rupert. More extensive development has been prevented because coal lands were inaccessible but it is believed that additional railroads will soon stimulate greater mining activities in Greenbrier County.

Fairmont—The following officers were elected at a meeting of the Northern West Virginia Coal Operator's Association on May 9: C. H. Jenkins, treasurer of the Hutchinson Coal Co., was re-elected president; he was the first president of this association. George T. Bell, executive vice-president, was chosen secretary. A. Lisle White, of Clarksburg was elected treasurer, succeeding C. J. Ryan of Hepzibah.

The West Virginia State Department of Mines held an examination for mine foremen at this place on May 13. The chief of the department, W. J. Heatherman, took personal charge of matters. The preliminary examination consisted chiefly of questions relative to the minings laws of the state; next the map work was taken up, the ventilation of mines being traced on blueprints; a third session completed the mine foremen's examination. An examination for fire bosses was also held, dealing at length with the gaseous condition of mines.

The subject of railroad fuel is a live one all over the country because of its magnitude and especially so in the Fairmont region because it is a substantial part of the business here. Accordingly the Northern West Virginia Coal Operators' Association, on May 9, decided not only to ask the Baltimore and Ohio Railroad Company to furnish figures on the railroad fuel loaded on that road, but also to secure the same information on other roads. This association represents coal operations aggregating 80 per cent. of the tonnage of northern West Virginia, or 20,000,000 tons annually.

Huntington—At a meeting of the West Virginia Coal Association held in this city on May 13 the selection of C. H. Jenkins of Fairmont and Quinn Morton, of Charleston, as directors of the National Coal Association was confirmed and Jarius Collins was indorsed for director at large for West Virginia. The holdover directors are T. B. Davis of Holden and John J. Tierney of Powhatan. J. G. Bradley of Dundon, president of the association, was elected as chairman of the delegation which is to attend the National Coal Association meeting. The executive committee of the association went on record as opposing the contemplated order of the Railroad Administration prohibiting the shipment of West Virginia coal for railroad use north of the Ohio River and sent a vigorous protest to Washington.

In the week ending May 10 substantial progress was made in the Logan field of West Virginia in the effort of the mines there to get back to normal production, the output being 23,000 tons in excess of the week ending May 3. The total production in this field was 161,000 tons, or 52 per cent. of full time capacity, and only about 40,000 tons less than the production for the corresponding period of 1918. Production losses were further reduced, being for the week above given only 140,000 tons, with 131,000 tons as the no market loss, a decline of 13,000 tons in that respect, losses from car shortage, labor shortage and mine disability cutting little or no figure. It has been largerly through additional lake orders that the mines of the district have been able to forge ahead, though coal from the district is being marketed generally in the West. During April the total production of the district was 572,000 tons or about 40 per cent. of normal. In April, 1918, 886,000 tons were produced.

Charleston—A score of mines on the Kanawha, Glen Jean & Eastern branch and the White Oak branch of the Chesapeake & Ohio railroad whose coal was transported over this road during the war will ship all in the future via the Virginian Railway. Half a dozen mines on the Stone Coal branch of the Virginian will at the same time be reached by the Chesapeake & Ohio hereafter, although served by the Virginian Railway during the war.

The organization in this city of the Black Band Consolidated Coal Co., with a total capitalization of $2,000,000, means not only a continuation of mining operations at Olcott, where the Black Band Fuel Co. formerly operated, but it means as well further development of the property in question embracing about 5000 acres of coal land. There are four mines on this property which will be operated as soon as certain improvements are made. Incorporators of the new company include S. B. Avis, I. C. Jordan, and N. F. Young, all of Charleston; Wm. Freudenburger and Henry A. Jones of Pitsburgh, Penn.

Accidents of a fatal nature in the mines of West Virginia in April were less in number than for March, there being 14 deaths in April and 18 in March. Nine of the 14 deaths were from the usual cause—falling roof and coal. The only other death inside the mines was caused by a mine car. Mine cars were responsible for three and a motor for one fatal accident on the outside of the mines. There were three nonfatal accidents each in McDowell and Kanawha; Boone, Braxton, Fayette, Logan, Marion, Mercer, Mingo and Ohio each had one accident. A special effort is being made by the Department of Mines to reduce mine accidents to a minimum, the head of the department having issued specific instructions to guard against dust accumulations in the mines by providing additional doors where necessary.

Following the creating of four additional mine inspection district in West Virginia, it became necessary to rearrange the boundary lines of the existing districts. As so arranged the various districts are now constituted as follows:

First District—Barbour in part, Grant, Mineral, Preston, Tucker and Randolph in part.

Second District—Barbour in part, Harrison in part, Lewis, Marion in part, Preston in part, Randolph in part, Taylor and Upshur.

Third District—A part of Harrison and a part of Marion.

Fourth District—Marion in part, Monongalia and a part of Preston.

Fifth District—Harrison in part and Marion in part.

Sixth District—Brooke, Harrison in part, Marshall, Ohio and Wetzel.

Seventh District—Boone in part, Braxton, Clay, Gilmer, Greenbrier in part, Kanawha in part, Lincoln in part, Logan in part, Nicholas in part and Webster.

Eighth District—Kanawha in part, Logan in part, Mason and Putnam counties.

Ninth District—Fayette in part, Kanawha in part and Wyoming in part.

Tenth District—Boone in part, a part of Kanawha and a portion of Raleigh County.

Eleventh District—A portion of Fayette, a part of Kanawha and a part of Nicholas County.

Twelfth District—A part of Fayette, a part of Greenbrier, a part of Nicholas, a part of Raleigh and Summers Counties.

Thirteenth District—A part of Fayette and a part of Raleigh County.

Fourteenth District—A part of Raleigh and a part of Wyoming County.

Fifteenth District—A part of McDowell, all of Mercer and a part of Wyoming County.

Sixteenth District—A part of McDowell and a part of Wayne County.

Seventeenth District—A part of McDowell, all of Mingo, and a part of Wayne.

Eighteenth District—A part of McDowell.

Nineteenth District—Lincoln in part and Logan in part.

OHIO

Leetonia—While at work in the Delmore coal mine near this place, Daniel Dempsey sustained injuries from a fall of rock. He died while being taken to the city hospital at Salem.

Cambridge—Joe Kotch, employed as a miner in the Harryette mine of the National Coal Co., was instantly killed by a fall of coal.

Columbus—A meeting of the Southern Ohio Coal Exchange was held in Columbus recently to name delegates for the Chicago convention of the National Coal Association, which will be held in the Windy City, May 21 to 23 inclusive. Much interest centers in the coming meeting of the National Coal Association.

Nelsonville—The Sunday Creek Coal Co., is installing a coal crusher at the Jobe mine near here which will be ready for operation within a short time. The crusher has a capacity of 1000 tons daily and will be used to prepare coal for several railroad contracts covering mechanical-stokers fuel. The machine is a Jeffrey crusher of the latest type.

ILLINOIS

New Douglas—The Madison County Mining Company struck a fine 7½-ft. seam of coal near this place in Madison county, on the Toledo, St. Louis & Western Railroad. It is believed that the seam is the same as that at Sorento, in Bond County.

Duquoin—The new coal crusher which the Victory Collieries Co., of Tamaroa, north of here, is installing at their plant is rapidly nearing completion and will improve output.

An explosion at the Marion County Coal Company's mine at Glenridge, near Centralia, occurred May 12, killing four men. The men—John Dicercon, Henry Cooley, Bux Burgess and Robert Thompson—were shot firers in the mine and a windy-shot was the cause of the accident. The fact that it happened at 5:25 in the evening probably saved many more lives as these four men were the only ones in the mine at the time. Mine Rescue teams from Duquoin, Benton and other southern Illinois towns were immediately called and with their combined efforts all of the four bodies were taken out within 36 hours. The fire which was caused by the explosion has not yet been extinguished.

Belleville—The St. Louis & O'Fallon Coal Co. has reported to the police of this vicinity that brasses to the value of $200 were stolen from the so-called Nigger Hollow mine a few nights ago. It is said that the thief came to the mine with a wagon, loaded up the brasses and then drove away. The mine announced that a reward of $100 would be paid for the arrest of the thief.

East St. Louis—State Mine Inspector Harry Thompson of this place recently visited southern Illinois for the purpose of reviving mine rescue teams throughout the district. Special interest is being shown along this line because of the coming meeting at Springfield, Ill., in September, when all the teams will compete against each other. A movement is on foot to offer as prizes to the winning teams, a free trip to the dedication of the new Bureau of Mines building which is to be held at Pittsburgh, Penn., about October 1.

West Frankfort—Judgment has been given A. Sedden against the Old Ben Coal Corporation for $25,000 on account of damages to Sedden's property, coming from a subsidence of the surface. There are twenty-two cases of this kind on the city court docket. The plaintiffs contend that the coal company is violating the state law in not leaving sufficient pillarage after the coal has been removed. Many residence property owners along East Oak Street and East Elm Street in the southeastern part of the city say they have suffered heavy damages from this cause and after the filing of the several suits for damages the Sedden case was tried as a test case.

Personals

C. H. Ronland resigned, on May 14, his position as superintendent of the Upper Lehigh and Hazle Brook collieries of the J. S. Wentz Co. **L. W. Muir** has been appointed superintendent at Upper Lehigh and **E. P. Humphrey** at Hazle Brook.

A. A. Layne has been appointed as assistant general manager to the following coal companies: Logansport Coal Co.; Pittsburgh and Allegheny Coal Co.; Pittsburgh and Clarion Coal Co.; and the Pittsburgh and Cambria Coal Co.

F. X. Meehan has recently been appointed advertising manager of the Walter A. Zelnicker Supply Co., of St. Louis, Mo. Mr. Meehan has had a broad experience in various executive capacities with a number of well known firms.

Roland B. Page has recently been appointed eastern district manager for Leamay **Company, the** manufacturer centrifugal pumping machinery. His offices are at 810 Broad Exchange Building, Broad and Franklin Streets, Boston, Mass.

Carl Becker, who previous to entering the service was with the Union Colliery Co., at Cambridge, Ohio, and Duquoin, Ill., has recently received an honorable discharge from the army and has taken a position in the St. Louis office of the Peabody Coal Co.

C. H. Jenkins, treasurer of the Hutchinson Coal Co. was the unanimous choice of the directors of the Northern West Virginia Coal Operators' Association as a member of the board of directors of the National Coal Association to represent the former Association.

W. P. Engleman has been retained as chief engineer of the Domestic Coke Corporation, of Fairmont, W. Va. During the war Mr. Engleman was in the service of the Government as a coke and byproduct expert; he has resigned his government position and has established his headquarters in Fairmont.

A. E. Hitchner has been appointed manager of the mining section of the industrial sales department of the Westinghouse Electric & Manufacturing Co. with headquarters at East Pittsburgh, Penn. Mr. Hitchner joined the Westinghouse sales organization as industrial salesman in their Philadelphia office in 1909. In 1912 he was sales representative in charge of the Wilkes-Barre office of the company.

S. G. Pierson, formerly vice president and general purchasing agent of the Colorado Fuel and Iron Co., recently has been made vice president and treasurer. **J. B. Marks,** formerly assistant to Mr. Pierson, was promoted to the position of purchasing agent. **D. A. Stout,** chief engineer of the fuel department, has been appointed assistant manager of that department, taking the place of **B. J. Matteson,** recently made the president's chief industrial representative. Mr. Stout will also continue as chief engineer.

Obituary

Jasper A. Writer, secretary and treasurer of the Colorado Fuel and Iron Co., and for more than 37 years in the company's service, died Mar. 19, 1919. Mr. Writer was 61 years old. He began work for the company in 1881; in 1892 he was made general auditor, in 1912 secretary and later secretary-treasurer.

Alva Tompkins, one of Pittston, Penn.'s, early settlers and a pioneer of the anthracite coal industry, died at his home in Tunkhannock, on May 14. He was 92 years of age. Mr. Tompkins was prominently connected with the mining and shipping of coal during its early development period. He was in the coal business for 34 years, starting in 1851. Mr. Tompkins owned the second breaker built in the anthracite region and shipped coal for eight years prior to the building of this structure. He held a controlling interest in a number of coal companies operating at present; he was also interested in a number of banks and was connected with educational institutions.

Coming Meetings

American Wholesale Coal Association will meet on June 3 at Cleveland, Ohio. Secretary, L. Romanski, Chicago, Ill.

Illinois and Wisconsin Retail Coal Dealers' Association will meet at Hotel Nelson, Rockford, Ill., June 4 and 5. Secretary, I. L. Runyan, Chicago, Ill.

Southwestern Interstate Coal Operators' Association will hold its annual meeting June 10 in the Keith and Perry Building, Kansas City, Mo. Secretary, C. N. Fish, Leavenworth, Kan.

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind. Secretary, J. W. Paul, Pittsburgh, Penn.

Kentucky Mining Institute will hold its annual meeting June 6-7 at Lexington, Ky. Secretary, C. W. Strickland, Huntington, W. Va.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

American Society of Mechanical Engineers will hold its spring meeting at the Hotel Statler, Detroit, Mich., June 16 to 19. Secretary, Calvin W. Rice, 29 West 39th Street, New York City

American Institute of Electrical Engineers will hold its annual convention at the Lake Placid Club, Adirondacks, N. Y., June 24 to 27. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Northeast Kentucky Welfare and First Aid Association will hold a first-aid contest July 4 at Pikeville, Ky. Secretary, E. H. Sowards, Pikeville, Ky.

The Rocky Mountain Coal Mining Institute will meet in Salt Lake City the first week in July, 1919. Secretary, F. W. Whiteside, Denver, Colo.

West Virginia Coal Mining Institute will hold its semi-annual meeting June 3 and 4 at the Frederick Hotel, Huntington, West Virginia. Secretary, Karl F. Schoew, Huntington, West Virginia.

Industrial News

Ashland, Ky.—The Green Rock Coal Co. has filed notice of an increase in its capital from $25,000 to $50,000, for expansion.

Williamsburg, Ohio—The Polley Coal Co., has been chartered with a capital of $25,000 by James Sheehy, U. S. Siler, John R. Howard and B. E. Sheehy.

Memphis, Tenn.—The Memphis Coal Co. has filed notice with the secretary of state of an increase in capital from $60,000 to $100,000, to provide for general expansion.

Bunceton, Mo.—A. H. Pearson and associates are understood to be having plans prepared for the early development of cannel coal properties located in Cooper County.

Hazard, Ky.—The Kentucky River Coal Mining Co. has filed notice with the secretary of state of an increase in its capitalization from $150,000 to $250,000, to provide for expansion.

Coalfield, Tenn.—The Coalfield Coal Co. is understood to be arranging plans for the rebuilding of the electric power plant at its properties recently destroyed by fire, with loss estimated at $5000.

Bristol, Va.—The Floyd-Elkhorn Consolidated Collieries have filed notice with the Secretary of State of an increase in their capitalization to $315,000, to provide for general business expansion.

Memphis, Tenn.—The Turner & Turner Coke and Fuel Co. has been incorporated with a capital of $50,000 to engage in the production of coke and other fuels. G. S. and L. E. Turner are the principal incorporators.

Ashford, W. Va.—The Curtis Branch Coal Co. has been incorporated with a capital of $25,000 to engage in general coal mining in the Ashford district. E. E. Huddleston, Charleston, is the principal incorporator.

Whitesburg, Ky. — Samuel Collins, Whitesburg, and associates, have completed negotiations for the leasing of extensive coal properties in the vicinity of Sergent, Ky., and are understood to be arranging for early development.

Barbourville, Ky.—The Kentucky Velvet Coal Co. has been incorporated with a capital of $150,000 to engage in general coal mining operations in the vicinity of Barbourville. C. C. Smith, W. B. and Walter Riley are the incorporators.

Buckhannon, W. Va.—The West Virginia & Pennsylvania Coal and Coke Co. has been incorporated with a capital of $50,000 to engage in general coal mining operations, etc., in the vicinity of Buckhannon. A. M. Minerd and O. B. Talbot are the principal incorporators.

Charleston, W. Va.—The Siler Coal and Land Co., recently organized with a capital of $150,000, is understood to be planning for the commencement at an early date of the development of a total of 15,000 acres of coal properties recently acquired. T. E. Siler is the principal incorporator.

Charleston, W. Va.—The Black Band Coal Co. has been incorporated with a capital of $2,000,000 to engage in coal mining operations in West Virginia. N. F. Young, S. B. Avis, I. C. Jordan and William Freudenburger, Charleston; and Henry A. Jones, Pittsburgh, Penn., are the incorporators.

Columbus, Ohio—The Pennsylvania lines announce fuel contracts for more than 2,500,000 tons. Several Hocking operators will share in on these contracts. The George M. Jones Co., secured 572,000 tons and the Elk Coal Co., 114,000 tons. The average price was around $2, for mine-run.

Dora, Ala.—The Mary Lee Coal Co., recently incorporated with a capital of $15,000, has perfected its organization plans, and is arranging for the commencement of work at an early date on the development of about 160 acres of coal properties. It is planned to have a capacity of about 200 tons daily. J. Johnson is president.

Paintsville, Ky.—The Wells-Elkhorn Coal Co., recently organized, is planning for the installation of new mining machinery and equipment in three mines, including motors and auxiliary appartaus. It is understood that the company is arranging for the construction of a power plant for works operation. C. O. Messenger is general manager.

Chattanooga, Tenn.—The Suck Creek Coal Co., recently organized with a capital of $350,000, is arranging for the early development of approximately 25,000 acres of coal properties in the Chattanooga district. The company has acquired the mines of the Montake Coal Co. for operation. G. F. Mehan is president; Z. C. Patten, vice-president; and C. L. Hall, general manager.

Chicago—With war orders, high prices and careful management the O'Gara Coal Co. which failed in 1912 is now solvent. This fact became known in the federal court when Judge Carpenter allowed all claims of creditors, except one for $1,500,000 by Thomas J. O'Gara, former head of the company, presented as the value of property turned over by him to the receiver.

Louisville, Ky.—The Illinois Central R.R., has requested the Louisville District Freight Traffic Committee for a revision of rates on coal from mines in Western Kentucy to Paducah, Fulton, Mayfield and intermediate points, asking the removal of preferential rates on nut, slack and pea coal, and for the placing of western Kentucky and Southern Illinois on a parity. The Southern R. R. has asked for a 10 cent per ton advance from mines on its Tennessee lines also Kentucky and Virginia lines to sations on the Elkin & Allegheny Ry. in North Carolina.

New York, N. Y.—The coal trade in the last four Liberty and Victory Loan campaigns subscribed a total of $62,510,450, to which should be added a liberal subscription for the First Liberty Loan, but which was not credited to the industry as such. In addition the local trade contributed $119,937.75 to the Red Cross and $188,572.49 to the War Work campaign. The trade feels that its record in this respect is worthy of commendation and those who have been in charge of the campaigns, particularly Michael F. Burns, John E. Berwind, Richard H. Williams and LeBaron S. Willard take the occasion to congratulate their associates upon the showing which has been made.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Demand for Hard and Soft Coal Growing Better—Production Figures Show an Increase in Output—Indications Point to a Serious Labor and Car Shortage in the Fall—Bituminous To Be Scarce Before Long—Anthracite Mines Busy

THAT the demand for both anthracite and bituminous coal is increasing from week to week is proved by the gradual betterment in the output of the two kinds of fuel. During the week ended May 10 (the latest complete statistics available) there were produced 8,430,000 net tons of bituminous and 1,759,000 net tons of anthracite, as against 8,015,000 net tons of the former and 1,695,000 net tons of the latter in the week ended May 3.

Many large consumers of soft coal are still buying only for current requirements, in the belief that they will be able to contract for larger tonnages at any time. But this policy, to say the least, is an evidence only of shortsightedness on the part of those who pursue it. Based on present conditions, it requires no vivid imagination to foresee a coal scarcity next winter every bit as serious as that which the country experienced a year ago. There are several good reasons for this statement.

First, there is going to be a labor shortage. Not only has no new labor come into the United States for some time, but there has been a general exodus of foreign labor from our shores. More laboring men are returning to the countries of their origin than ever before in our history. This condition already is making its effect felt on the coal industry. One corporation operating a number of mines in Southern Illinois lost 583 men within a period of two weeks. Another company, operating mines in the East, has suffered a still greater loss covering a period of three months. An investigation conducted in the Hazard coal fields of Eastern Kentucky, where the mines are shipping large quantities of soft coal to the lakes, discloses that not an operation in that whole region has enough men. The result is that the mines are unable to produce anywhere near the tonnage reasonably expected of them.

This state of affairs promises to grow worse instead of better, for many mine workers, rather than wait until an improvement sets in to give them more regular employment, are leaving for more favored industries.

There is every reason to believe that there will be a serious car shortage next winter. Cars are plentiful at this time, it is true, but that is only because there is little demand for fuel. Let the demand become more pressing, and immediately it will be common knowledge that though the railroads have been discarding old and worn-out coal carrying equipment, they have not been adding new equipment to take its place. Our grain crop this year will be the largest we have ever harvested. Most of it will go abroad to feed starving Europe. The railroads will have to haul this grain to seaboard; and while they are hauling grain they cannot haul coal. At that very time, in the fall, the demand for fuel will be at its height. The result is obvious.

Conditions a few months hence are being discounted by bituminous operators, for many of them are growing distinctly conservative on contracts that call for deliveries through to next April. Sales agents are being warned to take care only of regular customers.

There is a quiet but steady inquiry for the better grades of soft coal, and prices are being maintained. The railroads are buying heavily, at prices ranging from $2.10 to $2.50, according to the district from which the coal is obtained. However, there are several large shippers who are still seeking May and June orders. There are sections, as in the Fairmont field of West Virginia, where there are plenty of miners but a great lack of spot business. For this reason operators in that field are quoting coal at prices lower than rule elsewhere; but even then the tonnage is disposed of with great difficulty.

The demand for the domestic sizes of anthracite continues strong from every quarter. There is a steady call from Canada, the West, and particularly from New England. The mines are operating to maximum capacity to meet the demand, and are doing their utmost to make up for the loss in production suffered the first four months of this year.

WEEKLY COAL PRODUCTION

The improvement in the production of bituminous coal which was recorded during the week ended May 3 continued through the week of May 10, the output during which is estimated at 8,430,000 net tons as compared with 8,015,000 net tons during the week of May 3 and 7,378,000 net tons during the week ended Apr. 26. During the same week of last year improvement also occurred when compared with the week of May 4, 1918, but such improvement failed to equal that of the current week. The daily average per working day is estimated at 1,405,000 net tons, and for the first time in a number of months exceeds the daily average for the calendar year to date, estimated at 1,359,000 net tons. For the period Jan. 1 to May 10 the production of bituminous coal is estimated at 152,218,000 net tons, and falls approximately 25 per cent below the output during the same period of last year, estimated at 201,023,000 net tons.

As in the case of bituminous production, improvement was also recorded in the anthracite field during the week ended May 10, the production being estimated at 1,759,000 net tons. The daily average during the week ended May 10 is estimated at 293,000,000 net tons, and while considerably below the daily average during the corresponding week of 1918, estimated at 334,000 net tons, it is far in excess of the daily average for the calendar year to date, estimated at 242,000 net tons.

Shipments of bituminous coal to all points from tidewater harbors during the week ended May 10 are estimated at 328,257 net tons, as against 397,174 net tons during the week preceding. Decreases during the current week occurred at all harbors with the exception of Philadelphia. The greatest decrease occurred at New York, the tonnage loaded declining to 178,250 net tons as against 235,141 net tons during the week ended May 3.

The tidewater shipments to New England during the week ended May 10 amounted to 72,409 net tons, which was a slight decrease compared with the tonnage moved during the week preceding, 84,176 net tons. Hampton Roads was the lone harbor to show improvement during the week, while shipments from New York decreased approximately 8400 net tons, or 20 per cent.

The production of beehive coke in the United States during the week ended May 10 is estimated at 261,115 net tons, as compared with 298,893 net tons during the week preceding and 623,993 net tons during the week ended May 11, 1918. Decreases in production occurred in Pennsylvania, West Virginia, Washington and Utah, while in other states the production was slightly in excess of that reported during the week ended May 3. For the calendar year to date the production of beehive coke amounted to 7,762,124 net tons as compared with 10,710,344 net tons during the same period of 1918. The daily average during the current week is estimated at 43,519 net tons as against 69,294 net tons during the calendar year to date, and 95,628 net tons for the same period of last year.

The bituminous coal dumpings at the lower lake ports during the week ended May 3 are estimated at 589,790 net tons as against 628,215 net tons during the week ended May 4, 1918. For the season to date, however, the dumping, estimated at 1,502,482 net tons, exceeds that for the same period of last year by approximately 180,000 net tons, or 15 per cent.

BUSINESS OPINIONS

The Iron Age—There is no mistaking the better feeling in the market following the dissolution of the Industrial Board and the freeing of the price situation from Government muddling. As at the original announcement of the March 21 prices, this last development has brought the release of some business held up for several weeks. That railroad buying before the end of the year will be on a considerable scale is more confidently looked for, as largely increased appropriations are discussed.

American Wool and Cotton Reporter—Fine wools are strong and low wools are coming in for a little attention at the present time. Prices are very firm with an advancing tendency. At the Cape, the United States, England and France have been buying rather heavily, and a large proportion of the wool has already been sold. Staple cotton is especially in demand, but is hard to obtain. Short cotton is in little demand at present. Mills are feeling much more optimistic on future business.

Marshall Field & Co.—Current wholesale distribution of dry goods is in excess of the corresponding week of 1918. Retail merchants continue to visit the market frequently and in greater numbers. All report excellent business. Orders from road salesmen, for both immediate and future delivery are in much greater volume, equaling any previous record. The market remains firm with retailers buying freely for fall. Some lines have been sold out. Collections are excellent.

Atlantic Seaboard

BOSTON

Slow movement of bituminous. Railroad buying leaves large tonnage yet unplaced. Operators conservative as to contracts. Spot orders still sought. More confidence shown in future business. Navy bids awaited with much interest. Better outlook for export. Little inquiry for Hampton Roads coals. Anthracite in demand from every quarter. Noticeable decrease in tidewater shipments by several companies. Retail trade brisk.

Bituminous—Receipts are on the same light basis that has been characteristic this season. The movement continues slow, and only through diligent canvassing is new business being developed. Many buyers are still "trying coals," the current market lending itself admirably to that method of delaying purchases. There are a good many steam-users in this territory who are buying from month to month on the theory that contract propositions will remain open until spot prices begin to swing upward, but manifestly there are pitfalls in any such policy. Admittedly, much of the present light output in all the regions is due very largely to lack of orders, but from week to week it is becoming increasingly apparent that were the orders in hand there would not be a sufficient supply of labor to get the coal.

So far as New England is concerned, no more railroad buying is anticipated this season. Although it is the policy of the Railroad Administration to publish the successful bids, there has been a good deal of secretiveness over the purchases made by certain of the roads in this territory. It is understood, however, that the range of price was about the same in every case, namely from $2.35 @ $2.55 f.o.b. mines per net ton; but aside from limited tonpages of high-grade gas coals for special runs, the average of quality would appear to be well below the customary mark. Many large shippers who have been customary channels of supply to the New England railroads this year are without a ton of locomotive business, and a large tonnage is left unplaced when comparison is made with other years. Of course, the roads here are buying something like a round million tons less than in 1917-1918, or nearly 15 per cent., but there is much interest in the trade to see what attitude certain of the large shippers will now take toward both spot and contract business.

It becomes increasingly clear that the producers in central Pennsylvania are growing distinctly conservative as to contracts that call for deliveries through to next April. Contract figures thus far have been on the basis of a dull market through the season, but certain interests who have the reputation of being far-sighted are warning their sales agents to take care only of regular customers. Buyers here are proverbially slow in sensing such a situation, and this may be another year when some of the larger consumers find themselves with increased business and without adequate provision for fuel supply. The activity of oil distributors has some bearing on this situation.

On the other hand, there are several important shippers who are still seeking May and June orders. There are sections, as in Fairmont, where there are plenty of miners, but a great lack of spot business. For this reason there are strong selling efforts at prices down to the railroad level and below, although the tonnage is absorbed only with great difficulty. There are frequent cases of "padding" on contracts, and consignees are complaining at the way their storage has been stuffed since Apr. 1. We know of plants where three to four months quota has already been received. Unless the production drops seriously below the present level, it is hard to see how there can be any broad market in New England until fall, unless the boom in general business comes earlier than is now looked for.

That a prosperous upturn is due some time between now and next spring is the way many people are talking. With the soldiers back, and peace conditions in the way of being restored in Europe, there is no doubt that commerce will improve rapidly. There are tremendous quantities of supplies that Europe will need from us, and it would seem that coal men are within bounds when they argue that coal will be very much in demand by October or November. Interests here are not quite so optimistic, but if the country is to have a prosperous wave it is probable that New England will get its share. Without doubt there is a lot more confidence in futures than was the case sixty days ago.

Meanwhile, there is only light buying of Pocahontas and New River in this market. The financial statement for April of the New England Fuel and Transportation Co. and related companies showed the extent to which the rehandling business has fallen off. It is the exception when an inland consumer takes his coal from tidewater; the great bulk of the tonnage is being supplied all-rail. Some expensive plants are practically idle, and overhead charges this year will reach record figures. Coastwise freights are easy; charters can be made at $1.50, Hampton Roads to Providence, and no takers. Were better dispatch to be had at New York piers, it is probable that a large number of soft coal barges would be diverted to the Long Island Sound trade.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.75@3.25
F.o.b. Philadelphia, gross tons	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.55

Georges Creek is quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $4.69@5.14 per gross ton f.o.b Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $6.89@7.24, and on cars Boston and Providence at from $7.60@7.90 per gross ton, the latter being the contract price f.o.b cars for season delivery.

Anthracite—The domestic sizes are in strong demand from every quarter. New England is no exception in this respect, and all the shippers find it hard to regulate the flow of coal in such way as to provide for the really urgent cases. The cool weather this spring and the comprehensive advertising indulged in throughout the country have combined to bring the public into the retail market to a greater extent probably since the years when strikes were threatened. Receipts both by rail and water are disappointing to all the retail dealers, for they are anxious to put out coal while consumers are eager to take it. In cities like Providence, New Bedford and Boston the retail demand has been unprecedented in the spring months. There are several cases where dealers have actually delivered in April from one-fifth to one-sixth of their normal tonnage for the year. Orders are still pouring in, and the average householder is not at all inclined to wait. He has the money to pay, and if he can't be served by one dealer he will try another.

To a notable extent some of the smaller distributors of anthracite at New York show a disposition to favor their all-rail business rather to the disadvantage of customers who take their coal by water. Heavy car demurrage, complaints of the lack of screening at the piers, and the bill of expense for operating barge lines are reasons enough for this attitude. In some cases dealers have been notified that they cannot look to their customary sources for the usual tonnage, and it all has a serious bearing on the volume of coal for New England. Opinions seem to differ whether there will be a quiet period in the summer, or whether this present extraordinary demand will be continuous.

NEW YORK

Domestic coals in heavy demand, with stove leading. Householders getting ready for vacations insist upon deliveries. Operators are doing their best to overcome deficit. Line dealers taking coal. Bituminous tidewater market slow, but all-rail trade is active. Brisk market anticipated within next few weeks. Manufacturers entering the market for the better coals.

Anthracite—With nearly every consumer anxious to get his coal for next winter into the bin, the demand for the various domestic sizes of anthracite continues. Stove coal appears to be the favorite. This is due to the preparation accorded egg and chestnut last year, when the trade heard many complaints regarding poor coal. While egg showed large quantities of rock and slate, chestnut was complained of on account of the large quantity of pea it contained. As a result many consumers who have heretofore used egg coal in their furnaces have changed to stove for next winter. But even this change from one size to another has not caused any accumulation of either size in this market, and dealers continue to complain of the slowness of deliveries.

The mine owners are doing their best to overcome some of the loss in production so far this year in comparison with what was produced last year and the year previous. The mines are being operated as much as possible, and it is predicted that the tonnage figures for this month will compare favorably with those for April, which showed a substantial increase over those of the previous month.

The number of cars handled at the various local piers during the week ended May 16 was 5921 as compared with 6462 cars the previous week, a decrease of 541 cars. There were 3306 cars of anthracite standing on the docks on May 17.

The large producing companies claim to be booked well ahead for all the larger sizes, while many of the so-called independent operators are refusing orders for the time being, desiring to get rid of some of the orders now on their books before accepting additional business. Reports of premiums being offered for mixed cargoes of the domestic coals of so-called independents for quick delivery were current, but could not be verified.

Wholesale dealers report a heavy demand for all the larger coals from all sections of the country. There is a steady call from Canada, the West, and particularly from New England. None of these sections ought to complain of a lack of coal next winter if urgency counts for anything. Dealers are in frequent receipt of telegrams urging quick shipments.

Locally the demand is just as urgent. Many householders want their coal in the bins before they leave for the country or seashore, and retail dealers are kept busy explaining why they cannot get the coal. However, the dealers are employing all their help steadily.

There is not much activity in the local market for the anthracite steam sizes, but the so-called independent product is being readily absorbed along the line. Prices are strong for line trade, the better grades of buckwheat being quoted at from $3.15 to $3.40; rice, from $2.40 up, and barley from $1.50 up.

The trade has been curious concerning the interests to be included in the new retail corporation which is to be known as the William Farrell Son, Inc. There has been much guessing as to which of the present retail dealers will be included in the new company, but it was said early this week that no definite announcement would be made until the middle of the week.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports, are as follows:

	Mine	Company Circular
Broken	$6.05	$7.90
Egg	5.95	7.80
Stove	6.20	8.05
Chestnut	6.30	8.15
Pea	4.90	6.65
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The local tidewater situation is quiet. There is comparatively little doing in the spot market, but contract coals are moving in good shape. That a few weeks more ought to see a brisk market here is the opinion of many wholesale dealers. They see a trifle stronger market than existed last week, with bright prospects ahead.

Large manufacturers are said to be gradually entering the market, not wishing to be caught empty handed when the tide sets in, and are said to be about ready to buy large blocks at current prices.

There is a quiet but steady inquiry for the better grades, for which there is not much dickering in price. The poorer coals move slowly, some consumers wishing to take their chance of obtaining the better coals.

A betterment is noticed in production, and operators look for a still greater improvement as the season advances. There was a report current last week that central Pennsylvania operators had discussed the advisability of advancing the prices for the better grades of coal.

The railroads are buying heavily, and at prices ranging from $2.10 to $2.50, according to the district from which the coal is obtained.

Wholesale dealers look for an active market within the next few weeks. All-rail trade is picking up and prices are slightly better than on the tidewater basis. Most inquiries, however, lean toward the better coals, but these are scarce since most of the output is tied up in contracts. Operators having some free tonnage are not adding new contracts without considerable thought, and manufacturers who believe it will be easy to secure all the coal they require are likely to be disappointed.

There were handled at the local tidewater docks during the week ended May 16, 5597 cars of bituminous coal, as compared with 5133 cars the previous week, an increase of 464 cars. There were 3298 cars standing at the docks on May 17.

The quotations for the various coals at the mines, net tons, for spot delivery and contract, follow:

	Spot	Contract
South Forks	$2.90 to $3.25	$2.95 to $3.50
Cambria County (good grades)	2.75 to 2.95	2.95 to 3.25
Clearfield County (good grades)	2.50 to 2.75	2.80 to 2.95
Reynoldsville	2.50 to 2.75	2.75 to 2.95
Quemahoning	2.65 to 2.85	2.95 to 3.10
Somerset County (best grades)	2.65 to 2.85	2.95 to 3.10
Somerset County (poorer grades)	2.00 to 2.35	2.50 to 2.75
Western Maryland	2.25 to 2.75	2.50 to 2.75
Fairmont	2.00 to 2.25	2.35 to 2.50
Latrobe	2.10 to 2.25	2.25 to 2.40
Greensburg	2.25 to 2.35	2.35 to 2.60
Westmoreland ¾ in.	2.60 to 2.75	2.60 to 2.75
Westmoreland run-of-mine	2.35 to 2.60	2.35 to 2.65

PHILADELPHIA

Anthracite trade kept active by cool spring. Pea-coal situation greatly helped thereby. Stove and nut demand continues abnormal. Dealers plan to store nut this summer. Some complaint as to preparation. Present condition revives size-change talk. Retail price-cutting continues moderately. Steam demand unimproved. Buckwheat fairly taken; other sizes very free. Bituminous in fair demand. No call for spot coal. Some contracting. Rail agreements taken by some shippers.

Anthracite—Owing to the unusually cool weather which has prevailed beyond the middle of May, retail dealers have enjoyed a large business on coal for current consumption. This has done much to offset the last few months of winter, when business fell off so badly as to make most dealers pessimistic as to the future. The chief call has been for pea size, of which all dealers have a goodly stock.

With the heavy demand for stove and nut coal for summer storing, the cool weather has greatly assisted the operators in that it has enabled them to dispose fairly successfully of their production of pea coal. Early in the week this size threatened once more to pile up at the mines, but with the lowering of the temperature the calls for this coal became more active. The big companies are still compelled to place a fair volume of this size in storage, however, and occasionally one of the smaller operators cuts the price in order to move it. The practice of offering stove and nut if pea is taken is growing among some of the lesser shippers.

The heavy drive on stove and nut coal continues unabated, and yards are occasionally out of the first-named size. A disappointing feature so far this month has been the lessened production at the mines. Some of the local dealers are bitter in their complaints at not having their orders for stove and nut filled. They fail to realize that this market is at this time taking more stove and nut coal than ever before due to the consumers almost abandoning the use of the other sizes.

There has been some complaint recently as to the preparation of coal coming to this market. There are the usual complaints as to the sizing, such as a continuation of the practice of increasing the percentage of pea in nut, but in addition to this much of the coal coming in has entirely too much dirt in it, the dealers claim. We have seen some shipments recently which fully justified this objection, but we believe it is far from general. Most of the consignees are taking the coal in without going further than calling attention to it, as they realize that under present conditions they are likely to have their supply curtailed if they become too particular as to the preparation.

The present strong demand for stove and nut, to the exclusion of pea, has again brought up among the dealers the question as to the advisability of having the operators adopt the two-size plan which they attempted to effect a few years ago. Now, as then, the retailers seem to favor such a proposition, as it would simplify their work in many respects and wipe out the many complaints they receive from customers unable to get a particular size to the exclusion of others.

From the operators' standpoint conditions are good, but always with the possibility of trouble due to an overabundance of pea coal, which will accumulate the moment warmer weather comes to stay. On the other sizes—egg, stove and nut—they have plenty of orders on their books right now to keep them running for at least six weeks without taking another order.

The price-cutting situation among the retailers is improved if anything. The most extensive cutter who ten days ago increased his pea coal price from $8 to $8.75, and also made advances on the other sizes, continues at this schedule. There are a few instances of prices less than these, one or two still selling coal around $8.50. Fortunately, this is now confined to one section of the city and the tendency is for it to diminish rather than increase.

There is absolutely no improvement in the steam coal situation. All the orders for buckwheat are being filled, with at times a surplus existing with some of the larger producers. No trouble is experienced in finding a buyer for the better grades of buckwheat, as contract customers are taking advantage of the situation to put in their regular winter stock of this size. Rice coal is only fairly well taken, with quite a tonnage going into storage, as is also the case with barley. There can be no denying that the anthracite steam sizes have been much affected by the condition of the bituminous market.

The prices per gross ton for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.80	Buckwheat	$3.40	$4.45
Egg	5.95	7.80	Rice	2.75	3.65
Stove	6.20	8.05	Boiler	2.50	3.50
Nut	6.30	8.15	Barley	2.25	3.15
Pea	4.90	6.50			

Bituminous—There is little activity in the trade, as with no spot coal in demand the production is kept down to the actual known needs of the market. Yet with it all the prices continue to be fairly well maintained within a radius of $3 to $2. Of course, there are at times a few sales for fine coals at a little higher figures, and vice versa. The inquiry for contract prices is still strong and with some new business being closed each week.

It is now known that a number of operators have closed contracts with the railroads for fuel supply. The prices range from $2.05 to $2.50, and some shippers hint that it is not for coal of particularly good grade. In some instances the contracts are only from month to month, while others have been made on a yearly basis.

The prices generally ruling at this time are covered by the following:

Georges Creek Big Vein	$2.90 @ $3.00
South Fork Miller Vein	2.90 @ 3.00
Clearfield (ordinary)	2.75 @ 3.90
Somerset (ordinary)	2.55 @ 2.70
Fairmont lump (ordinary)	2.40 @ 2.50
Fairmont mine-run	2.15 @ 2.25
Fairmont slack	1.90 @ 2.00

Lake Markets

PITTSBURGH

Increased activity brings closer price figuring. Market becoming steadier. Much railroad coal under cover.

With more activity in the local coal market there has been closer figuring upon orders, with the result that some lower prices have been made, particularly by operators who recognized that with a heavier operation costs per ton would be reduced and profits would be increased rather than decreased by making slightly lower prices than would have been considered a few weeks ago. The coal operators have a perfectly business-like attitude in this matter, their desire being to place the coal market squarely on its own feet, believing that it will be able to take care of itself. Almost without exception the operators look for a higher market next fall and winter than will obtain this summer. Accordingly, they will not make prices for deliveries to the end of the coal year nearly as low as the prices made for deliveries in the near future. The lowest regular sales of steam coal hardly go below $1.90, while there are sales up to $2.35 for early deliveries, depending upon grade, and for deliveries over the remainder of the coal year concessions from the basic price of $2.35 are relatively insignificant.

Slack has experienced a decline, as is usual at this season of the year, when increasing lake shipments (¾-in.) augment the production of slack. Steam slack is now selling regularly at $1.70 to $1.80, with gas slack 10 to 20c higher. Lake shipments are now of good proportions, particularly in the case of gas coal.

A large volume of railroad coal business is now closed, and purchases are continuing. Each transaction is made on its own merits, the character of the coal and its location being the governing elements. The railroads are paying neither more nor less than the general consumer would pay for the same tonnage, quality and delivery. The best Pittsburgh steam coal for railroad use to Apr. 1, 1920, is bringing $2.35, while there are sales of Panhandle coal, and even of Connellsville, at less.

The market is now quotable as follows: Best grades gas coal, slack, $1.80@2; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $1.60@2.70. Steam, slack, $1.70@1.80; mine-run, $1.90@2.35; all per net ton at mine, Pittsburgh district. Byproduct coal is not quotable, as there is scarcely any movement.

BUFFALO

Coal trade conditions show little change. Shippers hopeful. Anthracite in sharp demand. Rail trade cuts in on lake movement.

Bituminous—While the tone of the reports coming from shippers is better than it was, coal must move more freely to bring about prosperity in the industry. The jobbers are doing what they can to maintain prices. In fact, they say they are doing more in that direction than are the operators. The signs of weakness in the slack trade would not have been in evidence if more of this fuel had been put into stock. It is customary to do that at this time of the year, and it might have been done now; but certain mines seem to have taken the view that it was best to sell it for what it would bring.

Canada still has considerable stocks of bituminous coal and wood that were bought to meet the demand last winter. Consumers are slow to contract for future requirements, while the fact is that the sellers do not care to bind themselves to anything that is likely to distress them later on.

While bituminous prices are not strong they are fairly steady at former figures: $4.65 for thin vein Allegheny Valley; $4.45 for Pittsburgh and No. 8 lump; $4.20 for same mine-run; and $3.80 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The demand is active locally and in all-rail markets, though the orders from upper-lake districts are not numerous. All that really disturbs the shippers is that if they yield to the eastern demand they may find themselves unable to get as much coal to the Northwest as they will need for winter. For a short time the lake loadings fell off badly, but now the shippers have returned to that branch of the trade and will endeavor to keep it up. This tends to make the local demand still more insistent; but that must go on for a while, as it is not possible to mine all the coal this summer that is to be used throughout the year.

The shipments by lake for the week were 97,100 net tons, of which 52,100 tons cleared for Duluth and Superior, 25,900 tons for Milwaukee, 7000 tons for Waukegan, 6000 tons for Chicago, 3200 tons for Fort William and 2900 tons for Marquette.

The city prices of anthracite to the end of May will be as follows:

	F.o.b. Cars Gross Ton	At Curb Net Ton
Grate	$8.65	$10.35
Egg	8.55	10.30
Stove	8.80	10.20
Chestnut	8.90	10.60
Pea	7.10	9.15
Buckwheat	5.80	7.85

With 25c. additional for loading to lake vessels.

CLEVELAND

Domestic bituminous coal is advancing in price while steam-coal is weakening. Demand for the latter is expected to improve as a result of the demise of the Peek Industrial Board. No. 8 operators still complain of large accumulations of slack. Lake coal is more plentiful than cargo space just now.

Bituminous—Domestic consumers apparently are heeding the warnings that coal next winter is likely to be scarcer and higher, and demand is reported quite brisk. This is especially true of Pocahontas, and receipts are no more than equal to sales. Anthracite and domestic bituminous are being carried along on this buying wave. Some retailers have marked Pocahontas prices up another 25c., while West Virginia splint prices are due for a similar advance next week.

Steam coal, on the other hand, is moving rather slowly, though the outlook the past few days has taken a decided turn for the better. The industrial atmosphere seems to be clearing, as a result of the determination of the Peek Industrial Board. Iron and steel mill operations will increase shortly, it is believed, and while the summer run will show considerable fluctuation the trend all the time will be toward improvement. Huge piles of slack, which they are unable to move, are causing considerable concern to No. 8 district operators.

Considerable discussion of increasing costs is to be heard at present. Cost sheets are showing an unexpectedly heavy upturn, operators say, while at the same time they are expected to revise their prices downward. No. 8 district mines now are operating at about 55 per cent. of capacity. Whether they could do 10 per cent. more were every condition ideal is a question. Labor is scarce, skilled workmen are found to have left in unexpectedly large numbers, and what remains is markedly inefficient.

Lake coal seems to be settling around the $2.35 mark. With railroads taking most of their mine-run supplies from Ohio mines at $2.10, this figure now is probably the average for mine-run sales. Slack is reported as low as $1.50 in the past few days. Net ton delivered steam coal prices in Cleveland now are about 20c. lower than they have been.

The report of the Pittsburgh Vein Operators Association of Ohio for the week ended May 7 shows shipments totaling 5563 cars, divided as follows: Railroads, 988 cars; lake trade, 3685; Ohio, 698; Michigan and Indiana, 167, and Canada, 75. Car supply is approximating 100 per cent.

Lake Trade—Because of the delay in getting some of the larger lake freighters on the run this spring more coal cargoes are being offered at Lake Erie ports than carriers are available. The number of cars being handled by the car dumpers is increasing daily, and has run as high as 3300 cars in one day. All indications are that for some time, at least, bituminous coal will be moved up the lakes as fast as carriers are available.

Prices of coal per net ton delivered in Cleveland are:

Anthracite	
Egg	$10.85@10.95
Chestnut	11.15@11.25
Grate	10.95
Stove	11.05@11.15
Pocahontas	
Forked	8.50@ 8.75
Lump	7.75@ 8.00
Mine-run	7.20
Domestic Bituminous	
West Virginia splint	7.30@ 7.40
No. 8 Pittsburgh	6.10@ 6.35
Massillon lump	7.30@ 7.40
Steam Coal	
No. 6 slack	4.10@ 4.30
No. 8 slack	4.50@ 4.65
Youghiogheny	4.70@ 4.90
No 8½ in. lump	5.15@ 5.30
No. 6 mine-run	4.20@ 4.30
No. 8 mine-run	4.50@ 4.65

DETROIT

Inquiries for bituminous coal are reported rather more numerous, but sales seem to have made no marked increase.

Bituminous—While some of the jobbers find reason for believing a larger interest in the bituminous supply is developing in the Detroit market, owing to a slight increase in number of inquiries from manufacturing plants, the apparent improvement is said not to have progressed to a tangible growth of orders. The business is still pronounced unsatisfactory with sales falling far short of what jobbers believe should be their level at this time of the year.

Criticism is also directed at the breaking of prices below the schedule fixed by the Federal Fuel Administration, and some of the jobbers intimate that dealers who have been emphatic in urging the advantages of price stability appear to have been among those who sought to increase sales by offering concessions.

Approximate quotations at the mines, on a long-ton basis, place Hocking domestic lump at $2.50 a ton, mine-run at $2 and slack at $1.50. Coal from other leading districts of Ohio is said to be available at about the same prices. West Virginia splint or gas lump is quoted at $2.65, the three-quarter lump at $2.50, mine-run at $2.25 and slack at $2. Although little smokeless coal is arriving in Detroit, Pocahontas mine-run can be had, it is said, for $2.75 at the mine.

Heavy stocks remaining in possession of consumers of steam coal and in yards of retailers are described as constituting the chief check on sales, and progress in reduction of these stocks seems disappointingly slow.

Anthracite—Domestic buyers are not showing the willingness to stock up early that the experiences they have passed through during the last two seasons should develop, according to dealers. While receipts of anthracite are not of large amount, the supply is said to be sufficient to meet present requirements for each of the sizes favored for household heating plants.

Lake Trade—Shipments over the lake routes consist very largely, so far, of coal sent to producers' own docks. The supply of vessel capacity is more than equal to requirements of the tonnage moving. Owing to the scarcity of ore and grain cargoes for loading downbound vessels, a few of the carriers are coming down light to load coal, while a few that loaded coal some time ago, have not yet started their first upbound trip.

COLUMBUS

There is a better feeling in the Ohio coal trade due largely to the award of railroad fuel contracts. Operations are more active and future prospects are better. A period of activity is predicted during the next 60 days.

The award of railroad fuel contracts, amounting to about 4,000,000 tons from Ohio mines, has stimulated the trade to a marked extent. The contracts were generally awarded at low prices, but on the whole the result will be that mines which have been idle for some time will resume operations. The general result is a better feeling in producing and shipping circles, and a large part of the gloom of the past few months is rapidly disappearing.

Beginning at once, the output of the various Ohio fields will be increased fully 50 per cent. over previous production figures. This is especially true of the Hocking Valley field proper, where operations have been working at about 35 to 40 per cent. of capacity. They are expected to reach 75 per cent. within a short time. In the eastern Ohio field a considerable part of the railroad tonnage will be produced, and operations will be correspondingly increased. Contracts for steam tonnage are still slow, although there is more of a disposition on the part of purchasing agents to secure data and figures.

The lake trade is also becoming more active as the season progresses. Shipments from the lower lake ports to the head of the lakes are becoming larger. Many lake agreements have been entered into with the price left blank, to be supplied later. Quite a few of the Ohio producers have their own docks in the upper lake region, and thus price is not a material matter at this time. The records of the loadings at the Toledo docks are showing up pretty well, and the same is true of loadings at other Ohio lake ports.

The domestic trade is still quiet, although some school contracts are being awarded at this time. The better grades, such as Pocahontas and West Virginia splints are in good demand, and prices are ruling higher. Ohio-mined grades are not moving well, although some dealers are inclined to buy better. Retail stocks are fairly well used up and not a great deal is being carried over. It is believed that the retail trade will open fairly early, and many dealers have made preparations accordingly.

CINCINNATI

Heavy demand for smokeless. Contract business picking up. Domestic demand better, with prices steady.

The coal situation in Cincinnati is still quiet, the consumer remaining sanguine that there will be a sharp decline in price when the peace treaty is signed. One of the prominent coal dealers in this city, when interviewed in regard to the coal situation, had the following to say about conditions. "The consumer is still withholding orders, anticipating a drop in price. This decline, however, will fail to materialize; in fact, there is seen in the future a surer possibility of a rise in price. This condition might be changed somewhat after the meeting of the national association in Chicago, when the general public will learn the true state of affairs. They will be advised of possibilities of another serious car shortage, which will result in a repetition of 1917 conditions. While the sales in Cincinnati are not what they should be, there is a steady increase, and some lines in particular have shown an improvement. Smokeless coal has taken a sharp rise; the heavy demand for this grade continues, and the dealers are experiencing some trouble in filling orders as the supply on hand is rapidly diminishing."

There were several large orders placed last week for steam and semi-steam grades, and the contract business is looking up, several large contracts being signed. The demand for domestic grades has somewhat improved with prices steady. Prices on coke experienced a sharp break owing to a falling off in the demand.

LOUISVILLE

Domestic prices strong, with a fair demand for block and egg sizes. Steam grades and mine-run in dull demand, and operators being forced to cut prices in order to move steam. Contract prices fairly firm.

Domestic prices are firm and stronger in practically every field of the state. In the Harlan and Hazard fields operators are getting from $2.85 to $3.10 per ton for block. In the Straight Creek field a price of $3.15 to $3.25 is asked, while on Jellico prices have advanced to $3.25 to $3.50 per ton. It is reported that Blue Gem coal is selling all the way from $3.50 to $4 a ton. Western Kentucky operators recently cut the price 5c. per ton on block, or from $2.60 to $2.55, making the latter price the standard. However, some western Kentucky spot block is selling at as low as $2.20.

Retailers have been stocking their yards freely, and are getting a few stocking orders from consumers. However, consumers are not stocking as they did at this time last year, and instead of being rushed things are a little dull with the retailers. However, the demand for block coal is coming better, and late buyers will probably meet with a high market.

In the coal fields the entire feature is the demand for block coal. Mine-run and nut and slack prices have gone off badly during the past two weeks. These reductions, however, are on spot coal only, as contract coal is holding firmly, due to the uncertain labor situation. Western Kentucky steam prices show mine-run quoted as low as $1.85 for spot, with the average market at $2.10 to $2.35. Nut and slack is selling at around $1.70, with poor grades quoted as low as $1.40. Some thin slack is selling as low as $1.40, it is reported. Local dealers report some Indiana run-of-mine offered on the market at $1.50 during the week.

Eastern Kentucky nut and slack is selling at prices ranging from $1.50 to $1.85 per ton, and mine-run at $2 to $2.35. It is understood that eastern Kentucky mines quoted $2 to $2.25 on mine-run to the Louisville & Nashville R. R., and that western Kentucky quoted $1.60 to $1.70 on the Louisville street railroad contract.

Coal is going principally into Michigan, Ohio, Indiana and Kentucky, with some movement into Georgia on mine-run. The Louisville & Nashville lines handled 301 cars of coal from Kentucky for the Lake district after Apr. 20 and up to May 1. The lake movement is now getting into good swing.

BIRMINGHAM

Demand for steam coal fails to show improvement. Strong inquiry for domestic fuel continues. Supply inadequate to meet requirements. Production from steam-domestic mines confined to half-time operations, there being no surplus stocks in the hands of producers.

General industrial inactivity continues to affect the coal market in this district, and sales of steam fuel are being held down to current requirements of users. Trade conditions may be stated as satisfactory when considered in relation to the business of consuming interests, but not otherwise.

Both the wholesale and retail channels of domestic trade are featured by a good demand, and few domestic operations have any tonnage to offer between now and the end of the year. Such relief as may come will depend on the output of the steam-domestic operations which are now either

idle or running only half time, when such mines are again restored to full-time schedules.

Basic conditions in both the steam and domestic trade are considered stable, prices remaining firm and unchanged, with a strong probability of a shortage of domestic coal during the coming fall and winter. Retailers are now carrying on an advertising drive, in which consumers are urged to not delay in providing their supply of fuel for winter consumption.

Some improvement in production will soon be noted from the mines of furnace companies, the Woodward Iron Co. starting up one or two mines to supply coking coal on account of putting one of their furnace stacks in operation. Otherwise there is no change in the production end of the trade.

Coke

CONNELLSVILLE

Continued decline in coke production. Fairly active prompt market. No contracting as yet for second half.

With the continued decline in coke production in the Connellsville and Lower Connellsville region, there is less coke available for odd-lot sales and the spot market has stiffened further. It has now closely approached the level of values obtaining on monthly adjustments of contracts, just as should be the case. While $3.60 and even $3.50 was done on spot lots of furnace coke three or four weeks ago, the common quotation now is $4, and $3.75 could be done, if at all, only with difficulty. Nearly all contract settlements for May delivery were at $4.

Furnace coke shows a somewhat broader demand, but is not quotably higher. Iron foundry operations are evidently increasing, and as there was less contracting for foundry coke for the present half year than usually occurs, there is a fairly active prompt market.

More than half the furnace coke contracts now in force expire June 30, and both furnace men and coke operators are beginning to consider the matter of second-half contracts. There have been hardly any active negotiations as yet, and the feeling of the two parties is not disclosed; but the guess may be hazarded that coke operators would quote a flat price of $4 for the second-half while furnacemen would talk $3.50 or less. It seems improbable that contracts will be renewed on the basis of monthly price adjustment. This system has worked fairly well during the transitionary period since Government control was removed Feb. 1, but for the future both buyers and sellers prefer to settle the matter of price when they make the contract, rather than later in six monthly installments. Sliding scale contracts, based on a ratio of coke to pig iron, may however be considered.

The spot market is quotable at $3.75@4 for furnace coke and at $4.25@5 for spot foundry, per net ton at ovens. There is no contract market quotable.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended May 10 at 100,980 tons, a decrease of 32,626 tons. In some quarters of the trade doubt is expressed whether the decrease in production has been as great as stated.

Buffalo—The trade continues dull, with little prospect of improvement in the immediate future. The fact that the demand for iron ore at the furnaces is still light shows the condition of the iron market to be quiet. The movement of ore down the lakes has begun, but only a few of the steamers have been ordered into it. Ordinarily they would all be busy by this time. Prices remain at $7.25 to $7.60 for 72-hour foundry coke; $6.60 to $7 for 48-hour furnace, and $6.10 for off grades, per net ton, f.o.b. Buffalo.

Middle Western

MILWAUKEE

Coal market is quiet and uneventful. Prices of all grades well sustained, however. Cargo receipts brisk for this season.

The coal market at Milwaukee at present is quiet and devoid of anything worthy of special mention. Deliveries are being made at a normal rate only, as it is altogether too early to expect consumers to burden their minds with thoughts of another winter supply of fuel. Pocahontas of all grades is easily obtainable this year, and many are turning to this class of fuel because of the high price of anthracite. Illinois coal is being held up, despite heavy stocks everywhere. Production has been curtailed to meet the situation, and it is apparent that there is organized effort to sustain the price of western coal. There is considerable complaint as to the poor quality of coke now on the market. Those in position to know say the byproduct plants were compelled to use Illinois coal to some extent last winter, with the result that the coke is not up to the usual standard.

ST. LOUIS

Market continues inactive, with practically no demand for anything and a tendency on the part of the Standard operators to continue cutting prices. Both steam and domestic inactive in the city and country.

There is no change in the local situation from that reported for the past few weeks. There is practically no call from the country for coal, and there is nothing to indicate that the domestic user in the country will do much storing before July or August, if then. The first country business will come from the threshing, which is expected this year about the middle of June. Beginning the first of June, therefore, there will be some threshing coal moving; but this seems to diminish in tonnage year after year, owing to the growing use of gasoline tractors.

The country demand is rather good for anthracite chestnut sizes. This coal is moving south through St. Louis for the first time in years to points in Texas and Oklahoma, and to places in Arkansas and the southwest. This is accounted for by the fact that no anthracite is moving via boat to New Orleans as in previous years, and such demand as comes from the southwest must be taken care of all-rail.

The local demand is off on everything. There is a little coal going into storage for domestic purposes, but it is so small that it is hardly noticeable.

In the Standard field the feeling prevails that every mine must work, with the result that the few that are working are cutting prices to get the little tonnage offered. The only thing in the field that looks at all promising is screenings, which seem to be getting stronger all the time.

Some mines work one day a week, some not as many as three days a week, and some have been idle for many weeks. Dissatisfaction is growing among the men.

In the Mt. Olive field conditions are somewhat better. Prices are rather firm, and there is a feeling of satisfaction with the business that this field has been able to take care of up to the present.

In the Carterville field of Williamson and Franklin County some improvement has been noticed during the past week in the movement of domestic sizes. There is at the present time a shortage of screenings and steam sizes. All the mines are on short time, but a fairly good tonnage seems to come in from the Northwest on domestic coals, while there is nothing doing in the St. Louis territory or south thereof. The same condition applies to the Duquoin field.

Cars are plentiful and movement is good. The Franklin County operators are expected to raise their prices on June 1 10c. above those quoted below, which are prices prevailing today:

Williamson and Franklin County Association:	Mt. Olive and Staunton	Standard
Lump, egg and nut	$2.75	.....	.....
Washed Nos. 1 and 2 nut	2.85	.....	.....
Independent:			
Lump, egg and nut	2.55	$2.55	.....
Lump and nut	....	....	1.90@2.10
Washed Nos. 1 and 2 nut	2.85	.....	.....
Mine-run	2.35	2.20	1.60@1.70
Screenings	2.20	2.05	1.25@1.40
3-in. lump	....	2.30	.....
2-in. lump	....	.....	1.75@1.90
2x6 egg	....	.....	1.80@2.00

Williamson-Franklin County rate to St. Louis is $1.07½; other rates $0.92½.

General Statistics

ANTHRACITE SHIPMENTS, APRIL, 1919

The shipments of anthracite for the month of April, as reported to the Anthracite Bureau of Information, show a substantial recovery from the slump which prevailed during the two closing months of the coal year 1918-19—February and March.

The quantity shipped from the mines in April amounted to 5,224,715 tons, as compared with 3,938,908 tons in March, and 3,871,932 tons in February.

The increase over March shipments was 1,285,807 tons. Notwithstanding this decided increase over March, the shipments in April this year were 1,143,658 tons less than in the corresponding month last year, when they amounted to 6,368,373 tons. The difference in weather conditions in the winters of 1917-18 and 1918-19, and also the speeding up of production last year because of the war, account for the smaller tonnage last month as compared with the corresponding month last year. As compared with April, 1917, the shipments last month showed a decrease of less than 370,000 tons.

The shipments by companies were as follows:

	April, 1919	April, 1918
P. & R. Ry.	1,044,192	1,233,512
L. V. R.R.	865,924	1,175,027
C. R.R. of N. J.	481,781	528,886
D. L. & W. R.R.	885,215	1,008,018
D. & H. Co.	603,479	771,553
Penna. R.R.	383,250	448,374
Erie R.R.	581,453	695,186
N. Y. O. & W. Ry.	144,856	185,650
L. & N. E. R.R.	234,565	322,167
Totals	5,224,715	6,368,373

Coal and Coke Securities

New York Stock Exchange Closing Quotations May 19, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com.	(BB)	143	151
Burns Brothers, Pfd.	(BB)	99¾	110
Central Coal & Coke, Com.	(CK)	55	...
Central Coal & Coke, Pfd.	(CK)	63	...
Colorado Fuel & Iron, Com.	(CF)	46	46
Colorado Fuel & Iron, Pfd.	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com.	(EH)	28⅝	29
Elk Horn Coal, Pfd.	(EH)	...	47
Island Creek Coal, Com.	(ICR)	39	...
Island Creek Coal, Pfd.	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	60	...
New Central Coal of West Va.	(NCC)	5	...
Pittsburgh Coal, Com.	(PC)	55½	56
Pittsburgh Coal, Pfd.	(PC)	88	89
Pond Creek Coal	(PD)	17	17½
Virginia Iron, Coal & Coke	(VK)	65	67

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	93½
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	75	77½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	89	90
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99⅛	101
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79⅜	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	84	88
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	88	88½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	80	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	91½	95½
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85⅛	86¼

COAL AGE

Volume 15 New York, May 29, 1919 *Number* 22

A Parting Word

Dear Friends:

Nearly eight years ago the first copy of a small and modest, but rather hopeful, mining weekly was submitted for the attention and approval of the coal fraternity. That paper was COAL AGE, and almost to a man the original crew that embarked on the journalistic adventure is still busy trimming sails and bailing out the water that was shipped in occasional high seas.

Unlike most editorial organizations of a similar nature, the staff of COAL AGE had a chief in name only. Of course, it was necessary to have someone sit in the pilot-house, look at the compass and see to it that the boat didn't run in circles, which job was mine. And although at first I felt quite necessary at the wheel, it soon became evident to me that the rest of the crew also knew north from south and were perfectly able to perform the captain's duties at any and all times.

It is a fact, therefore, that my associates on this journal have never worked for me, but always with me. We have all shared alike in the numerous discouragements and felt equal joy over the successes. If the respect and friendly cooperation of America's great coal industry has been gained, it was accomplished through the paper constantly reflecting the ideals, not of one man, but of several loyal workers, who have stood fast on the platform that modern industry is a four-cornered affair. It must deal squarely, not only with capital and labor, but also with the people as represented by the state, and brains as represented by management.

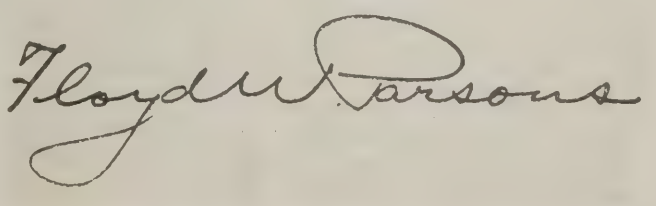
I am resigning from COAL AGE with this issue, after having spent the happiest years of my life in helping build it. If I were not certain of the great future of the paper, nothing could induce me to leave; if I were not aware of the splendid abilities of my associates who will "carry on" so successfully, no possible inducements could lure me away.

The coal industry is the one business I have served continuously since the day I left college to earn my first dollar. No man can labor in the dark chambers of Mother Earth, face the perils of death that lurk there, help carry the lifeless forms of his buddies to daylight, and then forget. I have my friends in and about the mines in thirty states. To me they constitute the greater part of the whole world in which I move, and I want it always to be just that way. No doubt I can take my body elsewhere, but the heart of me stays in the mines.

In the new field I enter, it is my hope that there will be opportunities to serve the great industry I love, and if such chances appear, it will be no fault of mine should I fail. But the real editorial work that will be of profit to the coal industry in the future, as in the past, will, of course, be carried on in COAL AGE. R. Dawson Hall, who has worked hand in hand with me from the day of the christening, has qualities so rare they arouse in me a feeling of envy. Indefatigable in his work, loyal to his friends, uncomplaining when the way is rough, consistent and faithful to the demands of justice, he has grown largely in the esteem of his intimates and the respect of his company.

No men are better equipped to continue the plans and policies of this journal than Messrs. Hall, Beard, Kneeland, Moss and Harris. What little there will now be of added responsibility for them will be taken care of by the greater play of latent powers that now have a still better opportunity for individual expression. COAL AGE has preached humanity and democracy in industry, and we are happy to apply these teachings in our own case by recognizing and rewarding merit. When a company must go outside its organization to pick men for the jobs higher up, there need be no doubt of the injustice and inefficiency of that corporation's management.

If the words here used and the method employed in thus saying adieu are at all unusual, it is because my feelings in the matter are unusual. In my heart at this moment are but two thoughts: The first—Thanks for ten thousand favors; the second—good luck and an ocean of success.

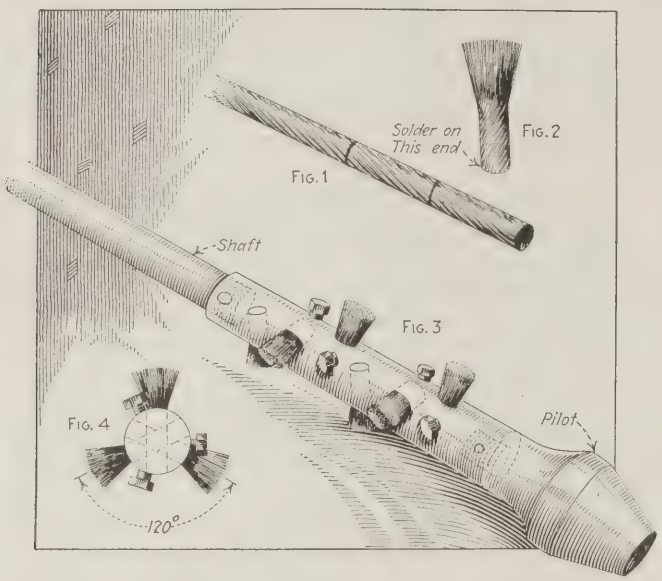


IDEAS AND SUGGESTIONS

Unique and Durable Tube Brush

BY CHARLES H. WILLEY
Concord, N. H.

The tube brush shown in the accompanying illustration may seem a rather queer-looking affair, but if any of the readers could step into the boiler room of the plant with which I am connected and see a set of these homemade brushes driven by air motors, chasing out the havoc created by a week's run on "bugdust," they



FIGS. 1 TO 4. DETAILS OF A HOMEMADE TUBE BRUSH

would get busy and make up a few of them for their own use.

The idea for these brushes came to me after I had consumed many dollars' worth of standard spiral tube brushes. I had searched the advertising pages of several trade papers for some sort of a tube or flue brush that would permit the renewal of the wire fagots, but none could be found. So I set out to make such a brush. The wire used was some $\frac{3}{8}$-in. eight-strand cable from the scrap heap.

A length of this wire was soldered at points $2\frac{1}{2}$ in. apart, as indicated in Fig. 1, and then cut into short lengths. Then in a piece of round bar stock (Fig. 3), $1\frac{1}{4}$-in. in diameter, a series of holes was drilled at 120-deg. angles along the piece and into these were inserted the short lengths of cable. The soldered ends, as indicated in Fig. 3, assisted in this insertion. Each piece was secured in its hole by a set screw, as shown. The large pilot was screwed onto the end of the brush, thus making it easy to enter the brush into the tubes. The other end of the brush head is provided with a shaft whereby the device is revolved.

In use the brushes are pushed through the tube while revolving to the right, and then the air motor is reversed and the brushes pulled back while turning to the left. This not only keeps the brushes from laying one way and gives them longer life, but it results in a better cleaning job. One set of brushes will last long enough to pass through and back again in 600 four-inch flues, 8 ft. long. It is then only a few minutes' work to put in new pieces of cable.

Three Different Types of Switchboard

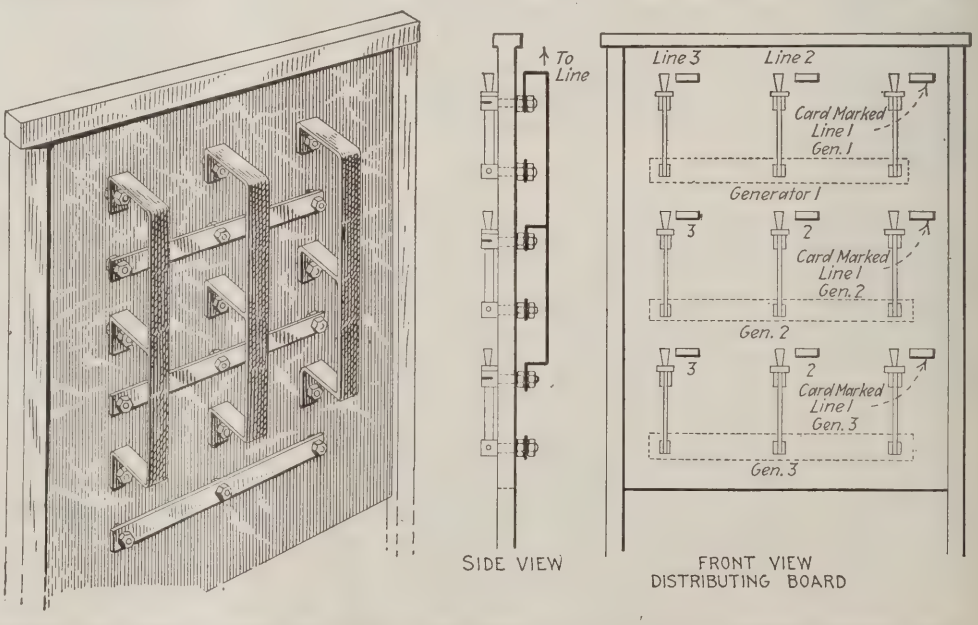
BY J. J. NOLAN
Linton, Ind.

The accompanying illustrations show three different makes of switch boards installed in one plant. This makes it inconvenient to install bus bars on account of the wide difference in the location of the studs on the rear of the boards as will be seen.

Seven hundred and fifty thousand circular mil, stranded, covered cable was substituted with terminal lugs in place. The station where these boards are installed supplies current to three different points as shown by the top of the distributing board.

Lines Nos. 1 and 2 furnish current to motor driven centrifugal pumps in the mine and line No. 3 supplies mine locomotives and mining machines. This line must be kept separate from the pumping load because short circuits would be injurious to motors and pumps.

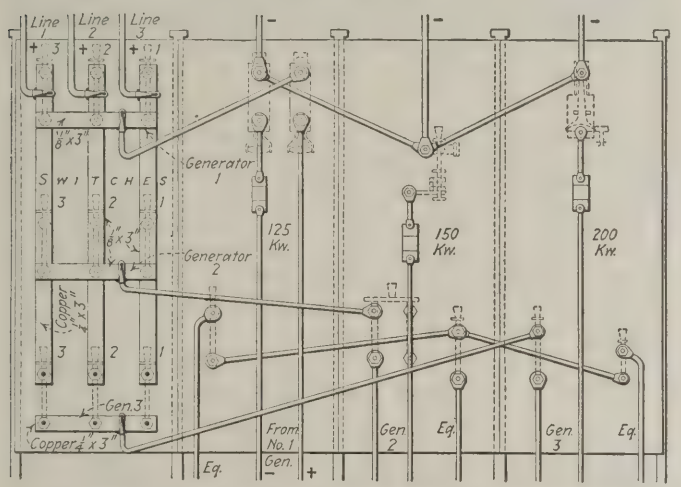
The distributing board shown is of original design and was intended to prevent mistakes in throwing in



SIDE AND FRONT VIEWS OF THE DISTRIBUTING BOARD FOR THREE GENERATORS

switches when changing over from one unit to another, paralleling, etc. As will be noticed any one of the generators can be connected to either Nos. 1, 2 or 3 line separately, either two or three paralleled on one line or all three lines as needed while in case of breakdown any line can be operated from any unit. The parallel connections are of course placed on the distributing board.

For example, suppose No. 3 generator was supplying current to No. 1 and No. 2 lines, No. 2 and No. 3 switch on lower row would of course be closed and it was desired to put No 2 generator on this load and close down No. 3 generator without stopping the motors. After building up voltage on No. 2 generator close



REVISED LAYOUT OF GENERATOR CONNECTIONS

No. 2 and No. 3 switches on the distributing board in middle row, close breaker and double pole switch of No. 2 generator (this parallels the two), trip breaker and pull single pole knife switch on No. 3 generator (this separates them), then pull No. 2 and No. 3 switch on lower row of distributing board. In this operation it is hardly necessary to use the equalizing switches.

This arrangement makes a handy but simply arranged layout in both front and rear of the board and has more than paid for the expense incurred in its installation through preventing mistakes which might have occurred damaging the equipment.

Alarm in Case of Mine Fire

As soon as word of a mine fire or an explosion is received, an alarm should be given and assistance summoned by an official or employee of the mine. In case of fire within the mine or in the entrances, the alarm should be sent immediately to all parts of the mine in order that the men may escape, and efforts be made at once to put out or control the fire. In case of an explosion, aid will necessarily be needed. All employees not engaged within the mine should be hastily summoned to appear near the mine entrance, and help should be asked from near-by mines. The call for assistance should be for mine foremen, firebosses, electricians, mechanics, hoisting engineers and timber and brattice men. Reliable men should be stationed at once at all entrances to prevent any but safety or electric lamps being taken into the mine and to make a written list of all who enter.—*Rescue and Recovery Operations in Mines.*

Fire Cleaning and the Tools Therefor

By Jack L. Ball
Amsterdam, Ohio

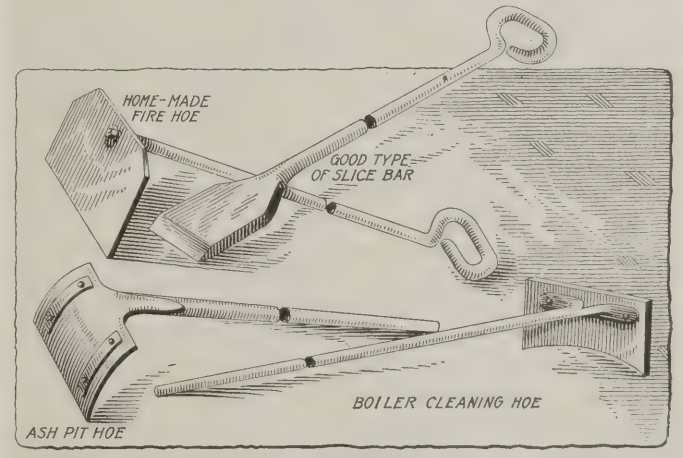
When the length of the grate bars of a boiler furnace is not over 6 ft., the quickest and easiest way of cleaning fires is to push the live coals back to the bridgewall, pull out the ashes in front, pull the fire forward and then clean the back of the grate. The method of "kicking" over one side at a time is uneconomical for these reasons: It is necessary to have one fire door open while cleaning, thus allowing great quantities of cold air to enter the furnace; it requires a longer time to clean; and it will be noticed that when a fire is "kicked" over a large amount of pit ashes is the result.

If the method of pushing the fire back is used, the following advantages will be noticed: The time required to clean fires is reduced to a minimum; the fire doors can be kept nearly closed while pushing back the fire, thus preventing a large amount of air from entering the furnace; also, the fireman is not exposed to the heat to any great extent. It is true that a small amount of ash will be pulled over with the fire, but the quantity will be small if a little care is exercised.

The handle of a fire hoe usually breaks near the blade, at which place the handle is usually welded. If the hoe is drilled and tapped, and the handle threaded, the blade can be securely fastened to the handle with check nuts, as shown in the accompanying illustration. This method insures a quick repair if repair is necessary, and will save the blacksmith the task of welding and riveting.

A good slice bar is shown below. It will be found to be an excellent tool for freeing clinkers from the grate bars; also, it is effective when used for "spudding" loose the clinkers that adhere to the furnace walls.

For cleaning ash pits, the ash-pit hoe shown was



HANDY TOOLS FOR CLEANING BOILER FIRES

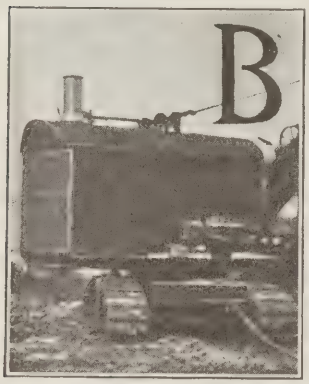
made from a discarded No. 2 coal shoved. This was bent and braced as shown and provided with a long handle. It is surprising how quickly and easily an ash pit can be cleaned with this homemade tool.

If horizontal return tubular boilers are fed through the front head, it will be noticed that much loose scale will be deposited at or near the blowoff connection of the boiler. It is often necessary to clean a "hot" boiler. As it is impossible for a man to get into it for the purpose of removing this scale, the boiler-cleaning hoe shown will come in handy for pulling this scale to the front end of the boiler so that it can be removed.

Machinery Used in the Stripping of Coal

By S. B. Creamer
Cambridge, Ohio

SYNOPSIS — *Describes stripping practice in Ohio as regards the types of machines used both to strip the coal and load it into cars. The comparative advantages of steam and electrically driven shovels are noted. The latter are gaining in favor wherever electric power is readily obtainable. The recovery of coal by the open-pit method of mining and the loading of it into cars by a power shovel, introduce more careful preparation in the tipple where impurities are removed.*



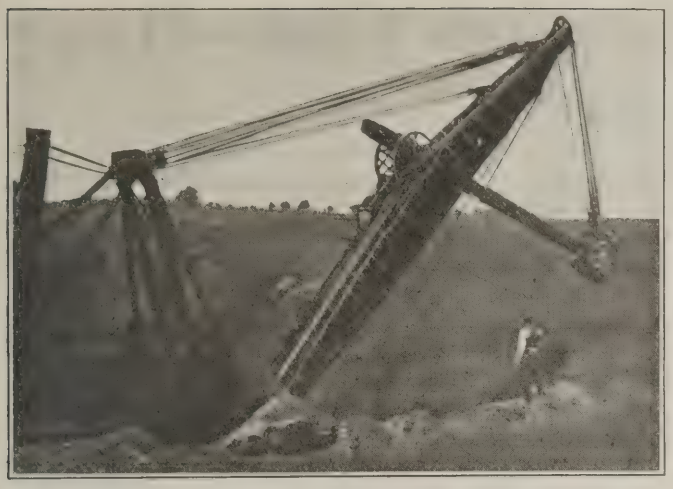
BOTH steam and electrically driven shovels are used in the stripping of coal. These shovels are massive machines of the revolving type, weighing approximately 350 tons with 80 to 90-ft. booms; they dig a cut 100 to 125 ft. wide and place dirt 145 to 165 ft. from the digging face. A 1⅜- to 1½-in. wire cable 365 ft. long is used on the hoist. This rope has an average life of from one to six months, depending upon the nature of the material dug and the running time. The shovels are carried on four sets of narrow-gage trucks—one set under each corner—and these run on two tracks 25 ft. between centers. Each type has its advantages, but much depends upon local conditions in determining the power to be used. The steam machine has had a preference. However, the electric type is gaining in favor.

There are many advantages in the use of electric power on shovels, and where it is cheap and reliable it is rapidly coming into use. There is much less vibration in a rotary electric motor than in a reciprocating steam engine, and the reduction of vibrations, due to various causes, not only reduces the amount of repairs but prolongs the life of the machine. With the electrically operated shovel steam lines with leaking joints are eliminated; less oil is used; a cleaner shovel is possible and delays due to cleaning fires are done away with. This delay is unnecessary with machines having two boilers, however, as one boiler has sufficient capacity to operate the shovel. Thus the fireman can clean the fire in one boiler while the shovel runs on steam from the other. Some may say that the cold air drawn in by the exhaust is injurious to the flues, but this can easily be prevented by the three-way valve in the exhaust line which turns the entire exhaust into either stack or both as desired. When boilers are used ashes are deposited on the coal. This dirt is eliminated when electricity is the motive power on the shovel; in the latter case expensive water supply and frozen pipelines are done away with, and labor is reduced to a minimum. Five to six men compose a machine crew on the electric shovel—a runner, a craneman, an oiler and three pitmen. The craneman often is omitted. Compare this with eight men on the steam machine; this crew includes a runner, craneman, oiler and fireman, with four men in the pit. The extra man in the pit is required to keep the shovel supplied with coal. When it comes to speed, the electric shovel is practically automatically controlled and "foolproof." It is impossible to speed it up as in operating the steam machine. When there is an overload, as there often is in pulling heavy stones, an increase in power above the capacity of the machine cannot be provided for at the electric control, as is often done at the steam throttle. The manufacturers arrange for a fuse to burn out instead. This prevention of an excess overload may save thousands of dollars on repairs and shovel upkeep, as well as add life to the cable. Ashes are not dumped on the coal and trenches are not dug in it, as is done when obtaining fuel for use on the steam shovel; these trenches frequently make extra trackwork. Some insist that it is unnecessary to dump ashes on the coal, but this is hard to prevent entirely. Six and 8-cu.yd. buckets are used on these shovels. However, the use of a 5- or 6-cu.yd. bucket is to be preferred over the 8-yd. bucket, on account of less strain. Yet with all the advantages of the electric shovel, the reliability and flexibility of the steam machines give them much prestige. With a supply of coal and water they can operate regardless of location.

The shovel used to load the coal is a much smaller machine than the stripping shovel; it is also of the revolving type. Shovels with booms from 28 to 32 ft. in length give the best satisfaction. The most valuable asset of this type of machine is the caterpillar tractor, which completely eliminates the use of pontoons and makes possible its operation with one pitman. On these small machines steam power has many advantages over the electric drive. While the large electric shovel is a machine run by three motors, the small one is operated by only one motor. The hoist, crowding and swinging mechanisms are operated by friction drives from this one motor, making impossible the "speeding up" of the machine while loading trains, as is possible with steam shovels. These shovels being small, it is easy to



STEAM SHOVEL USED TO LOAD STRIPPING COAL



STRIPPING COAL BY SHOVEL IN OHIO

increase their speed, and each minute saved in loading trains means cheaper production. On the other hand, only two men are required on the electric machine, the runner and pitman, while three men are required on the steam machine—a fireman being necessary.

The great advantage with the steam coal-loading machine, as with the "stripper," is its great flexibility. With the aid of a team to haul coal and water, and an extra man to help with the caterpillars, the shovel can be moved a distance of two miles in 10 to 16 hours. This, of course, depends upon the topography of the land. Such a move would be impossible with an electric machine, as the cost of power transmission would be prohibitive. These shovels can climb a 20 to 30 per cent. grade, but they must be moved straight up or down the hill. If an attempt is made to follow the contour of the hill, trouble is encountered by the trucks jumping the caterpillar belts. The only objection to the steam loading shovel is the leaking of flues in the vertical boiler. Much of this leakage is caused by mud on the flue sheet, which can be prevented by cutting out two or three flues every four or six weeks and "washing out" with water under high pressure. There are some objections to this, but they are negligible in comparison with the results obtained.

The haulage equipment depends largely on the plant layout. If coal is loaded directly into standard-gage cars, which is quite undesirable, one standard-gage 50-ton dinkey will serve one loading shovel. The big objections to loading directly into railroad cars are the lack of opportunity to clean the coal and the heavy track required. Then, too, it is often impossible to build a track from the railroad switch to the grade of the coal. Where the plant layout calls for a tipple, contractors' narrow-gage equipment is the most satisfactory to use. With two 14- to 18-ton dinkeys each hauling 15 four-yard dump cars, a loading shovel can be served at a distance of two miles from the tipple. An extra haulage unit of one dinkey and 15 cars should be kept in condition for use in any emergency that may arise.

The use of a tipple on a stripping plant is almost a necessity in the preparation of coal. Even with great care on the part of the shovel runner, bottom rock is occasionally loaded. Through the use of the tipple and picking table all impurities can be removed.

The increased use of automatic stokers in power plants makes a crushing unit most desirable, and an up-to-date tipple must include a picking table, crusher and slack conveyor. Each piece of apparatus should be equipped with an individual power drive, for should it be necessary to stop the picking table, in order to remove rock, the crusher can be run until emptied. In this way the crusher is not choked nor is it necessary to start it while loaded. The same is true of the slack conveyor.

Pit drainage is important as it is not always possible to obtain natural drainage. This makes necessary the use of pumps. In the choice of pumps there are three factors to be considered—capacity, portability and power. The capacity of the pump is quite important and it should be large. For instance, let us suppose we have a dry pit with the loading shovel descending a dip. A heavy rain falls during the night or early morning, which floods the loading pit. A man comes out with a team one or two hours before starting time, pulls a pump into the pit and has it dry by the time work should begin, or shortly after. This makes possible a full day's run, while if only a small pump is available one or two days' loading is lost because of the wet pit A portable centrifugal pump with a 4-in. suction and 3-in. discharge working against an 80-ft. head has given satisfactory service. This pump was driven by a 15-hp. gasoline engine with a chain drive and friction clutch. A gasoline engine, while a little troublesome at times, is convenient; and with a good gas-engine man on the job is fairly dependable.

The water supply, while one of the most important factors in steam plants, is generally given the least consideration. An undersized pump, with a 2-in. discharge, is generally hastily installed for the stripping shovel. As the shovel travels, the increased pipe friction and the addition of a loading shovel and dinkeys soon overload the pump and a shortage of water is the result. To close down a plant for lack of water because of low-capacity pumps and an undersized pipe line is not only expensive and inefficient management, but it is discouraging and exasperating to the man in charge as well as demoralizing to the working organization. On any stripping work, of one unit, a pump should have a capacity of not less than 60 gal. per min., and two pumps should be installed. Nothing less than a 3-in. pipe line, well buried below freezing, should be laid.

Flooded Coal Mines in Great Britain

The possibility that the Black Country mines will become totally submerged by the rising water has become a matter of grave concern in Great Britain, especially in view of the millions of tons of mineral that will be lost to the nation. In consequence of the heavy rainfall in the last few months and the inadequacy of the pumping machinery following serious breakdowns, a number of collieries were flooded, and it was intimated that several others will be unable to continue operations. Most of the pits in the Tipton district are working short handed, and the longer roads from the shafts have been abandoned. The colliery proprietors are urging government assistance to free the mines of water, but it is feared that any efforts made in this direction will now be too late. The miners' federation, at the request of the local association, is bringing pressure to bear on the coal controller, and local members of parliament are being urged to use their influence. The district has never before been faced with such a dismal outlook so far as the coal supply is concerned.

Preparation of Bituminous Coal—II

By Ernst Prochaska
Benton, Illinois

SYNOPSIS—*The water used in coal washeries must ordinarily be clarified before it is either allowed to run to waste or used for washing again. Various means have been tried for this purpose with varying degrees of success. One important adjunct of all coal washeries should be a raw-coal storage bin. This should be of sufficient capacity to hold one day's supply of coal. Suitable elevators or conveyors must be provided for placing the coal in storage and removing it therefrom.*

THE methods used for the clarification of the wash water and for sludge recovery at washeries have the combined purpose of using the sludge otherwise carried away with the outflowing wash water and of obtaining sufficiently clear wash water to be used over again. The wash water must be cleared to such an extent that a continuous circulation can be carried on, as the use of fresh water, on account of the great quantities required, would increase the cost of washing to a considerable extent. Theoretically the process of clarification should be carried on in such a way that only sufficient fresh water will be required to make up for the loss of water carried away with the washed coal and the refuse, and also that lost by evaporation and leakages.

The methods of water clarification depend entirely upon the nature of the raw coal. Friable coal which shatters in crushing and which contains a great amount of fireclay will require more extensive and carefully designed clarification plants than a raw coal which does not break up quite so fine and which is freer of fireclay.

The oldest and simplest means of clarifying water consisted of large settling ponds in which the sludge was permitted to settle. After one pond was filled up with sludge a new one was installed or the walls of the first one were built up higher. These settling ponds, however, required immense ground space and later on two clearing basins were installed which were used intermittently. If the first basin became filled, the water was run into the second and the sludge removed from the first.

Did Away With Removal of Sludge by Hand

This arrangement, however, required the removal of the sludge by hand. Further improvements were sought by the use of *Spitzkasten,* which permitted a continuous operation. The sludge was withdrawn from the apex of the *Spitzkasten* and carried in a sluiceway to a settling tank out of which the sludge was conveyed by means of a dewatering elevator to the fine-coal bins. The outflow of the sludge from the *Spitzkasten* was regulated by a valve or cock and was hardly ever continuous.

In some installations the *Spitzkasten* were consolidated into one large settling cone similar to the Callow tanks used in ore dressing. One of the first and best arrangements of this kind is the Ramsay sludge recovery tank used in connection with the Robinson washers. To make the process of sludge recovery still more automatic and continuous, narrow and long settling tanks were installed in which slow-moving scraper conveyors or even screw conveyors collected the sludge which had settled out on the bottom of the tank. On the end opposite to the inlet of the dirty water the bottom of the tank was depressed to form a sludge pit or sump out of which an elevator carried the sludge to the fine-coal bins.

None of the installations described in the foregoing brought about a sufficiently perfect clarification of the wash water. The moving conveyors disturbed the body of the water too much to permit perfect settling; the water overflowed too rapidly to drop all of the fine particles and the resulting sludge was too liquid to be used advantageously without further dewatering. The question of an efficient way of handling and preparing the sludge is still far from being solved in a satisfactory manner.

Dorr Thickeners Clear Water Satisfactorily

The most modern type of sludge recovery and water clarification apparatus—one that promises to become an important part of any coal washery—has been borrowed from the ore-dressing plants where it has been used satisfactorily for many years. The use of Dorr classifiers for the coarse sludge and of Dorr thickeners for the fine pulp is coming into favor, and the experience gained with a few existing plants has shown encouraging results. The Dorr thickeners, if properly installed, do clear the water satisfactorily; and the resulting sludge, even if too liquid to be used without further treatment, is removed continuously and automatically in a simple and economical manner.

The theory of the Dorr thickener is based upon correct principles. The dirty water enters the apparatus at the center and the clear water overflows at the periphery. The sludge settles on the bottom of the circular tank and is carried toward the center discharge in the bottom of the tank by means of slow-moving scrapers. These scrapers being located near the bottom of the tank do not in any way disturb the surface of the water, therefore they do not interfere with the settling out of the sludge. The proportion of solids to liquid in the sludge is only limited by the ability of the pumps to carry away the sludge. In actual practice sludge has been made having 56 per cent. of solids to 44 per cent. of liquid. This sludge is dry enough to be mixed with the dried coal coming from the washer.

Little has been accomplished in treating the sludge succesfully; in fact few people have taken this problem in hand. Some washeries spray the sludge while on shaking screens with fresh water, but this is merely done to wash off the adhering fireclay. In most washeries the sludge if recovered at all is mixed in with the washed fine coal without further treatment. Otherwise it is simply thrown away on the refuse dump.

The most feasible way of treating the sludge would be to dewater it on continuous drum-type filters, and if low enough in ash and sulphur mix it with the washed

coal; or if too high in impurities to permit this, to treat the sludge on slime tables.

The sludge disposal is the final process in coal washing. In regard to the general arrangement of a coal washery it must be stated as important that it has always been considered advantageous to eliminate as far as possible all mechanical means for conveying the materials from one unit to the next. The different units should be arranged in such a way that by gravity only, or by the use of the wash water, the materials can be moved through the whole washing plant.

Where washeries are located on level ground this is only partly possible and elevators and conveyors must be installed. In the early washeries the mistake was made of spreading them out in a horizontal direction and installing between each unit a separate elevating device. This necessitated a great number of individual drives, requiring constant repairs, a great number of spare parts and consumed excessive power. For this reason the modern washeries are built with the units arranged vertically, thereby concentrating all elevating machinery at the incoming end of the plant. This simplifies the machinery, condensing it into a few heavy but carefully designed elevators, driven by large motors that can be operated with a higher efficiency than a great number of smaller ones.

Reasons for Installing a Raw-Coal Bin

A raw-coal storage bin by all means should be included in every coal washery, and this should be made as large as possible for the following reasons:

1. Every interruption in hoisting coal will stop the washery if a certain reserve cannot be supplied during such periods.

2. The foregoing holds true for an interruption in the operation of the screening plant.

3. If the operation of the washery is interrupted, the presence of a raw-coal storage bin will permit the screening plant to be run until the raw-coal bin has been filled. Otherwise the screening plant must be shut down and in connection therewith the hoisting of coal must cease and the working of the whole mine must be stopped.

4. A coal mine does not deliver the coal regularly during the whole day. In the morning the hoisting is rather slow and speeds up until the middle of the day. It is apt to slow down toward the evening. For the proper operation of a washery a regular supply of coal is of the greatest importance. A good sized raw-coal bin permits drawing off of some coal left over from the preceding day during the period of slow hoisting and the filling up of the bin when more coal is hoisted than the washery can handle.

5. If on account of heavier hoisting than figured upon or on account of insufficient capacity of the washery more coal is mined than the washery can take, a large raw-coal bin will make it possible for the washery to consume the daily output of the mine by working overtime.

In consideration of the reasons just enumerated, the raw-coal storage bin demands the fullest consideration as it is an important equalizer between the mine, the screening plant and the washery. If it is not possible to build a sufficiently large bin between the screening plant and the washery, it will become necessary to build one or more reserve bins at some convenient place. Conveyors must be installed to carry the coal between these bins and from them to the washery. The different units between the screening plant and washery are the conveyors from the screening plant to the storage bin, the storage bin proper and the conveying system from the bin to the washery.

Location of the Raw-Coal Storage Bin

To arrive at the proper arrangement of the different units it is necessary to form a correct idea of the most advantageous location and elevation between the screening plant and the washery. The following facts must be considered:

The elevation of the screening plant is fixed by the elevation of the railroad track in the loading yard under the tipple. To load the coal directly from the screens into the railroad cars in the most efficient manner the coal should neither be elevated by separate machinery nor should it drop from too high a point. The elevation of the rails under the tipple are the base from which the elevation of the screening plant must be determined. In a screening plant the use of elevators can be easily avoided, but in a washery conditions are different. The coal must pass over a number of different pieces of apparatus and elevators cannot be entirely avoided.

It has been previously stated that modern washeries are designed with the point in view of avoiding as far as possible the use of numerous small elevators and to place the first units of a washery at such a height that the materials can be conveyed either by gravity or in sluiceways with water through the whole plant. On account of this method of construction it becomes necessary to elevate the raw coal from the screening plant to the washery at a considerable height.

Because the raw coal travels from the screening plant to the washery by way of the raw-coal bin it will be necessary to determine how this bin can be located to the best advantage and so as to make the carrying of the coal as economical and efficient as possible. A raw-coal bin of even a few hundred tons capacity requires a heavy supporting structure and therefore it should not be located any higher than absolutely necessary. The conclusion is thus reached that the heaviest elevating should not be done between the screening plant and the bin but between the bin and the washery.

Storage Bin Should Be Close to Washery

Some designs do not show a proper bin at all but only an arrangement to deposit the raw coal on the ground, with maybe a low retaining wall on both sides to keep the coal from spreading too far. These walls can also be used to support the loading conveyors. The coal is recovered from this pile by a conveyor running in an underground tunnel. For the elevation of great quantities and the required uniform delivery steep bucket elevators have proved themselves especially well adapted. Skip hoists cannot be considered, because the delivery is irregular and intermittent.

For these reasons it is advantageous to locate the raw-coal bin close up against the washery at the ground level. If we now consider that the coal is delivered from the screens at a slight elevation above the track level, and that the top of the raw-coal bin, on account of its required large capacity, is at a much higher elevation, a normal arrangement of the units between the screening plant and the washery will be as follows: Elevating or conveying machinery to overcome slight differences in height between the screening plant and

the raw-coal storage bin and elevators to overcome a considerable difference in height for feeding the washery from this bin.

Scraper conveyors are well adapted for medium grades and short distances. Their construction is simple and they have large capacity with relatively small power consumption. Belt conveyors are also advisable because they carry the smaller sizes of screened coal efficiently. The question to be solved is, which of these two types of conveyors fulfills the conditions to the best advantage?

Belt conveyors are theoretically well adapted for this purpose. The delivery chutes from the screens deposit the coal upon the belts in the best possible manner. The hoppers under the screens act as equalizers and permit uniform loading of the belts. The discharge of coal from the belt into the bin is carried on easily and the coal is transported without degradation. But on the other hand belt conveyors are rather expensive and the belts require frequent renewals.

Scraper conveyors are comparatively cheap, quite durable, and the separate parts can be easily and cheaply replaced so that they are better adapted for rough treatment. But they grind up the coal so that the choice between the two types of conveyors depends a great deal upon the nature and size of the material to be conveyed. Soft friable coals require belt conveyors, especially if the small sizes are of little value. To a hard coal that does not shatter much or to a coking coal where fines are not objectionable, scraper conveyors will be better adapted. But the scraper conveyors use more power than the belt conveyors so that the cost of energy is another consideration that must be taken into account in making the proper selection of the most economical type of conveyor.

Conveyors Transport Material Through Washery

Scraper or belt conveyors are not only used for the filling of the raw-coal bin but are also employed for the conveyance of the different materials through the washery, and especially for the filling of the washed coal bins, which are usually arranged in a series of separate bins set in a row. To fill these bins by means of scraper conveyors it is only necessary to put in openings provided with sliding gates in the bottom of the conveyor trough, at the proper points.

Belt conveyors can be easily equipped with trippers, which will permit the discharge of the coal at any point, or fixed discharge stations can be built into the conveyor. The trippers can be either hand-operated or they can be made automatic and self-reversing. By locating movable stops on the track rails the coal can be discharged either over the whole length of the bin or over any part of it. For bins which are located at right angles to the general flow of material, shuttle conveyors can also be used to advantage.

Which one of the arrangements should be employed depends entirely on the type of the bin. Generally speaking, belt conveyors on account of their light weight and their adaptability to almost any condition are to be used for long distances and for fine coal if it is not too wet. For coarse and wet coal and for short distances scraper conveyors are to be preferred. For short horizontal conveying, shaking conveyors of the Marcus or Zimmer type can also be used to great advantage.

If the raw-coal bin is included within the main washery building the same material is used in the construction of both units. This is either timber, steel or reinforced concrete; in some rare cases, cast iron. Raw-coal bins are built either rectangular or round. Rectangular bins are more expensive in construction but have a greater capacity per square foot of ground space occupied than have circular bins. Rectangular bins permit also a more perfect arrangement for loading and unloading apparatus than do round ones, especially if the necessary capacity increases.

The capacity of the raw-coal bin depends upon the output of the mine and should be at least as large as the daily production. Bins with a capacity of 4000 tons have been constructed and some of the latest designs show bins with 6000 tons capacity.

The mechanical appliances for supplying the washery with raw coal are of the greatest importance. The continuous and regular operation of the washery depends entirely on a steady coal supply; therefore, the strictest specifications should be applied for the design and construction of these appliances.

The capacity must be fully equal to that of the washery. It must be considered that elevators handling large tonnages require large, heavy buckets. On account of the size of the weights to be hoisted and the height to which the coal must be elevated, failures of the chain are disastrous and repairs become difficult and take up much time. For this reason it is preferred to use in large plants two elevators.

Importance of Reliable Elevator Operation

On the other hand the general arrangement and the space available permit the installation of only one raw-coal bin. This makes the installation of more than two elevators almost impossible on account of the lack of room at the bottom of the bins. The conditions at the discharge end of the elevators are similar.

As a usual thing only one unit is provided to receive the raw coal, and economic reasons demand the concentration of the flow of coal through the washery. Therefore we must seek absolutely reliable operation of the elevators. This can only be obtained by using the best of materials, by ample dimensions of the carrying members and by the best workmanship. First cost cannot be considered if we take into account the increase in cost of operation caused by repairs and interruptions.

But even with all these precautions it is advisable, whenever possible, to have a complete spare elevator on hand. In case of a wreck or a collapse of an elevator repairs take a long time, and for this reason a spare elevator ought to be in place for immediate use.

If these precautions are required for continuous operation, there remains still the necessity for a regular and uniform supply. This is of the utmost importance for the efficient working of a washery. On account of the existing conditions, which require the elevating of coarse-grained material at a steep angle to a considerable height, absolutely continuous discharge can hardly be accomplished. But the continuous bucket elevator comes nearer to fulfilling the conditions than any other apparatus.

Bucket elevators are used in coal washeries for various purposes. The most important of these are the following: Supplying the washery with raw coal; dewatering the washed coal and elevating it into the washed coal bins; supplying the rewash jigs; dewatering the sludge; dewatering the secondary product (boiler house coal) and elevating it to the boiler house

coal bin; dewatering the refuse and elevating it into the refuse bin.

The design and construction of elevators depend upon the material to be handled. Most of the elevators are constructed with a two-strand steel-link chain. The chain links and the connecting bolts and rods ought to be fabricated out of the best medium carbon machinery steel. Small elevators have flat links, but for heavy elevators links with upset ends are to be preferred. Under ordinary conditions and for dewatering elevators, buckets are fastened to the chain at every other link. For raw-coal elevators buckets are provided at every link, making it a continuous bucket elevator.

Buckets are made from steel plates, securely riveted to the end plates and provided at the top edges with stiffening bands. Wide buckets have also a stiffener in the middle to prevent bulging out of the sides. The ends of the buckets are fastened to the sides with angle iron or, in some instances, the ends are made of malleable iron. Malleable-iron buckets or those pressed from one piece of steel plate are seldom used. Dewatering elevators have buckets with sides and ends made out of perforated plates. The size of the perforation must be in proportion to the size of the coal handled.

The elevator chains at the top are carried over sprocket wheels or head drums. On the lower end foot drums are universally used. Square, hexagon and octagon drums are employed, depending on the pitch of the chain links. Octagon drums can be used with short pitch chain, whereas those of long pitch require square drums. The pitch of the chain links varies from 8 to 18 inches.

Mechanical Details Are Important

The take-ups are generally placed at the foot of the elevator and only on small elevators are the take-ups placed at the top. Head and foot drums are either made of steel or have steel wearing plates. The chains are guided between angle irons which ought to be protected by wearing plates. To prevent a reverse or running-down motion of the elevator in case of a break, holdbacks are sometimes used.

Elevators are usually driven through a train of gears or by a sprocket or silent chain drive. Belt drives should not be used on account of the danger of slipping. The gear wheels should be of steel while for heavy elevators manganese steel gears ought to be specified.

The framework supporting the chains may be made of steel for the raw-coal elevators, but for dewatering elevators timber frames are to be preferred. The head and jack shafts ought not to be supported on the elevator frames, but on a separate supporting structure. This is advisable in order to facilitate repairs and to keep the gears in better alignment. The size of the bucket elevators varies considerably. The elevators for heavy tonnage are massive and heavy, and must therefore run slowly in order to prevent rapid wear. Dewatering elevators also must operate at a slow speed to permit the draining out of the water before the buckets reach the discharge point.

Dewatering elevators must be inclined to such a degree that the water running out of one bucket will not drip into the one next lower. Raw-coal elevators could be installed vertically, but this arrangement would require too much room at the head as well as at the foot end. The inclination of a raw-coal elevator depends entirely upon the room available. The speed of raw-coal elevators ought not to exceed 100 ft. per minute while dewatering elevators should not be run faster than from 50 to 60 ft. per minute. The maximum capacity of elevators in coal washeries is about 200 tons per hour.

(*To be continued*)

Legal Department

Exclusive Sales Agencies—A contract by a coal-producing company granting another company an exclusive agency for the sale of its output impliedly binds the agent corporation to dispose of its entire output so far as reasonable effort permits. (Kentucky Court of Appeals, Cassidy Coal Co. vs. North Fork Coal Co., 208 Southwestern Reporter, 769.)

Mine Engine as Part of Realty—Where a mining company installed on mining property owned by it an engine weighing 25,000 lb., with a flywheel 12 ft. in diameter, and embedded in a heavy concrete foundation, the engine passed under a subsequent deed of the real estate, as a part thereof, there being no attempted reservation of title to it in the deed. (Alabama Court of Appeals, Lewis vs. Mable, 80 Southern Reporter, 690.)

Pennsylvania Workmen's Compensation Act—A miner dying from inhalation of noxious gases in a mine while obtaining tools is to be regarded as having died from an accident occurring in the course of his employment, entitling his dependent relatives to an award under the Pennsylvania Workmen's Compensation Act, although he had been warned against going to that part of the mine. (Pennsylvania Supreme Court, Gurski vs. Susquehanna Coal Co., 104 Atlantic Reporter, 801.)

Mining Lessee's Timber Rights—A lease of coal lands, granting to the lessee the right to such trees not more than twenty inches in diameter one foot above the ground as might be needed in mining operations, should be construed as applying the diameter limit to the time of cutting, and not as authorizing cutting of trees of that size at the time the lease was made but exceeding the twenty-inch limit at the time of cutting. (West Virginia Supreme Court of Appeals, Raleigh Coal and Coke Co. vs. Mankin, 97 Southeastern Reporter, 299.)

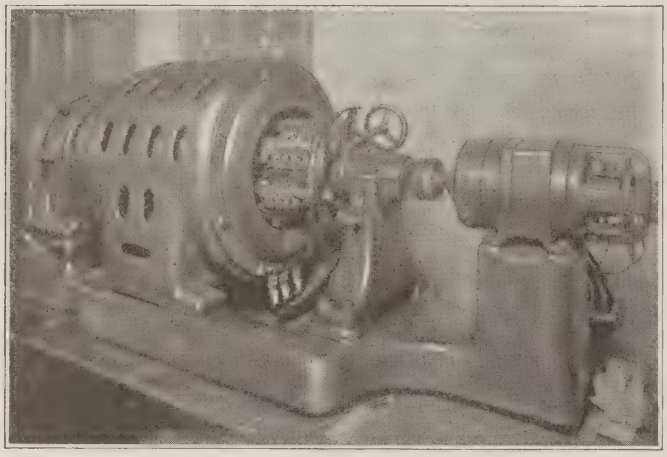
No Liability for Injury to Employee—A mine tracklayer stepped in between two motors to obtain a drink of water from a bucket on one end of one of the motors, although he could have safely and conveniently stood at one side in a clearance way. Not knowing of this man's presence between the motors, one of the motormen attempted to move his motor, but when the brakes were released it rolled back toward the other motor, for want of contact with the trolley wire, and the tracklayer was crushed between the motors and killed. Held, that the mine operator is not liable; there being no actionable negligence through failure to take proper precautions for the safety of decedent. (Kentucky Court of Appeals, Komonyi vs. Consolidation Coal Co., 206 Southwestern Reporter, 883.)

Rights of Coal Corporation Stockholders—An entryman on public coal lands, being unable to pay the price required by the Government, induced three other persons to organize a corporation, to which it was proposed to transfer the entries in exchange for stock. It was agreed as to the proportions in which the stock was to be distributed. Held, that other stockholders cannot recover from the three promoters on the theory of an improper stock distribution to the latter, where the transaction resulted in a profit to the corporation, and all the stock was worth at least par by reason of the lands so conveyed to the company. It is immaterial that the promoters may have reaped greater profits than other purchasers of shares in the corporation. (Utah Supreme Court, Robertson vs. Draney, 178 Pacific Reporter, 35.)

Coal Mine Ventilation Motors*

By H. W. Chadbourne
Schenectady, N. Y.

IN COAL mining it is necessary to keep all passageways and working places in a healthful and safe condition for work. To accomplish this there must be maintained a circulation of fresh air that will dilute, render harmless, and sweep away the noxious gas produced by the breathing of man and animals, the burning of lamps, the condensation of powder smoke, the decay of timber and other organic matter, the gases occluded from the coal faces and the fine coal and slack. Also, if gasoline mine locomotives are used, their exhaust contains additional gases to be diluted and swept away. Not only is the oxygen of the air consumed in the operations



REGULATING SET FOR MINE FAN MOTOR

performed in a mine, but a portion is also absorbed by the freshly exposed faces of coal.

There is always an unequal pressure on the air in a mine. This is caused by the difference in temperature of the air inside and outside the mine. This pressure forces air through the passages and workings. The volume of air passing through the mine varies directly with the pressure and inversely with the resistance of the air passages.

Although this method may be suitable for small non-gaseous mines, it is rarely used. Some of the objections to its utilization are that the air pressure varies with the external air temperature. The direction of pressure may be reversed from winter to summer and at intermediate times the pressure will be light or even non-existent, and may vary with the force or direction of the wind. The amount of this natural pressure can be calculated for any given difference of air temperatures, and thus the volume of air at any time be determined.

A furnace is sometimes used to raise the temperature of the up-cast air so that it will be lighter than the down-cast air. This gives more pressure and insures the air always traveling in the same direction. The chief point to be considered is the correct size of furnace. This type of ventilation should not be used in gaseous mines, and in some cases it is prohibited by law.

There have been a number of mechanical methods tried for ventilating mines. Among these might be mentioned: The wind cowl by which the wind pressure on the surface is brought to bear effectively upon the mine air-ways, the waterfall, the steam jet, and the fan or blower.

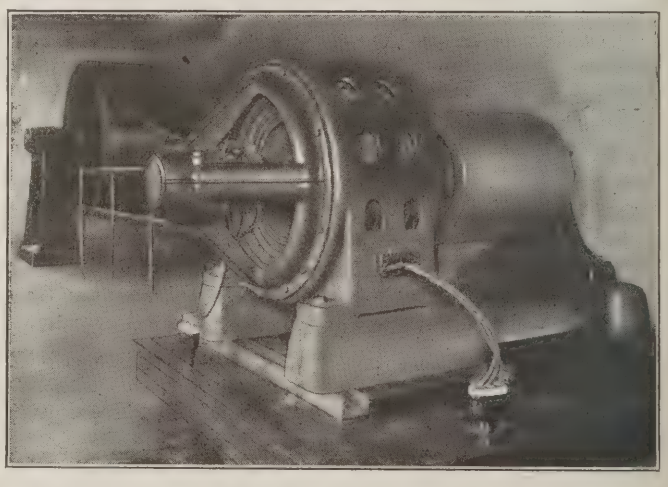
Mine ventilation fans are of two types, the disk fan and the centrifugal fan, with both of which all mining men are familiar.

The matter of fan speed is an important one. A small fan at high speed may give the same pressure and volume as a large fan at lower speed. There are, however, a number of conditions which make it desirable to have a variable-speed fan. For a given fan with a given size outlet the pressure varies nearly as the square of the speed, the volume directly as the speed, and the power required as the cube of the speed.

There are some conditions where a constant amount of air is necessary 24 hours a day all the year. For this constant-speed work, the standard induction motor is perfectly adapted. It may be remote-controlled if necessary, and requires no attention except to the oiling system; and that only at long intervals.

The choice as to whether a squirrel-cage or phase-wound rotor is used depends on the size of the motor and on the capacity of the transmission line and power service to supply the maximum peak requirements. Generally speaking, squirrel-cage motors should be employed up to about 200 hp., and phase-wound or slip-ring motors above that capacity.

When a mine is in the early stages of development only a small ventilating capacity is required, but later as the workings grow more air is necessary. Also there are times when because of falling roof or other blockades in the air passages a higher pressure is desir-



MOTOR DRIVING VENTILATING FAN

able with a smaller volume. Under these conditions an adjustable-speed fan is desirable and almost necessary. It is therefore the usual practice to use fans of low or moderate speeds, arranged for increased speed when required.

For adjustable-speed motors one naturally thinks first of direct current. The characteristics of a direct-current motor are well suited for adjustable-speed fans, and a large number of such installations have been made. These motors, however, require attention to the

*Abstracted from "Ventilation of Coal Mines," in *General Electric Review.*

commutators, and brushes and the transmission of direct current is not economical except for short distances. Therefore alternating-current motors are used almost entirely.

There are a number of methods for adjusting the speed of alternating-current motors. The first and simplest utilizes the standard induction motor with slip rings or phase-wound rotor and external resistance in the rotor circuit. This motor starts with a small current input and for a given resistance in the rotor circuit it runs at constant speed for a given fan load. As the fan load rarely changes except because of a change in speed, any speed or fan output desired may be obtained by varying the resistance.

The principal objection to this system is that it is inefficient. For instance, for half-speed operation, the power exerted upon the air will be the cube of ½, or 12½ per cent. of full load; but there must be dissipated an equal amount in the resistance plus the losses in the motor itself. Thus an efficiency of less than 50 per cent. is actually obtained. In spite of this low efficiency, however, a large number of these motors have been and are being installed for this class of service.

There are a variety of different dynamic regulation methods which can be employed. Under rheostatic control the energy from the rotor circuit is dissipated as heat. In the dynamic methods this energy is put back into the line. The most common of these systems is that of a regulating set. This arrangement gives exceptionally good operating characteristics, together with high efficiency and power-factor. Its only objection is the additional first cost of the set.

For fan motors of 300 hp. or less, a brush-shifting motor gives a simple, efficient and easily operated machine. This motor is started, its speed changed and even reversed by means of shifting the brushes. With a certain brush setting no torque is developed, and under this condition the motor will not start even if the line switch is closed. The brushes are shifted by a worm gear and handwheel to obtain the desired speed. This type of motor gives stable operation for fan service down to 70 per cent. below synchronism.

Cannel Coal in Texas

What is possibly the largest body of cannel coal in the United States, if not in the world, lies on the Rio Grande about 25 miles above Laredo, Tex. The outcrop of this coal can be traced for many miles in the bluffs along the river in Webb County to a point at which it swings northward into Uvalde County. The coal has been mined for many years at Santo Tomas and more recently at Darwin, or Cannel, and Dolores. It occurs in two principal beds, about 90 ft. apart, both of which are being mined. The beds range in thickness from about 2 ft. to 2 ft. 6 in., and are fairly persistent. For many years they have supplied a large part of the coal used on the railroads in southern Texas and the adjacent part of Mexico.

This coal is of geologic interest because, although it lies in rocks which elsewhere in Texas contain only lignite, it is a bituminous coal. It has the qualities of a cannel coal; it contains a large amount of volatile matter, or gas, and it yields oil by distillation—about 50 gal. of oil to the ton of coal. It contains more nitrogen than any other coal in the United States.

At most places the roof of the coal is poor and requires considerable timbering, and as no trees grow in Webb County this requirement adds considerably to the cost of mining. At each of the mines in this district there is a huge dump of clay, either removed in mining the coal or derived from the shale that forms the roof.

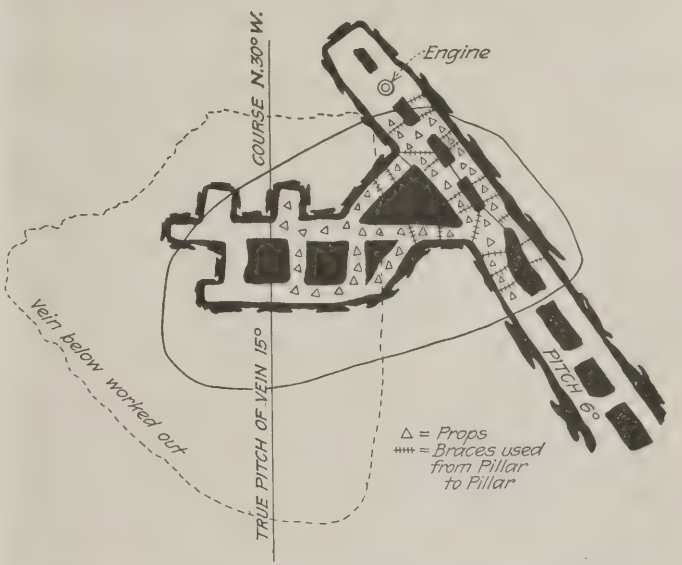
The coal of this field is described in a bulletin entitled "The Santo Tomas Cannel Coal, Webb County, Texas," by George H. Ashley, issued by the United States Geological Survey, Department of the Interior, as Bulletin 691-I.

A Sudden Mine Squeeze Arrested

By J. R. Thomas
Plymouth, Penn.

A squeeze is looked upon by mining men as a difficult problem to handle. Especially is this the case when a squeeze occurs in a bed where the seam underlying it has been worked out. The illustration shows the workings of a section of a mine where a sudden squeeze occurred, and as the bed underneath was worked out within the area shown by the dotted line, many reasons existed to support the belief that it was impossible to save the workings from caving in, or falling into the bed below.

When this squeeze was discovered the first thing done was to temporarily support the roof in the plane



SECTION OF MINE WHERE SQUEEZE OCCURRED

and plane airway with a row of substantial props. Then it was noticed that the props were getting loose, which necessitated their being recapped. It was deemed advisable, therefore, to try and support the roof from the bed beneath, but it was found that it was impossible to get into this at the proper point. The next thing done was to use good strong braces from pillar to pillar, as indicated by the small triangles in the drawing. After the first three pillars had been braced firmly, the squeeze seemed to settle a little. The braces were then used on the pillars, as shown in the sketch, and the workings allowed to stand awhile. It was noticed that the braces were taking weight, as they were bent.

After the workings had stood for a few days the work of reopening began. As the props and braces were removed, double timber of ample size was set and the bed beneath flushed to offer insurance for the prevention of a similar occurrence. The workings at present are still in operation, and everything is quiet.

Progress in Utilizing Pulverized Fuel*

SYNOPSIS—*Many reports received from users of pulverized fuel vary widely in tone, character and enthusiasm. Too much emphasis has been laid upon "heat balances" and by far too little on "cash balances."*

PULVERIZED (or powdered) coal has actively engaged attention for the past five years. Last year we all laid off from studying such things as pulverized coal to do our share in attending to the case of a combination in Central Europe that threw a monkey wrench into the gears of world progress with the idea of revamping things terrestrial to suit their particular kultur scheme. The boys went at the job so hard and earnestly that most of them have not really stopped yet.

The progress report now offered, therefore, will on account of the unusual conditions which have existed consist of a summary of some results, comments and suggestions. These are offered solely with the idea that they may bring out pertinent frank discussion and constructive criticism on an interesting engineering subject. All deeply appreciate the earnest work that has been done thus far to advance the art of burning pulverized coal by both manufacturers and those interested in effecting steam economy. There are many things about pulverized coal that we are satisfied with. There are some things that we are not satisfied with.

It is of the utmost importance that accurate analysis of this subject be made in order that progress may proceed along correct lines. The exact truth of the matter is what is wanted, as no one is so badly fooled as he who fools himself. And now, on the eve of a new advance in world progress, seems a good time to take an inventory.

As railroad interest in pulverized coal at this time lies principally in its value as a steam producer, the subject will be considered from that angle only. To date five different American railroads—the Atchison, Topeka & Santa Fe, Chicago & Northwestern, Delaware & Hudson, Missouri, Kansas & Texas and New York Central—have successfully operated during test periods individual locomotives equipped for and burning pulverized coal. These tests were all made under regular service conditions, and have demonstrated that locomotives burning pulverized coal will meet the train-handling conditions imposed by the different classes of service. None of the locomotives tested is in service at this time, it being necessary in most instances on account of war activity and demand for power to remove the pulverized-fuel equipment and discontinue the experiments.

Requests for information on results obtained from the tests made on locomotives were kindly complied with. The following points from replies received are of interest:

a. A carefully conducted test between two engines of the same class, one burning pulverized coal and the other hand-fired, showed that a saving of 23 per cent. in fuel burned could be made by burning pulverized coal. The main difficulties encountered were the slagging over of the flue sheet and burning out of the brick arch. The slagging was largely overcome by an air jet to blow off the slag accumulations. A number of burner arrangements were tried, but it was found impossible to overcome the rapid burning out of the brick arch. The cost of replacing the arch brick largely overcame the saving in fuel. The delay to locomotive, replacing arch brick, was also a decided drawback.

A comparison of total costs of hand-firing versus pulverized-coal firing on the locomotives tested, which include cost of pulverizing, cost of handling, cost of arch maintenance, interest and depreciation, showed the hand-firing to be the more economical.

In fairness to the pulverized coal it was thought possible to design a firebox that would eliminate such troubles as burning out of the brick arch and show an advantage in favor of the pulverized coal.

b. Burning pulverized fuel was quite satisfactory, furnished all the steam that was wanted with splendid control all the time, burning 60 per cent. anthracite and 40 per cent. bituminous, the bituminous being necessary to increase the volatile.

The question of economy is quite another thing, and unless a poor or byproduct coal can be purchased at a price that will absorb carrying charges, operation, etc., of a pulverizing plant and not exceed the price of a satisfactory lump coal, it should be given careful thought. There is no saving in the quantity of fuel used when pulverized, in fact the difference is in favor of the lump coal. Pulverizing costs between 45 and 50 cents per ton.

c. The burning of pulverzied coal in a locomitive was quite an easy proposition, and with us was very satisfactory. The only difficulties were with the drying, pulverizing and handling of the coal, and also the danger in connection with it. In case of a large number of engines being equipped to burn pulverized coal, were the plant to be blown up, burned or otherwise made inoperative, the locomotives would be tied up until the plant was in service again.

One foreign railroad, the Central Railway of Brazil, has made marked progress in burning pulverized coal. The following quoted from data kindly furnished by the Pulverized Fuel Equipment Corporation, will be of interest and give an idea of what has been accomplished:

d. The Central Railway of Brazil, after considerable investigation of pulverized-fuel-burning locomotives in this country, on account of the high cost of imported coal and inability to utilize the low grade domestic coal by burning it on grates, decided to install pulverized-fuel equipment for locomotive and stationary boiler purposes.

From a study of the coal measures in the southern part of Brazil during 1904-06 it was concluded that the native coal was unsuitable for economic use. Later, during 1915-16, at the direction of Dr. Miguel Arrojado Lisbona, then director of government-operated railways, an investigation was made of the use of pulverized fuel in the United States with the result that the Central Railway of Brazil decided to install a 15-ton-per-hour fuel-preparing and coaling plant and a stationary boiler equipment at Barra do Pirahy, an engine house and shop terminal about 65 miles north of Rio. Plans and specifications were prepared and installation was made. Arrangements were also made for the equipping of 250 existing and new locomotives, and since 12 ten-wheel type and two consolidation-type locomotives have been newly built and so equipped by the American Locomotive Co. and put into regular use.

The first locomotive put into service was No. 273, one of the ten-wheel type, which on its first round trip between Barra do Pirahy and Entre Rios ran a distance of about 110 miles, in freight service, in 7 hours 11 minutes, maintaining an average steam pressure of 172 lb. with maximum

*Progress report submitted by pulverized fuel committee to the International Railway Association. Committee consisted of W. J. Bohan (chairman), H. T. Bentley, H. B. Brown, R. R. Hibben, D. R. MacBain, J. H. Manning, H. C. Oviatt, John Purcell and L. R. Pyle.

working pressure of 175 lb., and with the pulverized-fuel-burning equipment working perfectly.

Steam pressure was easily maintained at all times with a clear stack with no difficulty whatsoever from ash or slag in the firebox or flues.

The first *official* run with the Brazilian native coal pulverized was made on Sept. 9, 1917, with a special train that transported Dr. Wenceslao Braz, President of the Republic of Brazil, and his staff. Ten-wheel type locomotive No. 282 handled the President's special train from Barra do Pirahy

ANALYSES OF FUELS USED

Name	Kind	Moisture	Volatile	Fixed Carbon	Ash	B.t.u.
Jacuhy	Bituminous	6.10	28.40	45.70	19.80	10,851
Santa Catharina	Bituminous	12.60	36.00	42.10	9.00	10,259
S. Jeronymo	Bituminous	3.00	31.00	39.30	26.70	9,565
Cascapava	Lignite	19.00	36.00	19.20	25.80	5,249

to Cruzeiro, a distance of about 90 miles, and during the greater part of the trip President Braz remained in the locomotive cab and fired the locomotive, on which the steam pressure was fully maintained throughout, without any smoke.

The Central Railway of Brazil locomotives equipped with pulverized fuel are operating in fast passenger, mixed passenger and freight, and freight service, and all are giving excellent results.

The results of tests recently conducted with Brazilian native coal and lignite may be stated as follows: (1) Distance traveled during trials was 118 miles. (2) Boiler pressure during trials remained almost constantly at 175 lb., which is working pressure.

The only difficulty met with has been in instructing the enginemen, who were not acquainted with this method of combustion, and for this purpose an illustrated instruction book has been issued to each man.

Only by adopting this pulverized-fuel system has the problem of the utilization of Brazilian coal, which cannot be burned practically or economically on grates or in retorts,

PERFORMANCE DATA

Fuel Name	Fuel Kind	Fuel B.t.u.	Quantity Burned Per Trip, Net Tons	Evaporation Lb. of Water Per Lb. of Fuel	Ash Found in Firebox and Pan, Lb.
Jacuhy	Bituminous	10,851	4.19	7.2	176
Santa Catharina	Bituminous	10,259	3.5	7.1	176
S. Jeronymo.	Bituminous	9,565	5.42	7.1	198
Cascapava....	Lignite....	5,249	4.41	7.3	220

or utilized to good advantage for the production of producer gas, been solved, and the development of the native coal fields of the country is now in process through the establishment of steamship and railway means of transportation from the mines, and in the actual mining developments.

Something like 200 pulverized-fuel installations on stationary plants are in operation throughout the United States, comprising central power and lighting stations, street railway power stations, power stations of various manufacturing industries, railroads, mining companies, smelters, sugar refineries, office buildings, hotels, schools, laundries, etc. These plants are reported as successfully burning all grades and classifications of anthracite, bituminous, sub-bituminous and lignite coals in the pulverized form.

The following are quotations from various replies to inquiries sent to different parts of the country asking for results obtained from stationary plants:

a. From an engineering company handling pulverized-coal equipment:

The advantages which can be obtained by using pulverized coal in plants where the quantity of coal used daily is sufficient to obtain a low cost of preparation is marked. In the first place, where pulverized coal is used, it is necessary that the boilers be equipped with combustion chambers suitable for the maximum amount of coal that will be burned to operate the boilers at maximum rating. The reason for these large combustion chambers is to eliminate refractory troubles entirely. The obtaining of good combustion is secondary to furnace life, and therefore this feature of design of the combustion chamber is the most important one to consider.

All kinds of coal can be burned satisfactorily in pulverized form regardless of quality, and there are no limitations to boiler capacity due to poor qualities of coal fired. Economy of operation is therefore far beyond that obtained by burning coal in lumps with any other kind of equipment, and from results already obtained there is no question in our minds but that pulverized coal is the coming fuel and that burning coal in pulverized form will shortly become the standard method of burning on account of the high economy obtainable.

b. Remarks in connection with a test made at an eastern experimental plant burning anthracite silt:

All claims made as to efficiency to be obtained were demonstrated to the satisfaction of everyone present, and it was remarkable how they made it possible to control the temperature in the ash pan. As you are aware, this has been the source of considerable trouble when removing the slag, but I wish to state no trouble in this connection was experienced at this test. The evaporation of 8 lb. of water per pound of coal was remarkable in view of the fuel used.

The proximate analysis of the fuel used in this test was:

	Per Cent.
Moisture	0.5
Volatile	8.5
Fixed carbon	78.0
Ash	13.0
B.t.u.	12,000 to 13,000

c. The folllowing is a log of test of a 300-hp. boiler burning a low grade of Pacific coast sub-bituminous pulverized coal exclusively at one of the power stations of a large West Coast traction, light and power company. (Figures shown in column A.)

The committee also obtained a log of test of two 512-hp. Stirling boilers located at one of the stations of another large railway, light and power company in another city in the same territory burning a similar grade of coal with Sanford Riley stokers. (These results are tabulated in column B for comparison.)

	A (Pulverized Coal)	B (Sanford Riley Stoker)
Type and capacity of boiler	B. & W. 300 hp.	Stirling 512 hp.
Duration of trial	14 hr., 7 min.	10 hr.
Temperature of feed water, deg. F.	185	150
Water evaporated, lb.	148,240	238,099.47
Temperature of steam, deg. F.	412	.....
Steam pressure, lb. ga.	112	.....
Factor of evaporation	1.1	1.17
Weight of coal, lb.	24,540	.....
Evaporation per lb. of coal as fired	6.05	5.175 (dry coal)
From and at 212 deg.	6.67	6.054 (dry coal)
CO_2 flue gas	13	8.8
B.t.u. raw coal	8,061	6,974 (as fired)
B.t.u. pulverized coal	9,688	9,650 (dry)
Efficiency, per cent	67 (details not given)	
Kind of coal	Centralia-Tono	*Chehalis-Superior
*Approximate analysis	*As fired	*Dry Coal
Moisture	27.50	....
Volatile combustible	35.53	49.08
Fixed carbon	27.98	38.65
Ash	8.9	12.27
Sulphur	1.07	1.53
B.t.u.	6,974	9,650

NOTE.—Attention is called to the comparative closeness of results obtained considering comparative B.t.u. of the two dry coals.

d. Personal visits to pulverized-coal-burning plants installed in a large office building, a high school building and a large laundry in this city (a Western city) developed that at both the office and the high school buildings trouble was being experienced with moisture in the powdered coal, and that one case of explosion had occurred at the laundry

due to careless operation. Engineers in charge of these plants expressed the opinion that oil and powdered coal at present prices in that locality were about a standoff.

e. From a company handling pulverized fuel apparatus:

Supporting data will show you that past experience has demonstrated that for locomotive use the economy of pulverized fuel has been proved, and that the items of auxiliary cost, trouble with moisture reabsorption and slag are things of the past and not of the present or future.

f. From a cement company (Southwest) which has burned powdered coal in its stationary boiler plant to some extent:

We have for years used pulverized coal in our kilns and therefore are fully equipped for drying, pulverizing and conveying this fuel in powdered form. Our coal when dried contains less than 1 per cent. of moisture, and we have provided against damage and therefore have never had an accident on account of spontaneous combustion. I may state further that our limited experience leads us to believe that while there are some difficulties to be overcome, greater efficiency may be obtained from the use of coal in the powdered form, under properly equipped stationary boilers of suitable type, than can be obtained from the use of such coal in any other form.

g. From a large power and light company (Middle West):

We do not experience any slagging, brickwork or explosion trouble. Difficulties are being encountered due to moisture in the coal, but whether it is a reabsorption or not we cannot definitely state. We are making arrangements to determine this by changes in our drying plant. When this is completed we will have eliminated one uncertainty.

h. From a large smelting company (Rocky Mountain district):

In the following report of boiler test is shown the type and size of boilers used and the efficiency obtained in our power house boiler No. 8. Only No. 7 and No. 8 boilers are now equipped with pulverized-coal burners. But it is expected that we will equip the other boilers to burn this fuel in the near future. The power house boilers are used as auxiliary to the waste heat boilers in the reverberatory furnace flues; so that the load factor on these boilers is quite variable and the efficiency is correspondingly low.

The coal is dumped from the cars into coal bins; then on belt conveyors it travels past Ding magnetic pulleys, which take out all iron, onto rolls where it is crushed; into Ruggles coal dryers; up elevators to Raymond five-roller pulverizers; fan elevators and screw conveyors; to powdered coal-storage bins over furnaces to be fired. Eighty per cent. of the powdered coal will pass through a 200-mesh screen. At first considerable trouble was experienced with explosions. These difficulties were overcome by study of conditions. In drying the coal the temperature of the dryer and amount of air was regulated according to amount of moisture.

With moisture from 5 to 10 per cent. the temperature used is 110 to 130 deg. C.
With moisture from 10 to 15 per cent. the temperature used is 120 to 140 deg. C.
With moisture from 15 to 20 per cent. the temperature used is 130 to 145 deg. C.

Explosions are sometimes still experienced in the elevator that takes the coal from the dryer, but explosion doors are provided and the explosions do no damage. The pulverized coal in the storage bins sometimes ignites spontaneously, but these bins are air-tight and the smoldering fire is soon extinguished by cutting off the coal supply to the bin on fire, and feeding out the coal in the bin.

i. From a southwestern railroad:

I am not in a position to give you very much of a report for the past year, as our stationary boiler plant that uses pulverized fuel has during the past year been compelled to use a considerable amount of oil, this on account of breakdowns and other troubles, and also the mixing of oil and powdered coal.

The manufacturers have for some time, in fact almost all winter, been changing, overhauling and remodeling their equipment, and on two boilers we have had very little service on this account. I am not going to give you any figures as to the cost of using pulverized coal at our plant for the reason that our pulverizing and drying plant has not sufficient capacity to properly take care of the demands upon it, and this, you understand, requires more labor than would otherwise be necessary, hence the cost is greater and would not be a fair comparison. We have, however, kept the plant going on pulverized coal most of the time, but it has been a forced proposition.

The foregoing summary you will note has been collected from widely different sources. It is representative of the results obtained with different fuels throughout the United States and also is representative of the enthusiasm of the manufacturer of pulverized fuel apparatus and the reality of the man who must justify his engineering opinion for power installations by increased economies sufficient to justify the expenditures made and who must primarily keep the industry in which he is interested operating at full capacity. The following conclusions may be deduced:

The development of the art of burning pulverized coal during the past two years has shown marked progress in that the experimental work done and tests made, although still incomplete, have demonstrated the

EVAPORATION TEST ON 330-HP. TYPE K-19 STIRLING BOILER BURNING POWDERED COAL

1.	Date of trial	Sept. 6, 1918
2.	Duration of trial	6 hr. 48 min.
	Make of boiler	Stirling
	Sq.ft. heating surface	3,297
	Rated horsepower	330
	Volume of firebox	1,782 cu.ft.
	Number of burners	1
	Average Pressures	
3.	Steam pressure in boiler, by gage	153.5 lb.
4.	Absolute steam pressure	166.28 lb.
5.	Atmospheric pressure, 25.95 in.	12.78 lb.
	Average Temperatures	
6.	Of external air	77 deg. F.
7.	Of fireroom	80 deg. F.
8.	Of steam	366.6 deg. F.
9.	Of escaping gases	514 deg. F.
10.	Of feed water	64 deg. F.
	Fuel	
	Kind	Wyoming lignite
	State	Powdered
	Analysis of Coal	
		As Fired / As Received
	Moisture	2.83 per cent. / 19.2 per cent.
	Volatile	42.77 per cent. / 34.3 per cent.
	Fixed carbon	49.90 per cent. / 42.5 per cent.
	Ash	4.50 per cent. / 4.0 per cent.
	B.t.u., per lb	11,849
11.	Total amount of coal fired	13,821 lb.
12.	Dry coal fired	13,430 lb.
13.	Combustible fired	12,808 lb.
14.	Total coal fired per hour	2,032 lb.
15.	Dry coal fired per hour	1,975 lb.
16.	Combustible fired per hour	1,884 lb.
	Quality of Steam	
	Percentage of moisture in steam	3.3 per cent.
	Quality of steam	96.7 per cent.
	Degrees of superheat	0.
	Water	
	Total water fed to boiler	99,679 lb.
	Total water actually evaporated	96,390 lb.
	Total water evaporated from and at 212 deg. F.	115,547 lb.
	Water fed to boiler per hour	14,659 lb.
	Water actually evaporated per hour	14,175 lb.
	Equivalent water evaporated per hour from and at 212 deg. F.	16,992 lb.
	Lb. of water fed to boiler per lb. of coal fired	7.21
	Lb. of water evaporated per lb. of coal fired	6.97
	Lb. of water evaporated per lb. of dry coal	7.18
	Lb. of water evaporated from and at 212 deg. per lb. of coal	8.36
	Lb. of water evaporated from and at 212 deg. per lb. of dry coal	8.60
	Lb. of water evaporated from and at 212 deg. per lb. of dry combustible	9.02
	Average heat in coal 11,849 B.t.u per lb. of coal as fired— Heat produced per hour	24,077,168 B.t.u.

Heat required to evaporate a lb. of steam as discharged from the boilers = 0.967 (1195.1 — 32.0) + 0.033 (338.7 — 32) = 1124.7 + 10.1 = 1134.8.

Total heat given to the boilers per hour = $14,659 \times 1134.8 = 16,635,000$ B.t.u.

$$\text{Efficiency of boiler} = \frac{16,635,000}{24,077,000} = 69.1$$

$$\text{Horsepower developed} = \frac{16,635,000}{33,479} = 497.$$

$$\text{Per cent. of horsepower rating developed} = \frac{497}{330} = 151 \text{ per cent.}$$

apparent soundness of the principle of burning coal in a finely divided form in suspension, and that the complete commercial success depends upon the further careful working out of such details as the correct determinations of proper fineness of the various grades of coals, and economical and efficient methods and apparatus for preparing, storing and transporting the pulverized coal to the stationary plant or locomotive furnace.

It has not been clearly established that coal ground to the extreme fineness and dried to the extent recommended by most of the supporters of pulverized coal best meets the conditions of the practical user operating under widely diversified conditions. The tendency to explosion and spontaneous combustion, which is always present in coal of this character, should be eliminated entirely if possible to do so. The tendency of reabsorption of moisture in containers and transmission piping in stationary plants and at coaling stations of railroads will always be a problem in climates having extreme variations of temperature and humidity.

Experiments to determine if thoroughly air-dried coal ground to the fineness of, say, coarse granulated sugar and burned in suspension in specially designed furnaces will not produce greater over-all economies should be made.

Individuality of Locomotive Should Be Considered When Using Powdered Coal

Further, in so far as the use of this kind of fuel on locomotives is concerned, it seems advisable to give more careful consideration to the individuality of the flexible steam locomotive as it exists today. Regardless of the objections which may be raised at this time to the locomotive stoker, the fact remains that it is a usable and practical device capable of producing economical over-all results. Much improvement may be expected in the locomotive stoker during the next ten years, and it is without the realm of possibility that a pulverizing and stoking device might be arranged that would prepare any grade of coal on the tender and deliver it to the firebox in the pulverized form, thus eliminating all of the expense incident to preparing and transporting pulverized coal from a central plant. The same thing would also apply in a modified form to a stationary plant.

As is frequently the case with large engineering projects this one has some too-enthusiastic promoters. Much ill-advised engineering work and experimenting has been done and some snap conclusions have been rendered without careful analysis of the problem and without the essential laboratory work necessary to the establishment of fundamental facts.

Some hurriedly prepared and conducted tests with incomplete and inadequate facilities and equipment have been made, particularly on locomotives on busy railroads during periods of heavy traffic movement. Tests of any kind conducted at such times always create prejudice, due to the fact that they are more or less of a nuisance. Such tests are frequently void of results, not only from lack of preparation and facilities, but also because employees cannot give them proper attention. In fact, the tendency of employees during such busy times is to do all they can to get rid of tests as quickly as possible. For these reasons also adverse opinions and doubt about pulverized fuel prevail in the minds of many.

It does not seem that we are using the laboratories of our great universities to a sufficient extent. Many of these universities have thoroughly equipped laboratories, and they always have many eager and bright young men who, guided by capable faculties, could and gladly would not only thoroughly thrash out all of the technical questions and lay the foundation for reasonably operative devices before making field applications, but the opportunity for so doing would vastly increase the practical knowledge of these students and better prepare them for the field of work they may select, by giving them an insight into the practical side of their work and thus produce increased man efficiency which would be of mutual value to both the young men themselves and the industries that employ them.

It is particularly noticeable in the reports of pulverized-fuel tests received by this committee that practically all dealt with fuel economy only and by means of a deluge of figures and "heat balances" conclusively proved fuel economy to everybody's satisfaction. Not enough has been said about "cash balances." All industries are operated for the purpose of paying dividends and maintaining economic balance. In this respect conclusive evidence is lacking about pulverized coal, at least in so far as this committee has been able to develop after careful inquiry. This has been disappointing. May we hope for some reliable statistics in the near future that will dispel all doubt that now exists on this important matter?

There is little or no question about the ultimate practicability, efficiency and economy of burning coal in a finely divided form, both in stationary plants and locomotives. To develop this fact to a practical conclusion requires thorough coöperation of both manufacturer and user and it is suggested that in view of the immense supply of bituminous, lignite and other grades of coals of various characteristics peculiarly adapted to the pulverized method of burning, that as soon as business conditions again adjust themselves, the railroads, with the assistance of manufacturers and universities, make the necessary conclusive and exhaustive tests and develop the fixed principles of methods and apparatus necessary to successfully meet the urgent demands for more economical consumption of coal. This is not a question of self-interest on the part of either manufacturer or particular industry. It is one of national interest and urgency.

After a mine explosion many miners and officials from other mines offer their services. The number of such volunteers is generally so large during the first four or five days following a disaster that the services of all the men cannot be profitably utilized, but they as well as those whose services have been accepted must necessarily be fed. For this purpose a commissary and mess should be established. The commissary should be placed in charge of the manager or superintendent of the store and the mess in charge of an experienced cook who should be furnished from the commissary the necessary stoves, utensils, dishes, etc., to enable him to supply wholesome food for the men doing the rescue and recovery work. The mess should be assigned to some unused building or part of a building or to a tent. The kitchen should be kept separate from the mess room, and all persons except those engaged in preparing and serving the food should be excluded from it.—*Rescue and Recovery Operations in Mines.*

Original Pocahontas Coal Field

Among the pioneer coal and coke operations of the original Pocahontas coal field of West Virginia is the Houston Coal and Coke Co., whose plant (as it appears today) is shown in the accompanying panoramic view. The store and office of this company is opposite the Elkhorn station on the Norfolk & Western R.R. The Houston plant has expanded wonderfully under the management of the family whose name it bears, and the leadership of T. E. Houston. In the '90's a modest tipple occupied about the site of the present modern plant for preparing and loading coal. At that time Mine No. 2 of this company was opened up and preparations were actively prosecuted to make the operation what it is today—the largest single shipping plant of the old Pocahontas field.

With the increase of mine opening, greater accommodations were provided for workmen, more coke ovens were built and every facility added to handle large tonnage. The Houston tipple is located between the two mine openings, and the coal is moved from mines to dump over surface roads by motors. The location of these tramroads is clearly indicated by the grade and the line of trolley poles. Extensive sidings for loaded and empty mine cars are provided at the tipple, 50 loads being accommodated at one time. The narrow valley at this point is so completely taken up by the plant that it would seem as though "standing room only" were left.

The long line of inactive ovens calls attention to the days when the Norfolk & Western R.R. distributed cars for the transportation of coal in proportion to the number of coke ovens possessed by an operation. This was in the days when Pocahontas coal was making its way in the world, and often slack would have been a drug on the market were it not converted into coke. In the '90's new plants were sometimes developed and 100 or more coke ovens built solely to secure railroad cars. The ovens might be built of the cheapest materials and never be fired up; in a short time grass grew on the oven-clay filling, and later the firebrick disintegrated and the ovens caved. In the light of present-day practice this would seem to be quite a waste of capital.

It was during these days that an operator started a mine near the town of Pocahontas and decided to combat the policy which was then in vogue in the field. No coke ovens were built at his plant, and when the mine and tipple were about ready to ship coal he notified the Norfolk & Western of his intention to ship shortly and asked for a railroad siding and cars. This request being refused, teams were secured and coal from his plant was dumped at the railroad freight depot. This operator claimed that the railroad company was a common carrier of freight and should receive transportation when presented. The situation was an interesting one. In the course of time conditions in the field changed and the coal became one of the most famous fuels on the continent. In 1916 about 19 millions tons of coal were shipped from McDowell County, West Virginia.

The appearance of the Houston oven plant reflects conditions throughout the field. In 1916 there were 9730 beehive ovens in McDowell County, of which just 6269 were not in use; only about one-third of the ovens were making coke. While Pocahontas slack is in demand among byproduct coke oven operators who use it to mix with certain high volatile coal, many authorities claim that this noted fuel should never be used for any other purpose than raising steam, asserting that not a pound of Pocahontas coal should be made into coke. The Houston interests are represented at other points in the Pocahontas field, one plant, the operation at Keystone, closely approaching the mines at Elkhorn as regards annual shipments. The aggregate tonnage of the Houston plants shipping Pocahontas No. 3 coal amounted to 1,139,100 in 1916. As the operators of these noted Pocahontas mines look forward to the exhaustion of their properties, other coal investments are often made in territory adjacent to the original field. The Houston people have valuable properties in the newer Pocahontas field as well as in the Thacker territory.



PLANT OF THE HOUSTON COAL AND COKE CO. AT ELKHORN, W. VA., IN THE HEART OF THE

Nova Scotia's Submarine Coal Mining Problem

At the extreme northern part of Cape Breton County, Nova Scotia, the coal measures dip toward and extend under the sea at low angles. The beds are affected by no important structural breaks or faults, according to "The Coal Resources of the World."

Mining operations beneath the sea have shown that the coal seams are continuous beyond the points where, from a consideration of the structure, faults might be expected to occur. From the undisturbed condition of the land areas it might be expected that the undersea area is also undisturbed and that a large portion of its coal, to a limited distance from shore, will utimately be utilized. The coal seams throughout the whole field are generally quite uniform in thickness.

Mining operations are being extended under the sea at several points in the Sydney field. Some of the mines have workings extending over a mile from shore; at a distance of a mile some small rolls parallel to the coast were passed through. These are the only disturbances in the regularity of the measures, and it therefore seems possible, according to the authority previously noted, to extend the workings everywhere to the limit of haulage and ventilation. In an estimate of the amount of coal, the limit for probable reserves is fixed at three miles from the shore and that for possible reserves at five miles. Figuring on this basis and including seams of one foot or over to a depth of 4000 ft., the actual coal reserves of Cape Breton County are 1,027,911,000 metric tons; this calculation is based on actual thickness and extent. An approximate estimate places the probable reserves at 4,064,357,000 metric tons.

The Sydney coal field extends for a distance of about 30 miles in an airline along the northeast shore of Cape Breton Island. Recently a question of considerable interest, both from an engineering and a legal standpoint, has arisen in relation to the undersea extension of this coalfield, says an editorial in the *Canadian Mining Journal*. The coal practically can be attacked only from the shore end of the deposit and along a line 30 miles in extent. The system under which the undersea coal areas have been leased for the mining of this coal has permitted the blanketing of some leases by other leases.

A situation has now developed which calls for some remedial action by the Province, which is the lessor of the coal areas. It is the intention of the local government to enact legislation which will correct the existing condition. The lease plan of this coal area as it exists today shows a checker board of conflicting and interfering leases that absolutely prohibit the extraction of the submarine coal by any methods which would commend themselves to a mining engineer or operator interested in the best, the most complete and the most economical extraction of the submarine coal.

Probably when the early leases were given out to lessees the extent of the coal field was not known; its extension under the sea may have been given little if any thought. Furthermore, the lease lines were drawn arbitrarily to further disconnected and oftentimes conflicting private and corporate interests during many generations. The last and least consideration that has governed the layout of the submarine leases has been the preservation of the coal field for economical operation. It has been aptly stated of the lease plan that, like Topsy, "it growed." No person living is to blame for the tangle, but the remedy is within the power of those who administer the coal areas as stewards for the people of Nova Scotia.

The Cape Breton coal field is a unique deposit of coal, at least as far as the American continent is concerned. Its exact submarine extent is not known, but enough of its probable extent is known to state confidently that the field has a long future if it is conceived as one comprehensive mining proposition. It is a field in which one operation by unwise or careless management may depreciate the value of the whole or even impair the accessibility of a considerable part of it.



ORIGINAL POCAHONTAS COAL FIELD; ON MAIN LINE OF THE NORFOLK & WESTERN RAILROAD

A memoir on "The Coal Fields of Eastern Canada" was written for the Canadian Federal Department of Mines some three years ago by F. W. Gray. In this report is summarized the mining laws of the Province in relation to the unworked submarine coal field; the state of affairs revealed by the Fuel Controller of the Province was noted, and Mr. Gray stated that it was the obvious duty of the present generation "so to prosecute the work of extraction as not to imperil the accessibility of the remaining submarine coal." This is precisely what the present arrangement of the submarine leases will not permit of being done. If the existing lease lines are adhered to, the greatest single asset of the Province will be imperiled.

In discussing the limitations to working the submarine coal field in the memoir just referred to, Mr. Gray predicted that the cost of mining would be the first limiting factor to make itself felt. Therefore, no artificially difficult conditions of extraction should be unnecessarily imposed on mining coal from submarine territory. This would cause the limit of profitable mining to be reached sooner than would otherwise be the case, and the Province would the earlier lose its revenues and all the other advantages that accompany the production of coal.

If previous experience could have governed the leasing of submarine areas, then it would have been realized how different submarine mining is to ordinary land operations. In the latter case mine openings can be located at many points on the surface, but access to submarine areas is limited to certain parts of the shore. Therefore, it would have been seen that no submarine leases should have been granted, unless their accessibility was secured by the terms of the lease itself.

The present outlook for coal in Nova Scotia seems to be uncertain in view of the fact that this industry is admittedly going to have sufficiently hard work to keep its head above water without the addition of unnecessary duplication of expenditure and effort, and without the totally unnecessary addition to the cost of extraction which adherence to existing lease lines will inevitably cause. The truth is, says the *Canadian Mining Journal*, that the whole submarine coal question should be thoroughly reviewed. A map should be made of the whole coal field showing the existing workings, the outcrops, the location of the faults and folds, and all lease lines. Due consideration should be given to the facts disclosed by soundings at sea, the nature of the sea bottom, data concerning the superincumbent strata, the position of the coal seams and the probable extent of the submarine coal field. This information should have been available for reference on a government map, especially as the whole matter is controlled by the Province. Some of the data must have been on hand for many years; a complete land map at least should have been kept up to date. Other information could readily have been added from time to time and a comprehensive view of the whole situation would have disclosed at an earlier date the tangle which now comes prominently to light. But of course hindsight is distinctly better than foresight.

The making of the map proposed would seem to be inevitable. It should then come up for consideration by competent mining engineers who might to advantage practically disregard existing lease lines where they seriously handicap the final working of the coal field as a whole. This plan would necessitate considerable lease readjustment on the part of the owners of the coal (the Province) to satisfy the lessors. However, the conservation of the submarine coal, its protection from inundation, creep, improper mining and the preservation of its accessibility over the maximum period of operation should guide those having the readjustment in hand.

The measure which has recently been passed by the Nova Scotia Legislature regarding coal areas in Sydney Harbor, in which both the Nova Scotia Steel and Coal Co. and the Dominion Steel Corporation are interested, is a fair and reasonable one, according to W. D. Ross, vice-president of the former company. Mr. Ross commented that there is much misapprehension outside of the Province as to the meaning and effect of the act. This legislation is necessary owing to the hopelessly uneconomic location of the submarine leases in the Cape Breton coal field. The act provides that governmental inquiry is to be made by a commission and that on the report of this commission, the Governor may rearrange these areas so that the undersea coal may be systematically mined. The so-called blanket lease of the Dominion company is not to be interfered with, the act only applies to other submarine areas and due compensation is provided for. The governmental investigation and subsequent adjustment of this matter is expected to insure not only to the benefit of the Province but to the principal coal companies involved as well.

TARDINESS

By J. KENVIN
Jeddo, Penn.

Every day in the mines of America I make thieves of honest men.

I steal from employers precious hours, never worked, but paid for nevertheless.

I cause miners to hurry along forbidden haulageways when Death rides a speeding trip bound bottomward.

Outside men caught by habit hurry along forbidden paths or travel on busy planes and trips, risking life and limb to hide their guilt.

Breaker boys in my clutches hurry over dangerous drag lines and under speeding shafting, often meeting with injury or worse.

By these and other means I cause delay and friction in the starting of breakers and the operation of mines, and mar the workday at its beginning.

I am Tardiness. Promptness and Punctuality are my worst enemies.

AT ONE TIME it was considered that waste constituted fine coal, the largest piece of which passed through a $\frac{3}{32}$-in. mesh. This fine coal or culm approximated 7½ per cent. of the total output. At the present time coal passing through a $\frac{3}{64}$-in. mesh is either utilized at the plant, shipped or stocked for future use.

Haulage Capacity of Locomotives

By E. Steck
Hillsboro, Illinois

MINE superintendents often order a haulage locomotive of certain weight because they have seen such a locomotive in operation in some other mine, and hauling an amount of coal which they desire to haul in their own mines. If the locomotive fails to haul this amount of coal, or if its armatures burn out, the blame is often laid at the door of the manufacturer. The reason for this failure may be any one of a number of causes, as the haulage capacity depends on the following factors: Weight of locomotives, type of tires, speed of haulage, horsepower rating of motors, grades, weight of pit cars, type and condition of wheels on pit cars, condition of track, length of haul, number of cars per trip loaded, number of cars per trip empty, number of trips a day. In the foregoing it is assumed that the proper voltage is supplied to the locomotive.

The maximum drawbar pull of a locomotive in pounds is equal to one-fifth of the weight of the locomotive for iron wheels, and one-fourth for steel-tired wheels. This is on the basis of a clean, straight rail. Beyond this, excessive slipping of the wheels will occur.

The horsepower developed by the motors equals:

$$\frac{\textit{Tractive effort} \times \textit{speed of locomotive in feet per minute}}{33000 \times \textit{mechanical efficiency of locomotive.}}$$

For example, take a 10-ton locomotive with steel-tired wheels and a speed of 7 miles per hour:

$$\textit{The tractive effort} = \frac{2000 \times 10}{4} = 5000\ lb.$$

$$\textit{Speed in feet per minute} = \frac{5280 \times 7}{60} = 616.$$

Assume the mechanical efficiency as being 90 per cent., then

$$Hp. = \frac{5000 \times 616}{33000 \times 0.90} = 103\ hp.$$

The practice among locomotive builders is to furnish on standard equipment 10 hp. per ton, or on a 10-ton locomotive two 50-hp. motors.

The horsepower rating of this type of motor is on the basis of a rise of temperature of 75 deg. C. after one hour's operation at full load. In other words, if the locomotive under discussion were loaded to develop a maximum tractive effort at the end of one hour, the motor temperature would show a rise of 75 deg. C., which would mean, in a room temperature of 70 deg. F., a motor temperature of $70 + \left(\frac{9}{5} \times 75\right) = 205$ deg. Fahrenheit.

For a day's run the square root of the mean square values of the current for the various cycles of operation for the two 50-hp. motors must not exceed 75 amp. per motor; or, in other words, the average horsepower must not exceed 34 per cent. of the normal rating of the motors.

The drawbar pull to move pit cars varies greatly with the condition and type of car wheels. This variation may be from 15 to 50 lb. per ton. A conservative average is 30 lb. per ton. On grades 20 lb. per ton additional is required for each per cent. of inclination independent of the friction of the wheels.

Again referring to the 10-ton locomotive with a maximum tractive effort of 5000 lb., the total drawbar pull on various grades is as follows:

Drawbar pull on level $= 5000 - (30 \times 10) = 4700$ lb.
Drawbar pull on 1 per cent. grade $= 5000 - (30 \times 20)\ 10 = 4500$ lb.
Drawbar pull on 2 per cent. grade $= 5000 - [30 + (2 \times 20)]\ 10 = 4300$ lb.
Drawbar pull on 3 per cent. grade $= 5000 - [30 + (3 \times 20)]\ 10 = 4100$ lb.
Drawbar pull on 4 per cent. grade $= 5000 - [30 + (4 \times 20)]\ 10 = 3900$ lb.
Drawbar pull on 5 per cent. grade $= 5000 - [30 + (5 \times 20)]\ 10 = 3700$ lb.

The number of tons this locomotive will haul on the different grades is as follows:

Level, $\frac{4700}{30} = 157$ tons.

1 per cent. grade, $\frac{4500}{(30 + 20)} = 90$ tons.

2 per cent. grade, $\frac{4300}{[30 + (2 \times 20)]} = 61$ tons.

3 per cent. grade, $\frac{4100}{[30 + (3 \times 20)]} = 46$ tons.

4 per cent. grade, $\frac{3900}{[30 + (4 \times 20)]} = 35$ tons.

5 per cent. grade, $\frac{3700}{[30 + (5 \times 20)]} = 28$ tons.

Assume that a pit car weighs 2500 lb. and has a capacity of 4 tons, the number of cars and tons of coal this 10-ton locomotive is capable of hauling will be as follows:

Grades	*No. of Cars*	*Tons Coal per Trip*
Level	30	120
1 per cent	17	68
2 per cent	12	48
3 per cent	9	36
4 per cent	7	28
5 per cent	5	20

The foregoing tabulations give the haulage capacity of the 10-ton locomotive on the basis of one hour with a maximum permissible rise of motor temperature. The continuous capacity of the locomotive would be only 34 per cent. of that given in the tabulation. The actual cars per trip must be calculated from the sequence of grades, the number of empties and the number of loads per trip, as well as the number of trips per day. The square root of the sum of the mean square values of the currents must not exceed, in this particular case, 75 amp. per motor. The current values can be determined by placing an ammeter on the locomotive and taking readings for a round trip, and then taking into consideration the number of trips per day. The graphic ammeter is the best variety to employ because the time during which the various current values flow through the motors of the locomotive may be readily calculated from its graph.

Attention should be paid to curves, as the track gage on them should be increased, especially where long wheel base locomotives are employed. Otherwise the wheels will bind and reduce the haulage capacity of the locomotive.

National Coal Association Holds Meeting at Chicago

The National Coal Association meets in perfect harmony after several months' experience in co-operation. A banner in the meeting room states that "The big idea of coöperation is education." The members are fully committed to that form of education as far as it is embodied in open prices, but there are not a few who still halt at accepting Dr. Garfield's appeal for open costs of production.

EVERYTHING at the meeting of the National Coal Association, held in Chicago May 22 to 24, moved quietly and according to schedule, but the session did not lack for enthusiasm nevertheless. The only unexpected discussion was one relative to the use of Mexican oil. That matter may, in the future, cause no little anxiety in the minds of the members of the association. Some are already keen to its possibility as a menace.

The meetings of the association were held in the Congress Hotel, and no one was excluded, the regular press table being well filled and plainly in evidence. The association lays all its cards on the table. It is not purposing the violation of any laws. Never was an organization more careful of its ground. From the rostrum its attorney watches every move like a hawk, ready to counsel the meeting should it in its proceedings vary a hair's breadth from the straight and narrow way of strict legality.

An address of welcome was made by H. H. Merrick, president of the Chicago Association of Commerce. He declared that the three essentials of life were air, water and coal. Chicago, he said, had them all, and it was certainly true that Chicago had more than its share of rain and smoke-laden air while the members were in session.

Suspicious of Proposed Amendments

Proposed amendments to the charter aroused the suspicions of one of the West Virginia delegations, of which Tom Lewis was a conspicuous leader. Mr. Lewis sought to delay action on the amendments until they were printed and duly considered by all present. Later, when it appeared that the voluminous amendments might be expressed by laymen in a few words, and would be dismissed by them in a few minutes as entirely inconsequential, Mr. Lewis and his friends withdrew their opposition. By that time the amendments were in the print shop and shortly thereafter were ready for distribution. They were carried unanimously. The only purposes of the change were (1) to lift bodily out of the charter the requirement that there be 37 directors, (2) to put that provision in the by-laws and (3) to give the general secretary the title of vice president with all the powers of the general secretary intact.

The word "secretary" has a progressively attenuating value. The word "general" placed before it does not attain the object sought, which is to name the real executive officer of the organization. Some institutions have added "general manager" to the title, but "vice president" is, by and large, considered the better term. Hence J. D. A. Morrow, the permanent central ganglion of the National Coal Association, becomes "vice president in receipt of pay."

President Wheelwright's report confined itself in the main to a recital of the cheerful acquiescence of the coal industry in the work of the war. General Secretary Morrow, with business-like and fluent oratory, took up the questions confronting the association in some detail. He said that the war revenue legislation was written with an eye to the manufacturing industries and not to mining. Washington was not blind to the fact and was prepared to recognize the difference as taxables between the two types of industries.

He spoke a good word for open prices—open covenants openly arrived at. The reports of prices as received did not, he admitted, cover the whole country. Some associations had not gathered their forces together properly since the war and could not at that moment collect price data. Others doubtless viewed the propriety of open prices with some doubt. What data had been collected did not include all the sales made. The collection of such data would probably never be complete.

Open Market Prices Inspire Confidence

But even in the Stock Exchange there are "wash sales" which disguise the real market movement. There are sales made out of the exchange regarding which no word is obtainable. Nevertheless the Stock Exchange prices receive almost universal recognition. They inspire confidence. No one feels, when he buys or sells on their indications, that he is being, or is even in risk of being, dealt with unfairly.

They shed a light on the conditions of industry, and a similar light is shed by the open price in the coal market. It is about the only large basal industry which has till the present been content to grope in the dark. Given a dark room and a cry of fire, the members of the august assembly he was addressing might be found bleeding and mangled as a result of a wild, haphazard rush for the exits. But given a light, all might be expected to find their way out by the devious paths that led to the adjacent room.

Similarly, given the cry of low-price sales in a market unlighted by published quotations, the mine operators might expect to find themselves, as they had often found themselves before, struggling in the dark and injuring one another in the hope of finding an exit from their financial troubles by the dangerous and mutually harmful way of unfair competition. The darkened way is over the chairs and the lighted way, the way of the corridor.

He said the operators would sit up nights trying to save a fraction of a cent in the cost of production and then with the return of the working day would give away several times that fraction in the first contract that they made.

In the afternoon it was decided that a portion of each company's assessment be allocated to payment for the

Digest, so as to make that publication subject to second-class rates. The railroad-relations committee recommended in its report that legislation be passed forbidding the assignment of cars in return for the acceptance of railroad orders.

One of the star features of the meeting was the report of the cost-accounting committee as read by Thomas T. Brewster. As it is printed and will go to all the members, it is not necessary to consider it here. Taking issue with some of the recommendations of the Federal Trade Commission, the committee relies on the commission to show again the broad judgment that it has always exhibited in the past and to modify its stand wherever a good case can be made for the change.

The foreign-trade committee did not report. It is understood that the committee of 27 formed a subcommittee of three which went to Washington and obtained a promise that 1,500,000 tons of shipping would be allocated to the coal industry in the last quarter of the year. This is regarded by some as entirely inadequate, and indeed it will be so unless the allocation is permanent and not for one trip only. The reason for the delay of the report was the absence of Thomas F. Farrell, the chairman, who was at the coast to welcome his returning soldier-son.

The credentials committee reported that 28 associations were represented and that 21,009 votes would be cast out of 21,050.

On the following day Dr. H. A. Garfield, United States Fuel Administrator, made a valedictory address in the spirit which has endeared that official to the coal industry. He admitted that the Administration had made some mistakes. He said he did not blame the N. C. A. members for criticism so long as it was constructive criticism. This was, he added later, his valedictory. Some would be glad he was saying goodby; to such he could only say that he was glad to say goodby to them. This was said in Dr. Garfield's most winning manner. Not even those at whom it was aimed would take offense. But he intimated these persons were few in number and that he was more than pleased that after the years of trial he was a welcome guest to the counsels of the National Coal Association and a good friend to those engaged in the production of coal.

Dr. Garfield declared himself of the opinion that owing to the increased size of corporations we could no longer do business as in earlier days. Some corporations are now so large that they employ as many men as there were people in the thirteen states at the foundation of the republic. Some corporations are as big as some governments in 1776. The same rules could not, he believed, be applied to such mammoth corporations as had been adequate when dealing with partnerships and individuals. The day of "laissez faire" he felt was passed. Hereafter it was not a question whether government shall interfere, but how much.

The coal industry has grown in public respect. When the war started the railroads, recognizing that coal would keep, kept it on the sidetrack. Coal, we have learned, is the food of industry. We have recognized at last that the army is but the cutting edge of our nation, whereas industry is the real force by which the nation triumphs.

Strategy is no longer confined to the foughten field. In a large sense it runs back behind the lines. The narrow pass which decides a campaign may not be crossed by men of war. It may be merely some congested point of traffic or a shortage of bunker space in a harbor. The lack of supplies that its existence causes may not be felt at once, and it may be some months later when the issue at the strategic point decides the campaign.

Dr. Garfield added that, fortunately, owing to the stimulus given the industry in production campaigns, our production grew progressively larger as the war advanced, whereas in other countries it progressively declined.

He urged the industry to hold firm to cost accounting and warned the mining men that if the public believed it was not getting a square deal it would not be satisfied, and the industry would then have to settle with radicalism. He advocated open production costs, so that the United States might know that the coal business is properly conducted. There are three parties in interest—the consuming public, capital and labor. They may well sit apart in their counsels but they should, before final decision, sit together. The cost of production should be as well known to the Government as the cost of living.

The report of the finance committee was as follows:

	Expenses Year Ending Mar. 31, 1919	Expenses Estimated Year Ending Mar. 31, 1920
Executive	$43,576.68	$43,000.00
General office	33,987.02	31,064 46
Information	116,762.58	40,648.56
Traffic	10,886.00	9,700.00
Accounting	3,391.64	7,400.00
Legal	14,501.20	12,000.00
Market information service	1,833.68	21,000.00
Equipment	1,162.94	2,000.00
Total	$226,099.74	$167,313.02

In the afternoon the new president, Harry N. Taylor, took the chair. He declared his determination to give a square deal to the multiple interests of the National Coal Association: A. F. Sheldon, president of the Sheldon School, addressed the meeting on "Selling Coal for a Profit." His address was excellent though not strikingly new. He based salesmanship on service. It was at the conclusion of his remarks that the discussion on Mexican oil arose. C. E. Bockus, president of the Clinchfield Coal Corporation, said that the oil could be produced for 19c. per barrel with a labor cost of only 8c. It can be delivered on the coast for from 60c. to 70c. a barrel. Two or three hundred contracts have been placed, to come in effect as soon as the refining plant being erected at Charleston, S. C., is completed. With oil at such prices coal would have to be sold on the coast at $2 or $3 per ton. T. W. W. Guthrie, president of the United Coal Corporation, Pittsburgh, Penn., stated that if coal of equal thermal power to oil were to be delivered to the market it would have to be sold for 20c. per ton to compete on an even basis with oil when freight rates are considered.

The smoker held Tuesday evening was a most enjoyable event, especially an address by an orator named Mallett, of the *American Lumberman.* His epigrams kept the whole party convulsed.

THE FOLLOWING ACCOUNT of an accident furnishes food for thought from several different angles. A motorman left his trip while it was in motion and with the power turned on, and ran ahead to open a door; he fell on the track and was run over and killed by the trip. This man's idea likely was not to save time but rather to avoid the trouble of walking back to his trip. A motor should never be left alone with the power turned on; it would also be well to reflect that an automatic mine door would have avoided the issue altogether.

Liquid-Oxygen Explosives*

The military necessity which compelled Germany to requisition her entire stock of nitric explosives created an emergency which gave liquid oxygen its opportunity, and its development as a mining explosive has occasioned considerable comment.

The explosives now in general use are mixtures or definite compounds containing two essential constituents, a combustible element—carbon—and an ignition element—oxygen. The explosion is the result of the abrupt and violent combination of these two elements. Oxygen is introduced under the form of nitric combination or chlorinated combination, whereas the carbon is in the form of an organic matter. Therefore, in ordinary explosives, the combination of the active elements carries with it a considerable dead weight, constituted by the other elements.

New Explosive the Result of Evolution

This is not the case with "Oxyliquit," for in the latter the liquefied oxygen is put in contact with carbon in a divided and porous form. Under a system of ignition the combination takes place with explosion, and in principle the procedure is perfect. In the evolution of this process, however, which was first invented by Linde in 1895, many difficulties were encountered.

Liquid oxygen is always produced on the spot where it is to be used, as it is impossible to prevent volatilization for very long, notwithstanding all the precautions. It is prepared by liquefying the air, the mixture so obtained of liquefied nitrogen and oxygen being submitted to a partial distillation, which eliminates the larger part of the nitrogen, more volatile than the oxygen. The resulting bluish liquid contains about 85 per cent. of oxygen. A German company exploiting the Linde patents is able to furnish installations giving an hourly output of 23 lb. (10 kg.) of liquefied rectified oxygen.

Containers Used for Transporting Liquid Oxygen

Transportation of the liquefied oxygen from the place of production to the place of utilization, mine or quarry, required a new container. In the laboratory, glass vessels, so-called "Dewar" bottles, having double walls with a vacuum between, have been used for the keeping of liquefied oxygen. These bottles are not closed—on account of the danger of a closed bottle in handling—but, owing to good insulation, the loss of oxygen by evaporation is small. These glass bottles, easily breakable, are neither convenient for wholesale manufacturing nor for use in the workshop, and are now replaced by containers of metal—especially brass and steel—which give excellent service.

The steel or brass bottles do not hold the vacuum as well as those of glass, and the vacuum must be often renewed. To lessen this inconvenience, Dewar inserts porous charcoal between the walls.

By what is known as the Kowastsch method, the liquid oxygen is poured upon lampblack in the borehole. A cylindrical cardboard cartridge is made of the same diameter as the hole, the cartridge containing the lampblack or other porous material rich in carbon. It is closed at both ends with cardboard or cork. Two small tubes of thin cardboard pierce the stopper at the outer end. These tubes serve for the pouring of the oxygen; also for the ignition system (fuse or electric). The cartridge being thus made, a metal rod is inserted in each tube to prevent it being crushed, and the cartridge is deposited at the bottom of the hole, which is then packed with a wad of clay. The metal rods are extracted and the liquid oxygen is poured in through the larger tube by means of an elbow funnel. The gaseous air escapes by the shorter tube, and also the overflow of liquid oxygen when the cartridge is saturated completely. The cartridge is now ready for the firing. The explosion is comparable to that of dynamite.

The Marsit method allows of a more regular working. It is therefore more in use than the other. Here the cartridge is saturated before being introduced into the borehole. To do this the cartridges are immersed in a special vessel of cylindrical shape with double walls filled with liquid oxygen. The cartridges are first exposed for a few minutes to the vapors above the liquid to cool them off, then completely immersed for half an hour. The saturation is therefore complete. When the cartridge is saturated, it is taken out and the ignition system attached as quickly as possible. It is then placed in the borehole, tamped and exploded.

Inconveniences of Marsit Method

The manipulation in this method is far simpler than in the first mentioned. The only inconvenience is the unavoidable delay between the taking out of the cartridge and the placing in the borehole. During the lapse of these few minutes a certain part of the oxygen of the cartridge evaporates. To lessen this loss, and to keep in the lampblack a sufficient excess of oxygen, the walls of the cartridge, which are made watertight, are of corrugated cardboard. No detonator is needed to explode these cartridges, and this is one of the advantages of the new method. All that is necessary is a small primer ignited by a fuse or by electricity.

The principal company manufacturing "Oxyliquit," the Sprengluft Gesellschaft, of Berlin, claims to have delivered each year an equivalent of 10,000 tons of nitric explosives. Even allowing for probable exaggeration, this figure shows how widely this product is used in Germany. Its greatest advantage over other explosives is that it almost entirely eliminates the danger of accidents. The cartridge itself is explosive for about 10 min. only, between the time of its saturation and the time of its ignition. During this time the danger is not any greater than with any other explosives. The result is that in case of a miss it is only necessary to wait half an hour for the cartridge to become entirely harmless, and then one can uncover the borehole without danger. Moreover, all dangers inherent to transportation and storage of the explosive are entirely eliminated.

Some Objections to the Method

The method, however, has its inconveniences, the principal objection being that it is impossible to store liquid oxygen, necessitating the establishment of a liquefaction and rectifying plant at the place where it is used. Also, there is need of experienced hands for a quick charging of the boreholes.

Theoretically the new explosive may claim superiority over others. In practice, however, it gives an explosion hardly equivalent to the most powerful explosives known, common dynamite and gelatin-dynamite.

*Abstract of an article appearing in the January issue of *Compressed Air Magazine.*



Urge Elimination of Waste in Mining and Consumption of Coal

In pointing out the means of remedying wastefulness in the use of energy resources, C. C. Gilbert and J. E. Pogue, of the Division of Mineral Technology of the National Museum, make the following reference to coal:

Coal is the basis of organized life—the home, industry and commerce are entirely dependent upon it. Under the present conditions, it is failing to live up to that responsibility. It is wastefully mined because of unnecessary conditions of competition; it is wastefully distributed as a result of unnecessary transportation to regions already supplied with water power or with coal of a lower grade than that transported; it is wastefully used because the numerous valuable byproducts resulting from burning coal are not recovered.

The wastes in mining may be decreased by considering coal as a public utility and eliminating undue competition, by integrating the mining operations—organizing them to work together instead of in competition. Unnecessary distribution of coal may be reduced by developing water power in favorable regions, and by improving methods of utilizing the large quantities of lower grade coal in the regions where it occurs, doing away with the necessity of hauling high-grade coal to those localities. The waste in utilization of coal may be eliminated by establishing municipal public utility fuel plants to convert coal into gas for heating purposes, at the same time recovering the valuable byproducts, ammonia. benzol and tar. This method of community use of coal will give cheaper fuel, end the smoke nuisance, relieve transportation, and cause the growth of a great coal-products industry, whose ultimate possibilities are beyond the grasp of imagination.

In concluding, the authors reduce the whole energy situation, an extremely complicated subject, to a fundamental basis in which two courses of action on the part of the Government will bring about the proper development of the whole matter.

1. The provision of a common-carrier system for the transmission of electrical energy, which will lead to a balanced development of coal power and water power, and serve as a coördinating influence in the building up of municipal public-utility fuel plants.

2. The application of a constructive economic policy to the production of petroleum, which will largely correct the wasteful methods which are now leading to a premature exhaustion of the petroleum resource.

Foreign trade, despite the relaxation of many restrictions, is still hampered by Government regulations.

Reifkin Sues du Ponts for Commission on Coal Purchases

A suit for $473,750.43 against the E. I. du Pont de Nemours Co. has been filed in the Supreme Court of the District of Columbia by Philip M. Reifkin, formerly of the Bureau of Mines. The amount in question is alleged to be due Mr. Reifkin as a part of his commission while acting as coal purchasing agent for the du Pont company. Mr. Reifkin alleges that between Nov. 15, 1917, and Mar. 31, 1918, at the request of the company, he obtained for them 3,168,100 tons of bituminous coal for a commission of 15c. a ton and 41,950 tons of anthracite coal for a commission of 20c. a ton. He received on account of his claim $9,854.57, and alleges that the company refuses to pay the balance.

Many Coal Companies Paid Unnecessary Taxes to Government

Now that the coal industry is becoming more familiar with the revenue act, it finds that many companies have paid more taxes than was necessary. Since it is held not to be the intention of the law to take money inequitably from those that were undercapitalized, or who made payments through miscalculation, it is believed that arrangements will be perfected to make reimbursements in all such cases. The matter is being presented vigorously to internal revenue authorities at the present time by attorneys for numerous coal interests.

Railroads Trying to Collect Old Accounts

In their efforts to relieve their present financial stringency, the railroads are going to unusual extremes to collect money. They are going over their books and raking up old accounts that had been regarded as impossible of collection. In a large number of cases, freight bills which the consignee has failed to pay, and which cannot be collected, are being presented to the consignor. A large number of suits are being filed in such cases. A considerable percentage of such cases is based on coal shipments.

While the Industrial Board of the Department of Commerce is a thing of the past, due to the refusal of the Director General of Railroads to coöperate with the stabilization program of the Department of Commerce, it is believed that his very obstinacy in this matter will bring the whole question of consolidated purchasing power to an issue.

EDITORIALS

Overwhelming Flood of Money

INFLATION is not necessarily accompanied by high prices, any more than quantities of mines are inevitably associated with large tonnage, or extended lengths of railroad lines with car-miles of transportation.

Mines, at times, lie idle or work irregularly and half-heartedly and the tonnage is low despite the multitude of collieries. Railroads which could carry immense quantities of merchandise may rust for lack of traffic. Similarly, when times are unfavorable any amount of currency and credit may be idle.

But granted there is a demand, the mines produce a flood of coal, adequate railroads will transport endless quantities of goods and the currency will support an unheard-of amount of inflation. That is why we have to fear the flood of money of which the world is now possessed. When we get busy the money will come pouring out upon us. Comparatively idle now, it will be active tomorrow.

We want a little higher price now only for stimulus. In the year coming we may well find it disturbing to our social relations. The war increases will not be duplicated; nor, alas, will the war patriotism. We shall not have the chance to stay the ill feeling that a readjustment may bring with it. For this reason it would be well if we could secure a new dollar such as Professor Fisher has been advocating, a dollar that will be a unit of consumption and based, not on gold values, but on all the elements which enter into our expenditures for living.

Labor is most efficient when times are bad and there is little demand for goods. As soon as times become good the workmen become indifferent and listless. Thus supply is shut off by demand and actually fed by lack of orders. All of which contradicts, in part, the law of supply and demand.

Spectacular Career of Electric Mine Motor

THE electric locomotive for haulage purposes in and around the mining districts has become such a matter-of-fact part of the equipment today that one seldom considers how rapidly it has forged to the front as the dominant system of haulage in the coal mines. The mine operator of this country is quick to appreciate the advantages of improved equipment and there is, perhaps, no better example of this than the spectacular career of the electric mine motor. For example, the number of electric locomotives in use in and around the Pennsylvania bituminous mines had increased from 1300 in 1910 to 2600 in 1916, thus doubling itself in a six-year period.

This same period has witnessed the gradual demise of steam and air locomotives. The steam locomotive underground has shown a gradual but fairly persistent decline in numbers, from 166 in 1910 to 142 in 1916, though it did show indications of recouping its declining fortunes in 1912, when 168 were in use; however, the decline in their use since that time leaves small room for doubt as to the ultimate future of the steam locomotive in the coal mine.

Even the air locomotive, with its reputation for safety in gaseous mines, is apparently suffering the same fate. This type of locomotive apparently reached the climax of its career in 1915, when 168 of these machines were in use, this representing an increase of about 20 since 1910. There was a gradual decline in their use in 1914 and 1915, the number falling off six in each year. But in 1916 there was a sharp decline of 19, making the total in use in that year 137, or twelve less than in 1910.

The history in the anthracite field is much the same, though the decline of the steam and air motor is less evident. The number of electric locomotives has practically doubled, there being 568 in use in 1910 as compared with 1133 in 1916. The air locomotives in use in 1910 numbered 142, this increasing to a maximum of 163 in 1912. This number remained practically stationary until 1915, when there was a moderate decline to 156. The number of steam locomotives increased up to 1915, but the succeeding year showed a very sharp decline; a continuation of this movement can have but one final result.

Nor is this trend confined alone to the State of Pennsylvania. Ohio, with high wage scales, has been quick to adopt any means that might reduce operating charges, and the increase in the number of motors there has been quite as rapid as in the Pennsylvania field. The state report shows 405 electric motors in use in 1909 and 525 in 1912.

The reports from Illinois tell the same story; in 1907 there were only 129 electric locomotives in use in the mines of Illinois, and in 1917 there were 744. Statistics for this state also show the falling off in the use of cable and animal haulage. In 1907 there were 26 mines using cable hauls and only five in 1917. Even the old mine mule has had to give way before his more efficient and economical brother, the mine motor. The reports show that some 27,000,000 tons of coal were handled by 303 mules in the year 1907, and 10 years later there were only 113 left, which handled 9½ million tons.

Figures such as these cannot but bring home to the mine operator the need for closer attention to the mechanical side of his operations. It is only in this way that the economies necessary to meet the aggressive competition that marks the coal industry today can be met. Further improvements in mechanical equipment are necessitating higher grade men as time goes on, and it is not unlikely that the next decade will see the mechanical engineer as an important official at all the larger mining operations.

Operators could well take example from the army in its rehabilitation work. There is no reason why a man who has lost one or more of his members in a mine accident should not be prepared for some job for which his injuries do not necessarily render him unfit.

Other Times, Other Preferences

STYLE changes. First of all, "Any coal so it's bright"; then, "Any coal so it's chunky." Later we began to inquire into its sulphur and phosphorus contents, then into the thermal values. Still later we started investigations into the fusing temperature of ash. We may yet regard content of recoverable nitrogen as the true index of superiority or, perhaps, the quantity of material solvent in phenol or the amount of pyridine extract. As we play new favorites among coal qualities the high places of coal production will change their location. We do not now know whether the type of coal produced in the Pocahontas region or that found in North Dakota will eventually be considered preferable?

The operating revenue of the railroads under the Government administration during the first three months of this year was $1,125,078,000; the loss was $192,000,000, or 17.06 per cent. on every ton hauled. A good beginning for Government ownership!

Is It Safe to Dry the Air Entering Coal Mines?

FOR SOME time English engineers have been considering how best to meet the difficulties of mining coal at great depth. It is claimed that the heat and humidity of the air will be the principal obstacle to be overcome at depth. The remedy suggested is the cooling and drying of the air entering the mine and, if necessary, drying the air at different points in the mine. This operation is common practice in refrigeration establishments. It seems that it is not so much the heat that affects the miners as it is the heat combined with the moisture in the atmosphere. It is well known that if the humidity is low, perspiration takes place freely from the surface of the human body and a man may be fairly comfortable even though the temperature of the air is high. Suffering is caused by the atmosphere being so charged with moisture that perspiration is not readily absorbed.

It has been suggested that modern cold-storage methods be followed as to mechanical equipment to dry and cool air entering mine workings. While overcoming one objectionable feature by this method will not dangerous conditions of another sort be brought about? In some gaseous and dusty bituminous mines in the United States it is common practice to humidify the air and to sprinkle the roadways to keep down the dust. Will not the possibilities of coal dust explosions be increased in some instances by drying the air entering mines?

Pinching the dollar till the eagle screams was well enough during the war. Let the dollar loose now, wherever the expenditure will serve to restore the wastes of deferred maintenance.

Powdered Coal and Its Application

INQUIRIES reaching *Coal Age* concerning the applicability and use of coal in powdered form show that the characteristics and utility of this method of combustion are not thoroughly understood by the average person. The introduction of finely divided fuel into a furnace by means of a strong air blast, and the production there of a flame with intense heat strongly resembling a gas or oil flame, is apparently sufficiently spectacular to take powerful hold upon the layman's imagination.

That powdered coal will burn while in a state of suspension in air has been common knowledge among engineers for many years. Serious attempts to utilize this process on a commercial scale started about the beginning of the present century. Today, after approximately twenty years of experiment, trial and use, the limitations of the process are fairly well defined and accurately known.

A powdered-coal fire is one of great heat intensity or high local or centralized temperature. In certain metallurgical processes this is exactly what is desired. Here the value of the metal treated is large compared to the cost of the furnace. The degree of temperature necessary to fuse the metal is sufficient to ruin the furnace after a certain number of runs, regardless of the kind of fuel used. To such processes pulverized coal lends itself admirably, and is consequently there employed with excellent results.

Difficulty experienced with powdered coal in steam-raising has arisen from the fact that the temperature attained in the furnace is greater than the boiler setting can long endure. Here the process is continuous, and the value of the product (steam) made daily is small compared to the cost of the setting. Frequent renewal of the furnace or its lining is therefore out of the question.

The claim that coal burned in the powdered form yields more heat than similar coal burned on grates is, other things being equal, absolutely false. Any unit, such as one pound or one ton, of any coal contains a definite, determinable number of British thermal units; and no device, contrivance or process of man can change this amount one iota. It is quite true, however, that the definite amount of heat evolved from the combustion of a pound of coal by one process may be more available, or recoverable in larger measure, than that resulting from the combustion of the same pound of coal by another process. Thus, if the coal contains 15,000 B.t.u. per pound, in one case 10,000 B.t.u. only might be absorbed; while in another, say, 12,000 B.t.u. might be utilized. This, however, is a question of heat absorption, not heat generation.

It is probable that much of the misunderstanding and misconception surrounding the utilization of pulverized coal arises from a confusion of heat volume with heat intensity. The average person has no more definite and exact idea of just what constitutes the difference between a British thermal unit and a degree Fahrenheit than he has of the distinction between a watt and a volt. To such a man a high-flame temperature may be quite easily, perhaps naturally, confounded with large heat yield from the fuel.

Workingmen everywhere rejoice when the industry they labor in is attacked for its prices, despite the fact that if their goods are bought for too low a price they must be produced by low wages. Where the prices charged are known to be fair, at least a decent neutrality might be expected. Furthermore, when one knows that a daily paper continually misrepresents one industry—one's own—it is safe to assume that it misrepresents other industries as well. Why therefore credit it?

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

A feeling has been prevalent that the British Columbian plan of advancing wages to accord with increased costs of living by an automatic provision embedded in the contract would not find favor with the mine worker. It is true it was not popular in British Columbia among the workmen, but it is also true that there is in western Canada a degree of unrest unparalleled, and apt to continue unparalleled, here.

In fact, had an automatic clause been introduced earlier it would have done much to delay the progress of sovietism in western Canada. Canada has gorged herself even more gluttonously than have we, with foreigners who do not understand her free institutions, do not know her language or appreciate her spirit. Many of our coal regions were well peopled with Americans before the mines were opened in them. There was thus a basis of Americanism on which to work. The civilization of the people in parts was, it is true, often quite backward. The mountains had shut them in and arrested their development. But they were of our kin; they spoke our language; they were fostered in the same traditions; they revered what we revere. As a result there is always a bedrock of conservatism that cannot be found in every instance in western Canada, where all is newer and where the percentage of foreigners is higher.

The adjustment of wages to prices is a cardinal point of justice. It should appear in every contract. Unionism makes it possible to adjust wages to meet the cost of living, and the operator should fully avail himself of that and of his happy opportunity to grant essential justice to his workmen without injury to himself. So long as wages were determined by private dicker he could not do this, but now that there is no competition among employers as far as wage is concerned (the matter of bonuses being overlooked) a price is bound to be obtained that will have a definite relation to the wage rate regardless of what that rate may be, high or low.

Difficulties of Mexican Oil Situation

The competition of Mexican and other oil does, however, introduce some uncertainties. Mexico is a country which is not necessarily affected by the same wage changes as the United States. It is an independent variable in many respects. However, the careful reader of *Coal Age* will remember that O. P. Austin showed (Vol. 15, p. 863) that price movements in Mexico are not altogether independent of like movements elsewhere. In fact, sisal grass, which rose in price 300 per cent. in four short years, exhibits the fact that Mexico is getting the full benefit of the world's changed conditions with some of its own added for good measure.

It must be remembered that Mexican oil is a menace in itself, and not merely a menace because it is produced by cheap labor. Moreover, Mexican oil is not the only source of concern. Our own oil, produced, as it is, by well-paid labor, is in the South causing much worry, whereas in the West western coal is triumphing over western oil. Still too much stress must not be placed on oil competition. Wages must be kept where they are, and even raised to meet increased living costs, when they occur, whether Mexican or other oil invades or does not invade the coal market.

A wage which rises and falls with cost of living is not a sop thrown to labor. Today it is one of labor's rights, whereas it was not a right a few years ago, because it could not be safely assured to labor so long as there was a free wage market, where some could concede it and others need not.

J. D. A. Morrow said at the meeting of the National Coal Association recently that a shortage of 48,000,000 tons of coal was imminent. Dr. Garfield has, it is said, approved that statement. Some say the national labor market is depleted by over 5,000,000 men already, that figure taking in consideration the loss from the cessation of immigration as well as the decrease in the labor force owing to the departure of those who for a time formed a part of our labor forces. According to Mr. Morrow we will lose 40,000 of our foreign coal laborers in the next year. A Wilkes-Barre paper recently stated that from that city and from Hazleton about 1900 workers were preparing to return to their native lands. Shortages like these are quite likely to cause a semi-panic in the coal industry as soon as the public becomes aware of the true situation. Its slowness to buy is making the alien restless and homesick.

The labor situation is everywhere quiet. On the Monongahela River the men, at the Seventh Pool coal mine, organized themselves on May 16 and marched through Greensboro. The mine had been closed down for some time. When it reopened it cut wages 25 per cent. The men demand the scale price.

Strike of Labor Temple Builders in Ohio

By a peculiar irony of fate, mine workers now know how it feels to be the victims of a strike, for the laborers doing the excavating work for the new $100,000 temple of the coal miners at Thirty-fourth and Belmont Streets, Bellaire, Ohio, went out on strike on May 15. As a result, the completion of the new building will probably be delayed for some time.

The men ask for $4.30 per day of eight hours. They have been working nine hours per day and receiving 40c. per hour. Fifteen men laid down their picks and shovels and left their work. Eight teamsters who were working on the job and receiving $1 per hour did not strike.

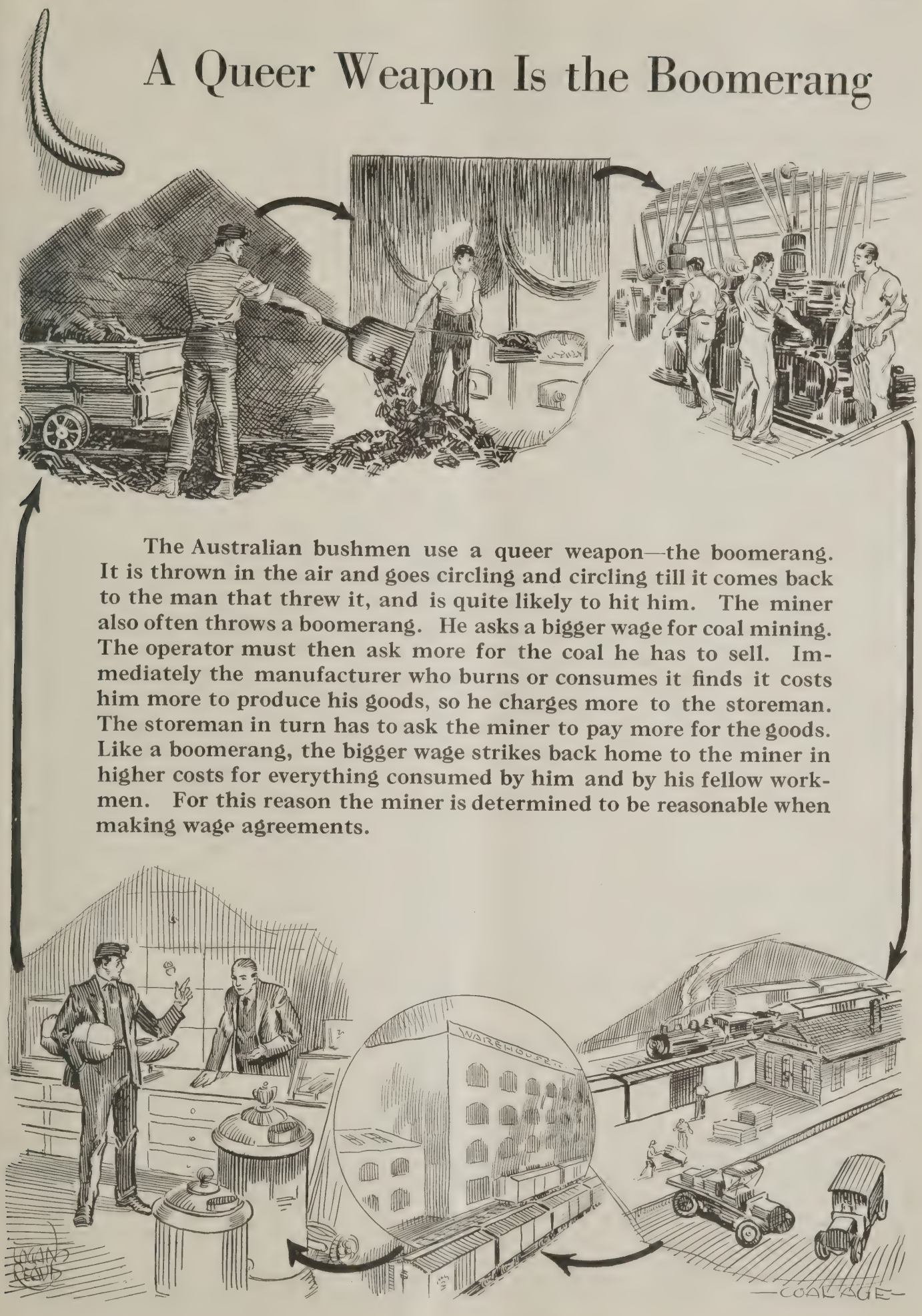
According to officials of the miners, members of coal miners' unions were to be given preference when men for the work were being secured and after that any man who was a member of a local union could be employed. The R. R. Kitchin Co., of Wheeling, was recently awarded the contract for erecting the temple. The contract calls for completion of the building in ten months from May 1.

Sympathy Strikes Violate Wage Agreement

Officials of the United Mine Workers of America have taken steps to end the strike of coal miners in the McAlester, Okla., district. About 380 miners quit work in sympathy with the striking electrical workers of the Texas Power and Light Co. and the Choctaw Light and Power Co., which furnish electric power for many of the coal mines and also for the homes of the miners. When the union men of the power and light companies walked out the electric companies employed nonunion men wherever possible. The coal miners claimed that the power companies were employing incompetent help and that their lives would be endangered in the mines if they continued to work under such conditions. Several of the largest mines in the McAlester district were forced to close down for a time, including the Rock Island Coal Co.'s mines at Hartshorne and the mine of the Osage Coal and Mining Co. at Krebs.

International officials of the United Mine Workers have telegraphed the leaders of the strike at McAlester, holding that the coal miners are working under the Washington agreement and that they cannot go on a sympathetic strike. All the men were ordered to return to work except in those mines where all equipment is electrically operated. All mines have resumed operation with the exception of Mine No. 10 of the Rock Island Coal Co. at Hartshorne.

A Queer Weapon Is the Boomerang



The Australian bushmen use a queer weapon—the boomerang. It is thrown in the air and goes circling and circling till it comes back to the man that threw it, and is quite likely to hit him. The miner also often throws a boomerang. He asks a bigger wage for coal mining. The operator must then ask more for the coal he has to sell. Immediately the manufacturer who burns or consumes it finds it costs him more to produce his goods, so he charges more to the storeman. The storeman in turn has to ask the miner to pay more for the goods. Like a boomerang, the bigger wage strikes back home to the miner in higher costs for everything consumed by him and by his fellow workmen. For this reason the miner is determined to be reasonable when making wage agreements.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Punishment of Intimidators

Letter No. 1—I read with interest the brief reference to the action of the Raleigh County Grand Jury, in West Virginia, which indicted 19 members of the District Local, for recent acts of intimidation at the mines of the E. E. White Coal Co., *Coal Age*, Apr. 3, p. 630. The announcement led me to reflect and wonder if those who think that the American Government is radically wrong in its methods of conducting its industries are not more pronounced in giving expression to their ideas than those who have greater faith in their government and believe that it is the best on earth.

A man who finds fault with existing conditions is entirely within his rights as long as his fault finding does not find expression in acts of violence and the intimidation of others. But, when it comes to the overturning of existing systems and authority, by a group of individuals, we face a revolution. Revolutions are justified only in rare instances and are, at all times, highly dangerous.

Under our republican form of government, the fellow who repudiates authority and strives to upset law and custom is either misguided or guilty of having wrong intentions. The high officers of the United Mine Workers of American have rightly advised all their locals against any concerted movement for a strike in behalf of "slackers" or "conscientious objectors," who have gotten themselves into jail by reason of setting themselves against the authority of the nation.

Submission to Government Essential

It is poor logic to think that one can support and uphold the Government and, at the same time, seek to enforce a demand for the release of any one man or group of men who have violated its laws and been thrown into jail to await their trial. Obviously, such a demand is a clear repudiation of the regularly constituted authority and must be so regarded. There are men of socialistic inclinations, though otherwise high-minded and regardful of law and order, who are led to support and favor the making of such a demand on their government. Such inclinations are akin to the socialistic tendencies that animate the I. W. W. and stand for revolution.

Certainly, a personal friend of a prisoner who is suffering for his acts of disloyalty or violation of law has a right to petition the Government for leniency or clemency in his friend's behalf. But, when it comes to a group of men making such a petition and accompanying it with a threat or act of intimidation, it is time for good people to get busy.

When established authority is not free to enforce law and order, and if its decrees are repudiated, there is no government worthy of the name. It is a pity that men of good intentions and kindly natures become blinded and fall victims to class prejudice that would lead them to support any movement that would subvert law.

Never was there greater need for law abiding citizens than today, when the future of our country depends on the overwhelming loyalty of the people who enjoy its privileges. The fact that German propaganda is at work to overthrow the peace and prosperity that we enjoy is sufficient argument for the full punishment for intimidators such as those indicted by the Grand Jury of West Virginia.

LOYALTY.

Clinton, Ind.

Waste of Coal

Letter No. 6—I was much interested in reading the letter by a Colorado mine foreman on this subject, *Coal Age*, Mar. 20, p. 544. As he intimates, in his letter, while there is undoubtedly much coal lost after it has reached the surface, a much larger loss occurs in the mine.

Briefly stated, the principal sources of loss of coal are the following: (1) The fine coal and slack produced in blasting and cutting the coal. (2) Coal left in mine pillars instead of being recovered. (3) Loss in loading at the tipple. (4) Loss in storage by reason of sizes being reduced and ground to dust. (5) Loss in transportation to market. (6) Loss by improper methods of firing. (7) Unburnt coal thrown away in the ash.

Now that the war is over we do not hear the cry so often raised during the past two and three years, "Save coal to win the war." It is to be hoped that the lessons learned in the conservation of coal and other supplies will not be forgotten. One of the most important of these lessons is the need of avoiding the waste of coal, particularly, in the operation of the mines.

In the letter to which I have referred, the foreman alludes to the waste in machine mining, because four or five inches of coal were left on the bottom. Where the floor is a soft fireclay, this bottom coal is often of great assistance in shoveling. It gives a smooth hard floor, quite different from the soft clay that makes the work of shoveling coal so often laborious. The trouble is much aggravated if the bottom is wet. However, four or five inches of bottom coal should not be left to be lost, but should be wedged up and loaded out as the place advances.

Where coal is underlaid with a dry clay bottom, the waste of bottom coal can be avoided by putting the mining or undercutting in the clay. In starting such a cut it is necessary to take up a sufficient thickness of the clay to lower the machine; but, after the first cut is made, this work will not be required.

The loss in pillar workings is often very great because of an improper method of drawing the pillars. It frequently happens that the pillars between rooms are too small and so badly crushed by the weight of the overlying strata that they cannot be drawn with safety. When this is the case what is needed is a better plan of driving the rooms. The distance between the rooms will have to be increased or the rooms driven at a less width.

All pillar coal should be removed as quickly as possible after the rooms have reached their limit, so as to avoid the drying out and the crushing of the coal be-

fore "robbing" is commenced. The most important consideration, in room-and-pillar work, is to see that the pillars are strong enough to withstand the weight of the overburden. C. McMANIMAN.

Rawdon, Quebec, Canada.

Barometer vs. Outflow of Gas

Letter No. 2—It is quite true, as E. P. Brennan has pointed out in his letter, *Coal Age*, Apr. 3, p. 634, that the indications of the barometer have an important bearing on the possible dangers that arise from the presence of gas in mines. In this country the variation of barometric pressure may range from 28 to 31 in. of mercury column, which corresponds to a range of atmospheric pressure from 1980 to 2192 lb. per sq.ft.

It has long been observed in coal-mining practice that an increase of gas in the mine air occurs at times when the barometer is falling, and it was common to accept the indications of the barometer as a gage of the relative safety of the mine atmosphere. A falling barometer is still generally accepted as a warning that calls for greater vigilance and the exercise of certain precautions to keep the mine workers safe.

It is quite generally agreed that the same change of pressure that causes the fall of the barometer results in the expansion of the air and gases pent up in the waste and abandoned places in mines. The expansion of this volume of gas-charged air causes an outflow of the same into the mine workings and endangers the lives of the men working in their places. The more sudden the fall in atmospheric pressure, the more observable the results that attend such a condition in the mine.

For example, only a few days ago, Sunday, March 9, the barometer fell 0.85 in. in 16 hours, causing a marked increase in the gaseous condition of many of our large mines having a considerable extent of abandoned areas. It is the sudden changes in barometric pressure that are more dangerous in their effect in the mines.

In England, it was the rule that the fireboss had to read the barometer every morning, before descending the mine shaft, and make that reading a part of his report. As Mr. Brennan has stated, "Mining men have been led to rely on the indications of the barometer," and I hope that this discussion will show how far it is safe to take barometric readings as a guide to safety in coal minig. TIMOTHY GOLDON.

Letter No. 3—Reading the letter of E. P. Brennan, which appeared in *Coal Age*, Apr. 3, p. 634, my attention was particularly arrested by one statement that read as follows: "Personally, I fail to see why a barometer when properly constructed should not adjust itself simultaneously with any change in the atmospheric pressure when that takes place."

In this regard let me state that a barometer certainly does adjust itself to every change in atmospheric pressure. However, there is a great difference between the sensitiveness of the mercury column of the barometer and the sensitiveness of a large volume of air and gases forming the mine atmosphere.

Owing to the greater sensitiveness of the air, the effect of any change in atmospheric pressure is more quickly felt in the mines, where an increase of gas may be observed some little time before there is an observable change in the height of the barometer. At the mines, we commonly speak of that instrument as the "glass."

Some years ago, it was the custom in England to issue daily warnings of the changes taking place in the barometer. These warnings were sent out from a central observatory, to all coal mines, to enable them to use greater precautions and watch all gobs and abandoned places for any undue discharge of gas into the mine workings. But such warnings were eventually discontinued, because it was found that they were quite generally received after the increase of gas in the mine had been observed. Nevertheless, the barometer is still regarded as an important item of equipment at all large coal mines.

Calculating Expansion of Confined Air and Gas

A simple calculation, based on the application of Mariotte's law, which makes the volume of air or gas vary inversely as the pressure, will show the effect of barometric changes. For example, suppose an old waste in a mine contained 50,000 cu.ft. of gas-charged air, and the barometer fell from 30 to 28.5 inches. The expansion of this volume would then be

$$28.5 : 30 :: 50{,}000 : x = 52{,}631 \text{ cu.ft.}$$

The volume of air and gas forced out into the mine workings, by reason of this expansion, is therefore 52,631 — 50,000 = 2631 cu.ft.

Owing to the far greater density of mercury, as compared with the gas-charged air in mines, it is only natural to believe that air and gas respond much more readily to a fall in atmospheric pressure than the mercury column of the barometer. Allow me, here, to illustrate this point by some actual observations showing the effect of changes of barometric pressure on air and gas in mines.

At the mine where I am at present employed, there are two pairs of entries that have been sealed off by means of a 12-in. concrete wall built in each heading. A 4-in. iron pipe equipped with a valve was built into each wall near the top. It is the custom to open these valves every day, to observe the pressure of the atmosphere contained in the enclosed space.

Barometric Effect Clearly Shown in the Mine

Some days when the barometer is low, having fallen during the night, a strong pressure is manifested when the valve is opened. At such times there will be such a strong rush of gas and air from the pipes that it is difficult to hold one's hand against the mouth of the pipe. At other times, when the barometer is high or rising, there will be little or no pressure manifest when the valve is open. There may even be a strong suction, drawing air from outside into the enclosed space behind the wall.

At times, I have observed a neutral condition, when air was neither discharged nor drawn into the pipe and, on my return to the surface, I would find that the glass was just on the point of changing. Indeed, I came more to rely on the manifestations of these valves than I did on the glass. There are many instances on record where gas has been observed flowing from the waste places into the mine workings long before such a condition was indicated by the glass.

On one occasion I recall that one of the valves continued to show a constant pressure behind the wall, irrespective of the changes in atmospheric pressure indicated by the glass. This was in strong contrast to the

manifestation of the valve in the other wall, which conformed with the action of the barometer.

When I mentioned this peculiarity to the officials of the mine, they explained the difference by saying that there had probably occurred a large fall in one of the rooms in that enclosure that had released a feeder of gas that continued to flow into the confined space and created a strong pressure that bore no relation to the pressure of the atmosphere. This explanation seemed reasonable, and, after a time, the excess pressure was relieved by opening the valves and allowing the gas to escape. Later, the manifestations became normal.

West Frankfort, Ill. GEORGE BOWKER.

Certification and Safety

Letter No. 4—I have been deeply interested in the discussion regarding the certification of mine officials and its relation to the safety of the mine. The letter signed "Essex" *Coal Age,* Apr. 24, p. 766, particularly arrested my attention, as the writer attempted to defend the illiterate practical man, and argued that he "should not be denied his place of service in a mine where the company or the operator has confidence in his ability to safely control the operations underground."

Allow me to say that, in my opinion, there can be no such person as an illiterate, practical man. It is impossible for me to conceive how a man who can neither read nor write can become a practical mine official.

Certainly, the practical mine foreman must know enough about arithmetic to enable him to measure air correctly and determine how much air he is getting for each man working on a split. He must be able to estimate what length of sidetrack will hold a given number of cars; or tell how many rails, ties, spikes, splice bars and bolts are required for a certain length of track. He must be able to scale distances from the mine map and determine the direction or bearing of any proposed heading, and do many other like things that require a simple knowledge of arithmetic, embracing addition, subtraction, mulplication, division, and decimals.

A Really Practical Man Will Study

It is my belief that a man who is intelligent and practical enough to be a mine official will be practical enough to learn to read and write and do simple arithmetic, and will have some knowledge of mine gases other than what he has been able to learn of them in the mine. Most of us can remember how the old practical miner used to tell us that he could detect carbon monoxide with his safety lamp; whereas, we all know that if enough of this gas was present in the mine air to detect it by the lamp it would cause instant death.

Practical men have often scoffed at the idea of a dust explosion resulting from a blownout shot; but the study of mine gases and dust explosions has made clear the danger arising from the accumulation of dust in working places where blasting is performed. By the study of gases, we find that firedamp mixtures tend to accumulate at the high points and in the rise workings of a mine, while blackdamp sinks to the lower places and collects in dip workings. This is because the former is lighter and the latter heavier than air, at the same temperature and pressure.

Even with my 28 years of experience in mines I would hesitate to accept the position of mine foreman at a mine, if I could not pass the written examination held in the bituminous districts of Pennsylvania. To accept of such a position without being certified as to my ability to fill it would cause me to feel that I was an impostor. I believe that a certified man realizes the dangers he must meet in the mine, because he has studied carefully the conditions surrounding the work. He is thoroughly acquainted with the requirements of the mining law. An uncertified man may have read over the law, but there is a difference betwen reading and studying the law.

By all means, then, let mine officials be certified as to their ability to fill the positions they hold. The study required to fit them for passing the necessary examination will develop their minds and teach them how to think, which is most essential in mining work where a man is often called to make a quick decision and display good judgment at the same time.

On the other hand, all learning and no experience in practical work is as bad as having years of practical experience with no knowledge of theory. The five years required by law seems a short time for a man to become a practical mine foreman. It is my belief that he should be at the face, mining coal, for at least two years, and the balance of the time be employed at general labor in the mine.

In closing, let me say that workers, as a rule, have no respect for the uncertified man. Neither do they regard the certified man if he has had little or no practical experience in mines. I have formed this opinion from my own observation in such cases, which convinces me that a foreman must be able both to tell a man how to do a certain piece of work and to give him all necessary instructions if he fails to understand.

Midway, Penn. W. J. LYKE.

Letter No. 5—Carelessness and indifference about the mine is claiming an awful toll on the lives of mine workers. If the Coal Mining Institute of America, the members of which are said to have discussed the subject of the certification of mine officials in its relation to safety in mines, could not reach a definite conclusion in respect to this matter, it is to be hoped that such will not be the case with the readers of *Coal Age;* but that the opinions expressed in these letters will be overwhelmingly against the employment of uncertified men as mine foremen in our mines.

In considering this question, I have not been able to understand, nor has anyone explained to my satisfaction, how an intelligent body of men, such as our legislators should be, could annul the requirement of the law making certification of mine foremen necessary. Why did they not go a step farther and throw down the bars completely, by rescinding the law requiring the state examination of mine inspectors. It would then be possible for any old politician to be a successful applicant for that office, and the mines would go to smoke.

It frequently happens that the first question asked on a mine foreman's examination is one that reads somewhat like this: "What is the principal purpose of the law requiring the employment of a practical and competent mine foreman?" This question shows that the body of men constituting the examining boards in Pennsylvania realize the necessity of passing, in the examination, only those who prove their ability and show by their answers that they are both practical and competent in respect to the safe and economical operation of a coal mine in their charge.

Allow me to quote briefly from the bituminous mine law of this state: Art. 4, Sec. 1, reads as follows:

In order to secure efficient management and proper ventilation of the mines, to promote the health and safety of the persons employed therein, and to protect and preserve the property connected therewith, the operator or the superintendent shall employ a competent and practical mine foreman for every mine where ten or more persons are employed.

No one will deny that this was a sane and sensible act, worthy of men of high ideals and aspirations, whose chief thought was to protect the lives and property of those concerned. Now, for another body of men to pass an act allowing any operator or superintendent of a mine to employ an "equally competent man" makes one think that the legislators were unduly influenced by those whose self-interests were the first and strongest consideration and with whom the safety of the mine workers was a matter of minor importance. It is about what we might expect if a farmer was to undertake to operate a mine. When I think of it, I cannot call to mind a single man who is capable of running a mine and not capable of passing an examination for a certificate of competency before a regularly constituted mining board.

A Mine Hopelessly Ruined by an Uncertified But "Equally Competent" Foreman

Sitting here, at my desk, I can see a mine whose history and condition today is one that furnishes an illustration that should convince the most skeptical in regard to the need of the certification of mine officials. The superintendent of this mine is a man who knows nothing of practical mining and who hires the "equally competent" men to run it for him. In the operation of this mine, mining laws and regulations have been ignored, entry stumps have been robbed to such an extent that a squeeze or creep started.

In one instance, six miners, a driver and his mule were all working under a rock that, to look at it, would cause one's hair to stand on end. The rock had been cut off on both sides and the props supporting it were broken with the weight. The mine has now been shut down by order of the state inspector, and the entire equipment has gone to ruin so that it is doubtful if the opening will ever be operated again.

Coal Mining a Hazardous Occupation

The mining of coal is not a farmer's job, but one of the most hazardous of occupations. In coal mining, therefore, the slightest deviation from the most rigid laws and regulations should not be tolerated. This is not the time when we can be slack in respect to our duty of protecting men and property.

Considering the number of men employed in our mines who do not understand the first principles of mining, and the many who cannot speak or understand the English language, it behooves the state to pass laws that will provide for educating mine workers and protecting them by compelling the employment of competent men to take charge of the work.

Every effort must be made to teach mine workers to protect themselves; but this cannot be done when coal operators are willing to employ bookkeepers, barbers, store clerks, and other incompetent men as mine officials. It is time that operators began to play "safety first" in the operation of their mines.

Osceola Mills, Penn. S. D. Hainley.

Prime Producer in a Coal Mine

Letter No. 1—The inquiry that appeared in *Coal Age*, Apr. 3, p. 637, asking who is the "prime producer" in the coal industry, will no doubt bring forth a variety of opinions. For myself, I must beg to differ with the inquirer who is of the opinion that "the actual producer is the loader who takes out from 8 to 12 lb. of coal each shift."

There are many different employees engaged in the work of producing coal and putting it on the market. First, there is the miner who liberates the coal from the strata, loads it into his car and sends it out of the mine. There is no question but that the miner is at the beginning of the production. He is the first man on the long list of drivers, motormen, trackmen, timbermen, cagers, engineers and bosses. However, if I may be permitted to put it that way, I would call the miner the "primary producer."

All the employees engaged in the work contribute their share in the production of the mine; but none of them can justly be called the *prime* or chief producer. All are busy workers, performing their duty in order, and assisting in the movement of the coal from the face to the tipple; but they are all dependent each on the other. To my mind, the man in charge, who commands and directs the work of all is the main spoke in the wheel. In my opinion, he is the chief and the *prime producer*.

It is true, of course, that the wages of all these workmen and the profits of the company besides, come from the point of the pick. But, it must be remembered that, in order to insure the greatest degree of perfection in the entire work, there is required one great head.

As I look at this question, the words "prime producer" mean far more than the first man on the list, or the miner who wields the pick. The words appear to me to embrace the higher meaning of getting the greatest yield, from a given area, in a given time and with the least expenditure of money and labor. On this basis the man in charge of the operation is the prime producer. J. T. Jones.

Rossiter, Penn.

Surveying Without an Instrument

Letter No. 1—I am tempted to offer a few comments on the article of T. Edwin Smith, *Coal Age*, Mar. 27, p. 562, suggesting the idea of making a mine survey when no instrument is available for that purpose and the only means at hand is a steel tape. In his description, Mr. Smith speaks of "lining in" two points on a section line, after locating one stake a quarter of mile and another a mile and a quarter away, on said line.

It would be interesting to know how any one would place any reliance on the subsequent work of a survey started in this manner. How is it possible to line in the two points that he mentions, at distances 20 ft. apart on the section line, or to project that line, without the use of an instrument.

The method described for finding the angle that a line, drawn from one of these points to another point located at the mouth of the mine, makes with the section line, is simple and would suffice for turning an angle or two in case of necessity. But, to apply this method for connecting a mine survey with the section line on the surface is certainly open to criticism.

If the three points used to represent the apices of the triangle happen to be ½ or even ¼ inch off their respective lines, there would result a grievous error in the survey projected from this triangle as a starting point, or employed to determine the course or bearing of the first line of the survey. Should one or both of these points be slightly off the true line, the error in the location of the stake at the mine entrance would probably be greater than the permissible error of any ordinary transit survey extending through a 2-mile circuit.

At the close of his article, Mr. Smith suggests that a steel tape stretched close to the ground is but slightly affected by a high wind that would render the observations taken with a transit unreliable. It is my experience that chaining or measuring in a high wind is a greater source of error than sighting through a transit, under the same conditions. I believe that practically all of the errors in surveys made in high winds can be attributed to chaining, and very little to the effect of the wind on the instrument.

There is no doubt, as Mr. Smith remarks, that "the accuracy of the results will depend upon the care taken in sighting the lines and measuring distances." This is true of all survey work, and it does not appear that the care to be taken is an argument in favor of the proposed method, more than when using an instrument in making a survey. Indeed, I will say that the most extreme care is needed, in the alignment of points without the use of an instrument for that purpose. An error of ¼ inch in a distance of 20 ft. makes an angular error of 4 minutes, which exceeds the allowable error.

Piney Fork, Ohio. F. C. SANNER.

Efficiency in Mine Management

Letter No. 5—The letters that have been written dealing with the question of efficiency in the management of mines have apparently neglected to mention one or two vital points in practical management. In order to secure the highest efficiency in any operation, it must be studied in detail.

In coal mining, one must start his investigation from the time the coal is taken from the working face until it is dumped over the screens on the tipple, ready to be shipped to market. By a careful survey of the situation, it will be found that, while negligence begins at the working face, the real fault can generally be traced to the failure of the management to choose men who are capable and trustworthy.

Employ Competent Men with Full Authority to Act

Success depends on employing only such competent men and giving them the authority they need to enforce discipline in the mine, and then holding them responsible for getting results. If it can be shown that men in charge of work are not fitted for such responsibilities as should be theirs, I would ask, "Why should they be retained on the payroll?"

Allow me to refer briefly to at least two items that are by no means uncommon in the management of coal mines, and yet interfere seriously with the highest efficiency attainable in the work. One of these items is the frequent derailment of cars in mines. This is most observable, in my experience, in machine mining where short rails or "jumpers" are used so as to enable the cutting machine to pass freely across the face, without interfering with the roadway. Several years of experience, in the movement of coal from the face to the tipple, enables me to give a close estimate of the number of derailments that are liable to happen.

Say, for instance, from 8 to 10 cars are taken from a single working place, daily. My observation is that an average of one of these cars a day will be derailed as the result of improper discipline on the part of the men in charge and for whom the management are responsible. Consider, for a moment, what this condition means, in a mine employing 400 loaders. All must agree that it will mean a marked decrease in the daily tonnage, to say nothing of the dissatisfaction of drivers, motormen and loaders, all of whom are delayed by reason of such derailments.

I recall to mind a particular instance where a motor, hauling a train of from 6 to 8 cars at a time, was compelled to pass over a switch not more than 7 ft. in length. To my remark that the switch should be twice that length, the partingboss replied that "a man in the office figures all those things by direction of the manager." But practical mining men know that such a length of switch can only be used in mule haulage, and will result in no end of delay in motor haulage.

Unpractical Work Charged to Office Men

In the instance just mentioned, the same figures were applied to all switches in the mine, whether in rooms or on the main parting. Such a condition does not speak well for either the technical or practical knowledge of "the man in the office," or yet for the efficiency of the management that employs him. Attention being drawn to such a matter in a mine invariably brings the reply, "Yes, I know it; but the manager won't stand for anything else, and I must do what he says."

While I do not wish to be understood as suggesting that an under official should go contrary to the orders of the management, I will say that too many under officials accept orders that they know are not practical, without making any attempt to explain the conditions that call for something different.

The cost-sheet is the one thing that is ever before the eyes of the manager, and it is not to be supposed that he is always acquainted with the conditions existing underground. On this account it is all the more important that an efficient management should employ competent men to place in charge of that work, and hold them responsible for the results, allowing them to have complete charge of all construction and repair work.

Unless this is done, the man in charge seldom feels free to do anything but what he knows will meet the approval of the management, and the entire responsibility for the result then lies at the door of said management, because full authority to act in accordance with one's practical experience has not been given, and the man is simply endeavoring, in a blind way, to carry out what he supposes to be the ideas of the management, imperfect and unpractical as they may seem to him to be.

In closing, let me say that it is difficult to understand how companies will employ men to take charge of their work, whom they assume to be incapable of independent judgment and action. Their chief aim and object should be to employ only men having a practical knowledge of coal, haulage, tracklaying, timbering and the handling of men, if they are to get results.

Edwardsville, Ill. CLAUDE W. CARRUTH.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Lamp Extinguished by Gas at Roof

I want to ask for an answer, through the columns of *Coal Age*, to the following question, which has caused some considerable discussion hereabouts:

When making the morning examination in a mine, the fireboss came in contact with a fall of roof on a main heading. The fall left a large pothole extending 8 ft. up in the roof and 6 ft. wide. On raising his lamp up into the hole, the fireboss first observed that the flame became dim and on raising it higher, the lamp was instantly extinguished.

Assuming that the air in this hole was stationary, although the normal current was traveling in the heading, I want to ask what was the cause of the dimming of the lamp flame and its later extinction when raised higher in the hole? An answer to this question in *Coal Age* will greatly interest others beside myself who are constant readers of the paper. STUDENT.

Pryor, Colo.

This question illustrates a situation that has often been explained in *Coal Age*. It is reasonable to assume that some gas is being driven off in the roof strata broken by the fall. The air current not being directed into this cavity, the gas accumulated and more or less filled the hole. Diffusion taking place in the lower portion of the hole, the gas passes off in a thin stratum at the roof, practically as fast as it issues from the strata.

The dimming of the lamp when raised into the hole would indicate that some carbon dioxide is mixed with the methane coming from the strata. This is not an uncommon occurrence in coal formations. At times, the carbon dioxide exists in the strata, but more frequently it has found its way there from adjoining workings or from an overlying, abandoned and worked-out seam.

It is possible for the carbon dioxide, accumulated in old workings that have been sealed off, to find its way through crevices in the roof strata where it becomes mixed with methane and issues into the live workings as a mixture of these two gases. Such a mixture, formed in the absence of air, is lighter than the air (sp.gr. 0.924) and will tend to accumulate in the upper portion of the hole where it issued from the strata. Its diffusion into the air current will be comparatively slow, because of its density so nearly approaching that of air.

When a lamp is raised into such a mixture of methane and carbon dioxide the first effect is a slight dimming of the flame, which takes place as the fresh air in the lamp is being displaced by the mixed gases. A close observation of the flame when the lamp is first raised into the mixture will reveal a small flame cap, which quickly disappears, however, as the flame dims. A little later the lamp is extinguished by reason of the combustion chamber of the lamp being completely filled with the extinctive mixture.

Owing to the brief appearance of a flame cap when the lamp is first raised into the gas, this mixture of carbon dioxide and methane has been called "flash-damp." Although the mixture has not sufficient air to enable it to support combustion, it becomes inflammable and explosive and may be highly dangerous when mixed with air in sufficient proportion. (*Mine Gases and Explosions—Beard, pp. 128, 129*).

Helium

Kindly describe the occurrence, properties and uses of helium, and state what is its chief source of production? STUDENT.

Washington, D. C.

Helium is a light gas, being only twice as heavy as hydrogen; chemical symbol, *He;* specific gravity, 0.139; occurrence very rare. It was first discovered in the spectrum of the sun, whence its name from the Greek *helios*, sun. It exists in extremely minute quantity in the atmosphere and in a few rare minerals, such as uranium, titanium, columbium, etc.

Its chief importance was discovered in the late war when a light non-inflammable gas was sought to replace hydrogen in observation balloons and dirigibles. The gas fields of southern Kansas, Oklahoma and Texas furnish the only supplies of helium for commercial use. The gas coming from these fields was formerly known as "wind gas," because it could not be ignited, and was wasted until the search for helium showed it to contain from 0.5 to 2 per cent. of that element.

Power Transmission

It is proposed to operate a pump located at a distance of 1300 yd. from the power station, and it is estimated that it will require 23 hp. to drive this pump. Kindly state what size of cable will have to be used to transmit the necessary power in this case. SUPER.

Collinsville, Ill.

Assuming 90 per cent. of efficiency in the motor driving the pump, the power delivered at the motor must be (23 x 746) $\div$ 0.90 = 19,065 watts. Then, supposing the pressure at the terminals of the motor to be 250 volts, the current necessary to be transmitted is 19,065 $\div$ 250 = 76 amps.

Finally, allowing for a 15 per cent. line drop, the size of wire required to transmit this current from the power station to the motor, assuming a wire return, will be that having a sectional area, in circular mils. calculated thus:

$$A = \frac{21.6 \times 3(1300)76}{250 \times 0.15} = 170{,}7000 \ circ.mils$$

Reference to a wire table for the transmission of electric current shows that a 000-wire will be required for this transmission, under the assumed conditions.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Miscellaneous Questions

(Answered by Request)

Ques.—In a certain shaft, the weight of the empty cage is $2\frac{1}{2}$ tons, the empty car $\frac{3}{4}$ ton, loaded car $2\frac{1}{2}$ tons, and the rope hanging in the shaft 2 tons; what should be the small diameter of conical drum when the large diameter is 28 ft., in order to equalize the load on the hoisting engine?

Ans.—To equalize the load on the engine, the net load moment at the beginning of the hoist must equal that at the finish. The load moment is the product of the load on the rope at the drum and the drum radius. The net moment is the difference betwen the load moments of the empty and loaded cages.

At the beginning of a hoist, the loaded cage is at the shaft bottom and the empty cage at the top. The total load hoisted is the sum of the weights of the cage, loaded car and the rope, or $2\frac{1}{2} + 2\frac{1}{2} + 2 = 7$ tons, which acts on the small radius, or diameter (x) of the drum; and its moment is $7\ x$ ton-ft. But the descending load, starting at the top of the shaft, is the sum of the weights of the cage and the empty car, or $2\frac{1}{2} + \frac{3}{4} = 3\frac{1}{4}$ tons, acting on the large radius or diameter of the drum; and its moment is $3\frac{1}{4} \times 28 = 91$ ton-ft.

The net load moment, at the beginning of a hoist is, therefore, $7\ x - 91$ ton-ft.

At the end of the hoist, however, the loaded cage is at the top of the shaft, and the empty cage at the bottom. The total load acting on the large radius is now the sum of the weights of the cage and loaded car, or $2\frac{1}{2} + 2\frac{1}{2} = 5$ tons, and its moment, using the diameter instead of the radius, $5 \times 28 = 140$ ton-ft. The empty cage being now at the shaft bottom, the total load acting on the small radius is the sum of the weights of the cage, empty car and the rope, or $2\frac{1}{2} + \frac{3}{4} + 2 = 5\frac{1}{4}$ tons, and its moment referred to the diameter as before, is $5\frac{1}{4}\ x$ ton-ft.

Hence, the net load moment at the end of a hoist is $140 - 5\frac{1}{4}\ x$ ton-ft.

Finally, equating the net load moments at the beginning and the end of a hoist, and solving the equation for x, gives for the small diameter of the drum, in this case, in order to practically equalize the load on the engine throughout the hoist,

$$7\ x - 91 = 140 - 5\tfrac{1}{4}\ x$$
$$12\tfrac{1}{4}\ x = 231$$
$$x = 18.85 \text{ ft.}$$

Ques.—Why, in mines worked exclusively with locked safety lamps, are explosions less frequent than in mines worked by open lights? State fully.

Ans.—It may be assumed that where the conditions in a mine are such as to require the exclusive use of safety lamps, greater precautions are taken to avoid the dangers due to the presence of gas, than in a mine where open lights are permitted. The greatest danger exists in mines where mixed lights are used. A mine worked exclusively with open lights must be assumed as being one in which gas has never been discovered. The men working in such a mine are mostly those who have no knowledge of gas and exercise no care to avoid possible dangers from that source. The mine may still be generating a little gas, which has escaped detection by reason of the place being well ventilated. A time of idleness or slack ventilation would then bring danger, unless the workings were thoroughly inspected before the men were allowed to proceed to work.

Ques.—When is a mine efficiently ventilated?

Ans.—The ventilation of a mine is efficient when it complies with every requirement of the mining law and the air is distributed about the mine in such a manner as to prevent any dangerous accumulation of gas in the working places and elsewhere in the mine, and the mine atmosphere is thus made safe and healthful.

Ques.—In selecting an explosive for blasting purposes in a mine what are the chief considerations?

Ans.—The chief considerations relating to the choice of an explosive for blasting coal and rock in mines, are the volume, duration and temperature of the flame produced in its explosion; susceptibility to moisture and freezing; and its strength and adaptation to the material to be blasted.

Ques.—If the mine resistance produces a $2\frac{1}{4}$-in. water gage, when the depression at the port of entry of the fan is 2 lb. per sq.ft., the area of the port of entry being 90 sq.ft., and the area of the port of discharge 65 sq.ft.; what is the manometric efficiency of the fan?

Ans.—The solution of this problem depends on the principle that, for the same quantity of air passing, the pressure varies inversely as the square of the area of passage. The first step is to find the total pressure absorbed in the fan. The intake area or port of entry of the fan being 90 sq.ft. and that of the discharge 65 sq.ft., the area ratio intake to discharge is 90: 65. Then, the intake pressure being 2 lb. per sq.ft. and calling the discharge pressure x, the pressure ratio, intake to discharge, is $2 : x$. But, by the principle just stated, the pressure ratio is equal to the square of the inverse area ratio, and we can write:

$$\frac{x}{2} = \left(\frac{90}{65}\right)^2 = 1.92$$
$$x = 2 \times 1.92 = 3.84 \text{ lb. per sq.ft.}$$

The total pressure required to pass the air through the fan is, therefore, $2 + 3.84 = 5.84$ lb. per sq.ft. But, the total pressure absorbed in the mine, as indicated by the water gage of $2\frac{1}{4}$ in., is $2\frac{1}{4} \times 5.2 = 11.7$ lb. per sq.ft. In this case, the total pressure producing the circulation in the mine and the fan is $11.7 + 5.83 = 17.53$ lb. per sq.ft.

Finally, since the manometric efficiency of a fan is the ratio of the pressure absorbed in the fan to the total pressure producing the circulation through the mine and the fan, expressed as percentage, it is, in this case, $(5.83 \times 100) \div 17.53 = 33\frac{1}{3}$ per cent.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Exemption of Transportation Tax on Export Coal

Many complications have developed to delay the Bureau of Internal Revenue in making an announcement in the matter of allowing exemptions from the payment of the transportation tax on export coal. The following regulations, however, have been submitted to the bureau by the American Wholesale Coal Association with the hope that they may be acceptable:

Any shipper intending to ship any commodity to any foreign country shall file with the carrier a sworn certificate containing the following information: (1) Character and amount of commodity to be exported; (2) name of the port through which the export shipment is expected to be made; (3) name of the country to which the shipment is to be made; (4) approximate dates between which the export shipments are to be made.

Upon receipt of such information, the carrier shall exempt such shipper from the payment of any transportation tax which is provided by law and intended to apply on domestic shipments. Provided that such exemption shall be considered temporary until the shipper has supplied to the nearest agent of the carrier the following data in proof of the fact that the commodity has actually been shipped into export:

a. A full copy of the foreign bill of lading containing: (1) The character and amount of the commodity exported; (2) the name or number of the conveyance used in exporting the commodity; (3) the city and country to which the shipment is destined.

b. Or a certificate containing: (1) Reference by number to the waybill or foreign bill of lading; (2) character and amount of commodity; (3) city and country to which shipment is destined.

When proof of export is thus presented, the exemption from the payment of the domestic tax on transportation shall become permanent. When there is any discrepancy between the amount originally declared to be destined for export and the amount actually exported, the exemption from the payment of the transportation tax shall be for the amount actually exported.

When the shipment is made through a pool, it will be sufficient for the purpose of proving exemption to show the amount actually exported is equal in quality and quantity to the sworn stipulations in the original declaration of intention to ship into export.

Disposition of Saar Coal Region

According to a recent issue of the *Iron and Coal Trades Review* (London) the following are the particulars regarding the settlement of the ownership of mines, etc., in the Saar Basin, which is the decision of the Council of Four:

The ownership of the mines is transferred to France in perpetuity, and the mines are to come under the provisions of the French laws. Germany, however, is to continue to be responsible for all liabilities incurred by her to the inhabitants of the country in so far as the rights of these people are not recognized by the French laws. France will exercise police functions in the district. The political sovereignty, however, will be assumed by the League of Nations, who will give a mandate to a kind of directory, consisting of five members, one of them an inhabitant of the Saar district, one a Frenchman, and the other three members are to be appointed by the League. The inhabitants of the Saar district will retain all their political rights concerning elections to local representative bodies, but will cease to send representatives to the German Parliament.

This régime will last 15 years, at the lapse of which period a plébiscite is to decide the future political status of the inhabitants of the region. In the case that they should express a wish to remain under the administration of their country of origin, Germany will have to buy up the mines for France, who will be granted their full ownership in recompensation for the damage done by the enemy in the Département du Nord. The estimated purchase price will have to be paid in gold or equivalent securities.

Foreign Coal Trade Opportunity

A firm in Belgium desires to get in touch with American producers of bituminous coal. Correspondence should be in French. References. Those interested may procure further details by addressing the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any or its branch offices, and referring to File No. 29366.

English Coal Market

The London coal market is gradually resuming normal conditions, says *The Colliery Guardian* of May 2. Seaborne arrivals have been fairly maintained and inland truck trade is improving. However, weather conditions and the wholesale arrears of orders on hand keep all business of a hand-to-mouth description. Domestic coals are in strong demand, and all manufacturing coals are keenly wanted.

There are larger supplies of coal for shipment from the Tyne for neutrals this month. Deliveries from Yorkshire are coming through more freely. The mines have now got into full swing, but it will probably take some weeks to overtake the arrears arising from previous low production. Supplies have improved in Lancashire, although restricted by the holidays, but there is a scarcity of domestic coal.

Outputs of coal at Cardiff are not yet up to the normal standard, and there has been a falling off in shipments. Operations are limited by the working conditions, but it is not improbable there will soon be great improvements in the supplies to meet the heavy demands.

Coal Shipments to Switzerland

On May 19 the War Trade Board announced that henceforth shipments of coal to Switzerland may be consigned to the Societe Coöperative Suisse d'Importation du Charbon, and furthermore that it is no longer necessary for importers in Switzerland to obtain certificates from the Societe Suisse de Surveillance Economique covering such importations. Applications on form X-A should be filed with the War Trade Board, Washington, D. C.

Brazilian Coal Imports During February

Vice Consul A. I. Hasskarl, of Rio de Janeiro, reports that arrivals of coal from all sources at this Brazilian port during February amounted to 43,179 metric tons (1 metric ton equals 2,204.6 lb.), of which 38,099 tons were American, and 5080 tons British, coal. The United States furnished 2138 tons in February, 1918, and 47,039 tons in the corresponding month in 1917.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report of May 19 states the following:

Since our last report, three large steamers were chartered to carry coal to ports in Brazil, and we have additional steamers open for such business; also have sailing vessels inquiring for coal to Brazil and the Plate at the chartering executive's rates.

There is very little demand for steamers to carry coal to West Indian ports, and shippers have been trying to arrange with the chartering executive to reduce freight rates (but without success), as such a reduction would help this business materially.

We have a number of steamers inquiring for coals to European ports, and think in the near future we will be able to secure tonnage for Genoa at $26.50, 1000 tons discharge, and Gothenburg, same terms—this gross form charter, freight in advance, no deduction.

The chartering executive's rates are as follows:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge. Rio, $19.50 net, 1000 tons dis.; Santos, $19.50 net, 1000 tons dis.; or $21 net, 600 tons dis.; Rio Grande do Sul, $22, 500 tons dis.; Buenos Aires or La Plata, $18.50 net, 1000 tons dis.; Montevideo, $19.50 net, 750 tons dis.; Pernambuco, $18.-50 net, 500 tons dis. Bahia, $18.50 net; Bahia Blanca, $20, 1000 tons dis. To Nitrate Range, $16.50 gross prepaid.

Sail (maximum) — Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Rio Grande do Sul, $20.50 net, 400 tons dis.; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. To Nitrate Range, $16.50 gross, prepaid.

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
May 13	Amer. S.S. Baxley	Bahia, Brazil	2,794	300
May 14	Amer. S.S. Lake Galera	Havana, Cuba	3,072	414
May 14	Amer. S.S. Hampden	Rio de Janeiro, Brazil	6,747	1,648
May 14	Amer. S.S. Achilles	Cristobal, C. Z.	11,331	1,152
Sewalls Point				
May 13	Am. Sch. Salem	Para, Brazil	1,249	. .
May 15	Am. Sch. Mabel Gale	Para, Brazil	1,140	....
May 17	Am. S.S. Munplace	Havana, Cuba	4,495	439
Newport News				
May 10	Amer. S.S. J. L. Luckenbach	Rio de Janeiro, Brazil	5,176	1,607
May 10	Amer. S.S. Hattie Luckenbach	Rio de Janeiro, Brazil	5,468	....
May 12	Amer. S.S. Lake Annette	Havana, Cuba	2,592	285
May 13	Amer. S.S. Waukesha	La Plata, A. R.	2,532	1,113
May 15	Amer. S.S. Munaires	Havana, Cuba	7,032	....
May 15	Am. Sch. Pusey Jones 4	Puerto Plata, S. D.	488	....
May 16	Amer. S.S. Lake Kyttle	Havana, Cuba	2,578	114
May 17	Amer. S.S. Cranenest	Callao, Peru	2,563	30€

COAL AND COKE NEWS

Harrisburg, Penn.

Senators and representatives from all sections of the state are being stormed with letters and telegrams protesting against the Mangan bill which reduces the standard weight of anthracite coal from 2240 to 2000 lb. The bill, which slipped through the House with scarcely any attention, is backed by the anthracite coal operators and retail coal merchants, and was introduced by Mr. Mangan, according to his statement, at the request of the wholesale and retail coal dealers of Allegheny County. Most of the letters received were from the eastern section of the state, and the protestants pointed out that the bill was sponsored by western interests where comparatively little anthracite is used.

Representative Mangan states the bill is justified by western Pennsylvania conditions, and he produced letters from coal dealers to prove his point. He also said that it was impossible to punish coal dealers who collected the price of a long ton for a short ton of coal, because the present law specifying that anthracite coal shall weigh 2240 lb. to a ton carries no penalty for violations.

Under existing legislation 2000 lb. to a ton is the standard weight of bituminous coal. Coal dealers complain that when they price anthracite at say $7.45 a ton of 2240 lb., some dealers quote the net ton of 2000 lb. at $6.65. This price, dealers complain, appears less, but actually is the same price per hundred weight. The general public, the dealers say, do not understand this and therefore place orders with the dealers who appear to be selling at reduced prices.

The Mangan bill imposes a penalty of $50 for each violation of the provision that coal shall be sold at a standard weight of 2000 lb. The bill is now in the Senate, where it is understood, an effort will be made to amend it, bringing the standard weight up to 2240 lb. While the bill will make little difference to miners who are paid by the car, it will benefit those who are compensated by weight.

Compensation amendments proposed by the state administration bill were given a hearing before the Senate judiciary general committee on May 20. After all the arguments were heard, the attorney general said there were only slight differences. General Schaeffer summed it up by saying that in the main features it was similar to a question of 50 per cent. of $24 dollars or 60 per cent. of $20. Henry W. Moore, of Philadelphia, speaking for the Manufacturers' Association discussed the medical charges and waiting period; Henry I. Wilson, speaking for the Central Pennsylvania Coal Operators' Association, objected to the payment to widows after remarriage as "establishing a peculiar precedent"; also noting the provision for supervision of payments to dependents, by the State Board. He suggested that guardians should be named. Evan C. Jones, of Wilkes-Barre, representing the anthracite interests made objection to the plan for determination of wages on a basis of gross earnings without deducting supplies and labor in anthracite mining as "an untrue" basis, and to the method of determination as involving too much search.

F. M. Painter, speaking for the Pittsburgh Coal Operators' Association, suggested changes in procedure, one being that agreements be altered as of the time when status changed; no awards be made on incompetent testimony; notice of appeals to court be given by appellant and that courts be empowered to dispose of cases instead of returning them to the State Board for review.

The interests were represented by James H. Maurer, president of the State Federation of Labor, Thomas Kennedy, head of the mine workers of the Lehigh field and Roger Devers, counsel for the mine workers. They asked that if the present amendments were not acccpeted, to let the present law stand as it is.

It developed at the meeting that if the employees were given an advance in compensation at the present session, that, if conditions warranted, they would ask for an increase at the next session also.

Charleston, W. Va.

A livelier demand in all markets was reflected in greater activities among the mines of West Virginia during the week ended May 17, that period even showing improvement over the first ten days of this month. At the present rate of production, May will prove to be the best month of the year, as in several fields the amount of coal mined is rapidly rising to normal, in no field being under 50 per cent. It is predicted that within a month conditions will be even more satisfactory. All classes of consumers now appear to be using more coal not so much as a temporary measuse, but because of regular needs. In certain fields the export demand is strong as a result of increased ocean shipping facilities; at the same time the demand for coal is growing in Lake areas. The effect of the increased demand has been of course to at least hold prices to government fixed rates if not to increase them somewhat.

While business has been much stimulated among the companies operating in the Kanawha field, the output of that particular district was on May 17 still a good many thousand tons below full time capacity. Insofar as it was possible to tell, however, mines were working about half time, or in other words, had produced during the week in question approximately 100,000 or perhaps 110,000 tons; any increases came largely from lake sources, although the general western market seemed to be much more active as indicated by inquiries for Kanawha coal. Taking them by and large, operators of the Kanawha region have been in no rush to ship coal until it could command a price insuring reasonable profit.

As was the case during the weekly period ended May 10, so it was also true of the week following; mines in the New River region were practically all working full time not only in getting out domestic coal but coal for export as well, the export trade having shown a spurt, probably because of the fact that more vessel space was obtainable. However, shipments to tidewater are being governed somewhat by the arrival and sailing of vessels. Insofar as it is possible to gage it, 200,000 tons or more a week were being produced during the week ending May 17. The labor shortage in the New River and Kanawha fields was not quite so pronounced as during the earlier part of May, the fact that mines were working regularly having caused the return of many miners to the field. A large part of New River smokeless is being shipped to Lake ports. Slack coal is moving out rather slowly and therefore is lagging a little in price, but is expected to reach old levels in the near future.

Fairmont, W. Va.

By May 17 production had reached the highest level of the present year in the Fairmont and other northern West Virginia coal fields, activities in the field being much more in evidence than was the case even at the beginning of May; it was estimated that in the three weeks which have elapsed since May 1 the output is fully one-third greater in volume than was the case at the first of the month, the loadings as an example, on the Monongah division alone being over 800 cars a day. Consequently there is less idleness among the various mines in the northern part of the state and it is believed that production is in the neighborhood of 80 per cent. Impetus in part has been given to shipments from northern West Virginia points through a growing demand for coal to be exported, daily shipments averaging as high as 167 loads from one railroad division. By May 17 there was also a considerable tonnage of coal being moved eastward for use on the railroads as well as for general industrial purposes. Western shipments also were materially increased during the week ended May 17, a large tonnage of coal being for Lake delivery. Such coal as is mined for export is being sent to Norway, Sweden and Italy. Prices for run-of-mine coal on spot sales have been running from $2.15 to $2.65 a ton. Some contracts have been made with the Baltimore & Ohio as low as $1.75 a ton, however.

Arrangements are being rapidly completed for the establishment of a rescue station at Fairmont, W. J. Heatherman (chief of West Virginia Department of Mines) and his chief clerk having been in the Fairmont territory where an examination for mine foremen was held during the week ended May 17. The equipment at the Fairmont station will be equal to that found on the average government rescue car and will consist of five helmets, a pulmotor and other equipment needed at a rescue station. Both Mr. Heatherman and Mr. Heiser went to Pittsburgh recently to make arrangements for the purchase of equipment.

Dallas, Tex.

Extensive development of the coal beds in Webb, Uvalde and other Texas counties along the Mexican border is probable, as much attention has been directed to that section of Texas by the recent bulletin issued by the United States Geological Survey. Coal has been known to exist in Webb and Uvalde counties for many years, and has been mined to a considerable extent at Santo Tomas Darwin and Dolores. Most of the railroads in southwestern Texas and in Mexico adjacent to the border have been supplied from these mines. The mining has been confined largely to the outcrop of the seams, however, and little effort has been made to mine the coal any great distance from the outcrop.

The coal occurs in two principal beds, both of which can be traced for a considerable distance along the banks of the Rio Grande, in Webb County, to a point where the coal outcrops swing northward into Uvalde County; here the seams dip somewhat. Two principal beds can be traced, about 90 ft. apart. The beds range in thickness from 2 to 2½ ft. and appear quite persistent.

This coal, geologically, is of considerable interest as it occurs in rocks that elsewhere in Texas bear only lignite, yet the coal here is bituminous. It has the qualities of cannel coal, contains a large amount of volatile matter, and it yields oil by distillation—about 50 gal. to the ton.

Mining has been hampered in this section by the nature of the rock forming the roof; it is of a loose sandy nature and requires timbering. As there is no timber in this section it has proved a drawback to mining operations. The additional cost of shipping in timber has been such that heretofore mining has not been attempted on a large scale where timber had to be used. Several large companies are being organized or considered, and extensive development in this field in the near future seems likely.

Victoria, B. C.

Two important actions, both involving title to the disputed coal rights of the Esquimalt & Nanaimo Railway belt, Vancouver Island, British Columbia, will come before the Privy Council in England this Summer. Hon. J. W. deB. Farris, Attorney General of the province, leaves shortly to appear before that court on behalf of the province. One of these cases is that between the E. & N. Ry. Co. and H. W. Treat, the latter being a resident of Seattle, Wash. A lease to certain foreshore on the east coast of Vancouver Island was given to Mr. Treat by the provincial Government and to this property the company claims ownership, by virtue of the terms of the grant it received in the year 1884. Mr. Treat proposes, if he is successful in this suit, developing the foreshore in question for its coal. From the provincial standpoint, its interest is to maintain the validity of its lease and to establish its authority to give such title. If the effort fails it follows that the company will have possession of all the foreshore on the east coast of the Island from Esquimalt to Nanaimo, a distance practically (as the crow flies) of 80 miles and of indeterminate extent if the undulations of the shore line are followed.

There are two other cases of a similar character; the Esquimalt & Nanaimo Ry. Co., vs Dunlap, and Esquimalt & Nanaimo Ry. Co. vs Wilson & McKenzie (Ganner estate) These Crown grants to coal rights within the railway belt were issued to the defendants by the provincial Gvernment in accordance with the terms of the Settlers Rights Act, 1917, during the interval elapsing between the passage of the act by the provincial Legislature and its disallowance almost a year later by the Dominion. The position taken by the company is that the grants were vetoed automatically with the disallowance. If this is not controverted it is likely to have a serious effect on a large and important island enterprise of recent date, that of the Granby Consolidated Mining and Smelting Company, at Cassidy's Landing. This company has a producing mine provided with modern plant and equipment; furthermore coke ovens, at Anyox, B. C., nearly completed will depend for their supply of coal on the Cassidy colliery.

Meanwhile the agitation among the settlers of the E. & N. Ry. belt continues. A deputation of residents of the Newcastle district recently waited on John Oliver, premier, and Wm. Sloan, minister of mines, to ask what action would be taken to secure their coal rights to them. The provincial legislation of 1917 was disallowed at Ottawa and the Lieut-Governor refused his assent to the re-enacted measure of 1918. The Newcastle delegation was informed that, in view of this and what has since transpired, there seemed little reason to believe that the 1918 legislation would be allowed; the chances of their obtaining title to their coal rights appeared to be slim. There are 180 settlers affected. These people now propose directing their representations to Ottawa and a general meeting of protest is to be held at Nanaimo, B. C., shortly.

PENNSYLVANIA

Anthracite

Lebanon—Lebanon County Commissioners have increased the assessment on the 7228 acres of land held by the Philadelphia & Reading Coal and Iron Co. in Lebanon County from $20 per acre or $144,560 to $142,000,000.

Wilkes-Barre — Frank Carichner, aged 35, of 49 Keith St., and his brother Hugh Carichner were killed at the Mineral Spring colliery of the Lehigh Valley Coal Co,. on May 21. The men had prepared a shot which exploded prematurely.

Tamaqua—Fire of an unknown origin has been discovered in the No. 4, mine of the Lehigh Coal and Navigation Co. It is having no serious effect upon production and officials state that indications point to the flames being under control.

Ashland — The Locust dale washery, operated by Thorne, Neale & Co., with main offices in Philadelphia, resumed operations the middle of May, after an idleness of several months. The property lies on the Philadelphia & Reading railroad a few miles west of this place.

Miners Mills—At a conference of representatives of the Wilkes-Barre Connecting Railroad, Miners Mills Borough and Healey Coal Co., Conlon Coal Co., and the Hudson Co., with engineer Krouse of the Public Service Commission on May 21, it was agreed that it would not be safe to proceed with the construction of a viaduct over the railroad tracks, owing to the menace of mine caves.

Sunbury—Northumberland County's anthracite coal land assessments for county taxable purposes will be given a substantial revision upward, according to the present plans of the County Commissioners. It is generally accepted in official circles, although not admitted by the commissioners, that anthracite coal land values will be advanced approximately $50,000,000 for the next three years.

Shamokin—The injunction filed in the courts of Northumberland County by C. J. Golden, president of district No. 9, U. M. W. of A., and several other members of Shamokin, against moving the district office from Shamokin to Shenandoah, has been withdrawn, the objectors paying the costs. At the district convention in Mahanoy City last November the convention approved the action of the district board in the matter.

Scranton—The enlargement and rearrangement of the Carbondale yard of the Delaware & Hudson company has been progressing for several years. This yard is one of the most important facilities in the operation of this coal road, as it is located at the concentration point of all northward bound anthracite passing over the company's lines, and the distribution point of all empties returning to the collieries. Carbondale is at the extreme north end of the Lackawanna coal basin and the D. & H. mines are distributed between this place and Plymouth, a distance of 38 miles. This yard now has an increased capacity of 50 per cent.

Nanticoke—The grievance committee of the Bliss, Truesdale, Auchincloss, and Susquehanna collieries in the Nanticoke district of the anthracite field, have decided that the mine workers of the Loomis colliery of the Delaware, Lackawanna and Western R.R. Coal Department must become members of the U. M. W. of A. by June 1, 1919. This action was taken by the grievance committee on hearing the report of the Loomis committee stating that the general committee should take immediate action on organizing the Loomis miners; otherwise the United Mine Workers are liable to be substituted by some other organization that does not approve of the present method of negotiating agreements and adjusting grievances.

Shenandoah—The Lehigh Valley Coal Co., on May 19, announced important changes of officials at Packer Nos. 4 and 5 colleries. Reuben Ball, for twenty years general foreman at Packer No. 4, has been placed on the pension list, on account of failing health. Richard Kane, inside foreman at No. 3, succeeds Mr. Ball. John Rudd, assistant inside foreman at No. 4, is promoted to the foremanship at No. 3.

The Girard Water Company, owned by the estate of Stephen Girard, has let a contract to the Central Construction Co., of Harrisburg, for the construction of an additional reservoir near Ringtown, not far from this place. The dam, which will cost approximately $200,000, will be completed in about eight months, and when it is put into service will go far toward obviating summer water famines which have hampered collieries and communities in the Mahanoy Valley. The capacity of the reservoir will be 270,000,000 gal.; its superficial area, when full, 42 acres, and its tributary watershed 1280 acres. The maximum depth of water will be 42 ft. Water will be drawn, when needed, from this reservoir into reservoir No. 5, which has a capacity of more than 300,000,000 gal., and which serves as a storage point whence water is pumped to various reservoirs supplying mines and towns. Engineers in charge of the plans were Gannett, Seelye & Fleming, of Harrisburg, and James Archbald, of Pottsville, engineer for the Girard Water Co.

Bituminous

Charleroi—The examining board of the twenty-first bituminous district, which recently held examinations here for mine officials, announced that of the successful applicants who passed examinations, five received certificates as mine foreman, 16 as assistant mine foreman, and 20 as fire boss. The examining board included the following: Inspector C. P. Bryne, Superintendent Joseph Edwards and Michael Dooley, miners.

Altoona—Speaking at the annual meeting of the Central Pennsylvania Coal Producers' Association at this place, May 15, James H. Allport, member of the U. S. Fuel Administration and representative of the United States in investigating mining and fuel conditions in France, urged the members to "develop the export trade in coal to help the French and Italian people get on their feet and to also aid in restoring prosperity in our own country." He told of the great suffering by the Allies and by the people of the allied countries due to the lack of coal brought about by the destruction of foreign mines by the Germans. T. H. Watkins, of New York, representing the exporters' association, also urged a boost in the local operations and the increasing of exports, stating that "only America can supply this big demand from the allied countries." J. D. A. Morrow, secretary of the International Coal Producers' Association, also spoke. The following officers were elected: President, Henry Boulton, of Clearfield; vice president, M. C. Bracken, of Gallitzin; secretary, Charles O'Neill, of Clearfield, and statistician, W. A. Jones, of Hollidaysburg—all of Pennsylvania. The following are the board of directors: T. H. Watkins, of New York, M. J. Bracken, of Gallitzin, B. M. Clark, of Punxsutawney, E. B. Chase, of Philadelphia, Harry Boulton, of Clearfield, T. Larry Eyre, of West Chester, D. C. Morgan, of Kittanning, H. B. Scott, of Philipsburg, J. S. Sommerville, of Robertsdale, J. C. Cosgrove, of Johnstown, George H. Francis, of Greensburg, Thomas F. Kelley, of Coalport, Robert Summerville, of Winburne, J. William Wetter, of Philipsburg, J. R. Caseley, of Du Bois, W. R. Craig, of St. Mary's, T. V. Gould, of Brisbin, and C. H. Jacobs, of Philadelphia.

WEST VIRGINIA

Raleigh—The Raleigh Coal and Coke Co. is making improvements at its Nos. 1 and 6 mines at this place, installing loading booms, steam car dumps and other new equipment which will increase output.

Macdonald—Protest having been made by the machinists of the New River Co. to going to Mt. Hope, where the company expected to relocate its new shops, final decision on the location of this plant has been deferred for the time being.

Wheeling—Shipment of coal to Cincinnati and Louisville over the Ohio River route has been resumed, it having been several months since any coal was shipped via this route. In the first fleet which passed here on May 16 there were 15 barges in two tows, or about 250,000 bu. in all.

Shinnston—A coöperative coal mine is a scheme which gives promise of reaching the development stage at this place. There is a tract of 14 acres of coal within the corporate limits of the town susceptible of development for a municipal supply of fuel. A possible future shortage of gas confronts the town.

Fayetteville,—The Cepec mine which is owned by C. P. Galloway, of Glen Jean, is about ready for operation, construction work on this plant having just been completed. The mine is located near Kilsyth. Two Fayette County men—Dr. C. B. Lee and Thos. Nichol—have leased several hundred acres of coal land from the McKell Coal Co. which will be developed through the opening of new mines.

Charleston—Mines of the Black Betsey Consolidated Coal Co., in Putnam County, are running again, having been closed down since about Jan. 1, because of poor market conditions. These mines are under the management of T. W. Woodward.

The work on the plant of the Ingram Branch Coal Co., near Page, has progressed to such an extent that the company plans to begin the shipment of coal shortly.

Fairmont—It will be necessary in the future to discontinue furnishing cars to mines where such mines have on hand unconsigned loads, provided the situation indicates a reduced car supply. Mines in the northern part of the state have been notified that where any mine carries unconsigned loads such a mine will be subject to having its car supply discontinued whenever the increase in Lake business makes it necessary. The new order indicates a growing car shortage and is made to insure and protect such mines as are working and are billing their coal.

Bluefield—In the Pocahontas district the week ended May 10 was marked by larger gains than have been witnessed at any time in recent months, production going up to 285,000 tons, a gain of 38,000 tons over 247,000 which was the tonnage for the week ended May 3. Equally encouraging was the reduction in the production loss from 171,000 to 114,000 tons—a gain of 57,000 tons; only 88,000 tons were lost from no market as against 141,000 for the previous week—a decrease of 53,000 tons. It will thus be seen that the Pocahontas district is sharing in the increased demand for coal. Certain it is that Pocahontas coal is commanding much higher prices than was the case a few weeks ago.

Huntington—Between May 3 and 10 another gain of 15,000 tons was made in the output of the Logan district. The mines of that district reached a total of 176,000 tons or 58 per cent. of full time capacity; at the same time this tonnage was 40,000 tons under the output for the corresponding week last year when 216,000 tons were mined. There was an increase in production losses of 21,000 tons—or from 148,000 to 127,000 tons. The no market loss was cut from 131,000 to 106,000 tons—a gain of 25,000 tons in that respect. There was a

pronounced increase in the car shortage which was run up from a loss of 1100 to one of 5500 tons.

Huntington—The twentieth semi-annual meeting of the West Virginia Coal Mining Institute will be held at Hotel Frederick at this place on June 3 and 4. The following papers are scheduled: Tuesday morning. "The Future of the Coal Industry," by J. A. Hall. W. D. Roberts will lead the discussion following. Tuesday afternoon. "Is There an Overproduction of Coal in America?" by J. H. Thomas. "The Recovery of Coal," by F. G. Wood (discussion). "Labor Saving Devices," by C. R. Jones. Wednesday morning. "What Coal Operators Have Learned from the War," by E. N. Zern. "The Most Common Violations of the Department of Mines," by W. J. Heatherman. The closing session: two papers on "Coal Preparation," (a) "Inside," by C. H. Tarleton; (b) by J. W. Bischoff.

INDIANA

Linton—Jesse Bedwell, age 35, was fatally injured at the Black Creek mine near this place on May 13, by being struck on the head by a piece of coal. He suffered a fracture of the skull which resulted in his death the following day.

ILLINOIS

Springfield—The June examinations by the state Miner's Examining Board will be held at the following places and at the dates noted: Du Quoin, June 4; Herrin, 5; West Frankfort, 6; Harrisburg, 7; Christopher, 9; Belleville, 10; Litchfield, 11; Springfield, 12; Danville, 13; La Salle, 16; Peoria, 17; Rushville, 19.

Centralia—State mine inspectors, V. P. Rassbottom, J. O'Rourke and Messrs. Wright and Morgan, of Belleville, met in this place to ascertain the cause of the recent explosion in the Glenridge mine of the Marion County Coal Co. near Centralia. Four men lost their lives in the accident, fire followed the explosion and the mine was badly damaged.

Johnston City—The Johnston City Washed Coal Co., has resumed operations at its White Ash mine at this place after a shut down of several weeks. During the suspension of work at this plant, the mine was given a complete overhauling and extensive repairs were made on the shaft and tipple. It is reported that the company has secured large coal contracts for the coming year which indicates that the plant will operate steadily for some time.

KENTUCKY

Boldman—The Furnace Coal Mining Co., located at this place, is making arrangements to increase its output through the installation of electrical equipment throughout its plant, a new power house having been built and power machinery installed.

Coal Run—C. E. Steel, owner of the Coal Run Coal Company at this place and manager of the Funk Coal Co., at Sutton, Ky., has sold his interest in the former company to H. H. Funk. Operations at the Funk Coal Co.'s plant have been suspended owing to repairs which are being made, much construction work is in progress so as to fit the mines for the more extensive mining of coal when operations are resumed.

Farmers—Quite extensive development in three Kentucky counties—Morgan, Breathett and Elliott—is presaged by a large deal in which approximately 200,000 acres of coal and timber lands will change hands, E. B. Carr of Philadelphia and Geo. B. Kaywood of Frankfort having sold the property to St. Louis, Pittsburgh and Chicago capitalists for a sum which will run well into the millions. It is proposed to build a railroad through from Index to Farmers, Ky., following the Licking River, a connection being made at Farmers with the Chesapeake & Ohio.

Pikeville—The Northeast Kentucky Welfare and First Aid Association is the name under which a new organization has been formed in Kentucky, with the following officers: President, J. L. Morgan, Pikeville; vice presidents, C. A. Warden, Hellier, R. C. Thomas, Paintsville, C. E. Anderson, Hellier, K. C. Mitchell, Wolfpit, C. W. Connor, Esco, Charles M. Keyser, Keyser, N. M. White, Prestonburg, J. J. Christie, Lookout and Zach Justice, Pikeville; treasurer, Linton Trivette, Pikeville; secretary, Everett H. Sowards, Pikeville. The new association plans to hold a first-aid contest on July 4 at Pikeville.

Ashland—A special meeting of the operators of northeast Kentucky was held at this place on May 16, being featured by the presence of W. B. Reed, of Washington, D. C., accounting secretary of the National Coal Association. Approximately 50 operators of the Elkhorn and Big Sandy fields were in attendance at the meeting. Mr. Reed talked largely on the proper way to handle war revenue and income tax statements. It was suggested during the meeting that the retention of expert accountants in an advisory capacity would be of much benefit to operators. Traffic counsel will be employed by the association as the result of a report made by the special committee delegated to secure through rates via the Chesapeake & Ohio railroad to tidewater and southeastern points. New members admitted gave the Northeast Kentucky Coal Association a total membership of 74.

Obituary

Walter W. Winton, of Scranton, president of the Winton Coal Co. died of heart failure at his home on May 19. Mr. Winton was a graduate of Harvard University; he also served the Union cause in the Civil War with distinguished bravery. Besides being president of the Winton Coal Co., Mr. Winton was connected with numerous other coal companies and also with banking institutions.

W. Arthur Hitchins, president of the Hitchins Brothers Co., a director of the Hitchins-Brophy Coal Corporation and the Citizens' National Bank, died at the Mercy Hospital in Frostburg, Md., recently. Mr. Hitchins was 50 years old. He succeeded his father, the late Adam E. Hitchins, as head of the Hitchins Brothers Co. and was widely known in the industrial and coal circles of Allegheny County. Among his surviving brothers is Owen Hitchins, of New York and Howard and Emery G. Hitchins, of Frostburg who were associated with him in the Hitchins Brothers Co.

Industrial News

Grove City, Penn.—The Pittsburgh Coal Co. has recently resumed work at its coal stripping operation in Pine Township.

Indiana, Penn.—The Commercial Coal Co. is understood to be planning to increase the capacity of its properties in Black Lick Township. The present output will be practically doubled.

Riceville, Ky.—The Green Rock Coal Co. is planning for the installation of the necessary mining machinery for the development of a large local coal tract. H. D Foster is president and manager.

Jeddo, Penn.—The G. B. Markle Co. is in need of 100 miners and laborers for its Highland No. 5 and Jeddo No. 4 collieries. There is a scarcity of qualified miners in the Lehigh anthracite field at the present time.

Charleston, W. Va.—The Dana Coal Co. has leased a tract of coal, comprising about 1200 acres and located in the Maiden district; it was held by the Maiden Coal Co. The Dana company expects to develop the property.

Edwardsville, Ill.—The Donk Brothers Coal Co. is sinking a shaft at this place and planning the construction of a plant to cost about half a million dollars. When completed and running at full capacity, this operation should employ about 700 workmen.

Moundsville, W. Va.—The Dunkard Valley Coal Co. has recently completed negotiations for the purchase of a coal tract comprising about 7½ acres, located in the vicinity of this place; plans are being arranged for the commencement of operations at an early date.

Harlan, Ky.—William Helton, mine foreman, died as a result of being crushed by falling rock while opening a new mine on the lease of the Canel Bits Coal Co., in North Harlan. His leg and side were badly mashed, resulting in death shortly after reaching the hospital.

Henderson—Plans are being arranged by L. P. Kleiderer, Fourth Street, Louisville, for the inauguration of operations in the local coal mine recently acquired. In connection with the work, it is proposed to install a new shaft, provide the construction of a new coal tipple, with the installation of necessary coal mining equipment, etc.

Monongahela, Penn.—Robert Robinson, of this place, is understood to have recently completed negotiations for the purchase of the holdings of the Vulcan Coal Co., Connellsville, Penn., including about 600 acres of coal with three mines, located at Pomeroy, Ohio. It is also understood that the new owner is planning for continued operation, with increased capacity.

Fairmont, W. Va.—The Consolidation Coal Co. has completed arrangements for the opening of a new mine and the construction of a tipple fronting on the yards of the Pennsylvania Railroad, at Mingo, Ohio. It is also stated that this company recently completed negotiations for the purchase of the holdings of the Royal Coal Co. and the property of the Tarr farm adjoining, comprising about 700 acres.

Birmingham—The annual meeting of the Alabama Coal Operators' Association will be held in this place June 3, 1919. The annual reports of officers will be made, plans for the advancement of the interests of the association will be discussed and officers for the ensuing year will be elected. Consideration will be given to amendments to the constitution and by-laws of the association as proposed at the last annual meeting.

Louisville, Ky.—Traffic manager C. D. Boyd, of the Harlan County Coal Operators' Association, the Hazard Coal Operators' Exchange and the Southern Appalachian Coal Operators' Association, has requested publication of through rates to take the place of combination rates on coal from mines on the Louisville & Nashville, Queen & Crescent and short line connections to destinations on the Baltimore & Ohio R.R.

Toledo, Ohio—Considerable activity has developed at the docks and the Lake trade is gradually increasing. This is shown by the records of loadings at the docks for the week ended May 17. The Hocking Valley docks during the week loaded 12,527 cars or 176,143 tons, making a total of 652,338 tons loaded during the season. The Toledo & Ohio Central docks during the same week loaded 41,810 tons as compared with 24,558 tons the previous week, making a total of 105,342 tons for the season.

Louisville, Ky.—The Western Kentucky Coal Operator's Association met at this place in the Seelbach Hotel, to discuss plans for competing with eastern Kentucky mines, as the result of a new freight rate to Cincinnati, effective shortly. The reduced rate is said to open a new field for western Kentucky coal. Steps were also taken for contracting for the sale of coal to bunker steamships at New Orleans and Mobile. Tests are being made as to the adaptability of western Kentucky coal for this purpose.

Louisville, Ky.—The Illinois Central railroad has requested revision of rates on coal from mines in western Kentucky to Paducah, Mayfield, Fulton and intermediate points, in order to remove preferential rates on nut, slack and pea coal and to place western Kentucky and southern Illinois points on a parity. It is held that rates on steam coal should be 20c. a ton lower than on other grades and that present rates place western Kentucky mines at a disadvantage. The matter will be heard May 28 before the Louisville District Freight Traffic Committee.

Another request, set for hearing May 28, is that of the Southern Railway for publication of an advance of 10c. per ton on coal from mines on the Southern in Tennessee, Kentucky and Virgina to stations in North Carolina on the Elkin & Allegheny Railway.

Bethlehem, Penn.—The Dodson International Coal Corporation recently formed expects to handle the future export coal business of Weston Dodson & Co., Inc., of this place. The following are the officers of the new company: Alan C. Dodson, chairman of the board; Sterling J. Joyner, president; John T. Morrow and W. R. Coyle, vice-presidents; G. R. Radford, treasurer; H. W. Kessler, secretary; J. H. Davison, manager. Mr. Joyner has been identified with the export business and with engineering and construction companies. The Dodson offices in New York will be moved to the fortieth floor of the Woolworth Building and will be in general charge of J. H. Davison, as tidewater and export sales manager. Mr. Davison had been New York manager of Weston Dodson & Co., Inc., for several years prior to his entry into the service in 1917.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

No Activity in Soft Coal—Prices Being Maintained—Higher Prices Predicted—Output Far Behind Last Year's Figures—Anthracite in Good Demand, with Some Mines Refusing New Business

THE bituminous coal market is colorless. Most of the coal being shipped from the mines is in fulfillment of contract obligations. Operators continue to be optimistic. Coal is being sold at the prices that have been in effect for some time, with the usual reductions heard of here and there on occasional shipments. It is freely predicted that prices will be higher before long, and operators quote above the present level on contracts to the end of the coal year. Production of soft coal for the week ended May 17 is estimated at 8,383,000 net tons. How the lack of demand has curtailed the output of bituminous coal may be gathered from the fact that for the period of Jan. 1 to May 17 the production totaled 160,599,000 net tons as compared with 212,511,000 net tons for the same period of 1918.

So urgent is the request for anthracite that producers are hard put to it to meet the demand. Many of the operators already have sufficient orders on their books to keep their mines working full time well into July. A number of producers refuse to consider any new business for the present. All the domestic sizes of hard coal are eagerly sought, but the smaller steam sizes are moving slowly. During the week ended May 17 there were produced 1,743,000 net tons of anthracite. For the period Jan. 1 to May 17 the output of hard coal totaled 28,859,000 net tons as against 37,144,000 net tons in 1918.

WEEKLY COAL PRODUCTION

The production of bituminous coal in the United States during the week ended May 17 is estimated at 8,383,000 net tons, and is but slightly less than the output of the week preceding, estimated at 8,421,000 net tons. The daily average production during the week ended May 17 is placed at 1,397,000 net tons, and as during the preceding week, exceeded the daily average for the calendar year to date, estimated at 1,361,000 net tons. For the period of Jan. 1 to May 17, the production of bituminous coal in the United States is estimated at 160,599,000 net tons as compared with 212,511,000 net tons for the same period of 1918, thus placing the current year's output to date at approximately 52,000,000 net tons, at 25 per cent. below the record production for last year.

The improvement which began in the anthracite production several weeks ago continued during the week ended May 17, and while such output is slightly lower than the production during the week of May 10, it equals the weekly average during the years preceding the abnormal year of 1918. The production during this week is placed at 1,743,000 net tons, with a daily average of 290,000 net tons as compared with 245,000 net tons for the calendar year to date. As in the case of bituminous coal, anthracite production for the calendar year to date is approximately 25 per cent. below the output for the same period of 1918.

The production of beehive coke in the United States during the week ended May 17 is estimated at 209.975 net tons and considerably below the output for the week ended May 10, estimated at 260,378 net tons. The current week's production is but 33 per cent. of the output recorded during the week ended May 18, 1918, when the production of beehive coke reached the high mark of 634,056 net tons. Production in all states with the exception of West Virginia decreased during the week ended May 17 compared with the ended May 10. The decreases which occurred were slight in all states with the exception of Pennsylvania, where the production amounted to 153,781 net tons as compared with 193,830 net tons during the week ended May 10 and 458,796 net tons during the corresponding week of last year. For the calendar year to date beehive coke production is estimated at 7,964,179 net tons against 11,344,400 net tons during the same period of 1918. The average daily production during the week ended May 17 is estimated at 34,996 net tons as against 67,493 net tons, the daily average for the period Jan. 1 to date and 96,138 net tons, the average daily for the period Jan. 1 to May 18, 1918.

The dumpings of bituminous coal at the lower lake ports during the week ended May 10 are estimated at 718,366 net tons and are approximately the same as the dumpings during the corresponding week of 1918, which were placed at 723,294 net tons. For the 1919 season to date the dumpings are placed at 2,220,848 net tons and are in excess of the dumpings during the same period of last year, which amounted on May 11 to 2,046,284 net tons.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running a little greater than for the corresponding week a year ago. More customers are in the market. Orders from road salesmen for both immediate and future delivery continue in exceptionally large volume, the total being nearly double that of the corresponding week of 1918. Collections are most satisfactory.

Dun's—With practically all centers reporting expansion, bank clearings at the principal cities in the United States this week attained notably high figures and surpassed all previous records for the period. The total at fifteen points amounted to no less than $7,028,308,834, an increase of 26.4 per cent. over the same week last year, and one of 39.3 per cent. in comparison with 1917.

Bradstreet's—Something like a shifting of activity is revealed in the trade and industrial reports this week. Cool, rainy weather and the lateness of some of the spring planted crops, especially corn and cotton, seem to be more stressed at the smaller markets, but increased activity, strength and confidence are revealed at the larger centers, while in instances where weather conditions have been favorable and seasonable temperatures have prevailed the trend has been a very cheerful one.

The Iron Age—Though a measurable volume of business now marks the recent ushering in of government-free trading, nowhere can it be said that the long awaited buying movement is under way. Weighing our various reports the conclusion is forced that pressure is gathering to such an extent that heavy purchasing cannot be long delayed. Concessions in price are unquestionably being made in both iron and steel, but there is no general break from what are regarded as market levels and few of the changes as yet establish a new price. There is no frantic endeavor to get business at keenly competitive prices.

Dry Goods Economist—Probably the most interesting event of the week, so far as the retailer is concerned, is the recommendation by President Wilson that the taxes upon retail sales "can hardly find justification under the easier circumstance of peace, and can now happily be got rid of." In every section activity among the retail dry goods stores is pronounced. The recent gains in the volume of sales have been well maintained and the expectation is general that an era of prosperity is at hand. Labor unrest continues in some textile centers, but the situation has been eased by the settlement of the strikes in Lawrence, Mass., and in Cohoes, N. Y.

American Wool and Cotton Reporter—Strength of the wool market still continues, but there is a decided trend toward conservatism in the trade. On the whole, in the West the buyers are inclined to hold off, prices have advanced so rapidly. Some mills are pretty well supplied with stock now and some have stopped buying for the present. Some are of the opinion that there may be a slump in wool after a while, while others feel that the strength will continue for a long time. "Stronger than ever," is practically the universal report among cotton factors in Boston in regard to the cotton market, and it is predicted that will be the report every week this summer. White cotton, especially staple, is apparently scarce.

Atlantic Seaboard

BOSTON

Market remains inactive. Receipts light. Pennsylvania grades maintain the advantage both all-rail and by water. Balance of railroad orders placed. Hampton Roads situation unchanged. Navy bids due to be opened within a few days. Scarcity of railroad barge tonnage hampers movement from New York and Philadelphia. Anthracite shipments extremely slow. Tidewater receipts far behind the demand. No limit to retail trade.

Bituminous—While there are surface indications of better buying, yet the undertone is extremely quiet. Buyers show as little interest as a month ago and there are many steam-users throughout New England who have not yet arranged for coal they are to use in August. Several large consumers who have usually drawn their supply from the Pocahontas and New River districts are still "experimenting" with grades from central Pennsylvania; there is no comprehensive buying, and aside from spot purchases of limited tonnages the bulk of contract business is still confined to specialties.

The figures show no material increase in receipts here from week to week. It is plain to the trade that the market is absorbing just about what is shipped, and were the tonnage to increase it would mean that New England was at last trying to be forehanded for the future. The strike of engineers in the textile mills of New Bedford, Mass., put 30,000 operatives out of employment and this is only one of many features of the industrial situation that

lead manufacturers to postpone buying on anything like a large scale. Even the railroads have been taking coal in very light volume. Their stocks have been large and it was only recently that arrangements were completed for the 11 months beginning May 1.

This territory shows no change from the turn given the trade early in the year when it became evident that Pennsylvania coals would have the preference. Certainly that advantage has been maintained, for not only by rail but by water from the New York piers are these grades being purchased to the virtual exclusion of the smokeless coals from Hampton Roads. The Boston & Maine R.R. has always taken at least 60 per cent. of its supply by the water route, but this year only about 20 per cent. has been arranged for other than all-rail. And of the 20 per cent. practically all has been bought from Pennsylvania or West Virginia shippers for loading at Philadelphia or New York. Recently the City of Boston bought 45,000 tons of steam coal for harbor institutions and while the contractor is a factor in Pocahontas and New River distribution yet this year the tonnage was placed on Pennsylvania coals, the differential was so much in their favor.

The railroad orders have now been practically all placed and published. Acting largely on directions from Washington the New England purchasing agents have bought in several new channels and the trade is curious to see how some of the experiments will turn out. A number of shippers who have been customary sources of supply and familiar with conditions put in bids on what they considered a fair basis only to find now that they are without any railroad orders at all.

At Hampton Roads there is no material change. Shipments to New England are very light and the sales agencies are obliged to look to Government and export requirements to keep the wheels turning. The coastwise freight market is still easy and steamers normally in this trade are still chartering for South America and occasionally for ports in the Mediterranean. Consignments for Italy are somewhat reduced. The needs there are large but it can hardly be expected that American coal will be shipped in volume until certain kinks are taken out of the political situation between Rome and Paris. The local distributors of Pocahontas and New River are about discouraged over the outlook here for any comprehensive business this season. Rates are now all against Hampton Roads loading, so far as New England is concerned and something radical will have to be done before this situation can be corrected. In a year of light consumption it is possible that this territory will be able to keep running on Pennsylvania coal, but a year of normal activity would doubtless make a different showing.

As the season advances it grows more apparent that there is a real shortage of railroad-owned barges for commercial use. There is a large amount of carrying space in the hands of private owners but naturally under the conditions that prevail the latter are interested only in the most favorable movement, as from New York to Providence on to Boston. One result is the narrowing of other shipments to such railroad-owned barges as may be available and the supply of these has been very much curtailed by the attitude of the Railroad Administration in seeking to reserve a large part of this space for the transportation of railroad fuel. The principal reason seems to be that it is desirable transportation and low-priced; therefore it must be saved for the railroads. It is very difficult on that account to arrange for bituminous deliveries by water when the destination is a point east of Boston.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.75@3.35
F.o.b. Philadelphia, gross tons	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.35

Georges Creek is quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $4.69@5.14 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $6.89@7.24, and on cars Boston and Providence at from $7.60@7.90 per gross ton, the latter being the contract price f.o.b cars for season delivery.

Anthracite—The same situation on railroad-owned barges has a bearing on the volume of domestic sizes that can come forward by water to New England points. Receipts are still much in arrears and retail demand shows no sign of slackening. The way the public is trying to get in its coal for next winter's use is something extraordinary; the persistency with which retail dealers continue to advertise is only more so. To have the householder put his order in early is of itself a great advantage to the retailer provided the latter can get his supply in regular monthly proportions or in quantity sufficient to keep his equipment busy. Neither all-rail or by water are shipments sufficient to meet this unusual situation and there only remains the hope that by August or September wholesale deliveries will have begun to catch up with the demand on the retailer.

NEW YORK

Demand for anthracite increases and operators have orders sufficient to carry them into July. Some shippers refusing new business. Serious shortage forecasted for next winter. Retail dealers wish for heavier shipments. Stove coal in heaviest demand. Bituminous tidewater market dull and prices easy. Plenty of coal at the docks, but spot sales are slow. Contract coals move rapidly.

Anthracite—There is an increase in the demand for the domestic sizes of anthracite which the producers are trying hard to meet. Most shippers have orders sufficient to carry them into July, while some refuse to accept any new business. Handlers of so-called independent coals in some instances have been instructed not to accept any more orders for the present.

Producers and distributors are endeavoring to make shipments equitably, but there is a lot of complaint. Business picked up considerably the lask week of this month, when dealers endeavored to place many new orders in an effort to save the regular monthly advance of 10c. per ton on the price of domestic coals.

Demand is heavy along the line with about an equal call for the various domestic sizes, and the dealers, according to report, appear to be better stocked up than those dependent upon tidewater coal. Locally the size most wanted is stove, but dealers are taking any size they can get. Egg and chestnut are selling rapidly and there is no accumulation. Pea coal, which is usually quiet in this market, is in heavy call and retail dealers are accepting all they can get so long as it enables them to obtain a proportionate share of the larger sizes. Straight orders for pea coal, however, are scarce.

The steam sizes are moving slowly. As is to be expected, these coals are plentiful but are not a drug on the market. Buckwheat is selling well and prices are holding firm. At times slight concessions are heard of, but these are on the poorer grades or on washery coals. Rice is in better supply and at times hard to move. The accumulation of barley is heavy and shippers are experiencing some trouble in keeping it down. Prices are generally held close to circular but, as with rice, slight concessions are made, especially on the so-called independent product.

The retail situation is interesting, first because of the heavy call for deliveries, and second, because of the launching of a new corporation composed in most part of local retail dealers. The new corporation, which will be known as William Farrell & Son, Inc., expects to begin business on June 1 with a tonnage of nearly three million tons. It has taken over the businesses of nine local dealers and one dealer in Jersey City, altogether operating 15 yards. In addition one wholesale firm is in the corporation. Since the formation of the new corporation there have been rumors that other local dealers are contemplating another combine. There are remaining in Manhattan and The Bronx about 40 retail yards.

Because of the high prices submitted in proposals the city departments are seeking permission from the Board of Aldermen to go into the open market for their fuel supplies. Bids were recently opened for furnishing and delivering a couple of hundred thousand tons of coal to twelve city departments. Because the prices submitted were "in excess of the current open market price, and in nearly all cases are higher than the allowances made in the budget to the departments" the Central Purchasing Committee believes a saving would be made by buying in the open market. While the committee complains of the high prices submitted, the dealers say that the specifications of the contracts contain penalties that are too severe.

At the recent opening of bids prices submitted for furnishing and delivering pea coal to the Police Department ranged from $9.98 to $11.25 per ton, depending upon place of delivery; and egg coal from $10.98 to $13.43.

For furnishing stove coal to the Department of Public Charities the prices submitted ranged from $10.97 to $12.89, according to place of delivery; buckwheat coal, $6.99 to $8.27; run-of-mine, $5.75 to $6.55; mixed coal, $6.98 to $7.59, and for furnishing the department with 2060 tons of buckwheat No. 2, the prices submitted ranged from $7.23 to $7.89 per ton.

For supplying the Fire Department with egg coal the prices submitted ranged from $12.45 to $12.99 per ton and for supplying chestnut coal from $12.77 to $13.18 per ton.

Current quotations, white ash, per gross ton, at the mine and f.o.b. tidewater at the lower ports, are as follows:

	Mine	Company Circular
Broken	$6.05	$7.90
Egg	5.95	7.80
Stove	6.20	8.05
Chestnut	6.30	8.15
Pea	4.90	6.65
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The local situation is practically colorless. Demand is slow and comparatively little spot coal is moving. There is a good movement on contract coal and indications point to an increase in this tonnage. Buying of coal in the spot market is not as active as it was a few weeks ago. Some of the pools, especially those containing the cheaper grades, are over-run and quotations for some pool coals are considerably lower than the mine basis.

Quotations for the various grades of coal for contract show no apparent change, but for spot delivery at the mine there has been some reductions for certain grades. The same coals in the various tidewater pools are being quoted at still lower prices, based on mine delivery.

The dealers continue to be optimistic as to the future notwithstanding the present situation. They look for a much stronger market within the next few weeks, with stronger prices. The local houses receive many inquiries as to future prospects and quotations for coal on contract. Much interest is being taken in the prices at which the railroads are securing their fuel supply. Operators are not so willing to make contracts running into next April and appear to be more conservative as to tying up their tonnages.

Quotations heard on pool coal follow: Pool No. 9, $2.50, mine price; Pool No. 10, $2.25; Pool No. 11, $2 and Pool No. 71, $2.75.

Quotations on the various grades, mine price, for spot and contract delivery, range as follows:

	Spot	Contract
South Forks	$2.90@$3.25	$2.95@$3.50
Cambria County (good)	2.75@ 2.95	2.95@ 3.25
Clearfield County (good)	2.50@ 2.75	2.80@ 2.95
Reynoldsville	2.50@ 2.75	2.75@ 2.95
Quemahoning	2.65@ 2.85	2.95@ 3.10
Somerset County (best)	2.50@ 2.75	2.95@ 3.10
Somerset County (poor)	2.00@ 2.35	2.50@ 2.75
Western Maryland	2.25@ 2.50	2.50@ 2.75
Fairmont	2.00@ 2.25	2.35@ 2.50
Latrobe	2.10@ 2.25	2.25@ 2.40
Greensburg	2.25@ 2.35	2.35@ 2.60
Westmoreland ¾-in.	2.60@ 2.75	2.60@ 2.75
Westmoreland run-of-mine	2.35@ 2.60	2.35@ 2.65

PHILADELPHIA

Anthracite demand continues, although consumers' orders fall off. Housing problem holds back many spring orders. Shippers swamped with orders and are trying to allot production. Hints of higher prices from June on by some shippers. Stove and nut in greatest demand, with egg scarce and pea showing surprising strength. Steam coal better, if anything. Bituminous shows little change. Railroads still after fuel at their own price. Little change in prices.

Anthracite—This week saw a slowing up in the ordering of coal at retail. The dealers report that comparatively little new business was received by them during the past week. The housing proposition has kept many buyers who formerly placed their orders each spring from ordering their next winter s supply. The dealers, however, have thousands of tons on their books undelivered and their appeals to the shippers of coal continue.

All shippers realize their inability to satisfy their trade at this time, and most of them are working out systems of distribution usually based on obligations of other years. Early in the year it was expected

that when April arrived there would be much shifting of trade. The dealers appeared to be quite willing to make new connections among the shippers, and it was noticeable that the representatives of the different houses accepted considerable new business, possibly because they feared the loss of some of the old. When the situation suddenly changed and the demand for the family sizes became out of all proportion to the production, it was these new connections that brought most of the discontent.

The big companies are simply swamped with orders for egg, stove and nut, and at least one of them is refusing all additional business until some reduction can be made in the accumulation of orders. No doubt the individual operators also hold orders out of all proportion to their ability to ship within a few weeks, but we believe that most of the dealers are worrying about the prices they will be asked to pay the smaller operators next fall and winter. Undoubtedly they are dreading premiums, and not without reason. We have in mind a half dozen houses who have already announced their intention of advancing their prices on egg, stove and nut 15c. per ton each month until September inclusive, instead of 10c. as planned by the companies. There are many high in the trade who predict that prices will go beyond that schedule by the time the snow flies.

While egg is short here there is not the urgent demand, as for stove and nut, but that is only because there is less call for it at any time in this market. Stove is not arriving in sufficient quantities to make any impression on the orders on hand, and the appeals for it continue more urgent than ever. Chestnut, too, is most active, and it will require substantial shipments to care for the business already recorded. By the middle of the present month sufficient orders had been accepted for both stove and chestnut by more than one shipper to care for the prospective production up to the end of June. Pea has been a surprise because the call for it has been beyond the expectation of more than one shipper. A number of sales for heavy tonnages at considerably reduced prices were made a few weeks ago, and purchasers are congratulating themselves and even fearing they might not receive the tonnage they arranged for at the reduced price quoted. Certainly the sellers were premature with these offers and are now refusing to duplicate them. Had they waited a short time the coal would undoubtedly have brought a higher price. It begins to look now as if the great bargains in this size which had been expected would not be available during July and August. We know that all shippers of high-grade pea coal are comfortably filled with orders, at least for the present.

Many of the dealers who had anticipated stocking heavily on nut coal are fast becoming dubious as to their ability to secure any surplus beyond their current needs. Many of them are actually displaying an inclination to take all the pea coal they can get, which is exactly opposite to their former intention. With the probabilities of a coal shortage next winter there can be no doubt that the man with a big pile of pea coal on hand will have an asset that will mean many dollars to him at a time when the people will be glad to take any size of coal.

The steam sizes are showing more signs of strength, and it is predicted by some that soft coal will before long come into its own and that the demand for all good grades will be so great that the anthracite steam sizes will be actively benefited. The larger shippers report consigning only a light tonnage of the small sizes to the storage yards during the past week.

Local dealers are not displaying more than ordinary interest in the proposed law making 2000 lb. the legal weight of a ton in this state instead of 2240 lb., as now in effect. Some of the newspapers have started an agitation that it would actually mean an increase in the price of coal, as there is nothing to compel the dealers to reduce their prices in the event of the law passing. As there is nothing in the new law compelling the shippers to use the net ton, it is presumed that they will continue to base their prices and make shipments on the gross ton. Certainly to use the net ton all around, including freight rates, would greatly facilitate the clerical work in connection with the coal business, and probably for this reason more than anything else most dealers favor it. There is also the additional reason that it would put an end to the criticism as to the high prices of coal locally as compared with other states, most of which use the net ton, but which fact is usually overlooked by the critics.

Bituminous—It is difficult to form an estimate of the bituminous trade. Some shippers report one day that there seems to be an improvement in the outlook, only to be followed the next day with the statement that the conditions are far from promising. Of course, some coal is being sold, principally on contract commitments.

The railroads, while they have closed for a considerable tonnage, are still in the market for increased shipments, but continue in the attitude of wanting to make their own price. Inquiries from industrial plants for contract figures continue to come into the offices and with an occasional fair order being booked.

BALTIMORE

Sufficient bituminous and demand is light. Anthracite in good demand, with dealers unable to fill all orders. Export shipments show increase.

The bituminous market in Baltimore is far from stable, and while there is sufficient coal to handle the situation as far as spot business goes, the demand is light and there is no contracting. Buyers refuse to go in for contracts with the spot market lower than the contract figure and appear content to obtain from time to time what their urgent demands require.

With the better grade of coals quoted at from $2.40 to $2.50 for spot sales, the demand was light. There was plenty of good coal here, and for the medium and cheap grades the prices also were low with a few sales on the former and practically no business worth while on the poor grade. The local market finds little business for poor fuels. For the medium fuels the figure was placed around $2.30 and down to $2.20. The lowest grade of coals brought $2 and under, a few sales being recorded at $1.90.

Dealers in anthracite are still complaining about the lack of hard coal to fill orders. At all of the big local quarters the transportation equipment is only in use part of the time because of lack of coals. Many of the firms are behind on April orders and do not expect at the present rate of receipts to be able to get their files emptied of April business until far into June. It is practically assured that July 1 will see an addition of 25c. to the retail price of hard coal. This is being talked of strongly, and in this way dealers hope to be able to recoup their losses sustained by the May and June increase of 10c. per ton per month.

The export business in bituminous bids fair to show some increase, not exactly on contracts, but in spot business. Vessels loading for the Italian Government, South America, Holland and Sweden are in port. Coal to the amount of 12,197 tons was shipped in cargo during the week.

Lake Markets

PITTSBURGH

Demand stationary. Slack softer. Contracts on firmer basis.

On the whole there has been no improvement in demand for coal in the past week, but the improved condition previously reported is maintained. Operations in the Pittsburgh district are at fully 50 per cent. of capacity, and this is regarded as a good showing in the circumstances, with industrial activity distinctly below normal and some consumers still in possession of considerable reserves, upon which they are drawing.

In the steel industry consumption of coal is somewhat lighter, and it is distinctly below the rate of consumption in April, since in that month the steel mills ran at an average of 65 per cent. of capacity, while at present they are hardly doing better than 55 per cent. There has been a slight improvement in the steel market in the past fortnight, but this can hardly do more than arrest the decline in production that had been occurring through the gradual exhaustion of old orders.

In the matter of coal prices there are somewhat mixed trends. There is developing more softness in slack while there is a stronger tone as to contracts to the end of the coal year. The weakness in slack is a local and ephemeral affair, due to heavier production on account of the large lake shipments now in progress, while the firmness as to contracts is due to more hopeful appraisals of the industrial future generally during the remainder of the year. Coal operators regard it as significant that commodity prices in general show practically no declining tendency and see no reason why they should not take this fact into consideration in connection with their own sales policies.

We quote the market unchanged from last week, but would note that slack is somewhat easier: Best grades gas coal: Slack, $1.80@2; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $2.60@2.70; Steam: Slack, $1.70@1.80; mine-run, $1.90@2.35, all per net ton at mine, Pittsburgh district.

TORONTO

Domestic coal much in demand. Dealers continue behind in deliveries. Stocks on hand light and little arriving. Soft coal not much in requisition.

Conditions of the coal trade show practically no change, and are similar to those which prevailed during the greater part of last year. Consumers of anthracite are desirous of laying in stocks, fearing a shortage as well as a rise in prices, and dealers are far behind in deliveries. The shipments coming in from the mines are quite inadequate to meet the demand, stocks on hand are very light and local deliveries are mostly being made from the cars. There is no improvement in the call for bituminous, many of the plants in the metal trade being idle or running at reduced capacity, owing to the strike of metal workers.

Quotations for short tons are as follows:

Retail:	
Anthracite, egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	8.25
Slack	7.25
Domestic lump	10.00
Cannel	11.50
Wholesale f.o.b. cars at destination:	
Three-quarter lump	6.00
Slack	4.75 to 5.00

BUFFALO

Bituminous trade still quiet. Only here and there a stir. Consumers still refuse to stock up. Waiting for business to move. Anthracite much below the demand.

Bituminous—Some shippers report an improvement, but the trade is much the same as it has been. Regret is expressed over the breaking down of the slack prices. Allegheny Valley operators allege that it was done by the Pittsburgh shippers. Some improvement is reported in the Canadian trade, but as a rule consumption has run down there more than it has here.

The demand for anthracite might contribute to a car shortage if bituminous were moving at the same rate, especially as Buffalo is now sending 500 cars of grain to tidewater daily. The light demand for bituminous makes it hard to manage the output of steam sizes of anthracite, for only bituminous prices can be obtained for them. It was advocated at the retail coal convention here last week that a general effort should be made to use small anthracite sizes in the domestic trade, so as not to drive them into the bituminous trade, where they are not wanted.

Bituminous prices are rather weak at former figures, $4.65 for thin-vein Allegheny Valley sizes, $4.45 for Pittsburgh and No. 8 lump, $4.20 for same mine-run and $3.80 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The trade is active. Consumers failing to get their orders filled promptly seem to imagine that the old shortage has returned and are insisting on deliveries. This the shippers cannot comply with if they reserve any for the lake trade. While shippers do not wish to cut the local and all-rail trade short, they know that it will not answer to neglect lake shipments, for when the fall comes the coal cannot be moved at will. There would be vessels enough to load it, but the mines could not turn it out.

Anthracite shipments by lake continue to decline on account of the demand locally and all-rail to the West and Canada. For the week the amount was 88,926 net tons, of which 55,726 tons cleared for Duluth-Superior, 18,600 tons for Chicago, 10,000 tons for Sheboygan, 3200 tons for Fort William and 1400 tons for Portage. Freight rates are 42½c. to Duluth, Fort William and Portage; 47½c. to Sheboygan and 52½c. to 60c. to Chicago.

CLEVELAND

Operators say the market has developed a decided upward trend. Not only is the outlook for immediate increased demand the brightest in months, but prices have stiffened. With the feeling that price revision upward is close at hand, operators are not so anxious to sell as they have been.

Bituminous—So far as demand and prices

are concerned, Cleveland coal interests have become rank optimists. The fog of uncertainty seems to have lifted, disclosing a vast amount of business that disagreement at Washington has kept under cover. Iron and steel interests—the largest single user of steam coal in northern Ohio—are resuming operations, and their order books are growing daily. Already, steam-coal users are showing a more lively interest in the market, although buying has not improved to a marked degree so far.

With the outlook for a broadening field for the surplus slack quite bright, operators are less disposed to offer bargain prices. Prepared sizes, too, have taken on strength. Mine-run continues to rule at slightly more than $2 a ton, with prepared sizes around $2.30 to $2.40. Operators who failed to land railroad fuel contracts now are more than pleased, for a $2.10 or $2.15 contract does not look so attractive in the light of developments the last few days.

Domestic consumers are still taking all of the Pocahontas and anthracite they can get. Dealers are wondering if this coal year will repeat itself; whether they will do a winter business this summer and a summer business next winter. A surprising tonnage is being absorbed by domestic users, especially when holdover stocks of domestc bituminous were supposed to be quite large.

Lake Trade—The trade has lost some of the speed with which it opened the season, due more to the scarcity of cargo space than to decreased demand or supply. The tonnage of bituminous at Lake Erie docks continues in excess of freighter capacity. This is due to the slow opening of the iron-ore season—a condition reviving business is expected to remedy shortly.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$10.85@10.95
Chestnut	11.15@11.25
Grate	10.95
Stove	11.05@11.15
Pocahontas:	
Forked	8.85
Lump	8.00
Mine-run	7.20
Domestic Bituminous:	
West Virginia splint	7.30@ 7.40
No. 8 Pittsburgh	6.10@ 6.35
Massillon lump	7.30@ 7.40
Steam coal:	
No. 6 slack	4.20@ 4.40
No. 8 slack	4.60@ 4.85
Youghiogheny	4.90@ 5.10
No. 8, ¾-in.	5.35@ 5.50
No. 6 mine-run	4.40@ 4.50
No. 8 mine-run	4.70@ 4.85

DETROIT

Sales of bituminous continue to fall short of normal, arousing apprehension of uncertain supply later.

Bituminous—Persistency of the users of bituminous coal in holding off on placing orders is reflected in the meager volume of business coming to wholesalers and jobbers in the Detroit market. The unwillingness of buyers to make provision now for future requirements creates a very unsatisfactory situation in the bituminous trade and occasions considerable anxiety to jobbers who have studied the general condition of the market.

The assertion is made that a reaction is almost certain to come, probably late in the summer, and that there will then be seen a grand scramble among consumers of steam coal to cover their requirements for the coming winter. It will be impossible, the jobbers say, for the producers to satisfy all consumers in the limited time that will be available, and the result, it is feared, will be that many of the buyers will not get all the coal they need. Jobbers emphasize the contention that should such a contingency arise, the buyers will have only themselves to blame, but probably will try to attach the responsibility to the coal men.

The expectation of lower prices, the jobbers insist, is certain to meet with disappointment. Instead there is said to be substantial basis for the belief prices will be higher than now, with transportation conditions less favorable for assuring prompt delivery of shipments.

Prices on West Virginia splint or gas lump at the mine, net ton basis, are quoted as $2.75; for three-quarter lump, $2.50; for run-of-mine, $2.10 to $2.25; for slack, $1.85. On the same basis, Hocking domestic lump is quoted $2.50; mine-run, $2, and slack, $1.50. Other leading varieties of Ohio coal are said to hold about the same level as Hocking. Smokeless is not very plentiful. Lump and egg is practically out of the market, with prices at $3.50 to $4, while mine-run is obtainable at $2.75.

Anthracite—Retail dealers are making a diligent effort to accomplish an early distribution of anthracite among household consumers. The latter, however, are less receptive than would be expected following the experience of the last two seasons.

Lake Trade—Coal for the lake trade is moving rather freely. Shipments for the week ending May 17 are reported as 860,880 tons, the highest for one week so far this season.

COLUMBUS

A better feeling is shown in every branch of the coal trade. Demand from manufacturing plants is increasing and there is also an increasing lake movement. Some stir in domestic trade is reported. The screenings market is still soft.

The coal trade in Ohio is getting better from day to day. Buying is on a more liberal basis and purchasers are in the market for quotations. Since the award of the railroad fuel contracts the situation has cleared to a large degree, and many coalmen predict an upturn in the market. With the exception of screenings there is a better demand for all grades of coal, and in some instances premiums are being offered for shipment.

The steam trade is now attracting the attention of coalmen. There is a better demand for mine-run and other sizes except screenings. Reserve stocks in the hands of consumers are gradually being reduced to a point where they will be compelled to come into the market soon. This applies especially to general manufacturing lines. Rubber plants still have a considerable surplus and the same is true of iron and steel concerns. But the steam situation is better than formerly, and there are a larger number of inquiries received from concerns which are about to start up. Railroads are taking a larger tonnage than formerly.

The lake trade is progressing satisfactorily as far as concerns having their own dock connections is concerned. A fair tonnage is moving from Ohio and West Virginia mines to the Northwest. Vessel rates have now been fixed at 42½c. from Ohio and Pennsylvania ports to the head of the lakes. Lake agreements for tonnage have been made with the prices left blank. Shipments have been made on these agreements. Some little mine-run is being shipped to the lakes but the large majority is prepared sizes.

The domestic trade is showing up more actively with some retailers in the market. This applies especially to the fancy grades such as Pocahontas and West Virginia splints. Little Hocking coal is being stocked. Prices for the fancy grades are exceedingly high and recent advances have all been maintained.

CINCINNATI

Everything is quiet. Reduction in the price of anthracite is expected to stimulate buying.

The coal situation here is still quiet. Large coal dealers report that business is only fair, and that the demands for the different grades continue to remain far below normal. There was, however, a decrease in the price of some kinds of coal that might stimulate trade somewhat; anthracite, formerly priced for this locality at $12.50 for chestnut and egg per ton, has taken a drop to $11.75 and $12. Domestic egg coke has also taken a drop from $11.50 per ton to $9.35 and $9.45. Smokeless grades, for which there has been a heavy demand here lately, has increased in price. This coal, which has been quoted at $7 and $7.25, has been increased to $7 and $7.50.

The Ohio Valley Coal Operators Association has petitioned the Louisville District Freight Traffic Committee for through rates on coal from mines in western Kentucky to southwestern territory, and a hearing has been set for June 5.

LOUISVILLE

General business showing improvement, with slightly better steam demand; stocking orders for domestic increasing. Prices on domestic coal firm, but spot steam-coal prices are weak and cover a wide range.

Bad weather during the greater part of the past month has been an incentive to early stocking, although it has not produced much actual business, as the domestic consumer has been able to keep warm with gas. However, stocking orders have been coming in somewhat better, and while retailers generally state that business is dull, they are operating a much larger percentage of their delivery equipment and are buying more freely from the mines.

Jobbers report a fair movement of coal into some Southern districts, and also to the lake region, with steam draggy, but mine-run picking up and domestic or prepared sizes in good demand at strong prices. Notices have been received by jobbers and retailers of further price advances about June 1, on numerous grades of block coal. North of the Ohio there is a steadily increasing demand from dealers, principally in Ohio, Indiana, Illinois, Michigan and Minnesota, while Kentucky consumption is holding up nicely.

The producers of eastern Kentucky are feeling much better over improved conditions, reporting a 70 per cent. or better production, with full supplies of labor and cars. Block coal is in strong demand, with markets steadily advancing; mine-run is better. Getting rid of spot screenings has not been easy with steam plants. Contract prices as a whole are firm, however, and several good contracts have been closed. The Louisville & Nashville R.R. has closed most of its contracts, and the Big Four lines recently closed contracts with West Virginia and eastern Kentucky mining concerns at prices ranging from $1.88 to $2.25 for the most part.

The following prices are being quoted by Kentucky districts, less 15c. per ton brokerage, and plus 15 to 30c. a ton on contracts.

Elkhorn and Harlan—Block, $3 to $3.10; mine-run, $2.40; nut and slack, $1.60. Hazard—Block, $3; mine-run, $2.40; nut and slack, $1.60. Jellico—Block, $3.25 at $3.40; mine-run, $2.40 at $2.50; nut and slack, $1.90. Straight Creek—Block, $3 at $3.15; mine-run, $2.40; nut and slack, $1.75. Western Kentucky—Lump, $2.20 at $2.60; mine-run, $2 at $2.35; nut and slack, $1.60 at $1.75; thin screenings, $1.40. Blue Gem—Block, $3.50.

There is a considerable range in some of the prices, but the foregoing figures are as close as can be had. Some Hazard block is reported as low as $2.50 and up to $3.25, or an average of $2.76, with mine-run selling at $2.40@2.90, and nut and slack, $1.50@2.75. Wide ranges are due largely to tipple and wagon operations, and good grades as compared with grades from poorer mines in the same field.

BIRMINGHAM

Slightly improved condition in coal trade, with some contracts closed for steam fuel. Domestic situation tight, with tendency for advance in price of all grades. Production shows falling off of some 25,000 tons, as compared with previous week.

Some contracting was done for steam fuel during the past week by cotton oil mills and ice factories to cover requirements for the coming summer and fall, and while inquiries are somewhat better, other classes of consumers are still holding off from actual buying, business being confined to scattering small orders. Lack of vessels for caring for foreign trade is undoubtedly hindering the consummation of some deals for coal from this district, as inquiries are being received almost daily from some foreign territory; and as soon as bottoms are provided, rates adjusted and some other details arranged some good orders will more than likely be booked by local coal men.

The demand for domestic coal is sharp and the shortage is already pronounced in the better grades, while production of the medium and lower grades is still held down by the lack of orders for steam grades. Cahaba operators have advanced prices on lump and nut from $3.85 to $4.25 and $4.75—those who have not entirely sold up their production through the remainder of the year. Corona lump and nut has advanced from $3.40 to $3.65 per net ton mines during the past week, and on account of the scarcity of all domestic fuel prices are expected to steadily climb as the demand increases with the approach of fall and winter.

Coke

CONNELLSVILLE

Spot furnace and foundry coke stiffer. Uncertainty whether furnaces will close second half contracts. Production very light.

On the one hand spot furnace coke cannot be picked up at as low prices as formerly, while on the other hand there are rumors of large numbers of loaded cars held on track because the holders will not accept prices consumers would offer. As the time for making second half contracts has practically arrived, the operators may be engaged in an effort to produce a strong spot market for the favorable influence this

would exert upon contract prices; but in this they may be reckoning without their hosts, since the furnaces that buy coke have scarcely any pig iron sold ahead and may prove quite indisposed to take hold for a six month's period even at price concessions. The attitude of the merchant furnaces is that they do not want to run unless they can make a profit. Pig iron prices are very high, and so are pig iron production costs, and the furnaces would rather see a margin of profit made for them by a decline in production costs than by an increase in selling prices. While the operators expect to close second half contracts in the next few weeks, it is not certain that they will be able to do so.

The whole coke situation, at best, has become a narrow affair. While the merchant ovens in the Connellsville and Lower Connellsville region averaged more than 140,000 tons a week production from the middle of March last year until the end of October, their production lately has been averaging less than 45,000 tons a week, or about 30 per cent. as much. The furnace ovens show a still greater decrease approximately from a 190,000 ton average to a 40,000 ton average, whereby they are making only about 20 per cent. as much coke as formerly. This great decline is due to the fact that the decreased consumption falls almost entirely upon the Connellsville region, the byproduct ovens at the various furnace plants remaining in almost full operation.

Spot furnace coke is usually quoted at $4, but $3.75 might possibly be done in some cases. Spot foundry coke has stiffened, common brands formerly obtainable at $4.25 now bringing $4.50, while recognized standard brands readily bring their former prices, up to $5. Thus the spot market is quotable at $3.75@4 for furnace and at $4.50@5 for foundry, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended May 17 at 83,284 tons, a decrease of 17,696 tons.

Buffalo—An effort is being made to establish a trade here in high-grade coke for domestic use in various sizes at $7.10 per net ton f.o.b. here. The scarcity of anthracite favors it somewhat, though the low price of bituminous makes it impossible to sell coke breeze. The quoted price of 72-hour Connellsville foundry is $7.25 to $7.50; for 48-hour furnace, $6.60; and for off grades, $6. There is no improvement in the demand for iron ore, the amount coming down by lake still being small.

Middle Western

GENERAL REVIEW

Business dull, in spite of small improvements. Belief is growing that there will be a shortage of coal this fall and winter.

Business in Illinois and Indiana continues very dull, in spite of some small improvements. Coal is moving but slowly on current orders, both steam and domestic. Some business, calling for future shipments, has been reported, but not very much. The tendency on the part of the coal dealer to contract is growing, and an encouraging number of closed contracts have already been reported, with more to follow. The buying public, as yet, are not aware of their danger, and they probably will continue in blissful ignorance until, through either car shortage or labor shortage, they will be unable to get the amount of coal they require. It is worthy of note to remark that practically all bituminous operators firmly believe that this country is heading directly toward another and perhaps more serious coal shortage than before experienced. These operators formed their opinions on the fact that the mines will not have the labor to get out the coal, once the demand comes; furthermore, they believe the railroads will be unable to furnish an adequate number of cars to meet the demand which must come.

Reports continue to come in relative to railroad coal. A number of the larger operators and jobbers have taken railroad business below the old Government prices. This is rather disappointing, especially as we now understand that the railroads were unable to buy their steel rails any cheaper, even after they sent out bids all over the country. In short—the steel industry stuck together—an example the coal operators could well afford to follow.

CHICAGO

Steam and domestic demand brisk. Eastern coals in good request. Higher prices predicted.

Chicago has been having cooler weather, all spring, and this has helped the local situation to a considerable degree. The steam plant, as a result, has reduced its storage pile more than expected, and the householder has had to keep his furnace going steadily. In short, the local situation has been fairly brisk both among steam and domestic lines.

There has been an increase in business on Franklin County domestic coals, as operators in that field are advising the trade that the price on domestic sizes for June shipments will be $2.85 per ton f.o.b. mines, an increase of 10c. per ton over the May price.

Franklin County operators are not quoting prices calling for shipments after June 30, nor do they commit themselves as to what the July price on their coal will be.

The demand for eastern coal continues strong, and those that have good Pocahontas or New River coal from West Virginia and Hazard coal from Kentucky are having no difficulty in getting extra high prices on domestic sizes. Last reports show Pocahontas and New River lump selling at from $4.25 to $4.50 and Kentucky coal at $3.50. Indications point to higher prices in the near future.

Prices are as follows:

	F.o.b. Mines, Per Ton	Rate to Chicago
Southern Illinois		
Franklin, Saline and Williamson Counties, etc.		
Prepared sizes	$2.55 to $2.75	$1.55
Mine-run	2.35 to 2.50	1.55
Screenings	1.85 to 2.20	1.55
Central Illinois		
Springfield District		
Prepared sizes	2.55 to 2.75	1.32
Mine-run	2.00 to 2.35	1.32
Screenings	1.90 to 2.20	1.32
Northern Illinois		
Prepared sizes	3.25	1.24
Mine-run	3.00	1.24
Screenings	2.75	1.24
INDIANA		
Clifton Fourth Vein District		
Prepared sizes	$2.65 to $2.75	$1.27
Mine-run	2.35 to 2.45	1.27
Screenings	2.05 to 2.25	1.27
Knox County Field		
Prepared sizes	2.65 to 2.75	1.37
Mine-run	2.20 to 2.45	1.37
Screenings	1.90 to 2.25	1.37
New River and Pocahontas		
Prepared sizes	4.25 to 4.50	2.60
Mine-run	3.00 to 3.25	2.60
West Virginia Splint		
Prepared sizes	2.50	2.60
Mine-run	2.00	2.60
Pennsylvania Smokeless		
Prepared sizes	3.75 to 4.00	2.60
Mine-run	3.00 to 3.25	2.60
HAZARD AND HARLAN KENTUCKY FIELDS		
Hazard		
Prepared sizes	$3.00 to $3.50	$2.45
Mine-run	2.55 to 2.75	2.45
Harlan		
Prepared sizes	2.85 to 3.50	2.45
Mine-run	2.50 to 2.75	2.45
Cannel	2.75 to 3.00	2.45
Smithing coal	2.50 to 3.00	2.60

MILWAUKEE

Coal market quiet, with fair business. Pocahontas mine-run for steam purposes reduced 25c. per ton.

The Milwaukee coal market continues at an even tenor, with a fair amount of business. The first and only change thus far in the May schedule of prices was formulated during the week, Pocahontas mine-run for steam purposes being cut 25c. per ton, or from $7 to $6.75. There has been some newspaper agitation over the fact that the C. Reiss Coal Co., at Sheboygan, Wis., 25 miles north of Milwaukee, on Lake Michigan, advertises anthracite coal at lower figures than are current here, egg, stove and nut being 90c. less, pea 40c. and buckwheat $1.40. The lake freight to Sheboygan is the same as to Milwaukee. It is reported that coal is being sold at other ports to the north of Sheboygan at less than Milwaukee prices. Thus far there has been no explanation of the matter by those in control of the coal business here. The movement of coal by lake has slowed up a little. Receipts thus far since the opening of navigation aggregate 158,538 tons of hard coal and 466,711 tons of soft.

ST. LOUIS

St. Louis market has no demand for any kind of fuel and such little as is being forced on buyers is at a price below cost. The entire trade is utterly demoralized, both wholesale and retail, with the exception of the Carterville and Mt. Olive fields. Car supply good but movement a little slow.

The local situation continues unusually quiet with absolutely no demand at all unless it be for the normal requirements of screenings for the few steam plants that are in operation. The screening market in normal times would be stronger, but at the present time there is an unusual quietness in manufacturing, many of the large plants being on half time and some practically suspended.

The demand for steam coal in the country is insignificant. In the south the wet weather has prevented the lumber business from going forward as it should, and the rainy weather in the past few weeks has also retarded the wheat situation which usually calls for a light movement of coal for threshing for some districts as early as the middle of May.

The domestic situation locally could not be in any worse condition than it is at the present time. While the wholesale prices of high grade coal continue to increase, the local retailers are cutting prices and making it cheaper until they are delivering coal at less than it actually costs them. This pertains mostly to the wagon-load steam business.

The retail prices for the domestic user still continue to be pretty well maintained. One of the causes responsible for this is the action of the Standard operators who insist upon cutting prices to get the little tonnage available. Some of these mines are working one and two days a week on commercial coal. A few mines that are working on railroad coal get as many as four days a week. In other sections the mines are idle altogether and there is a growing dissatisfaction among the miners relative to the unequal manner in which the tonnage for the entire field is being distributed.

In the Mt. Olive field conditions still continue satisfactory on the two or three days a week that the mines are getting and prices are being pretty well maintained. In the Carterville field of Williamson and Franklin Counties there has been a noticeable improvement in the movement of the domestic grades of coal. As a matter of fact, screenings are also in good demand and are bringing the top prices. The railroad tonnage in this field is light at the present time, but in a general way the entire situation is satisfactory. Cars are plentiful, but the movement of cars on all lines from all fields in Illinois is just a trifle slow.

The condition in the Du Quoin field is not as satisfactory as that of the Carterville field, but there are some signs of improvement,

The anthracite situation in St. Louis is slow. The shipments are three to four weeks behind, but the local demand is not what it was expected to be. Orders were taken for about fifty cars of West Virginia smokeless coal to be shipped in during the latter part of May and the early part of June. Perhaps a dozen or fifteen cars of Arkansas smokeless moved in, but there is little demand for the Arkansas coal, while the demand for West Virginia seems to be increasing.

Coke is taking slowly with the public, but at the present time the general storage of coal is light. The coming month will see a fairly good start made on the storage coal tonnage.

The prevailing prices, which will be increased 10c. a ton on the first of June by the Franklin County operators, is:

	Williamson and Franklin County Association:	Mt. Olive and Staunton	Standard
Lump, egg and nut	$2.75	.....	.....
Washed Nos. 1 and 2 nut	2.85	.....	.....
Independent:			
Lump, egg and nut	2.55	$2.55	.....
6-in lump	....	....	$2.00 up
Washed Nos. 1 and 2 nut	2.85	.....	.....
Mine-run	2.35	2.20	1.60@1.70
Screenings	2.20	2.05	1.35@1.50
3-in. lump	....	2.30	.....
2-in. lump	....	.....	1.75
2x6 egg	....	.....	1.75 up

Williamson-Franklin County rate to St. Louis is $1.07½; other rates $0.92½.

I. C. C. Decisions

No. 9517—Ohio Valley Coal Operators' Association vs. Illinois Central Railroad Co., Director General, et al. Submitted Mar. 6, 1919. Decided May 1, 1919.

Upon complaint attacking the rates on bituminous coal, in carloads, from mines in western Kentucky on the Illinois Central, Louisville & Nashville, and Kentucky Midland railroads, to points in Mississippi Valley and southwestern territories, Illinois, and various other northern and western states, Held:

1. The rates assailed are not shown to be unreasonable per se, nor are they shown to be unduly prejudicial except to the extent stated in the following paragraphs.

2. The rates from mines on the Illinois Central to points in Texas by way of Mississippi River crossings south of East St. Louis are unduly prejudicial to the extent that they exceed the rates contemporaneously maintained from mines on the Illinois Central in southern Illinois to the same points through the same river crossings.

3. The rates from mines on the Illinois Central and the Louisville & Nashville to East St. Louis and St. Louis, proper, are unduly prejudicial to the extent that they exceed by more than 57.5c. per ton the rates contemporaneously maintained from mines in the Illinois Central's inner group and the Louisville & Nashville's Belleville group, respectively, in southern Illinois to the same destinations.

4. The rates from mines on the Illinois Central and Louisville & Nashville to East St. Louis, as applied on traffic for beyond, are unduly prejudicial to the extent that they are not lower than the rates contemporaneously maintained from the same mines to East St. Louis, proper, by at least 12.5c. per ton.

5. The rates from mines on the Illinois Central to Chicago, to points in the northwest as defined in this report, and to points in Illinois north of and including Mattoon and Decatur, are unduly prejudicial to the extent that they exceed the rates contemporaneously maintained from mines on the Illinois Central in the southern Illinois group by more than 25c. per ton.

6. The rates from mines on the Louisville & Nashville to Chicago are unduly prejudicial to the extent that they exceed the rates contemporaneously maintained from mines on that road in the Eldorado group in southern Illinois to Chicago by more than 25c. per ton.

7. The rates from mines on the Kentucky Midland Railroad are unduly prejudicial to the extent that they exceed the rates contemporaneously maintained from mines on the Illinois Central in western Kentucky to the same destinations.

General Statistics

Shipments and Value of Anthracite in 1917 and 1918

The statistics of shipments and value of anthracite in 1918 as compiled by the Geological Survey from the final reports of the operators, are given in the following tables. Although shipments of anthracite decreased 1 per cent., the value at the mines increased 18 per cent. The average value at the mines of chestnut, for instance, increased from $4.45 per gross ton in 1917 to $5.12 in 1918; of pea size from $3.12 to $3.77.

ANTHRACITE SHIPPED IN 1917 AND 1918, BY REGIONS AND SIZES, IN GROSS TONS

Size	Lehigh Region 1917 Mines	Lehigh Region 1917 Washeries	Lehigh Region 1918 Mines	Lehigh Region 1918 Washeries	Schuylkill Region 1917 Mines	Schuylkill Region 1917 Washeries	Schuylkill Region 1917 Dredges	Schuylkill Region 1918 Mines	Schuylkill Region 1918 Washeries	Schuylkill Region 1918 Dredges
Lump	51,176	.....	7,211	.....	104,521	.....	.....	64,346	.....	.....
Broken	485,577	1,061	414,153	4,314	1,032,732	.....	.....	1,156,097	.....	.....
Egg	1,386,859	13,743	1,345,485	10,764	2,517,914	3,478	.....	2,464 991	8,272	.....
Stove	1,902,895	14,167	1,782,206	20,710	3,577,834	12,888	200	3,228,731	13,528	.....
Chestnut	2,296,760	176,741	2,226,055	214,623	4,335,248	120,871	.....	4,109,420	134,041	171
Pea	1,066,363	87,827	1,027,559	92,452	2,104,780	246,012	523	1,937,187	375,930	1,494
Buckwheat No. 1	1,531,493	123,049	1,532,535	157,006	3,553,580	461,008	4,997	3,163,733	646,776	2,908
Buckwheat No. 2	806,394	168,497	582,759	177,273	1,239,449	258,882	5,434	952,041	483,742	26,802
Buckwheat No. 3	538,490	314,998	656,326	369,212	1,274,067	272,642	13,325	1,855,371	660,719	34,863
Boiler	294,521	51,487	339,727	11,111	366,853	227,073	18,483	287,750	45,198	52,419
Other (a)	179,413	1,452	482,877	97,684	242,023	31,888	1,350	197,967	101,832	3,278
Total	10,503,941	953,022	10,396,893	1,155,149	20,349,001	1,634,742	44,312	19,417,634	2,470,038	121,935

Size	Wyoming Region 1917 Mines	Wyoming Region 1917 Washeries	Wyoming Region 1917 Dredges	Wyoming Region 1918 Mines	Wyoming Region 1918 Washeries	Wyoming Region 1918 Dredges	Sullivan County 1917 Mines	Sullivan County 1917 Total	Sullivan County 1918 Mines	Sullivan County 1918 Total	Per Cent of Total, 1917	Per Cent of Total, 1918	Per Cent of Change in Sizes, 1918
Lump	34,900	.....	.....	61,972	.....	.....	.....	154,597	.....	133,529	0.2	0.2	—13.6
Broken	2,990,125	.....	.....	3,141,248	2,245	.....	22,394	4,531,889	32,263	4,750,320	5.9	6.2	+ 4.8
Egg	6,456,305	11,295	.....	6,385,431	28,108	.....	41,861	10,431,455	36,912	10,279,963	13.5	13.4	— 1.5
Stove	8,715,512	41,829	.....	8,256,966	65,819	701	59,180	14,324,505	54,289	13,422,950	18.5	17.5	— 6.3
Chestnut	10,594,746	159,303	.....	10,480,078	167,424	930	69,780	17,753,449	75,399	17,408,141	22.8	22.7	— 1.9
Pea	3,078,971	190,471	300	2,780,922	202,614	490	48,756	6,824,003	52,733	6,471,381	8.8	8.4	— 5.2
Buckwheat No. 1	5,170,433	814,616	.....	4,475,507	821,951	380	.....	11,659,176	.....	10,800,796	15.0	14.1	— 7.4
Buckwheat No. 2	2,389,077	1,251,822	.....	2,031,978	1,141,427	.....	.....	6,119,555	.....	5,396,022	7.9	7.0	—11.8
Buckwheat No. 3	451,897	208,265	.....	1,216,394	231,979	.....	.....	3,073,684	.....	5,024,864	4.0	6.5	+63.5
Boiler	645,565	82,513	2,580	760,140	178,844	.....	.....	1,689,075	.....	1,675,189	2.2	2.2	— 0.8
Other (a)	269,605	17,639	.....	271,601	40,889	.....	185,285	928,655	161,874	1,358,002	1.2	1.8	+46.2
Total	40,797,136	2,777,753	2,880	39,862,237	2,881,300	2,501	427,256	77,490,043	413,470	76,721,157	100.0	100.0	— 1.0

VALUE OF ANTHRACITE SHIPPED IN 1917 AND 1918, BY REGIONS AND SIZES

Size	Lehigh Region 1917	Lehigh Region 1918	Schuylkill Region 1917	Schuylkill Region 1918	Wyoming Region 1917	Wyoming Region 1918	Sullivan County 1917	Sullivan County 1918	Total 1917	Total 1918	Average Value 1917	Average Value 1918
Lump	$71,249	$35,906	$454,315	$341,755	$112,072	$252,884	.....	.....	$637,636	$630,545	$4.12	$4.72
Broken	1,963,843	2,038,976	4,349,743	5,977,848	11,374,169	14,703,895	$89,845	$175,351	17,777,600	22,896,070	3.92	4.82
Egg	6,128,183	6,712,050	10,912,844	12,393,265	26,839,488	30,711,534	165,431	183,719	44,045,946	50,000,568	4.22	4.86
Stove	8,623,742	9,097,340	16,311,779	17,012,522	37,482,081	41,055,551	232,569	283,368	62,650,201	67,448,781	4.37	5.02
Chestnut	11,300,903	12,589,113	20,666,227	22,713,532	46,770,455	53,483,908	297,268	415,424	79,034,853	89,201,977	4.45	5.12
Pea	3,869,783	4,332,738	7,363,535	8,875,797	9,890,762	10,964,304	156,008	228,073	21,280,088	24,400,912	3.12	3.77
Buckwheat No. 1	4,516,291	5,925,863	10,349,704	13,022,356	12,324,752	14,820,098	.....	.....	27,190,747	33,768,317	2.33	3.13
Buckwheat No. 2	1,413,599	2,173,770	2,845,796	4,017,238	4,648,633	6,829,942	.....	.....	8,908,028	13,020,950	1.46	2.41
Buckwheat No. 3	842,059	1,919,543	2,290,717	5,345,837	996,592	3,089,354	.....	.....	4,129,368	10,354,734	1.34	2.06
Boiler	624,352	758,721	860,594	783,449	940,675	2,113,812	.....	.....	2,425,621	3,655,982	1.44	2.18
Other	82,133	683,721	290,549	399,792	419,972	704,127	321,059	355,705	1,113,713	2,143,345	1.20	1.58
Total shipments	$39,436,137	$46,267,741	$76,695,803	$90,883,391	$151,799,651	$178,729,409	$1,262,210	$1,641,640	$269,193,801	$317,522,181	$3.47	$4.14

(a) Includes quantity reported as culm, buckwheat No. 4, buckwheat No. 5, screenings and mine-run.

Coal and Coke Securities

New York Stock Exchange Closing Quotations May 26, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com	(BB)	151	158
Burns Brothers, Pfd	(BB)	99⅜	115
Central Coal & Coke, Com	(CK)	55	...
Central Coal & Coke, Pfd	(CK)	63	...
Colorado Fuel & Iron, Com	(CF)	47½	47¾
Colorado Fuel & Iron, Pfd	(CF)	105	120
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com	(EH)	30	31
Elk Horn Coal, Pfd	(EH)	...	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, Pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	61⅜	61⅞
Pittsburgh Coal, Pfd	(PC)	92	112
Pond Creek Coal	(PD)	17½	18
Virginia Iron, Coal & Coke	(VK)	68	69

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	93½
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	76	76½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	88¾	91
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99½	100¼
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79⅜	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	84½	86
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	88	88½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	...	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	91½	95½
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Cok 1st 5s, 1949	85½	88½

COAL AGE

Volume 15 New York, June 5, 1919 Number 23

Open Production Costs

By R. Dawson Hall

ALL signposts point to lessened secrecy in business. Years ago the seller kept his prices tucked with his watch in his vest pocket. Now he wears them both on his wrist and furnishes the public with the selling price of his product with as little hesitation as he announces the time of day. Yet in times past so secret were his prices, and so variant, he barely let his clerical force learn what they were. In those times even railroad traffic rates were matters of profound secrecy and private dicker.

Then came a period when a certain openness was affected as a concession to the public demand for an equality of treatment between consumers. But still the railroads had their rebates and merchants their private discount sheets. Consequently, actual prices were hard to determine.

Today, in marked contradistinction, railroad rates are uniform and easy of ascertainment. To have a friend in the railroad service helps not an iota in securing a transportation rate, nor is a box of cigars the magical means it used to be in the placing of cars. The railroads have open tariffs, open mine-rating, and some at least a published car supply; and now the coal business even has its open-price record. The buyer can now, in most cases, tell the exact price at which coal from any particular section is being sold in any given market.

Some industries have stepped further into the light. In their own interests many corporations, notably those producing copper, have decided to give their production costs in some detail. They have sought thereby to show how cheaply copper can be produced under the conditions with which they are favored and under the methods that they have adopted. Yet it has been interesting to note that despite the knowledge of the public that some copper was being produced at an extremely low figure, the price of copper all through the war was made uniform for all producers and was reasonably high. The public recognized that the low production cost was a tribute to efficiency and the outcome of business acumen, and hence was entitled to a reward. The copper business was left under self-regulation, whereas the coal industry, which has secret production costs and variant prices, was not allowed self-control and did not secure a uniform selling price.

It would be wrong to disguise the fact that the difference in treatment was probably due partly to the fact that coal is such a universal requirement that its low price is a matter for public clamor. It is not quite safe to argue from copper to coal, or from 1917 to 1925, or to assume that a product like coal, purchased largely by the small consumer and in such generous measure, will be viewed in the same way as is a product like raw copper, which is purchased mostly by the largest of corporations—by concerns, that is, which have from long experience a broader and more liberal point of view than the small consumer usually enjoys.

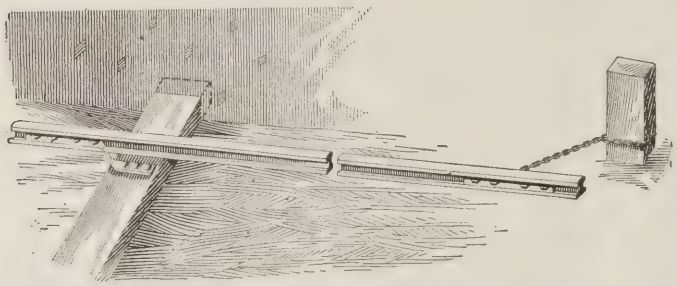
Dr. H. A. Garfield believes that the open publication of production costs is an assured way of averting public distrust and of allaying the growth of radicalism. Not a few corporation heads believe that he is right; others are equally convinced that such an open exhibit of the data of business would result in a public control as unfortunate to the consumers, the owners and their employees as has been the regulation of the railroad industry. COAL AGE would like to publish the views of its readers on this important problem. The time has come, if not for open production costs, at least for open expression of opinion on such matters of public interest.

IDEAS AND SUGGESTIONS

Preventing Track Rails from Creeping

BY RALPH W. MAYER
California, Penn.

Track rails on a slope or incline frequently have a tendency to creep downward or to buckle. A chain attached to one of the fishplate bolts, and fastened to a dead-man or anchored to a stump if on the surface, will hold the track in place. Another method is to weld an



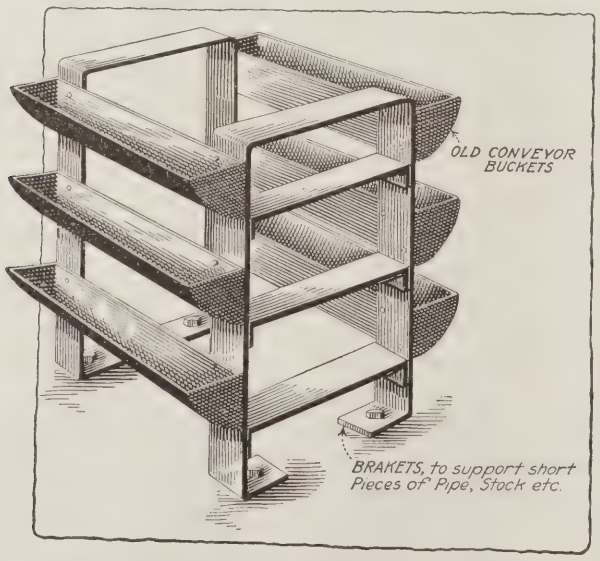
HOW TO KEEP TRACK RAILS FROM CREEPING

extension to the end of a fishplate, giving it a half twist and downward bend so that the welded extension will rest with its flat surface upon the tie (hitched into the rib) next above the fishplate. Holes are made in this piece, and it is firmly spiked to the tie.

Handy Catch-All

BY CHARLES H. WILLEY
Concord, N. H.

Instead of sending wornout coal-conveyor buckets to the scrap heap, and then disposing of them as junk, they can be utilized as catch-alls if made up as shown



DETAILS OF A PRACTICAL CATCH-ALL

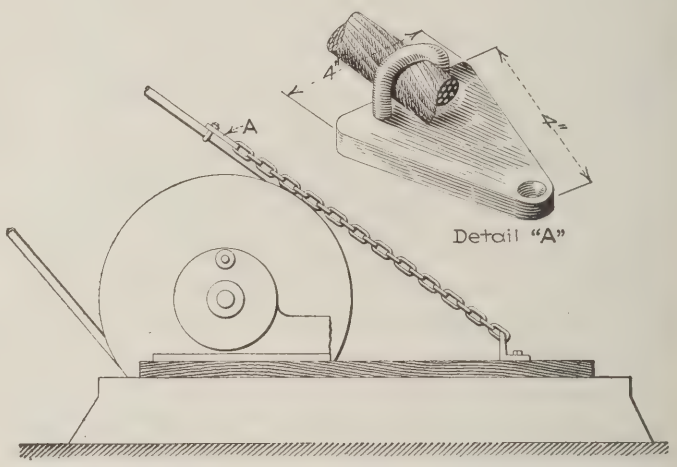
in the illustration. A description of the manner in which this catch-all is made is hardly necessary. Odds and ends of flat bars such as are used for braces and stays were employed in the manner indicated

Method of Taking Up Slack Ropes

BY GEORGE BOWKER
West Frankfort, Ill.

The usual method of taking up slack ropes it to put something across the shaft, say two heavy rails, take off the rope, and cut away as much as is required; but in this method all the work is done at the end of the rope away from the drum. The process here described is accomplished by means of a chain having a piece of iron bent in the form of a knee, with a hole drilled in each leg. At the opposite end of the chain is another piece of iron made in the form of a triangle, having one hole in each apex (see Detail *A*).

When it is desired to take up the ropes the cager on the bottom is notified. He then places wooden blocks on the cage seats in the sump and notifies the engineer that all is ready. One of the nuts is then taken off one of the anchor bolts of the engine bed, and the end of the chain having the right angle iron attached is



DEVICE FOR TAKING UP SLACK IN ROPE

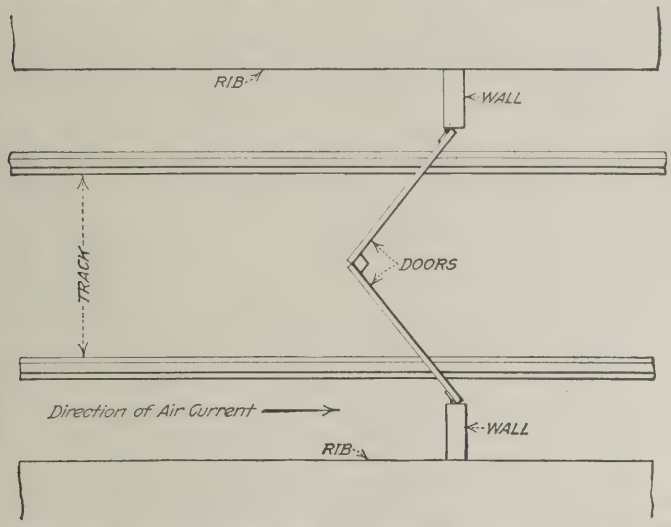
placed on the bolt and the nut screwed down. The other end of the chain is attached to the rope by means of a rope clamp. The clamp is attached to the rope, and before the nuts are put on the triangle plate is slipped on and secured. The rope is now fast and cannot move down the shaft.

The engineer then gives the engines a little steam, raising the other cage into the dump; and as the down rope is fast, the movement of the drum causes the rope to slacken. The brakes are now set tight and the assistant goes inside the drum, takes off the clamps, and by means of a small pinchbar pulls the desired amount of slack rope through the hole, puts on the clamps again, and all is ready to resume operation.

The method just described is simple and expeditious. I have helped the engineer perform this "stunt" quite a few times, and together we have taken up the ropes and been ready to resume operations again within 15 minutes of the time we commenced to take up slack. The accompanying illustrations show the arrangement.

Mine Doors for High Air Velocities

It is difficult to open a door against a strong air current. A double door such as that shown below can be opened more readily than a single door. The tops of the doors in this case strike against the door frame next to the roof, while the bottoms are caught on cleats on



EASY TO OPEN THESE DOORS AGAINST AIR CURRENTS

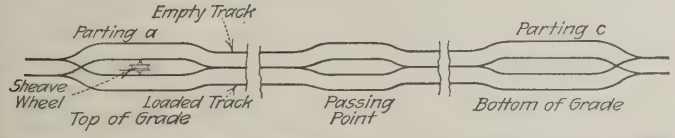
the floor. When closed the two doors form a V-shaped figure, the door frame preventing them from closing any farther than shown. Being set at an angle with the air current, the doors do not have to be opened wide to relieve the air pressure.

Wire Rope Assists Mule Haulage on Heavy Grades

By W. H. Luxton
Linton, Ind.

In the case of mule haulage in mines, unfavorable heavy grades against the load are hard on mules, are costly, and result in slow service. The following method of haulage saves mules and gains speed or time. Another advantage in the method proposed is that when mules become accustomed to such work and there is suitable means at both ends of the run, someone to unhook the mules, hitch them up again and start them out, then the driver can be discarded.

When the mules with the empties get to parting *C*, they can make the return trip to parting *A* with two cars, or trailers, as they are called. Three trailers are necessary, so that two be sent down from parting *A* to parting *C* with every empty trip while the remaining



ARRANGEMENT OF TRACKS TO FACILITATE HAULAGE

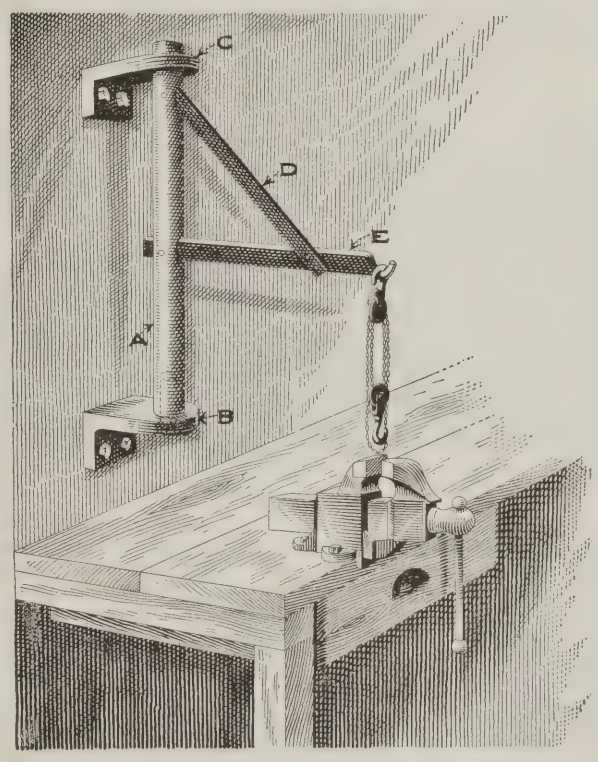
trailer is in use on the rope load. The passing point at the middle of the run is necessary to allow the empty trip and the mules to pass the rope load.

By referring to the accompanying diagram the arrangement of tracks will be understood readily. This system necessitates a double track or three-rail system most of the way; there should be a passing point for cars midway in the run in the event that a three-rail system is employed.

A light steel wire rope passes around the sheave wheel at parting *A*; when one end of the rope is at parting *A* the other end is at parting *C*. In practice, perhaps, the mule or mules can draw two loads on the grade in question, then hitch the rope to two loaded cars at parting *C*. In the meantime, hitch a mule or mules to four cars—two empty cars and two trailers—at parting *A*, also hitching the rope to the rear end of these empties. Now start the mules down the grade with the empty trip, at the same time hauling a trip of loads up the grade by means of the rope attached to the rear of the empties, passing around the sheave wheel and then to the front of the loads.

Wall Crane for the Bench

It is frequently necessary to lift a heavy piece of work from the floor to the work bench or vise, and if one cares to spend a few odd minutes to make a crane such as that shown below he can eliminate the heavy lifting. The device is simple to construct and is made from odd scrap stock of which plenty can be found about the shop. The upright *A* is made from a length



HOMEMADE CRANE FOR WORK BENCH

of old 2-in. pipe. The brackets *B* and *C* are made from pieces of flat strap stock. The top bracket simply has a large hole cut through it to take the upper end of the pipe, while the lower bracket has a piece of round stock set in it small enough to enter the inside of the pipe, as shown. This serves as a guide on which to swing the crane.

The diagonal brace and the horizontal arms *D* and *E* respectively are of bar stock. These pass through slots cut into the pipe and are pinned or riveted. A hook is formed on the end of the piece *E* to take a small tackle; this completes the apparatus. The device should be placed on the wall near the end of the bench so that it will serve the vise as shown and swing over the end of the bench to pick the work up from the floor.

Method Employed in Working the Crescent Mine

By Ralph W. Mayer
California, Penn.

SYNOPSIS — *In a mine producing a large tonnage of coal a considerable aggregate area is worked out daily. Under such conditions great care must be exercised to prevent bringing on a squeeze. This is here successfully accomplished through the use of both machine and pick mining.*

THE Crescent mine at California, Penn., is the largest operated by the Pittsburgh Coal Co. Its output is about 6000 tons per day. Surrounding it are some of the largest mines in the world. Underground operations on such an immense scale over an extended area bring problems of their own, such as are not encountered in minor operations. One of these is the prevention of squeeze, or creep. The Pittsburgh Coal Co. has adopted a new and novel method of working which has proved highly successful. It has been in use for several years and has passed the stage of experiment. "Half advance and half retreat" is the name given to it.





VIEWS OF THE TIPPLE AT THE CRESCENT MINE TAKEN FROM UP AND DOWN STREAM

The mine is worked on the five-entry system. The three middle entries are used as intake airways and the two side entries as returns. The middle of the five entries is used as the haulage road, it being an intake airway. These five entries are driven on the face of the coal and are called "face entries." The sets of face entries are driven 1500 ft. apart. The two side entries of the set of face entries have butt entries driven off them. The coal from both sides is pulled out through the middle face entry. The butt entries are driven on 550-ft. centers. The butts are driven 10 ft. wide, and a 50-ft. pillar is left between them.

Rooms are turned off both butts, 30 rooms on each one. The rooms on one butt are 250 ft. long and on the other 225 ft. long. The rooms from the right butt entry of one pair and the left butt entry of the adjoining pair are driven toward each other. A 5-ft. pillar is left between the face of the two rooms. The rooms do not break through into each other. A 6-ft. hole is kept in advance of the cut of the mining machine when the full length of the room has been nearly reached.

This 5-ft. pillar runs the full length of the butt entries. It is called a "liner," and helps to ventilate the old falls when the room pillars, or ribs, are drawn. Its size is so small that the roof will crush it, but it will still be air-tight and carry the air over the falls. As soon as the rooms are driven their full length, and up to the liner, a breakthrough, or crosscut, is made between adjoining rooms next to the liner. A breakthrough is also made through the face entry pillar into the adjoining room, next to the liner. These breakthroughs are called "bleeders," and allow the air to travel from the airway along the liner at the face of the room as well as pass from the butt entry up through the rooms. Efficient ventilation of all the falls in the room is thus provided.

The rooms are driven 24 ft. wide on 39-ft. centers and the pillars are 15 ft. wide. This gives 60 rooms to each pair of butt entries or 30 on a side. As the face entries are advanced the butts are driven off them 550 ft. apart. The pillars of the face entries are left of ample size, so that no trouble will occur from that source.

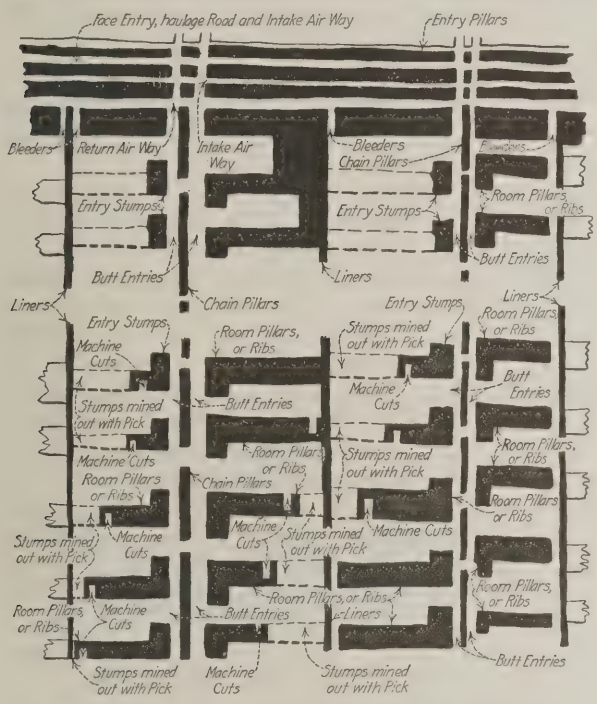
Rooms are turned off one of the butt entries as fast as it advances. No rooms are turned off the other butt entry of the pair until the butts are driven as far as they go. Then the rooms are turned from it at its inby, or face end, working back toward the face entry, or airway.

As fast as the rooms are driven to the liner the breakthrough is driven at their top, and the room pillar, or rib, drawn back. The rooms are advanced and the ribs drawn back so that the working faces of the different places make a diagonal line with the butt entry and the liner. This allows the roof to break better and no coal is lost. When the rooms of one butt are being worked the coal in the other is all in one solid block. After all the rooms have been started and most of the ribs drawn on the one butt, rooms are turned from the inby end of the other butt of the pair, and it is worked in the same manner as was the first butt. The entry stumps of the room pillars are left standing.

After the last room pillar of the first butt and several room pillars of the second have been drawn, the entry stumps are removed. The chain pillar is taken out at the same time. The second working follows immedi-

ately behind the first. The track that is used to drive the rooms is also employed to draw the pillars. The rooms are not allowed to stand idle, and there are no falls to clean up or timbering to do before work can be resumed. The roof falls behind the pillar drawing and takes the weight of the roof off the pillars, preventing them from being crushed into the floor. Two pairs of butt entries are usually placed on one air split, although this depends upon the number of men working on the butts. No timbering is used in the butt entries.

The rooms have two rows of props set in them. One row is set in the gob while the other is set close to the track. The props are set in pairs in this row, two props being set close together every 4 ft. Eight-foot props are used. The right side rib of the room is driven straight and the track is laid along it. This puts the straight rib and track on the outby side of the room of the first, or advancing, butt entry, and on the inby side of the room in the second, or retreating, butt entry.



METHOD OF UNDERGROUND OPERATION

This method allows the rib of the back adjoining room to be drawn without interfering with the next room ahead.

The rails of the room track are laid without ties. Channels are cut in the bottom coal left by the cutting machine and the rails laid in them. The rails are bolted together with fishplates. The 4-ton cars are hauled out of the rooms over these rails without difficulty. The motors do not enter the rooms but pull the cars therefrom by means of a reel and ½-in. cable. Armored chain cutting machines are employed. These are of the explosion-proof type and are operated by electric power.

These machines are used to undercut the coal in the room pillars, or ribs. A cut about 12 ft. wide is made into the side of the rib. This cut does not extend to the end of the rib, but 4 ft. of coal is left between the side of the cut and the end of the rib. This small stump, or pillar, is mined out by hand after several cuts by the machine have been loaded out and the rib has been broken through. A roof fall usually occurs as soon as the small stump has been removed.

A curved track is laid into the cut so that the car can be placed close to the coal. The pick miner employed in this robbing must be an experienced man, so that he will remove the car, take up the track before the roof falls, and not get hurt himself. A steel car is worth at least $150, and if a miner loses a few cars and some track he himself will be a losing proposition.

Only "pick" miners pull these small stumps, doing nothing else. They lose very few cars or rails. The "machine" miner loads the coal out of the cuts behind the machine, and a different price per ton is paid for the two kinds of mining. As soon as the pick miner has pulled the stump, the machine starts another cut, the same as the one before. A small 4-ft. stump is also left on the end of the rib to protect the machine loader and the cutting machine until the cut has broken through the rib. These small stumps are always removed by a pick miner before a new cut is started, so that there will be no small stumps in the gob to prevent the roof from breaking. All roof slate is gobbed on the side of the room which has been widened out opposite the straight rib when the room is driven. The accompanying illustration will help to make the method of working plain. The mine workings extend for about 7½ miles back from the tipple, which is located on the Monongahela River. Coal is shipped by rail and water.

The Pennsylvania R.R. running from Pittsburgh to West Virginia passes under the tipple. The main haulage road is driven through the coal bed from the tipple back to the end of the workings. The seam is on approximately the same level as the railroad track, and an incline is necessary to raise the track from the elevation of the seam to dumping height. The tipple extends from the point where the short incline emerges from the hillside across the railroad track, and out over the river. Two barges placed side by side can be loaded at the same time from this tipple.

Early Views Regarding the Coal Supply of Great Britain

The chief mineral industry of Great Britain at the present day—coal mining—was practiced in the north of England and south of Scotland in very early times, says Davide Bowen, in a recent issue of the *Colliery Guardian*. Doubtless this was the case also in all the other coal fields; originally, working was confined to the outcrops simply or for short distances from the surface. In a charter of the year 1234 there was an indication of the existence of the Northumberland coal supply; while the Yorkshire coal field is first mentioned early in the following century. The leasehold system with royalties appears to have been common in the 14th century.

On account of the fear felt that the supply of coal might rapidly be exhausted if intensive exploitation were permitted, it was a frequent practice of the lords of the soil to expressly limit the quantity of coal which might be worked per day. It was the prevalent opinion that coal could only be worked near the surface. In 1610 Sir George Selby informed Parliament that the coal supply of Newcastle would be exhausted in 21 years. This fear of exhaustion stimulated invention for draining and ventilating mines. It is interesting to note that, whereas in 1700 it was estimated that the total production amounted to only 2,612,000 tons, and to 10,080,000 tons in 1800, the tonnage for the United Kingdom in 1913 amounted to 287,411,869, valued at $708,758,708.

Preparation of Bituminous Coal—III

By Ernst Prochaska
Benton, Illinois

SYNOPSIS—*Shall the entire output of raw coal received at the washery be washed? Shall the coal be sized before or after washing? To what limit shall the washing be carried? These are some of the questions confronting the washery designer or manager, and they are answered in this article.*

THE coal discharged from the raw-coal elevator at the highest point of the washery must be separated from its impurities and screened into the different sizes demanded by consumers. The ways and means employed in this process vary according to the system of washing followed. As all the bituminous coals are similar in nature, it becomes necessary to study the different points involved before we can follow clearly the development of the different methods used.

The first question is: Shall the raw coal as a whole be subjected to washing or will it be better to screen out the fines? This main question can be divided into several parts, because different conditions require different solutions. The first sub-question is: Is it possible to improve the fines by washing? This can be answered in the negative with all possible assurance. The consideration, however, as to how fine the coal can be to be successfully washed is still disputable.

Results from Actual Operation

Laboratory investigations and results of actual operation give largely different limits. It can safely be stated, however, that coal passing through a 20-mesh screen will not show any marked improvement by washing. However, it is not possible to give an absolutely binding limit for all sorts of coal. A correct decision in regard to the permissible fineness of the coal to be washed can only be arrived at through accurate and reliable tests.

If it has been proved that the fines can not be improved by washing, the next question is: Is it possible to screen out the fines in the dry state? The condition of the coal in the mine will primarily determine this question. If it comes from a so-called dry mine, dry screening is probably possible, but if the coal comes out of a wet mine, or contains more than from 5 to 6 per cent. of moisture, all efforts at dry screening will fail.

The third question is: Are the advantages gained from the screening out of the fines sufficient to justify the cost of installation and operation of the necessary machinery? The considerations governing this point are as follows: (a) If coal is to be sized before washing, the screening operation will without doubt be more perfect. (b) Dust mixed with water becomes slime, which hinders the jigging process. If the dust has been eliminated, the jigs will deliver a refuse more nearly free from good coal and therefore work with greater efficiency. (c) If the impurities in the raw coal contain fireclay, which dissolves freely in the water, and on the other hand the coal dust is comparatively clean, the fireclay and the dust will be mixed together in the jigs and the resulting fines will be high in ash. The fines in this case will be of better quality if screened out before washing. (d) If the fines themselves contain fireclay, the wash water will become thick and difficult to clarify, requiring large and expensive clearing basins. (e) If the dust is sufficiently low in ash it can be mixed with the washed coal without increasing the ash in the final product. This method will also facilitate the difficult problem of dewatering the fines. (f) The possibility of reducing the ash in the washed product without increasing the loss of good coal, through screening out the dust, permits the addition of dust higher in ash than would be possible if the dust were not thus screened out.

In the light of the foregoing considerations, if heed is given to the fact that the removal of the fines is comparatively simple, the question of dust separation can be answered as follows: Except in cases where the raw coal contains too much moisture or where the nature of the material is such that little dust or sludge is produced, the installation of a dust separator ahead of the jigs is to be recommended.

The second question in regard to the proper method of washing is: Shall the coal be sized before or after washing? Close sizing before washing is not necessary. Only with a coal that is difficult to wash and one that is at the same time hard and not liable to make a great amount of fines, is sizing before washing to be preferred. Otherwise the sequence of operations will depend upon the nature of the coal—that is, how closely it should be sized or whether it should be washed unsized. Therefore, in washing plants we find at present the following main methods of procedure: (1) Sizing before washing, and the employment of separate jigs for each size. (2) Preparatory separation into two or three grades in addition to dust, and separate jigs for each of the three or four sizes. (3) Sizing into coarse and fine coal only, and separate jigs for both sizes. (4) Jigging of the unsized raw material with subsequent sizing into coarse and fine coal and rewashing of the fines. (5) Washing of the unsized raw coal without any sizing or rewashing.

With types 2 to 5, the final sizing of the coal for market is performed after washing. Type 5 is used for coking coals, and then only if the coal is easily washed.

Separation of Dust

Considering that not every washery is provided with a dust-collecting plant, and that the coal is sized either before or after washing, the required apparatus may be classified in the following order: Dust separating and collecting machinery, sizing machinery, washing machinery.

To separate the dust at once from the total raw coal would give only imperfect results. Therefore, it is desirable to screen the coal at first into two sizes besides the lump—a coarse product from ⅜ in. to 3 in., and a fine coal from ⅜ in. to dust.

A plant for the separation of dust should screen out in as perfect a manner as possible all the dust up to a previously determined size without carrying away particles of coarser coal; because, if part of the dust remains in the coarse coal, the intention of facilitating the jigging and avoiding cumbersome settling basins will not

have been fulfilled. On the other hand, if coarse coal goes with the dust some of the material which can be improved by jigging will not get the benefit of this improvement. Therefore, the fundamental principles are as follows: The utility of a plant for screening out the dust is in direct proportion to its perfect removal of dust containing no coarse coal.

Dust can be removed either on screens or by means of an air current. Screening appears theoretically preferable because the size of the perforations in the screen plates determines the largest size of particles that will pass through them. Failures encountered with the earlier installations were caused by the difficulty in keeping the perforations clear. This trouble, however, was overcome by the use of vibrating screens.

One great disadvantage of a screening plant for dust removal lies in the fact that such a plant is noisy, sub-

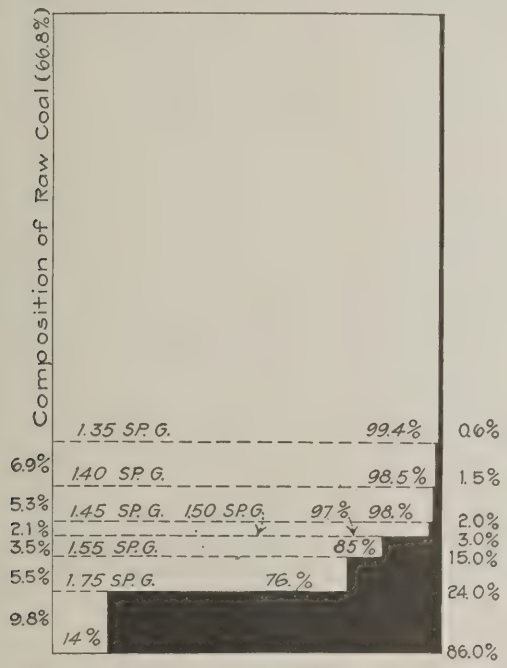


FIG. 1. CHART SHOWING COMPARATIVE EFFICIENCY OF DIFFERENT TYPES OF WASHERS

ject to frequent repairs, and that any air-tight inclosure for it is expensive and prevents the inspection of the moving parts. A dust separator using air currents works noiselessly and has no moving parts except the exhaust fan. It is also easy to inclose this type of apparatus in an air-tight casing, which is not objectionable because no moving parts requiring repairs are inclosed. With an air separator, however, it is not possible to get perfect separation in regard to sizes; some coarse material is always carried away with the dust or some dust remains in the coarse coal. In addition to a careful selection of the apparatus, its constant control and adjustment are required to insure satisfactory results.

What Shall Be Done with the Dust?

The use to which the dust should be put is determined by the nature of the coal, the amount of ash and the method of collecting the dust. With a coking coal, dust can be mixed with the washed fuel if the ash content will permit. This is the simplest method of dust disposal, because it helps in the dewatering of the washed coal. If the ash content is high, at least a portion can be mixed with the washed coal.

If the dust, however, is excessively high in ash it can be further treated in connection with the sludge, or it can be used as fuel under a boiler or in cement kilns, or it can be made into briquets. With fuel coal, the dust can be either briquetted or used under boilers; and if it is very high in impurities a considerable amount of it must be thrown away.

In the mining of coal foreign substances are mixed with the coal and carried with it through the washery. It is difficult to avoid this. Especially harmful are pieces of iron. They cause trouble and wrecks in the crushing plants, and work havoc with the conveyors and feeders. Furthermore, on account of their heavy weight they remain on the jig screens, where they form a heavy bed that prevents the required loosening up of the materials by weakening the water pulsation. This is detrimental to the effective operation of the jigs.

If a mine sends out a good deal of tramp iron, it is advisable to install a separate apparatus to catch all this foreign material. On account of the strong magnetic properties of iron a magnetic separator is the logical selection. Magnetic separators are simple and offer no difficulties. Any well-designed magnetic separator is adapted for this purpose, only it must be designed to handle great quantities. Magnetic separators are mainly of the revolving type and are either located in the bottom of a chute or in the head pulley of a belt conveyor. Revolving magnets have the advantage that they deliver the attracted iron automatically into a separate chute. Sometimes flat magnets are hung above the chutes, but in this case the attracted iron must be removed by hand.

The Jig Is the Heart of a Washery

The more or less successful selection or construction of a jig determines the economic success of a washery. The commercial results of a washery are influenced by the efficient yield of the jigging process. The yield of a washery is the proportion of the washed coal to the raw coal, or of the output to the input. A washery which produces 1200 tons of washed coal from 1500 tons of raw coal has a yield of $1200 \div 1500 \times 100 = 80$ per cent. This yield depends upon the ash content of the washed coal.

It is impossible to make an absolutely perfect separation of coal from refuse. Some refuse will be carried over with the washed product and a certain percentage of good coal goes into the refuse. This imperfection of jigging brings about a decrease in the yield which is in direct proportion to the reduction of ash. The possible yield with a predetermined amount of ash is influenced by the composition of the raw coal and can only be determined in each special case by a thorough investigation. If the possible limits have been determined consideration must be given to the selling price of washed coals having different percentages of ash. The yield, percentage of ash and the selling price must be considered together in order to arrive at the maximum total value of the washed coal.

A typical example will illustrate this. Let us assume that the possibility of putting a coal on the market commences at 8 per cent. of ash. The assumed price of coal with this ash content is taken at $3 per ton, and for each 1 per cent. decrease in ash the selling price advances 25c. per ton. Experiments gave the following results: An 8 per cent. ash gave 95 per cent. yield; a 6 per cent. a 90 per cent yield, and a 4 per cent. ash

gave an 85 per cent. yield. The price for the different coals will therefore be as follows:

$$8 \text{ per cent. ash coal} = \frac{95 \times 3.00}{100} = \$2.85$$

$$6 \text{ per cent. ash coal} = \frac{90 \times 3.25}{100} = \$2.925$$

$$4 \text{ per cent. ash coal} = \frac{85 \times 3.50}{100} = \$2.80$$

This shows that the best returns would be received by washing the coal down to 6 per cent. ash.

The results secured from the tests for the yield and percentage of ash can be used to calculate the composition of the different products if the amount and percentage of ash in the raw coal are known. If 3000 tons of raw coal with 10 per cent. ash are to be washed, we get the following results:

	Composition of Washed Product			Composition of Refuse		
	Combustible, Tons	Ash, Tons	Total Tons	Combustible, Tons	Ash, Tons	Total Tons
With 8 per cent. ash, 95 per cent. yield	2,622	228	2,850	78	72	150
With 6 per cent. ash, 90 per cent. yield	2,538	162	2,700	162	138	300
With 4 per cent. ash, 85 per cent. yield	2,448	102	2,550	252	198	450

The figures given in the table, even if exact conditions are not known, permit us to draw a conclusion in regard to the composition and nature of the raw coal. The raw coal is comparatively clean, containing only 10 per cent. ash. The impurities are mostly bone coal. This can be judged by the large percentage of good coal in the refuse, which can only be caused by a slight difference in the specific gravity between the coal and refuse.

The foregoing example is carried out for unsized coal. If sized coal is to be studied, determinations for each size must be made separately. In actual practice many other factors must be considered which, however, cannot be expressed in such a simple way by means of figures. The most important of such considerations are: (1) The possibility of using the refuse as boiler fuel or of recovering some good coal from it, by crushing and rewashing. The refuse shown in the example given could be easily used at the mine for boiler fuel. (2) As the cost of washing becomes greater with crushing and rewashing, this cost must be deducted from the price derived from the sale of the recovered refuse. (3) The possibility of making through close washing an especially clean and valuable coal that will be in demand even under adverse circumstances, may change the conditions mentioned considerably. This advantage can not be expressed in figures and should be especially considered by those mines that on account of the poor quality of their raw coal can not compete in the market with producers better situated.

The economic operation of a washery can only be based upon a complete and intelligently conducted washing test. The first step in such an investigation is to make a chemical survey of the mine. This consists in making careful sections of the coal bed in different portions of the mine, taking samples of the coal and impurities in the proportion in which they exist in the vein (so-called channel samples). These samples are taken down to the size to which the coal will be crushed at the washery. The samples are then mixed in equal proportion by weight, all fine material which passes through a 20-mesh screen is screened out for separate treatment, and the main sample is separated or classified by means of heavy solutions of varying specific gravity.

The objects sought by such procedure are, first, to obtain the theoretical ash or fixed ash in the pure coal, and second, to so classify the impurities as to plainly show the quantities, specific gravity and ash content of each class. For example, a coal which presents rather difficult washing problems shows the following results for the so-called sink-and-float test:

Pure coal lighter than	1.35 sp.g.,	69.7 per cent. with 7.11 per cent. ash
Impurities.....	1.35–1.40 sp.g.,	8.3 per cent. with 14.67 per cent. ash
Impurities.....	1.40–1.45 sp.g.,	3.6 per cent. with 19.10 per cent. ash
Impurities.....	1.45–1.50 sp.g.,	2.2 per cent. with 24.20 per cent. ash
Impurities.....	1.50–1.55 sp.g.,	1.0 per cent. with 28.02 per cent. ash
Impurities.....	1.55–1.75 sp.g.,	2.2 per cent. with 34.65 per cent. ash
Impurities.....	1.75 and over,	13.0 per cent. with 73.00 per cent. ash
Total raw coal.....		100.0 per cent. with 18.08 per cent. ash

From the foregoing it can be calculated that the ash in the washed coal would be 8.71 per cent. if the separation is made at 1:45 specific gravity and 9.10 per cent. if made at 1.55 specific gravity, assuming of course perfect washing. In the former case the washery loss would be 18.48 per cent. and in the latter 15.2 per cent., assuming that the refuse is free from coal.

A chemical survey of a mine, if properly conducted, will give accurate information on the following points: The amount and character of impurities in the run-of-mine coal; the amount of fixed ash or that in the pure coal; the amount of rejection which it will be necessary to make with a coal washer to produce any desired quality of washed product; the amount and character of impurities, if any, that could be drawn off as an intermediate product and used for boiler fuel, together with the heat value of such intermediate product; the composition of the washed product that may be expected; the size best adapted for the separation of the impurities; the units of machinery best adapted to produce the desired results with the least construction cost. In other words, such an investigation will show the financial returns that may be expected from a washery.

Mechanical Considerations

The mechanical arrangement of the jigs depends entirely upon the character of the coal. The specific gravities of the materials are to be primarily considered. The specific gravity of coal varies between 1.28 and 1.4, and that of the impurities usually lies between 1.5 and 3, or even higher in case of pyrites. If the specific gravity of the coal is close to or even overlaps in some instances the specific gravity of the impurities, we have a difficult problem on hand; but if there exists a considerable difference between the specific gravities of the two products the washing will become comparatively easy.

In the latter case simple pieces of apparatus are sufficient and one-compartment jigs can be used. In the first case, however, separate jigs with two or even three compartments must be employed and rewashing must be considered. Furthermore, it must be determined whether or not the impurities are diseminated throughout the coal. In this case the difference between the specific gravities of the materials is more or less obliterated and rewashing is advisable if the middle product cannot be used at the mine. If the difference between the specific gravities of the materials is small and at the same time the impurities are disseminated throughout the coal, jigging in three-compartment jigs would be advisable.

Many variations of the stated conditions exist, and it is difficult to predict which type of preparation should be used. The arrangement of the jigs should be such that the flow of the materials can be changed easily.

As to the actual performance of washers, it may be said in a general way that impurities lighter than 1.5 specific gravity are rarely separated by them to any considerable extent, and that a plant can be so designed as to eliminate practically all impurities heavier than 1.75 specific gravity and make a rejection of the larger portion of material between 1.5 and 1.75 specific gravity. There are few washers in operation, however, at the present time that are doing so well. Also, if the coal is not too fine there should not be more than 5 per cent. of coal in the refuse; and this amount will usually be less than 1 per cent. of the raw coal.

To show the efficiency of a washer, David Hancock, consulting engineer, has devised a chart upon which can be shown, graphically, the composition of the raw coal, washed coal and refuse. These are plotted to scale and show at a glance the comparative efficiency of different washers as determined from actual tests. A specimen of such a chart is shown. It represents the working of a Stewart type of washer. (See Fig. 1.)

Determining Composition of Raw Coal

It is necessary to know first the composition of the raw coal. This is determined by separations made for each five points of specific gravity upon an average sample. On the left side of the diagram to any convenient scale are laid off the percentages found. For instance, in this case the sample contained 66.8 per cent. of coal lighter than 1.35 specific gravity; therefore, at the distance represented by this figure the dotted horizontal line is drawn and marked 1.35 specific gravity. Also, the first class of impurity separated between 1.35 and 1.4 specific gravity was found to be 6.9 per cent. of the entire sample, and this distance is laid off to the same scale and marked on the chart.

After laying off the vertical scale in the same manner for the entire 100 per cent. of raw coal, the horizontal scale is then subdivided according to the per cent. of each class of impurity found in the washed coal as compared with the amount found in the raw coal. The balance, represented by the black area, is the rejection or refuse; both the quality and amount are indicated graphically, the areas being proportional to the weights of washed coal and refuse.

How to Use the "Efficiency Chart"

The figures to the right of the diagram show the amount of each class of impurity which goes to waste and the amount which is retained in the washed coal. For instance, it shows that 0.6 per cent. of good coal is wasted. It shows, further, that practically no separation of coal and impurities is made below 1.5 specific gravity, and that of the impurities heavier than 1.75 specific gravity 14 per cent. is retained in the washed coal and 86 per cent. rejected. It should be noted in this connection that heavy impurities when retained in the washed coal are usually fine material that would pass through a ¼-in. screen.

This chart can be called an "efficiency chart" of a coal washer and is applicable to any type of washer and any coal if the figures upon which it is based are accurately ascertained in any given case. In the case of the washer shown by the diagram, the ash of the raw coal was 15.94 per cent. and this was reduced by washing to 11.90 per cent., the coal being a difficult one to wash. The amount of refuse was 10.8 per cent. of the raw coal, and the yield was therefore 89.2 per cent.

The percentage of reduction of the impurities from raw to washed coal has been, and still is, frequently cited as a guide in comparing different washer efficiencies. It is certainly a very unreliable guide unless the washers which are compared are working upon the same coal. It will be evident to anyone upon a little reflection that the percentage of ash or sulphur reduction will depend more upon the nature and amount of the impurities in the coal than upon the different types of washers. I have before me figures showing an ash reduction from 21.50 per cent. in the raw coal to 4.50 per cent. in the washed coal, the work being done by a washer little, if any, better than the machine which made a reduction from 15.94 per cent. to 11.90 per cent., giving a reduction of 79 per cent. as against 25 per cent. The explanation is to be found in the difference in the amount and character of the impurities in the coal from the two mines and not in any essential difference in the washers.

Another result might be cited where a washer identical with the one which produced a reduction of ash from 15.94 per cent. to 11.90 per cent. showed the following results: Ash in raw coal, 21.4 per cent.; ash in washed coal, 3.08 per cent., or a reduction of 85.6 per cent. It is of course absurd to suppose that any such difference could have existed between washers of identical construction, but the difference is simply due to the fact that the two coals contain impurities quite different in character and amount.

The following maxims are therefore fully established: Practically no separation of coal and impurities can be made in material finer than 20 mesh. It is usually the part of wisdom to avoid pulverization of the coal as much as possible; but in this respect, also, each particular coal is a distinct problem.

(To be continued)

Coal Mining in Mexico

The Piedras Negras district ranks first in Mexico in the production of bituminous coal; in fact, it is the source of supply for the whole republic for railroad and smelting purposes. In the last years of the revolution the coal mines were greatly handicapped on account of confiscation, labor troubles, and the closing of the many smelters throughout the country which consumed their outputs; but the year 1918 saw the opening of many of the mines that had been closed down and a boom in the operation of those that had been running at half capacity. The Mexican Government has restored practically all of the mines to their former owners and the present State Government is doing its utmost to favor mines in the handling of labor questions.

The output of the coal mines in the Piedras Negras district is estimated to have reached 73,500 tons of coal a month, and if conditions continue to improve it will be increased to 100,000 tons a month. The making of coke on a larger scale is contemplated. At present there are two mines, the Mexican Coal and Coke Co. and the Cia. Combustibles de Agujita, that are equipped with coking ovens and are making a limited supply of coke.

Coal-Stripping Operations in Ohio

By S. B. Creamer
Cambridge, Ohio

SYNOPSIS — *Stripping operations in Ohio are characteristic of the field. The topography of the surface and occurrence of the seams largely limit this method of recovering coal to the outcrops. Great activity in stripping coal has been manifested in the last few years, and where operations have not been systematically carried out money has been wasted.*

THE open-pit (or stripping) method for the recovery of minerals on a large scale dates back many years. This system of mining was introduced in the iron-ore region of Minnesota in 1892. The term "stripping" is understood to mean the removal of all the overlying formation and the uncovering of the mineral for loading. However, it has been less than a decade since stripping operations made their advent in the coal fields of eastern and central Ohio on a commercial scale. But due to the incentive created by the demand for coal, stripping operations have increased so rapidly in the past three years that it has been impossible to get reasonable delivery on stripping machinery.

The great demand for coal and the prospects of a large return on the investment caused many companies to be organized, and much experimenting was done. As a result large sums of money have been wasted on poor property, worthless machinery and impossible or prohibitive layout.

While the general features of steam-shovel mining may appear simple, nevertheless good management, close attention to details and systematic work are essential to success. In the iron mines of Minnesota the overburden is loaded into side-dump cars which sometimes are transported a distance of two miles by dinkey. In the coal-stripping fields of Ohio the overburden is not loaded into cars as in the iron mines, but is simply cast to one side after the coal has been removed. Thus the depth of overburden possible to strip depends on the size of the shovel, thickness of coal, character of overburden and topography of the land. This feature is well brought out in Fig. 1, which illustrates a characteristic stripping operation in Ohio. The view is of the Coal Ridge Mining Co.'s No. 1 plant at Cambridge, Ohio. At the left is shown a large Marion shovel of the revolving type, which is removing the cover over the coal and depositing it on the right. The shovel in the foreground at the right loads the coal which has been stripped into cars, for transportation to the tipple. Conditions here lend themselves particularly to economical working and the operation is an ideal stripping. The maximum overburden is 40 ft. and the stripping follows the crop line on three sides of the property. The haulage track running through the stripping is a complete loop between the shovel and the tipple, making possible the moving of coal in either direction—an exceptional layout in the stripping field.

The first consideration of those contemplating a stripping operation should be a detailed study of the topographic and geologic structure as well as the thickness and steaming qualities of the coal. This study should consist of a topographic survey of the property. The property should also be thoroughly drilled to determine the thickness of the coal and the thickness and structure of the overburden. Core drills are most satisfactory for this work. Much stripping property in the No. 8 seam field has been hastily developed without the pre-

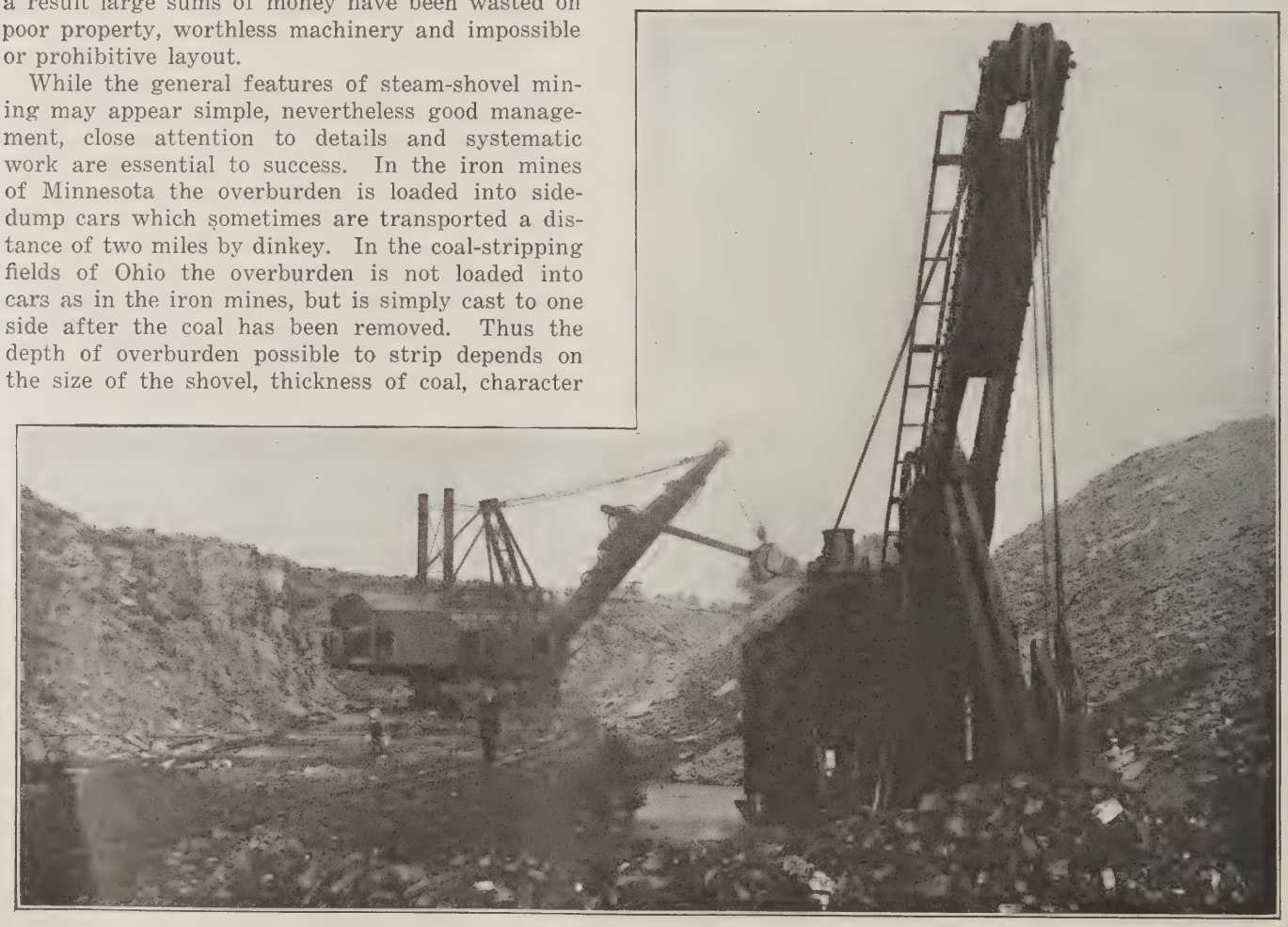


FIG. 1. STRIPPING PLANT OF THE COAL RIDGE MINING CO. AT CAMBRIDGE, OHIO

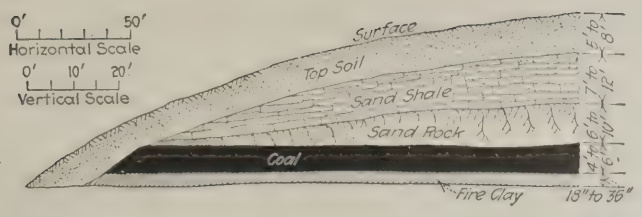


Fig. 2

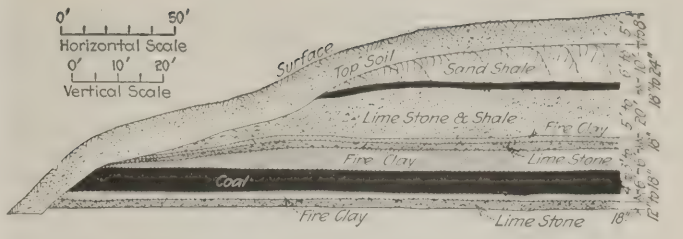


Fig. 3

FIGS. 2 AND 3. TYPICAL GEOLOGICAL SECTIONS OF THE OVERBURDEN OVERLYING OHIO COAL SEAMS
Fig. 2 shows the geological formation of the overburden of the No. 8 seam, while Fig. 3 shows that of the No. 7 seam

liminary surveys necessary for proper investigation and economic layout.

Ideal physical conditions are rarely found in the "stripping game" in Ohio. Such conditions would require a topography so that the property could be worked from two or more sides toward the center. The crop line of the coal should be such that the first cut of the stripping machine would be an open cut. This would necessitate a crop line with room for a spoil bank below the crop, the required width of which would be at least 150 ft. The geological formation of the overburden should include gravel or sand shale, which would make it possible for the shovel to dig without blasting. Under these conditions a bank of 40 ft. in depth could be moved without loss of coal with a 90-ft. boom for an indefinite number of cuts if properly operated.

In the No. 8 field the box (or through) cut is only used in a few instances, such as cutting through a saddle or low point in a hill. Without the box cut the crop line is an essential requirement, and this makes possible the open (or crop) cut for the first cut. Except in quite low flat ridges of small acreage the topography is such that the overburden increases rapidly in depth at each succeeding cut and geological structure more difficult to handle is encountered. Fig. 2 shows a typical geological section of the overburden overlying the No. 8 seam in Ohio. With one or two exceptions, this section prevails throughout the field. The coal is of little value until the 10-ft. cover line is reached, and the nature of the limestone is such that a cut 100 to 125 ft. wide can be dug without blasting.

In order to move overburden efficiently, and with a due regard for the proper care of the shovels, the overburden of succeeding cuts must be shot. The fireclay that lies directly over the coal is hard material, and it is almost impossible to dig it without shooting. However, it soon "air-slacks" on being exposed. Near the crop the limestone has a boulder-like formation caused by crevices due to ground water. In Ohio it seems to be impossible to do effective blasting without the aid of the jackhamer to drill the larger stones. The writer has measured stones 50 ft. long, 5 ft. thick and 10 ft. deep that have been moved a distance of 5 ft. horizontally from the face of the cut, without breaking, by a charge of 25 kegs of black powder placed 25 ft. from the face of the cut. However, as advance is made into the hill by succeeding cuts, the limestone takes the formation of a solid ledge and can be more economically blasted.

With the increase of overburden the cost of production increases, and to one not familiar with the "stripping game" it might seem financially impossible to mine coal at a profit in this manner. However, one must consider that from 90 to 95 per cent. of the coal is recovered by stripping in comparison to 65 to 75 per cent. by deep mining. Under the efficient management of George D. Rowland, the Apex Coal Co., of Cleveland, Ohio, has profitably moved overburden 70 ft. deep, moving 14 cu.yd. of overburden per ton of coal.

In the No. 7 seam field the geological formation is of a different nature, as shown in Fig. 3. It is necessary to blast the overburden when cover of 25 ft. or more is stripped.

Oil from Cannel Coal

The committee appointed by the Institution of Petroleum Technologists in February, 1918, "to obtain evidence in respect of the quantity of cannel coal and allied minerals available in Great Britain as a source of motor spirit, fuel oil and other products, and to formulate a scheme for the utilization of such supplies," has issued its final report, states the London (England) *Chamber of Commerce Journal*, April, 1919. This report states that a company, known as the Midland Coal Products Co. (Ltd.), has been formed with a capital of $500,000 (the whole of which has been subscribed), to produce oil from bituminous material, to manufacture domestic and industrial fuel, to deal with the chemical and other byproducts obtained, and to establish retorting plant on a commercial scale in which various retorts and systems of retorting can be tested. A site for an experimental and research station has been acquired in the center of the Midland coal field, flanked by the Great Northern, Great Central and Midland railways and adjacent to three shafts which are now bringing up a true cannel, an inferior cannel, half-inch top hards, and a soft coking coal. It is the intention of the company to test material from any part of the world. It is not only intended to erect large works (for which purpose an extensive site has already been secured), but also to assist in the establishment of works and to coöperate to that end with colliery owners and others in any part of the world. The company is receiving no government assistance, nor is it in any way interested in any particular type of retort or process.

There can be no doubt, the report states, that the more economical use of best raw coal, inferior coal, slack, colliery waste and other bituminous material not at present brought to bank, or, if brought to bank, put on the pit heaps, is becoming more and more a matter of immediate importance to the country, and more particularly to those engaged in the production or utilization of byproducts and the generation and distribution of power on a large scale. The technical advisors and others associated with the committee have done an immense amount of work in studying different types of retorts and producers already constructed, and designs and plans for suggested improved methods.

Know Your Battery Better*

By J. H. Tracy
Philadelphia, Pennsylvania

SYNOPSIS—*Because the storage battery will stand abuse uncomplainingly some people appear to consider this a sufficient reason for abusing it. While it is well to observe many precautions in handling a battery, the two chief points to be cared for are: keep the battery cool and avoid gassing—that is, water decomposition through circulation of excessive charging current.*

IT IS an unfortunate fact that among battery users and even the electrical profession generally there is little really known about the performance and care of storage batteries. It is the purpose of this paper to explain in simple language the action of the lead storage battery and to recite the important points of the proper manner for caring for storage batteries in operation, and giving the reasons for such rules as are laid down by the manufacturers for the proper care of the battery, and in this connection to point out the penalties that must be paid if these instructions are not followed.

The reasons for these instructions are not generally appreciated, and, if understood, would be better remembered than mere rules. Some knowledge of the penalties following the breaking of these rules will also be of assistance.

A storage battery consists of one or more cells; each cell consists of positive and negative plates immersed in an electrolyte. The electrolyte of all lead storage batteries consists of a mixture of sulphuric acid and water in such proportion as to best meet the requirements of the service in which they are to be used. For the propulsion of locomotives, street trucks and the like, the electrolyte has a specific gravity, as shown by the hydrometer, of approximately 1.27 to 1.28.

The voltage of each cell is approximately 2 volts on open circuit, but is higher than this when the battery is being charged and lower while being discharged. The nominal voltage of a battery is therefore the number of cells multiplied by two.

How Current Is Produced

When a cell is being discharged the current is produced by the acid in the electrolyte combining with the active material of the plates. The active material of the positive plate is lead peroxide and that of the negative is metallic lead in a spongy form. When the acid combines with the active material, lead sulphate is formed in both the positive and negative plates. The sulphuric acid, which has been absorbed by the plates, has, of course, been withdrawn from the electrolyte, with the result that the specific gravity of the electrolyte is reduced, and for a full discharge this drop in gravity will be from 100 to 125 points; thus, if the gravity of the fully charged cell is 1.275, the gravity at the end of a full discharge will be between 1.175 and 1.150, depending on the type of cell and the amount of the discharge.

To recharge the battery, direct current must be passed through the cells in a direction opposite to that of the current during discharge. This reversed current will reverse the action which took place in these cells during discharge. It will therefore withdraw the acid from the active material in the plates and restore it to the electrolyte. Thus, during the charge the electrolyte gradually becomes stronger as the acid is withdrawn from the plate until no more sulphate remains in the active material. All the acid having been returned to the electrolyte, it will be of the same strength as before the discharge, and the same acid will be ready to use over again during the next discharge, and the active material of the plate again in condition to combine with this acid.

During discharge the action has simply been that of the active material of the plates combining with the acid of the electrolyte. The whole object of the charge is to again withdraw this acid from the active material and return it to the electrolyte. When all the acid has been withdrawn, the cells are fully charged.

Some Facts About Discharge of Batteries

Operating instructions for storage batteries as issued by the manufacturers usually say little about discharging. As a matter of fact, a battery may, without injury to the plates, be discharged at any rate of current that it will deliver. There has been a widespread opinion that high rates of discharge are detrimental to the life of a battery. I can find no justification for this opinion with modern storage batteries. The maximum permissible rate of discharge is usually limited by the size of wiring used or by the capacity of the motor or other apparatus to which it is connected, and not by the battery itself. Caution should be given, however, against overdischarging the battery. It has already been pointed out that the drop in specific gravity of electrolyte should not exceed 100 to 125 points. Some have perhaps noticed the action of sulphuric acid on copper wiring terminals of a battery, and that a comparatively large amount of copper sulphate is formed when only a small quantity of the metal is eaten away by the acid. In the same manner, when the acid combines with the lead in the active material, the resulting lead sulphate occupies more space than the active material from which it is formed. The active material of all battery plates is porous, and this expansion is accommodated by a reduction in the size of its pores. All battery plates are designed to accommodate a certain amount of this expansion of the active material during sulphation; and in batteries of the type under consideration, this is limited to the amount represented by a drop in gravity of from 100 to 125 points, as already mentioned. Further discharge, even if it can be obtained at a satisfactory voltage, results in an excessive expansion, which so closes the pores in the active material that it becomes increasingly difficult to properly recharge the battery after an excessive discharge, and unless a proper recharge is given, the battery is liable to deteriorate. For this reason the discharge of any battery should not be carried beyond the point given by the manufacturers, as indicated by a hydrometer or by an ampere-hour meter.

*Paper presented before Illinois Mining Institute, May 23, 1919.

The function of the ampere-hour meter is to show the state of charge of the battery at all times and, therefore, indicate directly when the battery is approaching its limit of discharge as well as when it is approaching a state of full charge. To do this, it must be connected in the battery circuit at all times.

Operating instructions as issued by the manufacturers devote much more space to charging than to discharging. A battery must, of course, be charged with direct current, and the current must be connected to the battery so that it will go through it in the proper direction. The positive pole of the charging source must be connected to the positive terminal of the battery.

While a battery is being charged, the amount of sulphate in the plates decreases, the ability of the plate to give up the acid becomes reduced; in other words, during the early part of a charge the plates can give up the acid at a rapid rate, as there is a large amount of sulphate available. Therefore, a battery that is considerably discharged can be charged at a high rate, but as the charge approaches completion, currents at high rate cannot be utilized, and if high rates are maintained, only a portion of the current is used to withdraw acid from the plates, and the balance of the current acts to decompose the water in the electrolyte into oxygen and hydrogen, which are given off in the form of gas. Gassing of the battery, therefore, shows at any time whether or not the charging rate is too high. It therefore follows that when the cells are gassing on charge the rate of charge should be reduced. This reduction saves the loss of current, which is shown by the gassing, and also this gassing in excess has a wearing effect on the battery, which will be discussed further a little later.

The hydrogen and oxygen given off from the battery, when unmixed with a large amount of air, form a combination that will explode violently if ignited by an open flame or an electric spark. The compartment should therefore be open while the battery is being charged, in order that these gases may become mixed with air. Do not bring exposed flame, match, candle, cigar and so forth near the battery when charging or shortly after. If the battery is to be charged in a closed room or underground in the mine, especial attention should be paid to the ventilation of the charging room.

Effect on Plates of Escaping Gas

It has already been pointed out that gassing represents a waste of charging current. It does more than this. The action of the bubbles of gas in escaping from the pores of the plates and in "boiling" to the top of the electrolyte have a tendency to wash the active material from the positive plate.

It is a well-known fact that batteries wear out. This wear shows itself to the eye principally in the positive plate, the active material of which softens with use, and were it not for this unavoidable fact, the life of batteries would be much longer than at present. As the active material of the plate softens with use, there is a tendency for the softened portion on the surface to fall to the bottom of the jar in the form of sediment. The action of the gas in escaping from the pores of the plate and the eddy currents stirred up in the electrolyte when the bubbles of gas rise to the surface hasten this shedding of material and, by just that much, shorten the life of the battery.

Excessive gassing should, therefore, be avoided if the best life of the battery is to be obtained. A small amount of gassing at low rates and for a short time, at the completion of a charge, is not objectionable, but violent gassing should be avoided.

The cell temperature should not exceed 110 deg. F. The effect of high temperature is primarily to shorten the life of the wood separators which are always installed between the positive and negative plates.

There is always a tendency for wood in contact with sulphuric acid to become carbonized. This tendency is much accelerated at temperatures in excess of 110 deg. F.; and if a battery is regularly operated at temperatures in excess of this amount, it will probably be necessary to renew separators in the entire battery prior to the battery itself having ended its useful life.

There are also present in any commercial storage battery some impurities in the materials used, which cause a slight action in the cell, even when it is not in active operation. At high temperatures, these internal losses are increased, as is evidenced by the fact that a battery placed in storage will not lose its charge over a period of, say, six months if kept in a cool place. If kept at a temperature around even 100 deg. F., it will lose much more of its charge in, say, three months. In operation, however, the principal effect of high temperature on a battery is its deteriorating effect on the separators.

High Temperatures Soften Sealing Compounds

If temperatures much in excess of 110 deg. F. exist, there will follow a softening of the sealing compound and a warping of covers of the cells, so that the sealing of the cells will lose its effectiveness and there will result a possible slopping of the electrolyte, which will lead to deterioration of the wood trays in which the cells are assembled.

With the foregoing limitations in mind, it is advisable to charge a battery at relatively low rates if local conditions permit. Of course, the lower the rate of charge the longer the time required to complete the charge. If 12 or 14 hours are available, the charging can be done at a low rate: approximately one ampere per plate per cell; that is, a 15-plate battery can receive all its charge at approximately 15 amp., if 12 or 14 hours are available for the charge. If this length of time is not available, the charging rate should be higher at the start of charge and then reduced to the rate mentioned before the battery begins to gas.

Where an ampere-hour meter is used, as is usually the case, the following general rule can be given: the charging rate in amperes must be less than the ampere-hours still out of the battery until the finishing rate is reached. In other words, the ampere-hour meter will always indicate a rate which should not be exceeded at that time. Of course, any rate less than that indicated by the ampere-hour meter will be satisfactory.

More complete charging instructions are given in the instruction books issued by the manufacturers, but these instructions all conform to the general principles which have just been laid down. The important points are: Avoid gassing and keep the cell temperature below 110 deg. F.

There has been considerable said about boosting storage batteries. Boosting consists of giving a battery a partial charge, usually at a high ampere rate and for a relatively short time. Boosting in no way differs from charging and, therefore, the same rules should be followed.

It is highly important to give the battery a weekly equalizing charge, which consists of a prolonged charge at a low rate, preferably about ½ amp. per plate per cell until the specific gravity of the electrolyte will show no further rise over a period of one hour. As has already been pointed out, the object of charging is to withdraw all acid from the plates. In practice, the regular daily charges are not always given long enough to completely accomplish this. In fact this is not necessary provided the acid is completely withdrawn once a week by giving an equalizing charge. If this is not done and some sulphate is allowed to remain in the plates for a considerable time, it will gradually increase and the pores of the plate will become clogged and the battery lose capacity and deteriorate in such a way that it becomes increasingly difficult to restore the battery to its normal condition. To carry the daily charge to the full extent would involve an unnecessary amount of charging and gassing, which is not desirable. An equalizing charge properly given once a week accomplishes the desired result with a minimum of attention and a minimum of battery wear.

It is important that the plates of the battery be always covered with electrolyte. In order to accomplish this, it is necessary once a week, or possibly oftener, to add sufficient pure water to each cell to bring the electrolyte well above the tops of the plates. Use pure water for this purpose.

To determine whether natural water is sufficiently pure to use, a one-pint sample should be submitted to the battery manufacturer, who will make a chemical analysis of it, free of charge, and report to the user. If natural water is not sufficiently pure, it will be necessary to use distilled water, which can usually be purchased, or a small still may be installed by the user.

While the amount of impurities put into a cell at any one time may seem very small, these impurities accumulate with each filling, and will in time be present in such quantities as to affect the life of the cell.

The assembly of the cells is such that practically no water really evaporates, the bulk of the loss is due to disintegration of the water by the gassing at the end of the charge. No acid is lost in this manner, so none should be added to the cells unless some has been lost by spilling. Water should be added to the cells before charging in order that it may become thoroughly mixed with the electrolyte by such gassing as occurs. This is particularly necessary in freezing weather, as otherwise the water will remain unmixed and may freeze.

Keep the battery clean. Any piece of electrical apparatus should be kept clean and dry, in order that there may be no loss due to poor insulation. If the battery is not kept clean, the acid will slowly attack the wood trays in which the cells are assembled and not only weaken them, but may cause a failure of the insulation of the battery in such a way as to possibly cause burning of the jars, short circuits or a spark which may ignite gases around the battery and cause an explosion. Detailed instruction books give complete information as to how this can be most easily handled.

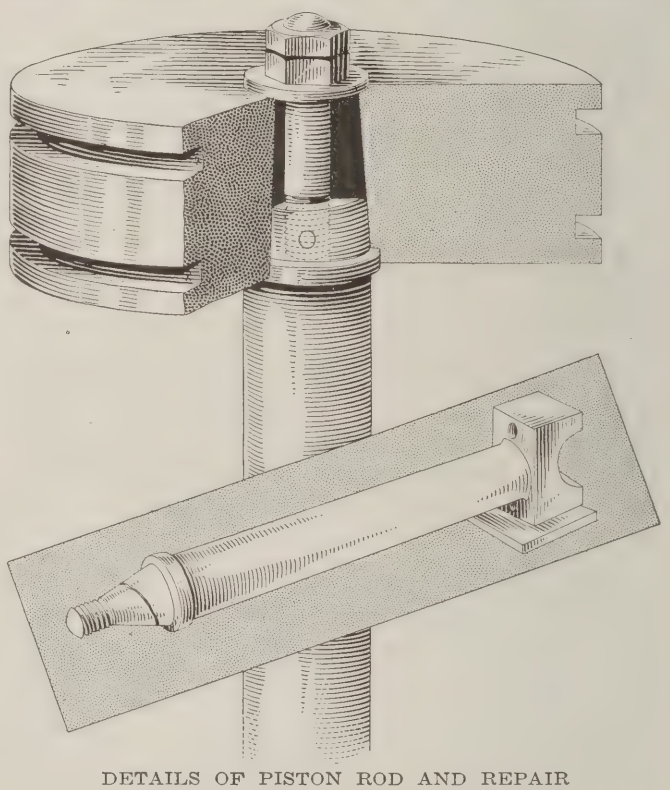
The battery should be inspected regularly and given such attention as may be required. Any piece of apparatus in daily use requires periodic inspections, followed by such cleaning and repairs as may be found necessary if the best results are to be obtained. Such inspections are less burdensome than the troubles which result with any piece of apparatus that is not properly cared for.

The action of the storage battery is relatively simple. The attention that it requires to keep it in regular daily service is simple and easily given. The mystery that exists in some people's minds regarding the battery is due to the fact that it does not complain under abuse. The operators do not appreciate, from their own observation, the results of abuse and so, in many cases, do not give the battery the attention that it deserves. It is hoped that this attempt to explain the reasons for giving the battery certain essential attention will result to the mutual advantage of both users and makers.

Emergency Piston-Rod Repair

How an emergency makeshift repair to an engine piston rod that had broken off at the tapered end, where it fitted into the piston, was made may be of interest to *Coal Age* readers. The design of the rod is shown in the illustration, which also shows the break as it occurred. The operating engineer had taken out the piston in order to examine and refit the piston rings. In putting the piston back and tightening up the nut, he broke the rod.

On looking the rod over it was found that a flaw and crack had existed, and when the rod nut was set up



DETAILS OF PISTON ROD AND REPAIR

tight the break resulted. The rod was of the type that had the crosshead forged on, and it became evident that to make or obtain a new one was a matter of weeks. Accordingly, a makeshift repair was necessary in order to operate the engine until a new part could be obtained.

The end of the broken rod was drilled and tapped out for a 1-in. stud; this was screwed in and pinned, the rod was placed in the piston, and babbitt metal was poured around the stud. The metal was peened down even at the top, a nut and large washer completing the repair. The rod worked satisfactorily by running the engine at half speed.

Heavy Paper Tamping Bags Prove of Service in the Blasting of Coal

Blasters as a rule realize the importance of tight tamping and of using proper tamping material. But proper tamping materials are not always available, so they sometimes use whatever may be near at hand with the result that more explosives are used than are necessary, increasing costs, or bringing down less coal or rock than could reasonably be expected from the quantity of explosives fired.

For instance, a miner will tamp with coal dust. This does not ordinarily pack well. Clay or loam would be much better, but a miner cannot be expected to go out of the mine for tamping whenever he loads a borehole. He therefore uses what he has at hand.

Miners and rock blasters are beginning to appreciate tamping bags made of heavy paper and used in many places as containers for sand, clay or loam to be used for tamping. The bags are particularly useful when loading holes pointed upward, the reason therefor being obvious.

A supply of these bags can be filled and taken into the mine or onto the job at the beginning of the day's work. The blaster is thus sure of having a tamping material that will give him maximum breakage at least cost. Their use also saves time when loading boreholes.

Tamping bags are useful when the blaster desires to make up charges of blasting powder in cartridge form as they usually do when loading uppers or holes in damp open work. They are much more convenient than clumsily made funnels or cones for which pieces of newspaper are generally employed.

Personnel of the Reorganized West Virginia Department of Mines

After the State of West Virginia, or at least the coal-producing sections of the state, had been redistricted in accordance with the terms of the Hale bill, it became necessary to appoint four new district mine inspectors. Following their appointment recently, both old and new members of the inspection staff lately were called to Charleston for a conference with the head of the department. The duties devolving upon each inspector were thoroughly explained by Chief Heatherman, who also pointed out the personal responsibility of each member of the force in enforcing the mining laws and seeing that conditions were safe.

During the day a photograph of the entire staff of the department was taken. This is reproduced here.



CHIEF OF THE WEST VIRGINIA DEPARTMENT OF MINES AND MEMBERS OF THE INSPECTION FORCE AT THEIR FIRST CONFERENCE SINCE REORGANIZATION OF DEPARTMENT

Reading from left to right, those in the photograph are: Eli J. Mason, Seventh District; James Golden, Fourth District; Edward Nicholson, Twelfth District; W. B. Riggleman, Fifth District; W. J. Heatherman, Chief of Department; Thomas Stockdale, Fifteenth District; R. M. Lambie, Thirteenth District; Zach Evans, Ninth District; E. L. Brewer, Eighth District; L. D. Vaughn, Eighteenth District; L. B. Holliday, Tenth District; M. B. Coulter, Sixth District; James W. Weir, Private Secretary to Governor; J. W. P. St. Clair, Seventeenth District; Evan L. Griffiths, Third District; J. L. Heizer, Chief Clerk; W. H. Sandridge, Second District; S. E. Hawkshaw, First District; V. E. Sullivan, Fourteenth District; H. L. Butler, Sixteenth District; R. L. Jenkins, Nineteenth District; J. G. Vaughan, Eleventh District.

Wiring at Mines

By Jack L. Ball
Amsterdam, Ohio

SYNOPSIS—*If maximum results are expected from an electric mine system, maximum care must be expended thereon. In many mines either through ignorance or haste electric wiring is installed in an extremely careless and haphazard manner. In order to obtain best results as well as secure a large measure of safety, the wiring of a mine should be installed with as much care as it is in a residence, factory or office building.*

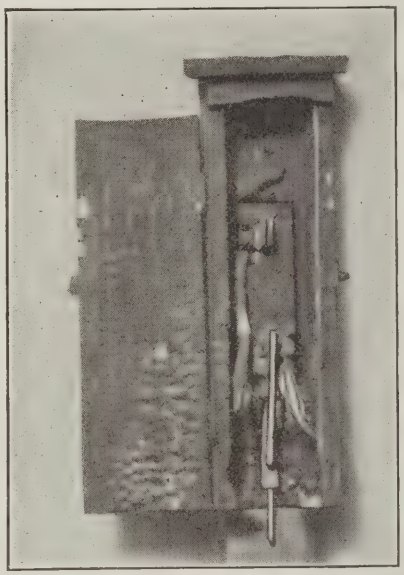
ELECTRIC wiring both inside and outside the mine should receive a maximum of care and have the best workmanship bestowed upon it that it is possible to obtain. It is noticeable, however, that this important detail receives little attention in many instances. Wiring in some coal-mine power houses, if carefully examined by insurance inspectors, would be condemned as entailing too great a fire risk. Such wiring is in some instances improperly insulated, the circuit breakers are mounted on wooden panels, light and motor circuits are connected between the breaker and the generator and not protected with fuses, switches are placed in inaccessible positions with inflammable surroundings, connections are loose, and poor workmanship is the rule rather than the exception. The local mine management is responsible for allowing such an installation to exist.

Inside of some mines the condition of the trolley and machine wires is such that it is a wonder that power can be transmitted at all, that someone is not electrocuted and that the mine is not continually on fire. Loose trolley wire connections or splices, wire loose from clamps and sagging, hangers improperly spaced usually too far apart on straight road and too few in number on curves, hangers loose from their supports and poor bonding, are a few of the common faults encountered. Machine wire may frequently be found in all sorts of inaccessible places, under falls, in abandoned workings or under water, with no protection from short-circuits except the circuit breaker on the switchboard in the power house. Single switches are placed on the positive side and installed in inflammable boxes. The worst feature from the standpoint of efficiency is loose connections or joints, grounds, and the fact that the copper is not infrequently too small to carry the load intended.

Where coal is mined and hauled electrically, the transmission lines as a general rule should have more attention, both in installation and upkeep, than they usually receive. Trolley wire should be run at as nearly a uniform height as possible. This, of course, is governed by the height of the entries, timbering and the like. However, trolley wire can be placed at a predetermined distance from the side of the rail and kept uniform in this respect. Patent trolley-wire splices that are in general use give excellent service, but in some instances because of the vibration induced by the trolley wheel, the wire becomes loosened, and arcing and heating begins with a resultant loss of power.

A practical illustration that shows that heat means a resistance is this: It will be noticed in cold weather that the shunt field of a generator requires considerable resistance cut in to keep the voltage normal. In the summer time when the weather gets warm the generator heats up to such an extent that it is necessary, at times, by means of the shunt field rheostat, to cut out all resistance to get the normal voltage; and even then this somtimes falls several volts below the potential desired.

A mine foreman in southern Ohio complained that two gathering motors and one haulage motor were not receiving enough power to handle the usual number of cars. A test was made at night, at which time several coal-cutting machines were using power. "Jumpers" were used from the trolley wire and rails to the machine circuit, which had been cut off from the regular source of supply. Two splices were found to be very hot and required renewing while three were quite warm.



RESULT OF PLACING A SWITCH IN A WOODEN BOX

After tightening the setscrews of the three splices and rebonding four rail joints, the trouble was overcome.

Trolley wires are either suspended from the rib, the roof or the top; the hangers are fastened in the coal, roof or wooden timbering with some from of expansion bolt or lag screw, or are clamped to "I" beams with some variety of clamp or bolt hanger. When using the expansion bolts care should be exercised as to the size of the hole drilled. If the diameter is too large, the bolt will soon work loose. If a clamp or a bolt type of hanger is used it is advisable to see to it that they are made tight when installed and that they are kept in this condition. If maximum efficiency is expected from a mine haulage system it should receive commensurate care.

Machine wires are sometimes much abused. In some cases it is found that they are strung around in all sorts of haphazard ways, with little attention paid to insulation or upkeep.

Copper forms an important item of mine expense. Circuits should be as short and direct as possible to get the desired results. If an efficient system is wanted,

with the fire hazard eliminated, the same care should be exercised in hanging machine wire that is used in an office or factory building. It is found sometimes that it would be better to use a smaller and a greater number of insulators. Wires should be well insulated, of course, not merely hung up on large-size insulators just to keep them off the bottom.

Care should be used when making joints. What is known as the "Western Union" joint, soldered, makes an excellent connection. As solder has a higher resistance than copper, it is advisable to first thoroughly scrape the wire, which insures a copper contact; after the joint is made it can then be soldered. Splices of the sleeve type are much in use and give excellent service. When using them, however, the proper size only should be employed and the wires butted together and the set-screws set up tight. Too large a splice with the extra space filled in with anything that is handy should never be used if a good joint is desired. Such work should be neatly done, with permanency in mind.

To save wire in many instances shortcuts are taken through some abandoned part of the mine. No careful workmanship is attempted. Falls occur, the wire is covered with slate and rock, or is immersed in water, and the machine runners are without sufficient power to operate their machines. Eventually, the wire is so completely covered up that it can never be recovered and is a dead loss.

Wire should be completely insulated from wooden timbering. It sometimes happens that a short-circuit occurs, heating the wires sufficiently to ignite the timbers. A small blaze in an aircourse soon reaches such proportions that it may result in a disastrous fire.

Usually, the machine circuits are not protected with circuit-breakers or fuses inside the mine. It is found, however, that single-pole switches, connected on the positive side, mounted on a slate base, the whole being placed in an unprotected, inflammable wooden box, are much in use. When machine and trolley wires are in the same entries, as many are, a two-pole switch should be used. Then, if for any reason a "short" occurs between the trolley wire and the negative side of the machine wire, the circuit can be completely broken and haulage can be resumed with a minimum loss of time. Also, if both the positive and negative sides are open, this insures a guarantee of safety when making repairs.

The accompanying illustration shows the result of a short on a machine circuit. The single-pole switch was mounted on a slate base, the whole being inclosed in a soft-pine box. No tubing was used for the outlets and the inside of the box was not protected with asbestos sheeting or other noninflammable material.

ALL MINERS AND SHIPPERS of coal are interested in the manner in which fuel is sampled by consumers. It should be done preferably when the coal is being unloaded, and in a regular and systematic manner, so that the entire quantity of the coal sample will be a fair representative of the shipment. Samples taken from the surface of coal in piles or bins, or in cars and barges, are generally unreliable. A shovel is often used for taking equal portions to make up a gross sample. For run-of-mine or lump coal, the gross sample should not be less than 1000 lb. If the coal contains an unusual amount of impurities in pieces of considerable size, the gross sample should be about 1500 lb., according to the Bureau of Mines. For slack coal and small sizes of anthracite in which the impurities are not in abnormal quantities, or are not in pieces larger than ¾ in., a gross sample of approximately 500 lb. is sufficient.

Legal Department

MULE AS AN "APPLIANCE"—A mule used in mining operations is an "appliance" within the provisions of the Indiana Employers' Liability Act, which requires employers to provide reasonably safe appliances, etc., for use of their employees. (Indiana Appellate Court, Van Hentenryck vs. Jackson Hill Coal and Coke Co., 120 Northeastern Reporter, 664.)

POWERS OF COAL-MINING COMPANY MANAGERS—The general manager of a corporation operating coal mines on leased property has no implied authority to sell or dispose of to another any part of the leasehold estate. (West Virginia Supreme Court of Appeals, Carroll-Cross Coal Co. vs. Abrams Creek Coal and Coke Co., 98 Southeastern Reporter, 148.)

INJURIES IN KENTUCKY MINES—A mine mule driver was not necessarily guilty of contributory negligence, barring recovery for injuries sustained in collision with a mule driven by another driver because he failed to stop on reaching an air curtain, raise it, and look beyond, where he had never been instructed by the mine boss to do so. Operators of different trips of cars are not fellow servants of each other within the rule of law applicable to Kentucky mines that an employer is not liable for injury to an employee when caused by negligence of a fellow servant. (Kentucky Court of Appeals, Tyree vs. R. C. Tway Mining Co., 208 Southwestern Reporter, 817.)

SHIPPER'S LIABILITY FOR FREIGHT CHARGES—The shipper of a carload of coal is primarily liable, as against the carrying railway company, for all proper freight charges involved. This liability of the shipper in interstate commerce cannot be specially released by a railway company as that would involve an unjust discrimination against other shippers. Under the Interstate Commerce Act, a railway company is not bound to notify the shipper of insolvency of a consignee and nonpayment of freight charges collectable from the latter, as a basis for holding the shipper liable. (Illinois Supreme Court, New York Central Railway Co. vs. Philadelphia & Reading Coal and Iron Co., 121 Northeastern Reporter, 581.)

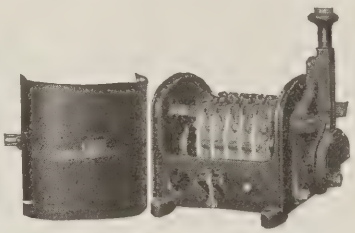
WORKMEN'S COMPENSATION ACTS APPLIED—Where a coal company's employee was struck by an automobile in a street while mounting his wagon, after having returned from a saloon where he went to telephone to the company's office that certain unloading equipment had been left off his wagon, was injured in an accident "arising out of and in the course of his employment," within the meaning of the Indiana Workmen's Compensation Act, entitling him to an award under that act. (Indiana Appellate Court, Ceislik vs. Consumers' Co., 121 Northeastern Reporter, 832.) And a coal hauler who died of heat stroke while shoveling coal on a very hot day must be deemed to have been injured as such result of his employment as to entitle his dependent relatives to an allowance under the Connecticut Compensation Act. (Cunningham vs. Donovan, 105 Atlantic Reporter, 622.)

DUTY TO MAINTAIN SAFE APPLIANCES FOR MINE EMPLOYEES—Supporting plaintiff's right to recover damages for injuries sustained because of defects in a mine car on which he was riding, the West Virginia Supreme Court of Appeals decided in the recent case of Long vs. Pocahontas Consolidated Collieries Co., 98 Southeastern Reporter, 289, that an employer is bound to use reasonable care to provide his workers with reasonably safe machinery and implements with which to discharge their duties. Unless the defect occurs in the use of the particular instrumentality by the employee and is slight and easily remedied by the employee, the employer will be liable for injuries sustained because of the defect, unless it clearly appears that the defect was open and apparent and that the servant, by the reasonable use of his faculties, should have discovered the defect in time to have avoided the accident.

New Apparatus and Equipment

Master Controller for Use with Automatic Magnetically Operated Controllers

The accompanying illustration shows a new multi-speed full reverse master controller for use with automatic magnetically operated controllers. This master is smaller than previous designs and is especially applicable to machines where the operator's attention should not be diverted from the work or machine, and where space is limited. An internal gear drive, which is entirely inclosed but which is readily accessible by the removal of four screws, eliminates the liability of accident to operators through the catching of fingers or clothing in the bevel gears usually employed in straight line drive controllers.



THE NEW CONTROLLER

This master controller may be mounted horizontally or vertically, the former permitting straight line movement of the handle and the latter a radial movement. A centering latch operated by a button in the handle indicates to the touch the "off" position of the master, while a strong notching spring is used to indicate the five positions in either direction. A maximum of 12 fingers may be mounted on the finger board, using six in each direction of rotation.

The new controller, although small and compact, is so designed that by the removal of two bolts the entire finger board may be taken from the frame, while the removal of three bolts allows the entire shaft and contact fingers to be withdrawn. Inspection, renewals and repairs are therefore easily effected. The construction of the finger board and drum follows the Cutler-Hammer standard, in that the fingers and segments are clamped to square insulated steel shafts, and adjacent contact points are separated from each other by arc barriers. This master controller is a new development of the engineering department of the Cutler-Hammer Manufacturing Co. of Milwaukee.

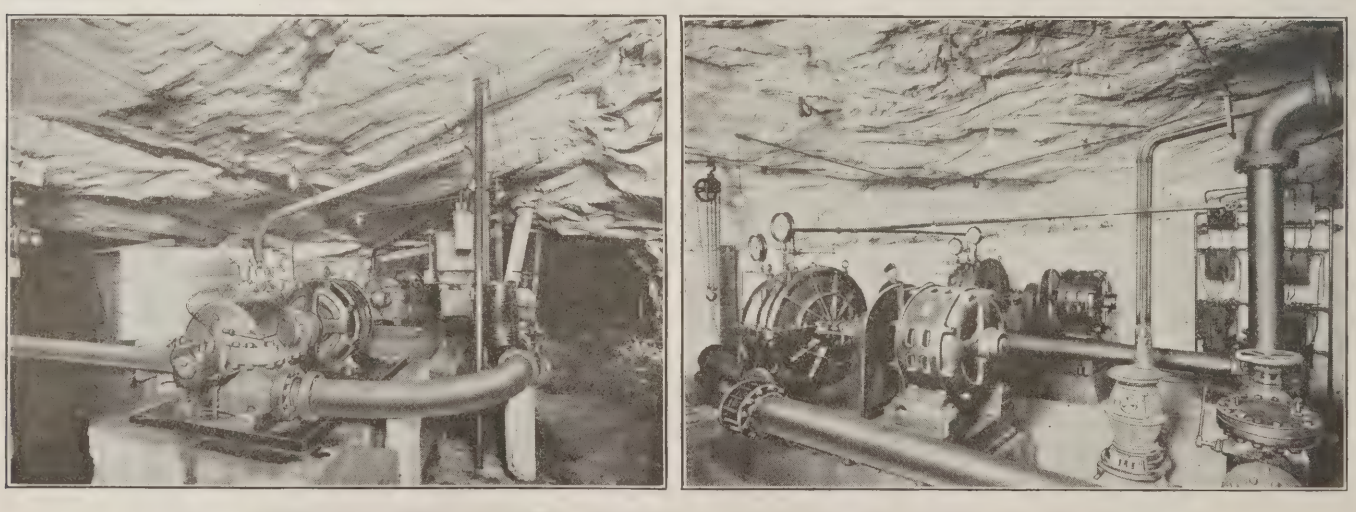
Economical Electrical Equipment for Mine Pump Service

The most essential requirements of mine-pump motors are that they run continuously and take as little power as possible. These needs are met by a complete line of Westinghouse motors and control built for all sizes and commercial circuits, either alternating or direct current. In addition to these the advantage of low first cost and maintenance expense, great compactness, flexibility and ease of control inherent with electric drive are obtained.

The simplicity and ruggedness of the type CS squirrel-cage motor especially adapts it to mine-pump service. It is built largely of steel and has nothing to wear except the bearings, which are large, well lubricated, and require but little attention. These motors may be started at the motor or at a distance. When started at the motor those smaller than 7½ hp. use a simple fused knife switch, while the larger ones require hand-operated auto-starters. When started from a distance an automatic starter is employed, of the resistor or auto-transformer type. This gives thorough protection and operates at high efficiency at both speeds. Only a simple double-throw switch is required to change from one speed to the other.

If the power source is limited, or a speed reduction is at times desired, the wound-rotor type CW motor with the same general mechanical characteristics as the type CS motor is furnished. With this motor also either hand-operated control at the motor or automatic control at a distance may be used.

Many mines have only direct current available, and for these type SK motors having the same simple,



TYPICAL UNDERGROUND ELECTRICALLY OPERATED PUMP STATIONS

strong and reliable construction, steel frame and rugged bearings are used. These motors are built self-starting as large as 20 hp., so that they may be thrown directly on the line from any desired point. For pumping from a sump, a float switch in connection with an automatic controller will start and stop the motor at the desired limits.

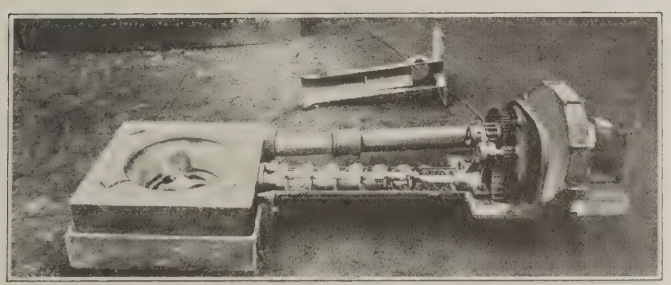
An especially handy outfit and an efficient arrangement of pumping equipment is obtained by mounting a motor-driven pump on a truck or mine car. This will enable quick transportation of the pump to any necessary location.

Westinghouse motors for mine pumps of either alternating or direct-current type are mechanically and electrically designed so as to give continuous, dependable and efficient service with little attention over long periods of constant operation. Where necessary additional protection may be added by inclosing the motors or supplying especially treated insulation to protect them from grit or dampness.

Small Electrically Driven Automatic Underfeed Stoker

The utility and scientific correctness of feeding bituminous coal to a fire from below is well recognized. The convenience and efficiency of the automatic stoker are also well known. Heretofore apparatus for mechanically stoking boiler or other furnaces has been built only in comparatively large units. These were far and away above the requirements of the small apartment house or large residence.

The American Smokeless Burner Co., of Seattle, Wash., has developed a type of automatic underfeed



SMALL AUTOMATIC UNDERFEED STOKER

stoker that may be constructed in small sizes. This device, which is electrically driven and automatic in operation, is made in five sizes giving a range in fuel feeding of from 2 to 800 lb. of coal per hour. It will thus be seen that the smaller sizes of this machine might be used for house or apartment heating.

The accompanying illustration shows one of these stokers set up in the open and the cover removed from some of the machinery. Coal is fed from a hopper or bin to the screw conveyor that forces it into the firepot at its extremity. Here blast is supplied by a fan and a revolving agitator in the center of the firepot forces the coal upward and breaks up any mass of coke that may tend to form. A single motor drives both fan and stoker proper.

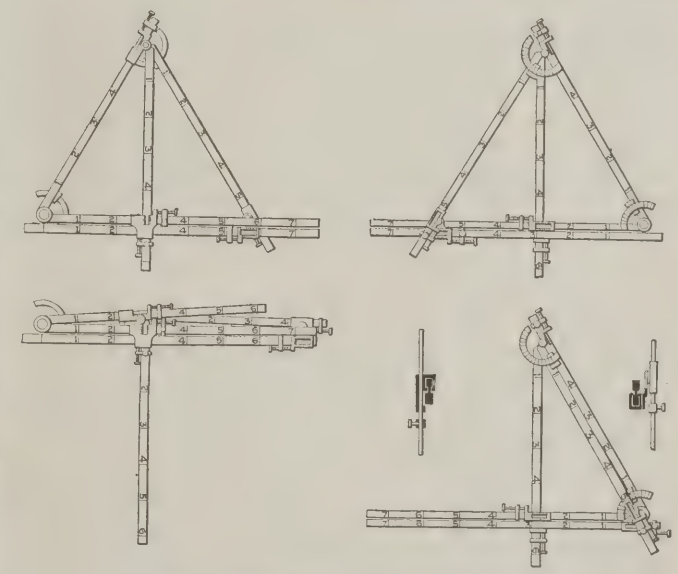
With a device of this kind feeding coal from below and supplying draft under pressure at the proper height, also with the fuel sufficiently agitated to prevent the formation of a bed of coke, combustion cannot well be other than perfect, or nearly so, and smokeless chimneys from furnaces where these stokers have been employed have been under observation for long periods and failed to show smoke except when the operation of the stoker has been interfered with. Furthermore, combustion is complete.

This stoker, of course, may be used for steam power generation but possibly lends itself quite as readily to hot water and steam heating plants where heretofore hand firing has been all but universal. In it several different kinds and sizes of coal have been successfully burned smokelessly. Any coal to be handled by it must be crushed to suitable size to pass readily through the conveyor. It is therefore particularly adapted to slack and nut—ordinarily not used for domestic purposes.

Trigonometer Solves Mathematical Problems Without Computations

The accompanying illustration shows a mathematical instrument known as a "trigonometer," designed to solve various mathematical problems without computations. It is particularly useful to the surveyor, or to others frequently confronted with the solution of triangles or the making of other trigonometric computations.

As may be seen, the instrument consists of four graduated bars joined together by one fixed and one movable



FOUR VIEWS OF THE TRIGONOMETER

protractor, one right angle slide and one varying angle slide. Thus the three sides, the three interior angles and the altitude of any triangle may be quickly found if sufficient data are available to solve the triangle mathematically. Suppose, for instance, the length of two sides and the included angle are known. The angle may be set on the fixed protractor while the length of the two sides may be scaled off on the bars joined by this protractor. The third bar then represents both in length and direction the third side of the triangle in question, while the fourth bar gives its altitude. In a similar manner the triangle may be solved if the magnitude of one side and two angles are known.

This instrument is the invention of Edward L. Renstrom, of Carbondale, Colo., and is covered by U. S. Patents, Nos. 1,149,085 and 1,268,620.

Coal-Mine Accidents by Nationality

The following table is published by the United States Bureau of Mines in its January Statement of Coal-Mine Fatalities in the United States. The remarks of the bureau regarding the table cannot be bettered and so are here reproduced:

COAL-MINE ACCIDENTS IN PENNSYLVANIA AND WEST VIRGINIA IN 1915 AND 1916, BY NATIONALITY OF VICTIMS (a)

Nationality	Pennsylvania (anthracite)								Pennsylvania (bituminous)								West Virginia							
			Killed			Injured					Killed			Injured					Killed			Injured		
	Men Employed (2 Years)	Per Cent. of Total	Number	Per Cent. of Total	Per 1,000 Employed	Number	Per Cent. of Total	Per 1,000 Employed	Men Employed (2 Years)	Per Cent. of Total	Number	Per Cent. of Total	Per 1,000 Employed	Number	Per Cent. of Total	Per 1,000 Employed	Men Employed (2 Years)	Per Cent. of Total	Number	Per Cent. of Total	Per 1,000 Employed	Number	Per Cent. of Total	Per 1,000 Employed
American: White	116,730	34.98	245	21.25	2.10	783	31.26	6.71	102,532	29.28	193	21.98	1.88	818	26.21	7.98	78,966	48.93	313	36.65	3.96	1,234	43.99	15.63
Negro	(b)								(b)								26,895	16.66	118	13.82	4.39	391	13.94	14.54
English	7,468	2.24	30	2.60	4.02	46	1.84	6.16	7,949	2.27	19	2.16	2.39	60	1.92	7.55	926	0.57	14	1.64		25	0.89	
Irish	10,410	3.12	29	2.51	2.79	64	2.55	6.15	4,451	1.27	13	1.48	2.92	39	1.25	8.76	671	0.42	4	0.47		5	0.18	
Scotch	1,121	0.33	4	0.35	3.57	2	0.08	1.78	4,391	1.26	10	1.14	2.28	49	1.57	11.16	450	0.28	5	0.58		2	0.07	
Welsh	8,263	2.48	25	2.17	3.03	75	2.99	9.08	1,803	0.51	5	0.57	2.77	13	0.42	7.21	106	0.07	1	0.12		3	0.11	
Total	143,992	43.15	333	28.88	2.31	970	38.72	6.74	121,126	34.59	240	27.33	1.98	979	31.37	8.08	108,014	66.93	455	53.28	4.21	1,660	59.18	15.37
Austrian	19,342	5.80	69	5.98	3.57	114	4.55	5.89	21,775	6.22	86	9.80	3.95	278	8.91	12.77	3,642	2.26	40	4.68	10.98	122	4.35	33.50
Belgian									1,770	0.51	2	0.23	1.13	23	0.74	12.99	114	0.07	1	0.12		2	0.07	
Bohemian									1,035	0.30	2	0.23	1.93	7	0.22	6.76	65	0.04	4	0.47		2	0.07	
Bulgarian																	202	0.13	2	0.23		1	0.04	
Croatian	173	0.05							2,142	0.61	4	0.46	1.87	7	0.22	3.27	638	0.40				6	0.21	
French									1,531	0.44	5	0.57	3.27	14	0.45	9.14	77	0.05	1	0.12		3	0.11	
German	5,637	1.69	24	2.08	4.26	32	1.28	5.68	7,592	2.17	15	1.71	1.98	60	1.92	7.90	976	0.60	3	0.35		33	1.18	
Finnish									414	0.12	1	0.11		5	0.16									
Granish									862	0.25	2	0.23		14	0.45		345	0.21	4	0.47		1	0.04	
Greek	2,363	0.71	12	1.04	5.08	21	0.84	8.89	1,087	0.31	1	0.11	0.92	14	0.45	12.88	1,074	0.67	14	1.64	13.04	25	0.89	23.28
Horwat	791	0.24				2	0.08		7,430	2.12	15	1.71	2.02	33	1.06	4.44	788	0.49	4	0.47		8	0.29	
Hungarian	6,371	1.91	14	1.21	2.20	29	1.16	4.55	21,094	6.02	63	7.18	2.99	146	4.68	6.92	9,620	5.96	41	4.80	4.26	135	4.81	14.03
Italian	26,408	7.91	104	9.02	3.94	224	8.94	8.48	51,484	14.70	157	17.88	3.05	519	16.63	10.08	18,609	11.53	127	14.87	6.82	381	13.58	20.47
Lithuanian	26,733	8.01	127	11.02	4.75	247	9.86	9.24	4,794	1.37	19	2.16	3.96	71	2.27	14.81	921	0.57	6	0.70		32	1.14	
Litvitch																	460	0.28	2	0.23		8	0.29	
Montenegrin	48	0.01				1	0.04		242	0.07				2	0.07		279	0.17	1	0.12		4	0.14	
Polish	55,274	16.56	286	24.81	5.17	500	19.96	9.05	34,611	9.88	88	10.02	2.54	328	10.51	9.48	5,080	3.15	54	6.33	10.63	120	4.28	23.62
Roumanian									128	0.04	1	0.11		1	0.03		870	0.54	6	0.70		20	0.71	
Russian	22,285	6.68	102	8.85	4.58	170	6.79	7.63	14,694	4.20	41	4.67	2.79	114	3.65	7.76	4,025	2.49	51	5.97	12.67	138	4.92	34.29
Serbian									131	0.04	3	0.34		7	0.22		317	0.20	2	0.23		7	0.25	
Slavonian	22,042	6.61	76	6.59	3.45	167	6.66	7.58	51,344	14.66	125	14.24	2.43	463	14.83	9.02	3,508	2.17	22	2.58	6.27	71	2.53	20.24
Spanish																	591	0.37	8	0.94		9	0.32	
Swedish	570	0.17				9	0.36		3,444	0.98	6	0.69	1.74	31	0.99	9.00	33	0.02				4	0.14	
Syrian	149	0.04				4	0.16		277	0.08	1	0.11					213	0.13	2	0.23		5	0.18	
Turk									117	0.03							211	0.13				2	0.07	
Tyrolean	1,075	0.32	2	0.17	1.86	7	0.28	6.51	769	0.22				2	0.07									
Not segregated	451	0.14	4	0.35		8	0.32		240	0.07	1	0.11		3	0.10		714	0.44	4	0.47		6	0.21	
Total	189,712	56.85	820	71.12	4.32	1,535	61.28	8.09	229,007	65.41	638	72.67	2.79	2,142	68.63	9.35	53,372	33.07	399	46.72	7.48	1,145	40.82	21.45
Grand total	333,704	100.00	1,153	100.00	3.46	2,505	100.00	7.51	350,133	100.00	878	100.00	2.51	3,121	100.00	8.91	161,386	100.00	854	100.00	5.29	2,805	100.00	17.38

(a) Based upon official records for the years 1915 and 1916 as reported by the state departments of mines. (b) Not segregated, as only a few are employed.

Coal Production in Canada in 1918

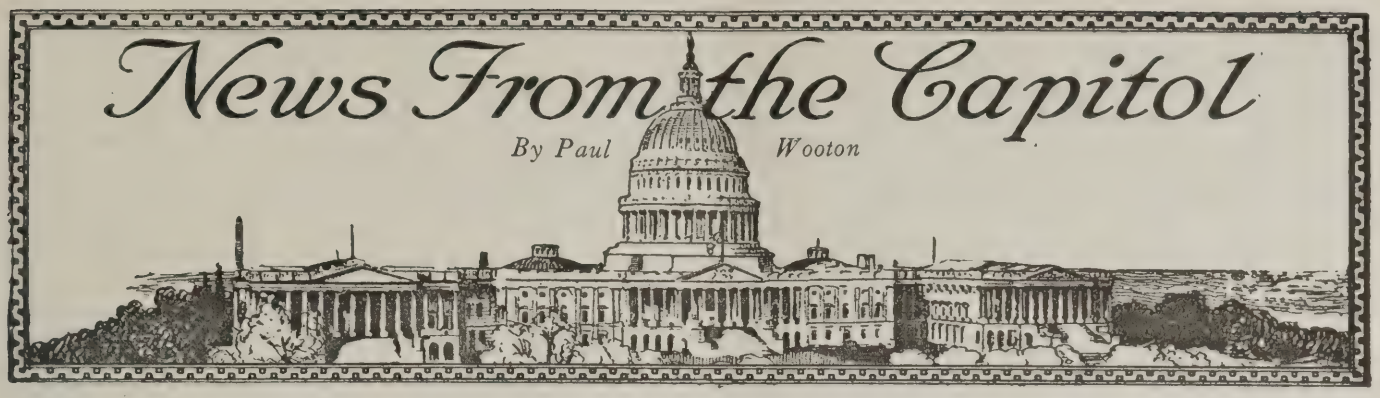
The preliminary report of John McLeish, chief of the Canadian Division of Mineral Resources and Statistics, of mineral production during 1918 gives the total production of marketable coal at 14,979,213 short tons, valued at $55,752,671, or an average of $3.72 per ton, being the largest on record with the exception of that of the year 1913. The production in 1917 was 14,046,759 tons, valued at $43,199,831. The total output including waste and unmarketable slack in 1918 was 15,405,958 tons, as against 14,435,361 tons in 1917. The production of 1918 included 115,405 tons of anthracite, all from one mine in Alberta; 11,532,592 tons of bituminous and 2,784,283 tons of lignite coal.

The increase in production has been obtained chiefly in Alberta, though there were also substantial increases in British Columbia and New Brunswick. The Nova Scotia production fell off 474,289 tons, or 7.5 per cent. as compared with 1917—New Brunswick increased by 78,651 tons, or 41.6 per cent.; Saskatchewan fell off 10,135 tons, or 2.85 per cent.; Alberta increased 1,205,496 tons, or 25.45 per cent.; and reached its highest production on record. British Columbia increased by 134,703 tons, or 5.53 per cent. The figures of the production by provinces are as follows in short tons—Nova Scotia, 6,327,091; New Brunswick, 189,095; Saskatchewan, 355,445; Alberta, 4,736,368; British Columbia, 2,433,888; Yukon Territory, 4872.

Exports of coal in 1918 were 1,817,195, tons, valued at $9,405,423, an average of $5.17 per ton, as against exports in 1917 of 1,733,156 tons, valued at $7,387,192, an average of $4.26 per ton. Total imports of coal of all classes were 21,678,587 tons valued at $71,650,584, as against imports in 1917 of 20,857,460 tons valued at $70,562,357. There was an increase in the import of bituminous coal, but a falling off in the import of anthracite. The estimated consumption of coal amounted to 34,840,605 tons as compared with a consumption of 33,123,735 tons in 1917.

The total output of oven coke during 1918 was 1,234,347 short tons made from 1,945,475 tons of coal, of which 1,348,232 tons were of domestic origin and 597,243 tons imported. In 1917 the total output was 1,231,865 tons of coke, made from 1,928,923 tons of coal. At the close of the year 1560 ovens were in operation, 1041 were idle, and 115 were building. Exports of coke were 29,612 tons, valued at $223,629, as against exports in 1917 of 23,595 tons, valued at $137,318. The imports of coke were 1,165,590 tons, valued at $8,975,445, as against imports in 1917 of 970,106 tons valued at $6,517,260. The estimated consumption of oven coke was 2,363,270 tons, as compared with 2,192,373 tons in 1917. Of the total output of coke 879,063 tons, or 71.2 per cent. was made in byproduct recovery ovens and the byproduct recovery included ammonium sulphate 10,525 tons and tar 7,697,435 gallons.

Lignite coal can be cheaply mined, and the mines are generally free from explosive and dangerous gases. As a rule sulphur is not found in objectionable quantities in this fuel. Once started, lignite burns well—one drawback being that it needs more attention than the average bituminous coal fire.



Government's Purchasing Policy Leads to Controversy

Other chapters are being written in the controversy between the Director General of Railroads and the Secretary of Commerce as to the Government's purchasing policy. The discussion of this subject is being followed with the keenest interest by practically every industry. This is testified to by thousands of letters on this subject which are pouring into every Bureau in direct touch with industry and augmenting the mail of every senator and member of the House of Representatives. While the coal and metal mining industries and the makers of steel are affected more than are most other industries, it is clear from the communications reaching the capital that every community in the country is interested in the proper exercise of buying power. Secretary Redfield, in his most recent expression on the matter, says:

The various transportation elements include a controlling purchasing power over our industries and through them over our labor and our producers of raw material. It would lie in their power to injure or even destroy not one but many industries simply by either refusing to buy or by delaying buying at a critical period or by insisting upon impossible prices, or impracticable terms. Most business men will, I think, agree that it might make relatively little difference to industry who administered the laws or even what the nature of those laws might be if power over the life and death of industry lay in the hands of a few men because of their ability to purchase or to refuse to purchase its output.

This power, which is not so much by purpose as by its very nature autocratic, would be peculiarly difficult to reach and control by law because it is impracticable to regulate by statute when or how buying must be done. Procedure can indeed be fixed. Publicity can be provided and competition secured in form. The danger suggested, however, comes not from paying excessive prices but from the reverse, from forcing by the pressure of enormous buying power prices, terms and conditions of such a character as substantially to put our industrial fabric into the hands of masters of almost imperial power. Let there be given any one of you ability substantially to control one-third or more of the coal purchases of the United States through your predominant power in buying fuel and that industry becomes plastic in your hands. Let there be placed in the hands of another of you the power to purchase from one-third to one-half or possibly more of the products of the steel industries or of certain portions thereof and that industry becomes your servant, to do substantially as you will. The same is true of other great industries like copper, the shipyards and the builders of machinery. It will, I am sure, become clear to your thought after reflecting upon the incidental creation through Government operation of a unified buying power that there would be established an economic force so mighty as to work its will with industry and labor and to make them its creatures. It is not assumed that there would be intent to do harm. The reverse is undoubtedly true. It may indeed be taken as certain that as in the past and present so in the future conscientious and careful men would do the work. Ruin, however, can well be wrought by want of thought, by absence of social vision, by incomplete knowledge, by partisanship—involving either a party or directed to a service or a person, by the sense of irresponsibility arising from possible brief tenure of office or by the loss of balance arising from the intoxication of power. Years are not required to cripple an industry. It can be done in months or even weeks. There seems to be involved, also, the principles of democracy in commerce as against autocracy, with all that both imply, and the deeper one's thought goes into the matter the more one questions whether there would not be created an empire within the state which, however free in form the state might be, would of necessity control it from inside.

Continuity of operation in industry is essential to effectiveness and low cost. From the human standpoint it is more important still. It is essential to continued employment and to regular earning power on the part of labor.

Director General Hines, in an "I-told-you-so" statement, analyzes the earnings of some of the steel makers and concludes that "grossly excessive profits" are being earned. As Mr. Hines' statement is certain to be the basis of a fiercer phase in this industrial controversy and provocative of efforts to enact remedial legislation, it is reproduced herewith in its entirety:

When the Industrial Board approved the prices proposed by the steel interests it became at once apparent to me and I so indicated in various discussions with representatives of the Government that that approval would encourage the steel interests to stand together on those prices even though governmental approval was withheld. I felt, however, that even so it would be far more in the public interest for the Government to withhold approval and if necessary pay such prices, for the time being, under protest rather than indorse the prices, and that too for the entire calendar year, as was proposed by the Industrial Board, and thereby given an official sanction to prices which were unreasonably high and which would merely serve as a starting point for still higher prices later on.

The result has been in exact accordance with this forecast. Six of the leading steel interests, in response to the Railroad Administration's request for bids for steel rail, have submitted bids which are uniform in all respects as to prices and conditions of manufacture and are in strict accordance with the prices proposed to and approved by the Industrial Board. In view of the immediate need for 200,000 tons of steel rails, orders have been placed at the price thus indicated (that is $47 per ton for open-hearth rail) for that quantity with the Carnegie Steel Co., the Illinois Steel Co. and the Tennessee Coal and Iron Co., all of which are subsidiaries of the United States Steel Corporation, and with the Colorado Fuel and Iron Co., the Bethlehem Steel Co. and the Lackawanna Steel Co. This action is taken not only without approval of the prices but for the reasons shown below with emphatic disapproval of the prices and the manner of their establishment.

That action of these six steel companies in making uniform bids was taken under the leadership of the United States Steel Corporation is clear from the fact that immediately after the Railroad Administration announced finally that it would not approve the prices fixed by the Industrial Board, Judge Gary for the Steel Corporation took the initiative in announcing publicly that the Steel Corporation was strictly maintaining the prices approved by the Industrial Board and that it seemed to him that would be the attitude of other manufacturers. The subsequent action of the Steel Corporation and the other manufacturers in submitting their bids has accorded completely with Judge Gary's announcement.

The Steel Corporation's annual report to its stockholders shows that after paying all wages and other operating and maintenance expenses and allowing most liberally for renewals and paying interest on debt of subsidiary companies and also taxes other than war taxes and excess profits taxes it had net earnings on all rolled steel products of $21.58 per ton in 1916, $35.73 per ton in 1917 and $33.53 in 1918. It is a remarkable fact that in the calendar years 1917 and 1918 the net earnings of the Steel Corporation aggregated approximately $1,000,000,000, being in excess of the annual rental which Congress has sanctioned as reasonable for practically the entire railroad mileage in the United States. It is true the Steel Corporation had to pay out of these net earnings heavy excess profits taxes to the Government, but even after paying these taxes, making liberal allowance for depreciation, and extraordinary replacement funds, and after paying interest on bonds and 7 per cent. on preferred stock, there remained an earning of 39.2 per cent. on its common stock in 1917 and of 22 per cent. on its common stock in 1918. The fact that excess profits taxes were paid out of the net earnings in 1917 and 1918 does not in any way detract from the accuracy of those net earnings as a measure of the productiveness of the war prices which were charged by the Steel Corporation.

Estimated Costs Show Wide Variation

These figures of actual net earnings per ton on the entire output of the Steel Corporation are much more convincing than estimated costs of rolling a particular steel product at a particular mill. The estimated costs may show the greatest variation, but the ultimate result is an enormous profit to the stockholders of the corporation. The claim that the wages of labor would be endangered by a reasonable price on steel is therefore not convincing.

Heavy profits are not confined to the Steel Corporation. It appears that the net earnings of the Lackawanna Steel Co. were $12.40 per ton in 1916, $24.81 in 1917 and $19.88 in 1918; of the Republic Iron and Steel were $13.88 per ton in 1916 and $25.92 in 1917, and its profits for 1918 are not yet available; of the Colorado Fuel and Iron Co. were $9.57 per ton in the year ending June 30, 1916, and $13.91 per ton in the year ending June 30, 1917. The Bethlehem Steel Co. furnished no reports that give any information as to the profits per ton. In considering all these profits it must be remembered that the reductions from war prices which were proposed by the steel interests and are now being adhered to by them as the greatest reductions they are willing to make are practically completely offset by the great fall in the price of scrap iron alone (which can be and is used largely as a substitute for pig iron in the manufacture of steel) without regard to the various other reductions in cost which are coming about as a result of readjustment to peace conditions.

A seventh steel company, the Midvale Steel and Ordnance Co., in response to the request of the Railroad Administration for bids, proposed prices $10 in excess of the prices proposed by the other six companies. It is interesting to note that the company which made this proposal showed on all its steel products net earnings in 1916 of $24.62 per ton, in 1917 of $44.23 per ton and in 1918 of $35.93 per ton. Its apparent position now is that it cannot afford to make any reduction in the price of steel rail without reducing the wages of labor.

It is important to remember that the present policy of the steel interests in adhering to high prices on the ground that the present high costs necessitate these prices is a policy that does not work both ways. It is a policy to keep prices from going higher as business increases and costs diminish. It will be remembered that the Industrial Board announced that the public could not expect prices to be lower during this calendar year, but it gave the public no hope that they would not go higher. The resumption of business in the country will probably result in the substantial diminution in the cost of steel production, but unless the attention of the public is constantly centered on the situation there is danger that the steel interests will take advantage of the increased demand to increase the prices of steel still further, even in the face of declining costs.

The situation in the steel industry is of greatest moment to the American public. The United States Steel Corporation is the largest producer and controls approximately 50 per cent. of the output. It takes the lead in maintaining a price, which, if its reports to stockholders are reliable, indicates a grossly excessive profit, and it does this for the avowed purpose of protecting alleged high cost producers which, however, so far as they make detailed reports on the subject to their stockholders, also indicate large profits. In other words the Steel Corporation appears to take the position that for the protection of other prosperous steel producers it is unwilling to initiate any competition in the steel industry and naturally these other producers are glad to follow this lead, and incidentally this position enables it to continue the enjoyment of very high profits. This condition operates to suspend the law of supply and demand when it could work in favor of the consumer, but it leaves that law free to operate with the greatest effect when it can work in favor of the manufacturer. This situation also works to deprive the public of the benefits of the increased efficiency due to the great combinations in the steel business. Those combinations are the result of public acquiescence and yet all the benefits of them go not to the public but to the private owners. The more powerful the combinations become the more successful they are in keeping up prices.

These reasons lead me to reiterate that the prices in question are unreasonably high at present and will become progressively more unreasonable as business improves and conditions become more nearly normal.

Soldiers Realizing Opportunities

One of the difficulties the Federal Board for Vocational Education has encountered in its work of reëducation is that of convincing disabled men of the generous aid offered by the Government: That all expenses of retraining are paid and in addition the needs of wife and children supplied; that this is not considered a loan, but the payment of a just debt, and that their only obligation is to make good and useful citizens of themselves, seems too good to be true. But when the disabled soldier realizes that he is the beneficiary—not of public charity, but of national gratitude, he accepts the proffered offer of retraining with good grace.

Already there have been 81,741 men to register with the board, the vocational advisors have made contacts with 52,367 of these and 2079 have started their training under the guidance of the Federal Board for Vocational Education.

Of the 4376 cases approved for training by the Federal Board for Vocational Education over 1200 have been approved for trade and industrial training, 846 for agricultural, more than 1200 for commercial and business courses, about 850 for professional courses. Three hundred and ninety-two are taking academic training and 99 are studying in some special course.

All the Fuel Administration's regulations and orders pertaining to petroleum and petroleum products were vacated effective May 15.

Interior Department Exposition Arouses Considerable Interest

Wide attention has been attracted by the exposition being conducted by the Interior Department. The extensive lobby of the new Interior Building is being used for the exposition. If the present rate of attendance continues, it is believed that no less than 100,000 persons will have visited the exhibit.

One of the most striking features of the Bureau of Mines' portion of the exhibit is the display of all stages in the handling of metals and other minerals from the crude raw material to the finished product. Copper, nickel, tin, lead, antimony, zinc, potash, sulphur, mica, abrasives and other minerals are thus shown.

Gas masks, oxygen breathing apparatus, dust and fume respirators, as well as a complete display of the absorbents used in protection against gases, are on display. The explosives exhibit is one of the most complete ever shown, as is the display of types of mine safety lamps. A section of the Bureau of Mines exhibit shows how coal analyses are made and how fuel inspection is conducted.

Certain Essentials Necessary to Effect Fuel and Operating Economy

At the recent meeting in Chicgo of the International Railway Fuel Association, Eugene McAuliffe presented a paper on "Certain Essentials." While this was intended chiefly for railroad men, it nevertheless contained certain points of considerable interest to coal producers. Mr. McAuliffe spoke in part as follows:

"A year ago the Fuel Conservation Section of the American Railroad Administration was launched. The meeting held in Chicago in May, 1918, was really a revival with patriotism the dominating keynote. Many in attendance who were previously passive toward fuel economy pledged themselves to effort, and much has been accomplished in the year just passed.

"My caption, 'Certain Essentials,' signifies certain compelling features, which if attended to will accomplish more in one year toward effecting fuel and operating economies than has been accomplished in the past five years. Briefly, the outstanding essentials of the railway fuel problem, as I see them, are:

"*Clean Coal*—Buy clean coal, get clean coal. There is not a coal contract in existence that does not suppose the delivery of the cleanest fuel that the particular mine from which the purchase is made is capable of producing. Do not ask from the coal producer the impossible, but insist on the possible. Tests have proved that with coal containing 12.5 per cent. of ash taken as 100 per cent. the relative efficiency falls as the ash increases until coal with 40 per cent. of ash marks a total lack of efficiency.

"At the mine face, or on the tipple, is the place to clean coal. The removable non-combustible matter can be separated cheaper there than in the locomotive firebox. Cleaning coal of excessive rock, slate, shale and sulphur is a 'delousing' process. Let the producer do the cleaning; such is a proper item in the cost of production. I have found on a majority of roads an insufficient and frequently untrained inspection force. I find that the roads which most need an inspection force are most lacking one. Good inspection supposes many things, including contract, quality, weights, clean equipment and the proper class of equipment. Ninety-nine per cent. of the coal operators, all that are worth considering, will appreciate the help that an intelligent inspection force can give them."

Distorted valve motions, air leaks in locomotive front ends, distorted draft apparatus, clogged flues, grates and ash pans, the superheater, back pressure losses, and the old type of locomotive were then discussed, the speaker closing his remarks as follows:

"In conclusion, I wish to suggest the absolute importance of bringing every locomotive now in service, or that will be required for service, up to the maximum standard of efficiency. I have been told that the work of applying superheaters and brick arches under order, and in some cases, in stock, has been held up on certain roads because of insufficient funds. This is unfortunate, and I trust such a condition will be quickly remedied."

Expect That Poor Transportation Facilities Will Hamper Coal Output

Without in any wise being critical of the Railroad Administration, National Coal Association officials state that they fear that railroad transportation deficiency will interfere seriously with supplying the increasing volume of coal which must be produced during the latter half of the year. It is well known that only such repairs have been made to coal-carrying equipment as will keep it in running order. Thousands of cars have stood for six months without attention. In many instances motive power conditions are little better than are those of cars. Already car shortages are popping up here and there despite the large number of stored cars. It is believed that a considerable percentage of the stored cars can not be moved until repairs have been made.

Rumor of Government Control of Coal Believed to Be Unfounded

Reports in the daily press that the President expects to urge some form of Government control for the coal industry are believed in Washington to be unfounded. It is probable that they have their foundation in the fact that Secretary Lane has been asked to look around for the personnel of the commissions provided in the Garfield plan, which was the subject of a referendum taken by the National Coal Association.

Dr. Garfield says that President Wilson, after careful consideration of the plan, instructed Secretary Baker, while the latter was in Paris, to advise Secretary Lane to proceed with the formation of the commissions which are a necessary part of the plan. President Wilson said that these commissions, immediately after organizing, should begin the necessary studies relating to coal and all other raw material industries.

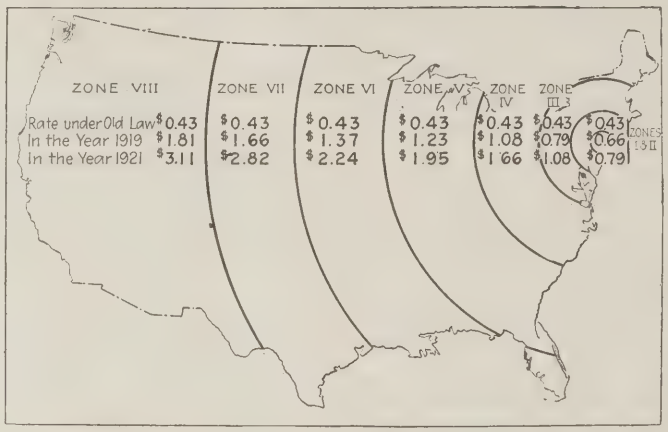
The Railroad Administration has issued a circular dealing with the storage of coal. Suggestions are made covering the proper method of storing to keep the cost of storage at the minimum and to reduce the hazard of spontaneous combustion. As it is estimated that the cost of transporting coal during the summer season is 60 per cent. of the cost of such movement during the period of extreme winter weather, employees are instructed to take those facts into account.

EDITORIALS

Government Tax on Western Readers

ON AND after July 1, 1919, subscribers of *Coal Age* residing in the western portion of the country must pay a substantial national tax for the sole privilege of living west of the Mississippi River.

On July 1, 1918, a benighted United States Congress enacted what amounted to a 17 million dollar bonus on ignorance. It decided that there should be no distinction so far as the mails were concerned between information and plug tobacco or other merchandise. It accordingly sectionalized the country and established a zone system in second-class postage, under which all newspapers and periodicals are carried. Nine-tenths of the literature perused by those who read or study technical subjects, so as to improve themselves and their industries, is carried under this classification.



The War Congress carefully divided the sheep from the goats—the distinction depending entirely upon geographical location. It separated the reading public of America into eight different classes. It decided that the people living in the eastern zones, where the nation's publishing is chiefly done, might secure their favorite periodical at comparatively small expense while those more remote should be progressively penalized until the point is reached where it becomes prohibitive to read anything except the local paper containing the latest town gossip. One concession (resembling the procedure of the boy, who, wanting to remove his puppy dog's tail without causing severe pain to the animal, amputated the member in small increments) was granted by these law-makers. They agreed to apply the thumbscrews gradually, the maximum pressure being attained in 1921.

Under the old law, or that in effect in 1917, it cost a flat 1c. per pound to mail *Coal Age* anywhere in the United States, or 43c. for the 52 issues of the year. Reference to the accompanying map will show present conditions and those that will exist two years hence. Even now the yearly postage alone on *Coal Age* mailed to the territory including and west of the Rocky Mountains is considerably over half the subscription price of the paper. The exorbitant postal charges established by this system actually erect a formidable barrier around each zone, effectively prohibiting the interchange of intelligence or information with the world outside.

This tax on intellect, this bonus on ignorance, since it was embodied in the War Revenue Bill we at first regarded as being purely a *war* measure. In company with other publishers and readers of publications we could not force ourselves to believe that it would be seriously considered after the stress of war had passed. And rather than impose upon our readers what we considered was a purely temporary burden, we shouldered it all ourselves, hopefully awaiting the repeal of this pernicious enactment.

We now learn that it is proposed to perpetuate this blunder, this monumental example of out-and-out class legislation.

It will be immediately apparent that although we have thus far carried the entire burden of increased postage no publisher can long continue to bear such an increased tax unaided. Therefore, beginning with July 1, those of our readers who reside west of the Mississippi River must add 50c. to their yearly subscriptions to defray in part the extra mailing charges. As will be seen, we are even then breaking much better than 50-50 with our western readers.

It is with deep surprise, mingled with no small amount of shame, that we learn that in this age of public schools and compulsory education men can be found (not to say be elected to posts of high responsibility and honor) who are willing to sectionalize the country, discriminate against the man who through force of circumstances must secure his "learning" through home study and hard knocks, and compel the ambitions miner or mine official to pay through the medium of zone postage on his favorite technical journal for such things as the free distribution of seeds to the farmer or backyard gardener by artful, politic, self-promoting politicians.

If you believe that the present zone system of postage is just, equitable, right and tending to promote the best interests of the coal industry, your community, your state and the country in general, you will "lie low and keep quiet." If, on the other hand, you believe it is none of these things, you will do exactly the opposite and demand from your duly constituted representatives in both houses of congress its prompt repeal.

A principal business for every man—coal man or other—is the nation's business. Industry needs to be speeded in slack periods, or the coal operator will not be prosperous nor the miner prosperous or contented.

The Reclamation Service is still running a mine at Williston, N. D. From state reports, we gather it is now leaving 42 in. of coal in the roof instead of 24 in. Yet we can still remember the time when government ownership was declared to be a complete solution for fuel waste.

Twenty-One Tons per Man-Shift

IN 1918 the average production per inside man in the anthracite region was 974 tons and in the bituminous region 1296 tons. The war made the figures large, and it is interesting to compare them with those showing the output in metal mines during the war period.

In this connection it may be noted that an extremely interesting figure was recently published by the Inspiration Consolidated Copper Mining Co. to the effect that the average production per mine worker at its shaft, which is located at Miami, Ariz., was 21 tons per man-shift. That, per year of 300 days, would mean 6300 tons per man. The ore is easy to mine, gravity delivers the material to the gangway chutes, and pulverization of the product is in its favor; but the figure shows how much more is being handled per man in some metal mines, even though in them payment by the day is the practice.

Anthracite must not be blown to pieces, and it doubtless takes more explosive to displace. The ventilation of the mines has to be speedy and positive. In the Inspiration mines, however, with its sulphide ores which are all the time oxidizing, the heat generated is considerable, and good ventilation is quite necessary.

What are the differences making for higher costs in the anthracite region? There are two main reasons: The methods of mining are different and the men in the metal mine do not mine by the ton. The Inspiration company, which pays by the day, uses methods made reasonable by reason of the use of day labor, so possibly there is only one real reason for the difference in cost, and that a difference in the method of payment.

An inquiry into the metal-mining costs and methods of Arizona would be well worth while. Some time ago an anthracite engineer made a trip of investigation. The report he made has never been given publication. All that has appeared has been something quite learned about the geology of the porphyries. The larger matter of interest was not treated, though it would be the main consideration to the coal-mining public.

Lest the point of this editorial be lost, we quote the actual words of Cornelius F. Kelley, president of the Inspiration Consolidated Copper Co., page 3 of the report of the year ending Dec. 31, 1918: "The average output of ore per man-shift for all the labor chargeable to the mining department was 21.5 tons." The comparison, we have just indicated, is at least interesting even if it be held to be not quite fair to the anthracite region.

Defeatism in National Business

THERE is a school of thought that is disposed to transfer Newton's law of motion, that "action and reaction are equal and opposite," into the domain of economic law. As the pedants of that school interpret its teachings: High wages are followed by low wages and high prices by low prices. The truth is that there is no evidence of any such law unless it is proved by the multitude of its exceptions.

Wages and prices have almost continuously risen for centuries. If action and reaction had been equal and opposite, there would have been no rise but a fluctuation between two limits. Instead, prices and wages have been lifted repeatedly and immensely, and have rarely been lowered in anything like equal proportion. It is true that some commodities, subject to the quickening hand of invention, and others, the value of which is determined largely by transportation costs, had risen but little in price, or even fallen, just prior to the war; but the law of action and reaction had nothing to do with this condition.

There is no sign of action and reaction in the quantity of currency, in the population or its consumption, in the amount of wealth or bank deposits. All these items have increased almost steadily from generation to generation. Nor is there any sign of rhythmic fluctuation back and forth about a given average in the currency per capita, the consumption per capita, the wealth per capita or the bank deposits per capita.

A doctrine like that propounded is a most distressing form of antisocial propaganda. It fosters a feverish fear of decreasing prices just when business needs a restoration of its faith. It is defeatism in business. It says in effect that it is useless to resist the inevitable reaction, that the times are earmarked for a depression. That lowering in wages and prices, that business collapses must come about by reason of laws beyond our human powers. Such fatalism is a danger to our body politic and a heresy that needs stamping out.

Overproduction may be followed by underproduction. But who will say that we have built too many houses, constructed too many railroads, equipped them with too many locomotives and cars, rerailed and retied the railroads with too great vigor, bought ourselves too many suits of clothes, dredged too many harbors or built too many roads. Why! we have been avoiding all these things for months, almost years, during the duration of the war. Never was there a time when we so curbed our desires.

There is no reason in a despicable defeatism of this kind that keeps us from a prosperous activity. It is not merely a psychological condition that we face but a false reasoning. If we will but shake ourselves, we can have done with the lethal dream.

They Have Gained Ground; but From Whom?

BEFORE the war, coal companies lost money or made negligible profits. Wages to mine workers were much lower than today. All increases of wage, therefore, must have come out of the consumer, who is either a manufacturer producing for sale to workingmen or is a workingman himself. It is idle to contend that combinations to increase wages are not combinations against the consumer and of one laboring man against another. This does not necessarily condemn such combinations, but it is a pretense for anyone to declare that they are in the interest of labor as a whole.

Such a combination is for the advantage of the group which organizes the combination, and justifiable only if used to defend a right and not as a means of attaining an advantage over other groups. The six-hour day, for instance, as a permanent institution should not be granted to one group while denied to another, or one group will serve the public six hours while the public is serving the first group eight hours.

It is true that there are employments where long hours are justified. There should not be too great a restriction as to the number of hours spent by a man asleep in a cabin, stretched out in a caboose, watching a lantern or nursing a danger flag. Like should be compared with like. The mine worker is justified in the

eight-hour day, and he should not seek to shorten it till it is reduced in other similar industries. He knows by this time who is his real paymaster—the public—and knowing it, he will not hide the fact from his eyes that he must not seek too high a wage or work too short a day. If justice is to be appeased, all men must throw an equal weight into the scale of production.

Unions are for defense just as are armies. They should not be used for offense. They are to establish justice, not to impose a yoke. They are to set an example, not to violate principles. Owing to labor-union action, there is a large section of the workingmen of the country who have been dispossessed of their former wages. They have not had wage increases proportionate to increased living costs; for this they blame the unions. The unions reply, "It is your own fault; you should have had a union yourself." The reply resembles one Germany might be supposed to have made to Belgium: "It is your own fault, Belgium, you should have had a strong enough army to repel our invasion."

These are unpleasant truths, and it is only fair to state that there is an immense amount of admirable idealism in the union. The average union man believes he is a pathfinder, leading not only the union but the non-union men also to a bettered condition of life. As a matter of fact, it is questionable whether by depressing output and by causing strikes he has not decreased production and so lowered the amount of distributable wealth. Many an admirably intentioned person has done harm rather than good. It is permissible to wonder whether the union man is not one of these, and whether his claims for having caused a beneficial reconstruction of the affairs of mankind are justified.

He sees his own lot bettered and says that it is a happy world and that he is setting a good example, when really some other body of workmen, less unionized, less large, or whose work is less vital, is ground to the wall by the collective action of the better unionized, more numerous and more vitally important operatives to whose collective action the public is obliged to bow. These organized men may not be supermen, but they nevertheless lay down the law to a sometimes too complaisant world.

Why leave the business of the country to politicians? The policies of the country should be directed by the productive elements of the Nation—by labor and capital—and not by those who arrange to fatten off both.

Bolshevism and Some Other "Isms"

EVER since the Russian débâcle the world has heard much of certain false principles then termed, for the first time, bolshevism. To the majority of us it is difficult to distinguish between socialism, communism, bolshevism and plain anarchism. All of these "isms" appear to shade into each other about as do the prismatic colors of the rainbow. Each nevertheless has certain points or phases wherein it resembles one or more of the others and each, it would seem, arises from a common selfishness.

We in America have long prided ourselves that John Jones had exactly the same rights and privileges and was held in exactly the same curb by the law of the land as was Sam Smith or Rob Robinson—in the body politic John Doe was just as good as and no better than Richard Roe. The social and economic system under which we dwell is similar and comparable to our principles of government. One man's money is exactly as good as another's; rewards for industry are measured solely by accomplishment, and each individual has as nearly an equal chance to better his condition as it is possible for human effort and organization to guarantee. The fair chance and the square deal for all are the two great objects sought. No power of man ever has made, or ever will make, any two individuals of the human or any other species exactly equal in strength, intelligence or ability. Nature does not deal in duplicates. The fact that one individual is stronger or keener than another is the result of nature or circumstances or both and is not chargeable to either the social system or the method of government.

Few will deny that our present form of government and economic state are the best that man has yet developed. They are probably the result of at least 10,000 years of experience in industry and the art of living. Despite all of this, however, the followers of, adherents to, or believers in, any or all of the above-mentioned isms inform us that the existing order of things is fundamentally wrong. They assure us that each individual should be rewarded for his effort, not according to the magnitude and efficiency of that effort, but according to the needs of the individual, regardless of the service, if any, rendered mankind.

To the disinterested onlooker this hue and cry appears much like the "kicking" of a "poor sport," like the groundless protest of a contestant in some athletic event who loses because he is too lazy to exert himself as energetically as his opponent.

Acquisitiveness is a universal trait. It is at once the common source of all wealth as we know it under our present social system and the mainspring that impels the "ismites" in espousing their pet theories. The adherents of socialism, communism, bolshevism, anarchism, or what not, want what they haven't got. They "want it bad" but not bad enough to work for it honestly as the man who now possesses it had to work for it. They proceed on the idea that the world owes them a living whether they earn it or not. They forget that in the very dawn of man's existence the stern edict went forth: "In the sweat of your brow shall ye eat bread." From that day to this no individual, family, tribe or nation has been able for long to avoid or escape this command and the perspiration mentioned—and as a general rule the more copious the sweat, the more abundant the bread.

America need have little fear from bolshevism. It is not indigenous or adapted to American soil. The early colonists in Virginia, once upon a time, tried a communistic experiment. Those who survived were well satisfied to go back to a more individualistic system of existence—the only system since the world began that has assured enough and to spare for those who were sufficiently industrious to put forth reasonable effort.

The people of the United States in the recent bomb outrage are getting a practical demonstration of the means and methods employed by the radical soreheads. It makes little difference by what name we call these extremists—we may judge of their motives by their deeds. Evidently they seek to rule without first having learned to respect and obey existing law.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Operators who are losing their men to Europe in great numbers will be keenly interested in a bill presented on May 19 in the House of Representatives by Mr. Lufkin. (House Bill 61.) Mr. Lufkin would prohibit immigration for a period of four years. Certain exceptions, however, are made—"Government officials, their families, attendants, servants and employees, ministers or religious teachers, missionaries, lawyers, teachers, students, authors, chemists, civil engineers, artists, physicians, and travelers for pleasure, business or curiosity, or their legal wives or their children under 16 years of age who shall accompany them or subsequently apply for admission with the purpose of joining them."

This bill practically excludes all those who would be likely to join the ranks of mine labor and practically admits all those who might possibly stir up trouble. Alien lawyers, teachers, students and authors are often extremely undesirable citizens, whose sole aim in life is to set their fellows by the ears and create dissatisfaction. It seems almost impossible to comprehend why we should admit the lawyers of foreign lands. The thought presses on us that the act will strain out the workers and let through all the trouble makers and labor exploiters. It is well known that much of the dissatisfaction of aliens with American conditions is due to ill treatment of labor by educated sharks of their own nationality whom the laws only inadequately restrain.

Another clause admits otherwise inadmissible aliens "who shall prove to the satisfaction of the proper immigration officer or the Secretary of Labor that they are seeking admission to the United States solely to avoid religious persecution in the country of their last permanent residence whether such persecution be evidenced by overt acts or by laws or government regulations that discriminate against the alien or the race to which he belongs because of his religious faith."

This exception has little effect on the mining industry for the religiously persecuted who arrive in the mining regions—to dig coal at least—are few. A few Doukabors, or spirit wrestlers, might possibly find their way to the mines, though they are farmers rather than mine workers. But it is possible that the Russians will no longer persecute them, now that the Russian state church is overthrown. The religious behavior of the Doukabors is most objectionable to us, and if they came here they would probably be more severely persecuted in our villages than in those of Russia where the moral law is not so closely enforced. In Canada they have been driven by droves into jail.

A few persecuted "Old Catholics," also from Russia, have come over in the past and found their way to the mines, and, while hard to deal with, they make good workmen, but they are extremely few in number. A few Serbians and Bulgarians may also be expected for there are many religious and ethnic quarrels and injustices where their populations overlap.

But these possibilities are interesting rather than important. The majority of those who are here and will come here as an outcome of religious persecution are found now and will be found hereafter in our big cities. The mining region will not draw labor strength from among them. After the war perhaps the dominant churches of the past may be persecuted by the adherents of no faith at all in a degree and manner recognizable by the Secretary of Labor, but this is hardly likely, and it seems therefore, as far as the mining region is concerned, that the act practically excludes all alien workmen. Before the war, under such an act as this Jews, Armenians and Syrians would have been practically America's only visitants, and they would all have flocked to the big cities. As Armenia and Syria will now be in the hands of friends, the Hebraic people will probably be the only would-be immigrants who will be admitted under the provisions of the Lufkin act, if the law is passed. From them the mining population will not receive any noticeable accretions. Perhaps it will be admissible to point out that it is no more excusable to persecute persons for their racial origin than to harry them for their religion, or for both their race and their faith, and if the gate is thrown open to the victims of ethnic persecution a somewhat larger number of aliens will be admitted.

There are exceptions in the act which permit skilled labor to enter as under the third section of the act of Feb. 5, 1917, and also providing for the admission of those who come under the joint resolution of Congress of Oct. 19, 1918, which authorizes the readmission of certain aliens who have been conscripted or have volunteered for service in the armies of the United States or cobelligerent forces.

This proposed enactment needs the careful attention of all employers. If it seeks to prevent the Bolsheviki from entering the country it may be well said that it seems hardly likely to effect that result. Only complete exclusion of all aliens, persecuted and unpersecuted alike, will do that. Such a drastic step Mr. Lufkin hesitates to take.

ILLINOIS MINERS NOT TO PAY DUES TILL SEPTEMBER

Illinois members of the United Mine Workers will not have to pay organization dues during June, July and August unless the local itself insists on the payments for its own fund.

Frank Farrington, president of the state organization, has so advised the 350 local unions in Illinois. It is expected that the action will reduce the burden of the high cost of living for 85,000 men while work is slack.

The notice says "if work does not improve during the three months named, the executive board will give consideration to the matter of extending the period, otherwise local unions must resume the payment of per capita tax and the 1 per cent. assessment to the district office for the month of September."

The first labor celebration held in Ziegler, Ill., since the historic miners' strike there 15 years ago, was held during the past week. The mine is now completely unionized. The particular occasion for the celebration was the inauguration of increased passenger service on the Illinois Central R.R. Addresses were made by President Frank Farrington of the Illinois Mine Workers and others. Ziegler is now a town of 3000 inhabitants and is growing rapidly. Joseph Leiter has just completed his $1,000,000 mine, which will employ 1400 men when fully developed. It is claimed to be the most modern colliery in the United States and is planned for a daily capacity of 8000 tons.

SOME PETTY ANTHRACITE STRIKES

Two brief strikes occurred in the Lehigh field during the week. The contract laborers in a section of Hazleton shaft colliery of the Lehigh Valley Coal Co. went out and returned three days later. The colliery was idle for nearly the whole week due to this cause and holidays. The steam shovel crews at Jeddo No. 4 colliery of the G. B. Markle Co. tied up that colliery for a day because back pay awarded by the "umpire" was not paid on the current pay-day. The matter was speedily adjusted and the colliery resumed work after a day's idleness.

Three late strikes in the Lehigh field have been brought about by the impatience of employees with the matter of the settlement of their grievances. Compared to the average county court, the board operated in a swift manner, and it seems pure folly to tie up a plant in order to hasten

a proceeding in which the union and the company are both factors and share in the tardiness of their board members.

Conditions and Unrest in Illinois

Riding to work in a high powered car is the latest fad among coal miners in the Connellsville region. The improved conditions among the laborers of the region were made possible by the wage scale which is yet in effect although overtime has been eliminated. Some days ago three Poles asked Superintendent Charles Opperman of Orient for a job. They got one as coal diggers. The next morning a graceful smooth running car valued at about $3000 rolled up to the pitmouth and the three poles got out, unloaded their tools from the rear of the machine, preparing for their day's work as if they had been accustomed to just such things all their lives.

A call has been sent out to 246 locals of District 11 to meet in the Pythian Temple in Terre Haute, Ind., July 8. This will be the 27th consecutive and the 4th annual convention of the district. More than 200 delegates are expected to attend. Officers of the International Mine Workers' Union have been invited to be present.

Mining conditions in the Carterville district, Williamson County, Ill., are reported to be dragging, most of the mines hardly averaging two days a week. The labor situation was slightly relieved recently when the "Burr" mine resumed operations after being closed down for some three months. Mines 3, 8 and 9 of the Madison Coal Co. near Marion are reported as working from three to five days per week.

One hundred miners working at the West Virginia Coal Co.'s mine at Murphysboro are out on strike since Saturday, May 24. The reason the men give for striking is because Superintendent John Henderson, of St. Louis, refused to give a bond for guaranteeing their wages and they state that Henderson has failed to meet President Farrington, of the Illinois miners, for the purpose of arranging a bond to guarantee their wages. The West Virginia company operates eight other mines besides the one at Murphysboro, two being at Marion, one at Coulterville, one at O'Fallon and four near Belleville. It was thought at first when the Murphysboro strike occurred that the men working at the other mines of the company would strike also, but so far they are still at work at the other places.

Four hundred miners came out on strike Monday, May 26, at the mine operated by the Wasson Coal Co. at Harrisburg, Ill., and indications are that the men working in the mines near there will follow shortly. The trouble arose because C. M. Wasson, president of the company, signed an appeal bond of the Evans Coal Co., which recently went bankrupt while owing money to the men employed.

The treasury of the local union connected with mine No. 7 of the Big Muddy Coal and Iron Co. at Herrin, Ill., needed replenishing and the men voted to levy an assessment of 25 cents per man for that purpose. The mine officials found nothing in their agreement to permit this and refused to collect the funds. The result was that the men went out on strike and stayed out for a week before an agreement was reached.

Want Eleven Hours Pay for Eight Hours

On May 23 it was reported that the coal miners of District 18, which comprises eastern British Columbia and the Province of Alberta, would strike on Saturday, May 24, as a result of a disagreement which has arisen in the Crow's Nest Pass section of British Columbia over the pay of some employees whose working time is reduced by the recently-enacted Eight-Hour Day law, a regulation passed by the parliament of the Province of British Columbia. About 6000 men were expected to walk out, of which number 1600 were resident in the Crow's Nest Pass.

The trouble arises wholly in regard to the wages of the surface men, for the law has for some time made the eight-hour day compulsory underground. But the trouble really revolves only about 12 men, for the company has conceded that the bulk of the surface workers, whose day previously consisted of nine hours, shall have the same pay for eight hours, but it refuses the same concession to foremen and others who have been working ten and eleven hours a day. The unions have had the matter under consideration for several weeks and, by an overwhelming majority, voted in favor of striking to uphold the claims of all workers to the same daily rate of pay under the Eight-Hour Day act as has been received heretofore.

According to the report of May 23 not only the miners but all the surface workers, including the engineers, were to be called out so that the situation in the colleries throughout District 18 would be serious unless some compromise could be reached without much delay. W. H. Armstrong, director of coal mining operations, endeavored to bring about a settlement, but his efforts were apparently unsuccessful, for on May 29 it was recorded that all the mine workers were out and that the railroad workers of Fernie with the Civic Light and Power Plant employees had struck in sympathy.

The British Columbia Federation of Labor recently telegraphed the Hon. G. D. Robertson, minister of labor, Ottawa, as follows:

"The executive board of the British Columbia Federation of Labor considers the refusal of an investigation into the condition of men who, by provincial legislation, are working eight hours in coal mines instead of eleven, and as a result have had their daily earnings reduced, is an action similar in effect to that which led to the Winnipeg strike. If nothing is done for these men and a strike results the Federation will be compelled to render them support in the only way possible. We have no desire to see any trouble in the West, but consider that the only way in which a strike can be averted is by granting an investigation."

Miners Clash on Zoning of Railroad Coal

Vigorous protest has been made to the Director General of Railroads by President F. C. Keeney of District 17, United Mine Workers, against the proposal to prohibit the Pere Marquette and other roads from purchasing West Virginia coal on the ground that the restriction would reduce the working time in West Virginia. A conference between President Keeney and President Moore of the Ohio United Mine Workers with Director of Purchases Spencer of the Railroad Administration has been suggested, the Ohio mine president being in favor, it appears, of the move to prevent the use of West Virginia coal on Western railroads. The president of District 17 has not only lodged a protest with the Railroad Administration, but with the international headquarters of the mine workers.

Strike for Electrification of Incline

About 300 miners employed at the Sprague and Skelton mines of the New River Co. in Raleigh County, West Virginia, went on strike and tied up operations for a week because the company refused to put in writing an agreement to electrify its switchback system. When District Inspector Sullivan visited the mines named above he found that 80 and 90 men at a time were riding the trips up and down the incline, whereas the law limits the number to 10. He immediately ordered the practice discontinued and a trolley system put in. This the company agreed to do, but miners insisted that the agreement be made in writing.

When the company refused to establish such a precedent the men went on strike and remained out for a week, W. J. Heatherman, chief of the department of mines, being called in to adjust the differences between the company and the miners. The men at one of the mines finally agreed to return to work on May 27, but miners at the other mine were still obdurate. The district officials were not a party to the strike. Committees of the miners stated in the course of a hearing that they no longer recognized any agreements covering the period of the war as being in effect or binding on them as the war was over. It is estimated that the company lost $18,000 by the strike, as it had on May 28 a vessel at tidewater waiting to be loaded.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

World's Production Record

Letter No. 1—Being a constant reader of *Coal Age,* I noticed the statement in an article relating to the development of a large coal field in England, that a certain mine near Mansfield "holds the world's record for output in a given time, 4850 tons having been brought to the surface in 7 hr., 40 min." *Coal Age,* Mar. 27, p. 567.

Appended to this statement, I was glad to see the footnote inserted by the editor, drawing attention to some American operations, namely, the Orient mine, of southern Illinois, and Vesta No. 4, near California, Penn. Allow me to add that the "Old Ben Mining Corporation, Mine No. 9, at West Frankfort, Ill., holds a record of 5305 tons of coal hoisted in 7 hr. 45 min., with 1386 dumps. This record was made in a single day's run, Feb. 18, 1919.

This mine has a remarkable average record of over 5000 tons of coal hoisted each working day throughout the months of February and March, with the exception of one day when the accident of a broken cage caused a shutdown at 1:30 p.m.

Regarding the reference made in the footnote just mentioned, allow me to say that our Orient friends have a 4-ton car, against our 3-ton cars. This fact gives them the advantage in the line of daily production. However, we are all proud that the world's record is held by mines in our town. MINE MANAGER.

West Frankfort, Ill.

A.-C. vs. D.-C. Current in Mines

Letter No. 2—Some time ago, I read the letter starting a discussion of the use of alternating as compared with direct current in the operation of a coal mine, *Coal Age,* Feb. 20, p. 372. Since then, I have been hoping to see a number of letters on this subject, which I consider is an important one in its relation to mine safety and the economy of operating. It is disappointing to see how little interest the letter aroused among mining engineers and mine electricians.

It may be and probably is true that many, like myself, hardly feel capable of discussing the relative merits of these two types of electricity in mining, either from a theoretical or a practical standpoint. Personally, I have had several years' experience in the use of direct current in mines, but cannot say the same with respect to alternating current. For one, therefore, I would be glad to see this subject thoroughly discussed by those whose knowledge and experience are valuable.

The letter to which I have referred draws attention to the question asked at a recent meeting of the Coal Mining Institute of America; namely, "Is the underground use of alternating current more hazardous than the use of direct current?" With what little experience I have had in the use of alternating current, it is my belief that there is really less danger, or I would say there are fewer accidents occurring in mines using alternating current than in mines where direct current is employed.

This statement may be challenged by many to whom it will appear strange, but it is the result of my observation, and I attribute the reason for fewer accidents being recorded with alternating current to the fact that mine workers have generally more respect for that current than they have for direct current. The latter is often made the means of playing practical jokes on fellow workers.

In a mine in this field where direct current was used, little thought was given to a man or a mule coming in contact with a live wire, in the general performance of his work. Since the direct current has been replaced by alternating current in that mine, however, a wide difference is observable. The men now have more regard for live wires, as they are not anxious to come in contract with them. Neither is there any fooling or playing with the wires by the practical joker.

DANGER DISREGARDED IN USE OF D.-C. CURRENT

This condition would seem to warrant the assumption that while the danger of alternating current is greater in case one comes in contact with a live wire, at the same time, if the recognition of the danger makes men more careful when working around wires carrying alternating current, it may be true that there is actually less danger in the use of alternating current than in that of direct current. Statistics ought to show whether or not this is actually the case, and I hope these will be forthcoming before this discussion is closed.

In conversation with another operator, in this field, he expressed the opinion that miners are more liable to become careless where direct current is employed than where the mine is equipped with alternating current. He stated that the general belief among miners is that if a man comes in contact with a live wire in the former case, he would be knocked down and thus lose contact with the wire; but an alternating live wire would hold the man coming in contact with it, and he would be unable to break away.

Now, whether or not this is true, I will not say. However, if it will keep men from taking chances that may result in injury or death, it is well that this belief prevails. The old saying is true in this case. "Where ignorance is bliss, 'tis folly to be wise."

When visiting mines where alternating current is used, I have invariably observed that the wires are strung in the air-course or in a blind entry that is not used as a travelingway. Where these wires are strung on a haulage road or in any passageway where men must travel, I have noticed that they are hung close to the rib and protected by boards or other means. High power lines are frequently heavily insulated. These extra precautions are not taken generally in mines employing direct current, as far as my observation goes.

Mining men who advocate the use of alternating current for general purposes in the mine, give a number of good reasons why this should be done: (1) Ease of

transmission. (2) Less motor trouble due to the burning out of armatures. (3) Less frequent machine repairs required because of the overloading of coal-cutting machines. These and other good reasons are advanced in favor of the use of alternating current.

It is probably true that many *Coal Age* readers have had much experience along this line that would be of interest to us all, and it is to be hoped that we shall hear from such. Some years ago I worked in a mine in West Virginia where 500-volt direct current was used for hauling coal with motors, and a 60-cycle, 3-phase, 300-volt, alternating current was used for cutting the coal, pumping and operating booster fans. I would like to hear an expression of opinion as to which of these installations is the more dangerous in mining practice.

Cleaton, Ky. OSTEL BULLOCK.

Barometer vs. Outflow of Gas

Letter No. 4—Referring to the letter of E. P. Brennan, *Coal Age*, Apr. 3, p. 634, the writer seems to be in doubt as to the reason for the slowness with which barometric changes take place. He appears to ask why it is that the indications of the barometer are late; or, in other words, why it is that an increase of gas is detected in the mine, before there is any apparent change in the barometer. According to his statement, Mr. Brennan cannot understand why a properly constructed barometer will not adjust itself simultaneously with any change in atmospheric pressure.

After revolving this question in my own mind, it seems to me that the late response of the mercury column to atmospheric changes is only what should be expected. The barometer is a mechanically constructed instrument and naturally takes a little time to react, under a change of pressure that would affect a body of gas very quickly.

Practically speaking, I believe that the gaseous condition in mine workings may become very dangerous, before its cause is indicated by an observed change in the height of the mercury column. If I am wrong in this conclusion I should be glad to be set right. It is a matter of much importance in its relation to the safety of the mine. JOSEPH R. THOMAS.

Plymouth, Penn.

Reducing Ventilation at Firing Time

Letter No. 8—Many interesting letters have appeared in *Coal Age* discussing this subject, and a wide diversity of opinion is manifest. From reading the arguments set forth by the writers in favor or in opposition to this method of reducing the liability to explosion in mines, one would be unable to decide which is right or wrong.

Personally, aside from the seriousness of the subject, I cannot help being amused at some of the criticisms that are offered by opponents who contend that such a method is dangerous to employ in the operation of a coal mine. Studying the subject from their viewpoint, I cannot but feel that these opponents are radically wrong. Otherwise, I must have a charmed life, being the originator, as I believe, of this system and having practiced it for many years. Let me say that if the arguments presented were true, I would not be here to write this letter.

A few of the older readers of *Coal Age* will remember that some 5 or 6 years ago, I gave at some length, my experiences in experimenting on this method of reducing the liability to explosion caused by the firing of shots in mines (*Coal Age*, Vol. 2, p. 838; Vol. 3, pp. 24, 156). All will agree that the experiments recorded in those letters contradict everything that we have been taught in regard to the prevention of dust explosions in mines.

However, those experiments and an experience of 42 years in coal mines, together with an education that enabled me to secure first-class certificates for every position in coal mining, have convinced me that the system is correct and that its opponents are deluded and have not discovered the fundamental principle underlying the origin of these explosions.

My greatest ambition has been to prove to mining men that, to reduce the ventilation in a mine, at the time of firing, lessens the chance of an explosion occurring as the result of blasting. Following up my experiments, two years ago I accepted a position as shotfirer with the Central Coal & Coke Co., Mine No. 45, Crawford County, Kan. Prior to that time, the mine had had many explosions in which shotfirers had lost their lives.

THE PRACTICAL TEST APPLIED IN A GASEOUS MINE WHERE MANY EXPLOSIONS HAD OCCURRED

Deciding that this mine would make a good testing station where the danger of dust explosion could not be disputed, I applied the method of completely shutting off all ventilation from the working places, before firing the 300 shots in 2½ hours each night. Such had been my practice during the past 28 years, in the worst mines in Kansas, including Mine No. 15 of the Western Coal & Mining Co., at Franklin, which holds the world's record for explosions.

Mine No. 45 where I am now employed contained unlimited quantities of inflammable coal dust, many of the places being marked up each morning, by the firebosses, as containing firedamp. The practice was to blast the coal off the solid. Many of the holes were drilled 8 ft. on the solid, being started in the back of the cutting. About 80 per cent. of these holes were charged with black powder, the average weight of charge being 6 lb. The remaining 20 per cent. were charged with dynamite, such holes being drilled straight in the solid. In firing the shots, I used fuse and would light as many as 40 shots at once.

I do not imagine that anyone will question these statements of facts, but I invite investigation, with the full consent of the management of the mines, and will demonstrate that an explosion cannot occur in this mine when the air is shut off.

But someone will ask, here, "Has an explosion occurred in Mine No. 45, during the two years of your employment as shotfirer?" I answer, "Yes." An explosion occurred in one instance when the foreman had been instructed to make a new air connection in a position that made it impossible to cut off all the air.

A shot had been prepared in that place and, while it conformed strictly with the requirements of the mining law, I refused to fire it, unless a sufficient length of fuse was provided to enable me to reach the surface before it would explode. I predicted that the shot would cause trouble. The mine foreman complied with my demand, and I ignited the fuse and was on top when the shot

went off. The explosion blew the trapdoor into a thousand pieces, and caused other wreckage.

My contention is that explosions do not occur now in this mine, because the chief factor producing them has been removed by completely cutting off the ventilation from the mine, at the time of firing. It is my hope that these experiments will prove of value to shotfirers who are striving to protect themselves to the best of their knowledge and ability.

Ringo, Kan. ALEXANDER MCALLISTER.

Roof Conditions in Longwall Work

Letter No. 4—Referring to the proposition presented in the inquiry in *Coal Age*, Mar. 27, p. 591, it appears to me that the conditions mentioned there are ideal for longwall working if proper care is taken in performing the work. Those familiar with this system of mining know that it is important that no posts be built into the packs or permitted to stand in the waste, but all timber must be drawn as the face advances, in order to allow a uniform and gradual settlement of the roof.

The plan I prefer to adopt, in working a longwall conveyor face on the advancing system, is that shown in Fig. 1. This plan differs from that often shown, in

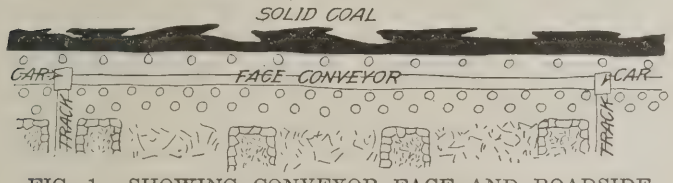


FIG. 1. SHOWING CONVEYOR FACE AND ROADSIDE AND GOBPACKS

one or two respects. First, besides the ordinary roadpacks, there are one or more continuous gobpacks. The roadside packs are usually 9 ft. in width, while the gobpacks may vary from 9 to 15 ft., in width, according to the amount of material on hand for building them.

Again, as shown in the figure, the conveyor is here laid between the first and second rows of posts, instead of in front of the first row, which affords a better support of the roof at the coal face. It is my belief that building the gobpacks, previously mentioned, affords a more uniform settlement of the roof and goes far toward preventing any sudden breaking of the roof at the working face. These packs must be well built though not too solid, and extended regularly as the face is advanced. Timbering should be conducted in such a manner as to throw just enough pressure on the face to break down the coal after it has been properly mined. As stated in the reply to this inquiry, the roof should not be permitted to break at the face if this can be avoided.



FIG. 2. SHOWING CROSS-SECTION AT CONVEYOR FACE

Fig. 2 is a cross-section of a conveyor face. On the left, is shown the coal undermined and the position of the conveyor between the first and second rows of props. On the right, the mined coal has been loaded out and the first row of props and the conveyor moved forward. The posts in the last row must now be drawn and set next to the conveyor, and the packwalls extended.

If the fireclay is of a good hard material, it will serve to make good packwalls. I have found by my own practical experience that there is none better. But if the fireclay is of a soft nature and crumbles readily when exposed to the air, it may be necessary to brush the roof in order to obtain good material for the packs.

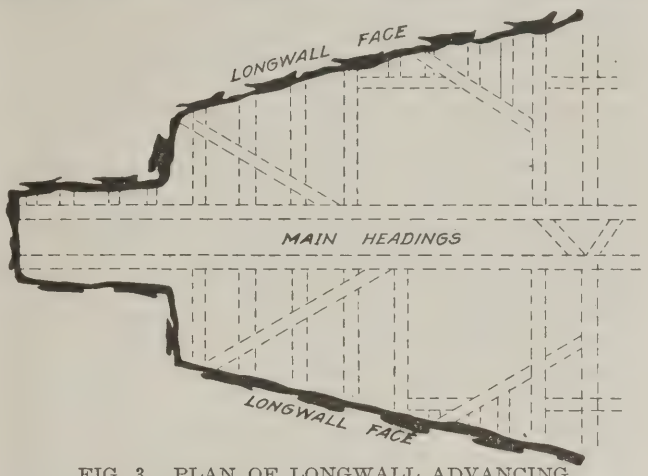


FIG. 3. PLAN OF LONGWALL ADVANCING

The hard sandrock overlying the coal is not good for packing, as it does not yield sufficiently to permit a gradual subsidence of the roof. The soapstone overlying the sandrock stratum makes better material and some sandrock can be used with it in building the packwalls.

In Fig. 3 is shown a plan of longwall advancing where no conveyor is used. In this plan, the gateroads are driven on 42-ft. centers, packs 8 or 9 ft. in thickness being built on each side of the road. Here, the cars are taken to the face where they are loaded by the men working each place. Under some conditions of roof, in longwall working, it is necessary to adopt a retreating plan and work the coal out in panels.

In Fig. 4, I have shown a panel system employing a conveyor face in each panel. This plan I have found

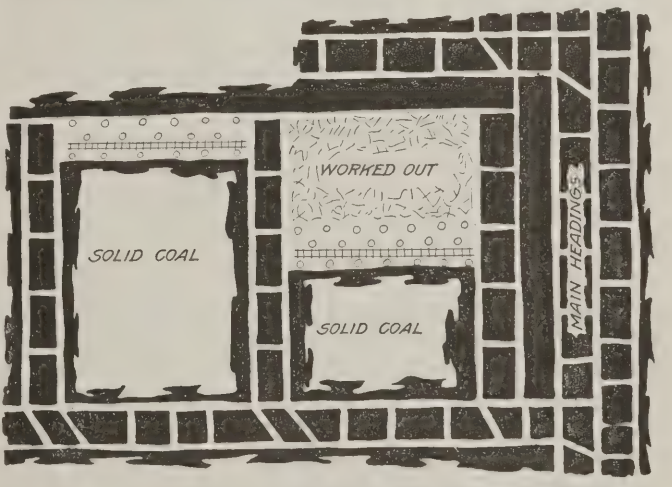


FIG. 4. A LONGWALL-RETREATING, PANEL SYSTEM

to work successfully where the nature of the roof requires the adoption of such a system. The main entries are driven three abreast and cross-entries turned to the right and left of the main entries, at suitable distances apart to form a good panel, say 100 to 150 yd. in depth.

As shown in the figure, a pair of butt headings, Nos. 1 and 2, are turned off the first pair of cross-entries, No. 1 butt being driven through into No. 3 cross-entry.

The purpose of this is to provide an extra air-course for the better ventilation of succeeding panels. A good pillar is left between these two butt headings, for the protection of this air-course.

Nos. 3 and 4 butt headings are now driven, at a distance of 300 ft. from the first pair of butts. This leaves a panel face of about 290 ft. in width. When these butt headings have been driven to the limit the panel is cut across at the face, and the work of drawing back the coal, on the retreating system, is commenced. A conveyor is used to convey the coal to the butt headings in the usual manner, and three rows of posts are kept behind the conveyor, to afford better protection at the working face.

At times, it is preferred to use a track along the face, instead of a conveyor. This track is supported on steel ties and is moved up as the face advances. Cars are then placed along the face as required by the men. Other panels are formed and worked in a similar manner; but when the second block has been worked out, the pillars between Nos. 3 and 4 butt headings are drawn back. The work of robbing the pillars should proceed as the panel of coal is taken out, which is far better than to allow the pillars to remain until the panel is finished. Each panel is drawn back to within 50 ft. of the cross-entries, so as to leave a sufficient pillar for the protection of the entries. WILLIAM DICKINSON, SR.

Oak Hill, W. Va.

Letter No. 5—In presenting his proposition for suggestions, *Coal Age*, Mar. 27, p. 591, "Sandrock" has omitted to give some important data, such as the depth of cover, inclination of seam, presence or absence of water and gas, etc. Any suggestions offered must therefore be based on assumed conditions.

This being a thin seam, only 3 ft. 4 in. in thickness, either a conveyor must be used to convey the coal to the head of the main road, or gateroads must be built and kept open, at short intervals along the face. Assuming that the seam is flat or nearly so, it may be supposed that mules are employed for gathering the coal at the face. In that case, I would arrange to make the main roads 200 ft. apart, with temporary roads or gateways 50 ft. apart. One mule would then be able to haul the coal from the three gateroads belonging to each main road, which would provide a good gathering haul for the mules.

TAKING UP THE CLAY BOTTOM PREVENTS HEAVING

By taking up the 3 ft. of fireclay, 10 ft. wide on the main road and 7 ft. wide on each gateroad, sufficient material would be supplied for building good roadpacks and, in addition, any trouble from the heaving of the floor would be eliminated. The 9 in. of sandrock overlying the coal would form a good support for the soapstone stratum immediately above.

It is my opinion that the sandrock in the overlying stratum would have sufficient elasticity to bend with the weight of the overburden, assuming a good depth of cover overlying this seam. In that case, the subsidence of the roof following the extraction of the coal would act as a lever to break down the coal after the face is mined.

At intervals of 200 ft. along the main road, diagonal roads should be started; and these, by cutting off the temporary roads or gateroads, would shorten the haul and liberate much tracking for use elsewhere in the mine. Probably this would also save much back brushing required to keep these gateroads open.

Let me say, here, that it is not good mining practice to attempt to pack all void places solid, in longwall work. In the plan I have suggested, there would be a good waste between the high-side pack of one road and the low-side pack of the road next adjoining, 50 ft. away As has been stated by other writers, all timber must be withdrawn from the waste, as fast as the working face advances, so that the only timber standing will be the temporary supports or rows of posts required at the face.

THE USE OF TIMBER COGS IN LONGWALL

Where cogs are used, one row of these is sufficient between the conveyor and the waste when operating a conveyor face in longwall. This row of cogs should be drawn and moved up as the face advances, so as to furnish the necessary protection for the conveyor. By this means, the roof has a good chance to sag down gradually in the waste, which will relieve the packs of a great deal of pressure and bring the desired leverage to bear on the coal face, which is the great concern in longwall work.

Referring to the practice of building a cog, to form the corner when starting a new packwall, it is my belief that this is a wrong method to pursue. The unequal resistance offered by the cog, which is always greater than that of the packwall, has a tendency to throw the weight too far forward on the face of the coal. This is frequently the direct cause of the roof breaking off at the face, which would defeat the chief aim of longwall work. It seems hardly necessary to add that a longwall face should be kept as nearly as possible in a straight line and not allowed to get zigzagged. Also, packwalls should be kept close up to the face.

Merritt, B. C., Canada. J. TOUHEY.

Living Conditions at Mines

Letter No. 3—I read with pleasure the letter of A. A. Allen, *Coal Age*, Feb. 13, p. 331, and later that of "Optimist," April 17, p. 726. Like both of these writers, I have spent my life around the mines, living in three countries, during the past 31 years. I have always been an interested reader of the accounts of large coal companies doing good work in the improvement of living conditions at their mines.

To some who have regarded this matter with less interest, no doubt the idea of making extended efforts for the improvement of the living conditions of men working in mines may seem unnecessary and radical, but it is my belief that much good is and can be accomplished when these ideas are carried out faithfully. But it will be useless to improve the living conditions of miners and their families, unless equal effort is put forth to give the men a square deal in the mine. Generally, fair treatment of the men by the bosses will bring equally fair treatment of the company on the part of the men, which makes it a business proposition for both parties.

Beginning at the mine, everything should be done for the comfort and welfare of the men. As the old saying puts it, "Cleanliness is next to godliness"; therefore, a good wash-house at the mine is especially necessary and should be provided. Here, the men should be taught to wash themselves and change their clothing

before going home. This little item will prove a great factor in maintaining neat homes and surroundings in the camp.

For all the men, there should be provided comfortable houses where they can live with their families and enjoy pleasant surroundings. These houses should be equipped with lights, running water, bathrooms and living rooms. Each house should stand on its own lot and have its own garden and lawn. Good roads should be maintained in the camp; churches, schools and entertainment halls provided to make it a good place in which to live.

Speaking of schools, these should be equipped for the accommodation of both day and night students. At the night sessions, instruction should be given in the English branches and special efforts made to implant American principles in the mind of each student young and old. First-aid and mine-rescue work should be taught and rescue teams organized. The entire work should be conducted so as to inspire keen competition in the line of efficiency.

Provision Made for Recreation and Entertainment Always a Good Investment

Mention has been made, in the letter by "Optimist," of the average miner being a hard worker and showing the same spirit at play. For this reason, athletic sports, baseball and football fields, as well as playgrounds for the kids, must be provided in every good mining camp. For indoor recreation, there should be a gymnasium. A large hall could be erected at small cost for the purposes of entertainment, dancing, picture shows and other amusements.

Welfare work among the miners is not complete without a good company doctor, supported by the monthly subscriptions of the miners rated in proportion to their family needs. Also, a company or coöperative store should be maintained where the best grade of goods can be procured at the lowest possible prices. A coöperative store should be under the control or governed by a committee of miners and bosses, elected every year or half year.

As I have said previously, these ideas may appear somewhat faddish to some; but they can be handled in a manner to make each effort self-supporting, and the benefit to the men and their families will be found far-reaching and of equal advantage to the industry.

Clinton, Ind. Mine Foreman.

Letter No. 4—The letter of A. A. Allen, on this subject, *Coal Age,* Feb. 13, p. 331, has struck a vital point, and his remarks are what we can all indorse. The fact is generally conceded that the more intelligent a workman is, the better work he does. But, being intelligent makes the man sensitive and, being sensitive, he cannot endure all things.

The intelligent workman and the one who gives the most efficient service naturally abhors the living conditions to be found at the average coal-mining camp. The same is true, also, in respect to the working conditions to be found in many mines. The man's training has fitted him for more congenial surroundings and he will not stay where the social conditions are of a low order, such as exist in camps where church and school privileges are lacking, the houses poor and ill-kept, the streets and sidewalks in bad condition, and cows, hogs and chickens roam promiscuously about.

Too often it is the case that the houses provided for the men have been built by contract, are poorly constructed of cheap lumber, and have no water, lights or other conveniences. It may be that they are located in a swamp or on low ground or, perhaps, on a steep hillside where approach is difficult and there is no opportunity for the cultivation of the ground and the making of a garden.

Poor Working and Living Conditions Destroy the Ambition of Good Workers

Working conditions and living conditions are twin sisters, and are commonly on the same order. Practical business management has come to realize that the successful development of a large operation depends equally on satisfying the men in both of these respects. In my own humble opinion, it would seem a good plan to build houses for the different classes of labor that are always to be found in the mines. It can hardly be expected that all the workers in a mine will be of the same grade or class. All have not the same ambition and desires.

There are men who are constantly seeking advancement and promotion to higher positions in life, and there are others who have no such ambition but are content to live on the same low level. To give to all of these men the same privileges, and expect the man of high ambition to be satisfied with the dirt and filth of his less ambitious neighbors would be to lower his ideals if, in truth, he would consent to stay where he was not accorded the privileges he has the right to expect.

Again, if the man of low ideals, living down in some back alley, is provided with the same conveniences that are given to one of higher ambition, the latter will have no incentive to better himself, but will often be satisfied to let things take their own course and make no effort to improve his surroundings. On the other hand, as men are quick to observe a difference in the treatment accorded to another, the desire is at once aroused in the man first mentioned to secure the same privileges and accommodations for himself.

Effect of Rewarding Faithful Workers

For example, here is Joe who keeps his little shack clean and tidy. The superintendent of the mine has noted that fact and offers Joe another place to live, where he will have a better house and a good chance to make a garden, knowing that he will take care of it. He has observed, also, that Joe is a good worker and has passed the word to the mine foreman to give him a chance.

In this manner, it is possible to build up a good, industrious body of men by improving both their working and their living conditions. The good workman has usually a good helpmate in the home, one who would not be satisfied to live in dirt and filth; but if compelled to do so, it will not be long before her discontent will create the same feeling in the man and cause him to wish to seek another place.

The last few years have proved conclusively that labor is our greatest asset. A wise management naturally dreads to see a good man leave its employ; but looking at the situation from the worker's standpoint, we cannot deny that we would do the same thing ourselves if placed in his position. Let us hope that these conditions will be improved steadily in our mines.

Osceola Mills, Penn. S. D. Hainley.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

An Interesting Mine Haulage Proposition

We have under consideration a proposition to improve our haulage in the mine. At the present time, the distance from the working face, at the head of the face entry shown in the accompanying diagram, to the foot of the hoisting shaft, is practically 2½ miles.

The heavy broken line, *EFGBCD*, in the figure, represents the present main track or haulage road. It will appear that there is a slight upgrade from the working face to the point marked *A* in the sketch; but from that point out to the foot of the shaft there is a slight grade in favor of the loaded cars. These grades are indicated in the figure by the signs plus (+) and minus (—), the former meaning an upgrade and the latter a downgrade toward the shaft.

Two plans have been under consideration, the first being to utilize the track that still lies in the old entry

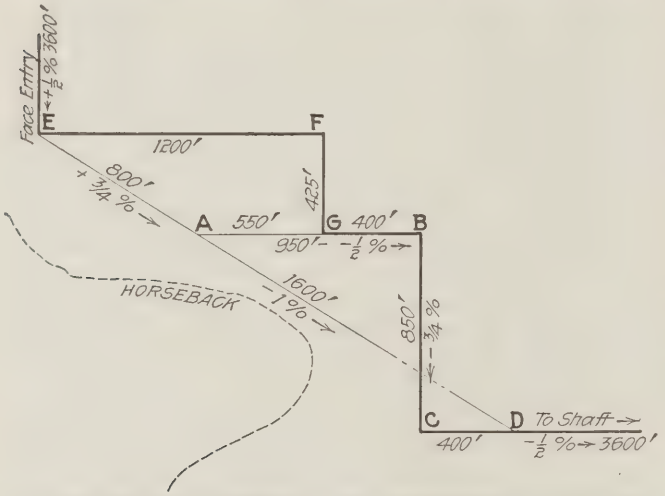


DIAGRAM OF PRESENT AND PROPOSED HAULAGE ROADS

from *A* to *B*, bringing the coal out by the route *EAB*, instead of *EFGB*, which would shorten the distance of haul 275 ft. By the second plan, the coal would be hauled out over a straight road *EAD*, instead of by the present route *EFGBCD*, which would shorten the haul 875 ft. between the points *E* and *D*.

As previously stated, track is already laid and in use from *A* to *G*, and on the main haulage road *EFGBCD*. The entry *EA* has been cut through and is ready for the permanent track; but the extension from *A* to *D* is not completed, a distance of 100 ft. still remaining to be cut through, as indicated by the dotted line where this entry crosses the main track *BC*. This portion being left had the advantage of not interfering with the circulation or disturbing conditions on the main haulage road until everything was complete to make the proposed change.

Moreover, there are two bad faults that must be cleaned up on this entry, before track can be laid and the road utilized for hauling coal. This work, together with the timbering of the entire entry from *E* to *D* will mean a considerable expense, in addition to the necessary outlay for tracking and ties, all of which must be taken into consideration in determining the practicability of making this change at the present stage of development of the mine.

It is estimated that we have some two million tons of coal in sight. We are using electric haulage, the present capacity of the motors being 24 trips a day, hauling 50 tons in a trip and producing a daily output of 1200 tons of coal. The haulage road is now double-tracked from *B* to *C* and thence out to the shaft. There is some double track also inside of *E*, on the face entry. The proposed road *EAD* would have but a single track. There is some double track also inside of *E*, on the face entry. Referring to the first proposition, the cost of fixing up the *ABCD*, for permanent haulage, may be considered as equal to the expense of laying track from *A* to *D*.

The question that we are at present considering is, Will the future life of this mine justify making the proposed change in the main haulage road? It is a problem on which we have been figuring for some time. In fact, as will appear from the work already accomplished, the plan had been practically adopted once and the work started and then abandoned for a time, till better conditions should prevail in the coal-mining industry.

We believe that many of the practical readers of *Coal Age* can outline, in a general way, to what extent the saving effected by the proposed change would justify the outlay for that purpose. Suggestions along this line will be greatly appreciated. J. H. DICKERSON.

Cambridge, Ohio.

We gladly submit this proposition to our practical readers, inasmuch as it presents an opportunity not only for a fair explanation of the work required, but also for the display of good practical judgment in regard to the requirements in underground haulage, in the development of a large mine.

While our correspondent has not stated the thickness of the coal or the height of the entries on the haulage roads, it may be assumed that this is a good workable seam of coal and overlaid with a generally good roof that has made possible the use of a considerable length of double track, on the present haulage roads.

The fact that there are two bad falls that must be cleaned up on the extension *AD*, which was driven some time since and allowed to stand, may be attributed to faulty roof conditions in proximity to the horseback indicated by the dotted outline in the figure.

The proposition is one that will often arise in the operation of coal mines, and we hope that it will receive the attention that it should demand. The systematic estimation of the probable costs, while they may vary from the actual expenditure for labor and material, cannot fail to be of deep interest to all who have similar problems with which to contend.

EXAMINATION QUESTIONS

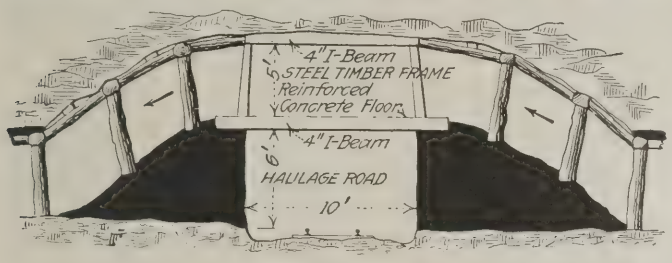
ANSWERED BY JAMES T. BEARD

British Columbia Examination First Class, Nov. 20, 1918

(Selected Questions)

Ques.—Give a sketch of what you consider a good overcast; such sketch to show dimensions and other details sufficiently complete to construct the same.

Ans.—In the accompanying figure, is shown an overcast conducting an air current across a 10-ft. haulage road in a 6-ft. seam of coal. This overcast is constructed by blowing down the roof over the haulage road, to a height sufficient to give a sectional area above the floor of the air-bridge equal to the sectional area of the air-course. An uprise is then driven from the air-course to connect with this excavation in the roof



AN ECONOMICAL AND WELL BUILT OVERCAST

above the haulage road. A similar connection is made with the cross-entry air-course, on the opposite side of the haulage road, as shown in the figure.

A reinforced concrete floor or bridge is then constructed by spanning the haulage road with two 4-in. I-beams, one at each side of the excavation in the roof. These I-beams are given a good foundation on the top of the coal forming the ribs of the haulage road. Crossbars of steel rails are laid at intervals and supported between the two I-beams. When this framework is in place, a temporary board bottom is constructed and a solid floor of concrete laid to a depth of 6 in., embracing the cross-rails and forming a solid joint with the I-beams on either side and the rock wall of the excavation that now forms the rib of the overcast.

Care must be taken to make everything air-tight between the haulage road and the overcast, to prevent the leakage of air into the roadway. The connecting drifts on either side of the air-bridge are securely timbered and braced, as shown in the figure, after setting the steel timber frame above the haulage road, as indicated, for the support of the roof above the air-bridge.

Ques.—A current of 140,000 cu.ft. of air is delivered at the foot of a downcast shaft and there divided into three splits as follows: Split A, 6 x 7 ft., 5000 ft. long; Split B, 6 x 6 ft., 4500 ft. long; Split C, 6 x 5 ft., 4000 ft. long. What quantity of air will pass through each airway?

Ans.—The first step in finding the natural division of the air current between these three splits is to calculate the potential factor for each split. Thus, reducing each factor to its lowest terms,

$$A, \quad a\sqrt{\frac{a}{lo}} = 42\sqrt{\frac{42}{5000\times 26}} \qquad 7\sqrt{\frac{7}{10\times 13}} = 1.624$$

$$B, \quad = 36\sqrt{\frac{36}{4500\times 24}} \qquad 6\sqrt{\frac{6}{9\times 12}} = 1.414$$

$$C, \quad = 30\sqrt{\frac{30}{4000\times 22}} \qquad 5\sqrt{\frac{5}{8\times 11}} = 1.192$$

$$\text{Sum of potentials} \quad . \quad . \quad . \quad 4.230$$

In finding the natural division of air, the work is much simplified by taking the lowest values for the area, length and perimeter, by striking out common factors in each of these. For example, in the above three splits, the sectional areas, 42, 36, 30, have a common factor 6, which divided out gives for the relative areas, 7, 6, 5. In like manner, the lengths 5000, 4500, 4000, are reduced to 10, 9, 8; and the perimeters 26, 24, 22 become 13, 12, 11. These relative values are then used to calculate the relative potential factors, as shown on the right, above.

The quantity of air passing in each split is then proportional to the relative potential for that split, and we have

$$A, \quad q_a = \frac{1.624}{4.23}\times 140{,}000 = 53{,}750 \text{ cu. ft. per min.}$$

$$B, \quad q_b = \frac{1.414}{4.23}\times 140.000 = 46{,}800 \text{ cu. ft. per min.}$$

$$C, \quad q_c = \frac{1.192}{4.23}\times 140{,}000 = 39{,}450 \text{ cu. ft. per min.}$$

$$\text{Total} \quad . \quad . \quad . \quad 140.000 \text{ cu. ft. per min.}$$

Ques.—If 65,000 cu.ft. of air per min. passes through an airway 7 x 7 ft., with a water gage 1.5 in., what quantity of air will pass through another airway of the same length, 8 x 8 ft. in section, the pressure remaining the same?

Ans.—In this case, the length of the airway and the pressure per square foot being the same, the quantity of air circulating in each is proportional to the potential factor $a\sqrt{\frac{a}{o}}$. For the first airway $a = 7\times 7 =$ 49 sp.ft.; $o = 4\times 7 = 28$ ft. For the second airway, $a = 8\times 8 = 64$ sq.ft.; $o = 4\times 8 = 32$ ft. The potential factors for these two airways are therefore,

$$\text{Airway } 7\times 7, \qquad 49\sqrt{\frac{49}{28}} = 49\sqrt{1.75} = 64.82$$

$$\text{Airway } 8\times 8, \qquad 64\sqrt{\frac{64}{32}} = 64\sqrt{2} = 91.51$$

Finally, for the same pressure, the quantity passing being proportional to the potential, the quantity ratio is equal to the potential ratio, and we have

$$\frac{x}{65{,}000} = \frac{91.51}{64.82} = 1.396$$

$$x = 65{,}000\times 1.396 = 90.740 \text{ cu. ft. per min.}$$

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Latest Developments in the Export Coal Situation

New Department Created by Shipping Board Will Handle Question of Vessels—Every Effort Being Made to Expedite Matters So That America's Foreign Coal Trade May Become a Reality

Ships are available to carry American coal abroad. This is the most important development when the frenzied discussion of the export situation, which has been in progress for ten days, is summed up. The Shipping Board has created a department of coal exports. Through this new department it expects to do all in its power to facilitate the exportation of American coal. In order that its coöperation may be of the most intelligent kind, the Shipping Board called a meeting of representatives of producers, exporters and brokers. The meeting was held May 29 and resulted in an all-day discussion of the export situation.

It is not the intention of the Shipping Board to allocate a certain amount of tonnage to the coal industry at this time, but it is expected that a business-like handling of coal exports will allow this country to get into the world's coal trade in an important way and at the same time to furnish outbound cargoes for shipping which must be dispatched to bring back cargoes from other countries. The meeting developed the fact that the chief obstacles to be overcome are by no means insurmountable, and it was decided that the Shipping Board would send out a questionnaire at the earliest possible moment so as to secure in orderly fashion the consensus of opinion on disputed questions and in order to furnish the Shipping Board with a more definite idea of the number of operators who are willing to enter the export trade.

In announcing the creation of its department of coal exports, the Shipping Board issued the following statement:

Statement of Shipping Board

"The Shipping Board is greatly interested in developing American coal exports, but as so much of our tonnage had to be devoted to food relief service we have not had the necessary ships to adequately serve the trade. Happily, the time has now come when we can plan in a constructive way for the development of our coal exports, and, recognizing the importance of this work, and in order to carry it forward, the Board has authorized the creation of a new department of the Division of Operations, to be known as the Department of Coal Exports.

"After a very careful canvass of the field for a man with the necessary qualifications and at the same time unbiased by any connection with the industry itself, we have selected H. Y. Saint, formerly Director of the Foreign Trade Bureau of the Seattle Chamber of Commerce, to take charge of the new department.

"The Department of Commerce, the Fuel Administration and the Foreign and Domestic Trade Bureau of the State Department have been requested to coöperate with the new Department of Coal Exports."

That the National Coal Association is impressed by the action taken by the Shipping Board is shown by the following statement made by J. D. A. Morrow, who is in active charge of the Association:

"Opening foreign markets to the American coal trade, as contemplated by the Government in the creation of the new Department of Coal Exports, announced by the Shipping Board, will provide the industry, it is believed by representative operators, with a new and powerful stimulant which should quicken production toward the pace that must be maintained if a serious shortage in home markets is to be averted next fall and winter.

"For months the coal industry of the United States has been unable to supply even a small percentage of the millions of tons of coal needed in foreign markets. This has been entirely due to the shipping situation, the first call on ships being for the homeward transportation of troops and the outward flow of foodstuffs to Europe. In the meantime, while almost every nation under the sun has been calling for coal, American mines have been producing from one-third to one-half their full-time output—in some fields, even less.

"The situation has now been reached where there must be a decided increase in production if our own needs are to be met in this country. That increase can be effected only by the entrance of buyers into the market. Mine forces cannot be kept together and mines cannot operate if there are not orders to fill. American buyers have not been in the market during the past few months to the extent necessary to enable operators to do more than keep their forces together. The men are going and have gone, in many instances, into more regular and less hazardous employment. Also thousands of miners are today at Atlantic ports, awaiting passage to Europe.

Coal Exports Would Stimulate Mining

"The entrance, therefore, of foreign buyers into American coal markets should help in keeping together forces necessary to produce coal to meet not only foreign requirements, but needs in the United States next fall and winter.

"Unless the United States can ship its coal abroad there is every indication that there will be a world-wide shortage of coal next winter. No other country can supply the demand. In Great Britain production has dropped to levels far below the pre-war days. It is regarded as virtually impossible that Great Britain can mine the coal that the world will need. She is not producing it in sufficient quantities now, and the rationing system, under which consumers may obtain only a limited supply, will be continued, it has been announced, in the United Kingdom for months to come, notwithstanding the fact that hostilities ceased more than seven months ago.

"The coal mines of France will not produce their pre-war output for from three to six years, engineers estimate, while in Russia the situation, so far as next fall and winter are concerned, is regarded almost as hopeless. Wholesale bankruptcy threatens the coal industry in Germany—indeed, in many instances has already overtaken it—as the result of revolutionary changes in governmental policy affecting the industry and because of general labor disturbances. A shortage characterized as acute exists in Australia, the one remaining large source of supply. Only in Spain, which does not produce enough to meet its own needs, has coal production been on the increase during the year, and in Italy, where a small quantity of lignite, far from sufficient to meet Italian needs, is mined.

Whole World Looks to America

"The entire world, with the exception of the United States, is in the throes of a universal coal shortage today and only the most sweeping increase in production wherever coal is mined can avert world-wide suffering next winter. More than one hundred million tons of coal could be sent out from the United States during the remainder of the year, were there ships enough to carry it, without meeting in full the foreign demand."

It is very clear, from the discussion at the Shipping Board meeting, that practically all those contemplating exports favor the adoption of the Welsh charter. The variations from that charter, which have been used by the Shipping Board, were said to cause much confusion and to work against the interests of the American shipper. Not much enthusiasm for Government inspection of coal was evidenced. Some of the advantages of such a plan were recognized, but it was declared that responsible exporters will keep up the quality of their coal and that the situation is one which will handle itself. The advantage of having an analysis of the coal accompanying the invoice was admitted generally.

There was a tendency on the part of small shippers to fear that they would have difficulty in securing equal rights with larger exporters, but they apparently are willing to put themselves in the hands of the Shipping Board.

All agree that a much more satisfactory condition has been brought about by concentrating in the one office all matters pertaining to coal exports. Mr. Saint, who is in charge of the coal department of the Shipping Board, was born and reared in western Pennsylvania and has a knowledge of the problems surrounding production. His experience on the Pacific Coast has been with foreign trade. These advantages, as well as his capacity as a businessman, recommended him to the Shipping Board for the place.

Mr. Saint has appointed a committee to inquire into the demand of insurance companies that shifting boards be used in loading bituminous coal. Such a requirement, it was pointed out at the meeting, would add $2000 or more to the cost of loading each ship.

Netherlands Coal Supply

Trade Commissioner Arthur H. Redfield reports from The Hague under date of Apr. 18, 1919, that the Netherlands Coal Distribution Office (Rijks-kolendistributie) has recently given out figures of the production and importation of coal, lignite and peat for the years ending Mar. 31, 1916, to 1919, which have been allotted by that office. As peat was first included in the distribution system at the end of April, 1917, no exact statistics of its shipments are to be had before that date, and the figures given below for 1916 and the first months of 1917 are based upon an estimate. The shipments of peat and lignite, moreover, are given in terms of their fuel equivalent in coal. The amounts stated are in metric tons and are for the year ending March 31.

Countries	Years Ending Mar. 31 1917, Metric Tons	1918, Metric Tons	1919, Metric Tons
Imported from Germany	3,377,533	2,761,110	735,100
Imported from England	1,295,722	201,012	92,376
Imported from Belgium	619,439	169,877	84'491
Imported from United States	.....	.....	84,491
Total imports of coal, coke and briquets	5,292,694	3,131,999	947,647
Shipments of coal from Limburg	2,553,577	2,980,318	3,210,149
Shipments of peat*	400,000	450,000	650,000
Shipments of lignite*	.....	46,053	526,886
Total domestic coal, peat and lignite	2,953,577	3,476,371	4,387,035
Grand total	8,246,271	6.608,370	5,334,682

* Converted to fuel equivalent in coal.

The figures in the table regarding the Limburg mines differ from the ordinary published figures, in that the figures for shipment are given instead of the total production of the mines, from which must be subtracted the coal consumption at the mines. In the period from Apr. 1, 1918, to Mar. 31, 1919, as compared with the corresponding period of 1917-18, a greater quantity of domestic fuel was available,

amounting to over 900,000 tons of coal, while over 2,000,000 metric tons less coal was imported from foreign countries. As compared with the year 1916-17, there were in the year 1918-19 almost 1,500,000 metric tons more available from domestic production and 4,400,000 tons less were imported from abroad.

Lancashire Coal Export Trade

In the course of an interesting article dealing with the Lancashire coal trade the "Statist" says that Lancashire is the fourth of the coal-producing counties in the United Kingdom, and in 1917 its output amounted to 21,760,000 tons, compared with 40,875,000 tons in Yorkshire, 32,133,000 tons in Glamorgan and 30,843,000 tons in Durham. The bulk of the coal raised is used locally for industrial and domestic purposes, but the export trade is considerable, especially in bunkers. A large coastwise traffic is also done to Ireland and the Isle of Man.

The trade has, for special reasons, not suffered material detriment during the war. The bulk of the coal shipped from England comes, in normal times, from the Bristol Channel and from the northeastern ports, both Welsh and Yorkshire coals being of the highest quality and easily standing transportation. The Admiralty commandeered a large proportion of the output of these districts, especially of the best coals, and Cardiff, Newport and Swansea, as well as Newcastle and Hull, were too busy meeting the requirements of the English and Allied navies to fill civilian needs. Only second-grade steam coal was available for export, and even this was often replaced by inferior qualities.

Users Like Lancashire Coal

Many foreign and home consumers turned to Lancashire coal, and, it is reported, were favorably impressed by its calorific power and by its adaptability for many purposes. Bituminous coal is naturally more easy to light and burns with a characteristic flame which is altogether absent from anthracite, but in heating capacity it is generally inferior. Both on sea and land, the Lancashire product has been extensively used during the war in steam-raising plants which formerly used only Welsh or Yorkshire coals, and, though results naturally varied with the type of boiler and with the arrangements for draft, the general verdict was one of surprised satisfaction.

It is probable, in the circumstances, that the new clientele attracted to Lancashire coal for the want of better will remain permanently with it. A practice, common in the United States, of purchasing coal for analysis, is coming increasingly into vogue in England, and the practice will benefit Lancashire coal, which, though showing a good return in calories and a low percentage of ash, has not the reputation attaching to the famous seams of Yorkshire and South Wales.

At present foreign importers are not inclined to haggle about prices, and therefore the problem of restoring England's export trade in coal hinges solely on output. In the absence of any calamitous social or industrial developments, output should rise above the war standard with the demobilization of able bodied miners and the execution of long overdue repairs, renewals, and improvements to mechanical equipment. The ultimate effect of the reduced hours on output is too problematical to discuss, but in Lancashire the best opinion views the matter in a very hopeful light.

British Coal Output Decreasing

The output in the United Kingdom had been decreasing long before the war. The average per underground worker which in 1905 was 360 tons, had fallen in 1913 to 321 tons, but it is expected that its downward course will now be stayed through better working methods and through the exercise of good will on the part of miners. Most of Great Britain's rich shallow seams have been exhausted, and the raising of coal from thin seams at great depths necessarily involves increased expense.

The rapid decentralization of industry in the last 50 years, and the more even distribution of manufactures over the world, naturally caused a slackening in the rate of industrial development in Great Britain, and her coal exports did not increase comparably with those of other countries. To prevent unemployment on a large scale, it is advocated that English exports be resumed as soon as possible, free from official interference. Her railways, docks and ships derive profit from the trade, which also enables her to import more cheaply her requirements of food and raw materials. Further, English coal is needed in foreign coaling stations for the use of British steamers, and many of her outward-bound ships can, by securing a coal cargo, avoid a profitless journey in ballast.

The complete resumption of coal exports by Great Britain is conditioned by the supply of shipping, but, according as it is provided, it is expected in Lancashire to stiffen prices in the home market. Foreign wants are imperious and must be satisfied, and, moreover, Germany, England's principal competitor before the war, is for a time out of the market. At present under the control system Lancashire coal for export is on an average from 6s. to 8s. per ton dearer than for home consumption, and naturally merchants prefer to ship, but are hindered by the embargo. When shipments no longer require a license, prices will probably rise to the present export level. The increased demand from abroad may result in the taking on of extra hands in the Lancashire mines, where employment is already given to nearly 100,000 workers.

The proposed scheme of state electric-power stations, if carried out, should effect considerable economies in the use of coal for industrial purposes in the cotton and steel manufacturing areas of Lancashire, but such an eventuality is at present too remote to use as a calculable factor in the plans of coal owners. Besides, increased demand in other directions, due to the growth of population and similar causes, will offset a decrease in the quantity of coal used for steam-raising or gas-making purposes. Of more immediate concern to Lancashire and to the coal-mining industry of the United Kingdom in general are the findings of the Coal Commission as to nationalization and the proposals formulated by the Coal Controller as to mining finances, both of which will to a large extent determine not only the fate of the coal trade but the industrial future of the United Kingdom.

Foreign Coal Trade Opportunity

A firm in Malta is proposing the opening of an American shipping and coaling department, and desires to communicate with steamship owners and coal-mining companies. References. Further details may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its branches, and referring to File No. 20,490.

Coal Traffic in Spanish Ports

The ports of Vigo, Corunna and Ferrol in northwestern Spain are important depositories for coal supplied to the various steamships calling at these ports, states Consul Edward I. Nathan, Vigo, under date of Mar. 27, 1919. In prewar times this coal was principally imported from Wales and deposited either ashore or in floating hulks, of which there are three in Vigo. Such deposits can be made in bond, but this privilege is accorded only to Spanish concerns. Hence a British company which supplies coal at Spanish ports does so through a subsidiary Spanish corporation, and a similar course would have to be adopted by American concerns seeking this trade.

Over 50,000 tons of Welsh coal were imported at Vigo in 1913. Of this amount 37,770 tons were imported by two firms alone. About 8000 tons of briquet coal were also imported in 1913. Coal continued to be imported at Vigo during the years 1914 to 1916 in greatly reduced quantities. None was imported in 1917 and 1918, but with the renewal of foreign steamship service such imports are being resumed.

Spanish coal of inferior quality from the mines in Asturias is used locally by the railroads, gas works and for coasting steamers. In 1913, 16,318 tons of this coal were brought to Vigo by steamers and in 1918 10,780 tons were brought. A small quantity also comes by railroad. Spanish coal now sells at 180 pesetas (the normal value of the peseta is $0.193), or $34.75 per metric ton. Welsh coal has recently been sold as high as $40.50 per ton.

Vice Consul W. Bruce Wallace, at Corunna, reports as follows: Coal has for a number of years been one of the most important items of import at Corunna, averaging 14,000 metric tons until 1913, when the imports increased to 35,234 metric tons, and to 58,426 in 1914. The imports were all from Great Britain and were principally Welsh steam coal for bunkering, although there were also important sales to the Spanish railroads. The imports decreased on account of the war and were only 6700 metric tons in 1916 and 1460 tons in 1917. Imports of Welsh coal at the neighboring port of Ferrol amounted to 7075 metric tons in 1913.

In prewar times Welsh coal could be imported at Corunna c. i. f. at $4.83 per long ton, but this price increased enormously during the war, and although prices have decreased since the armistice a good quality of Welsh coal costs $33.78 per long ton c. i. f. Corunna at the present time. The average freights were $1.06 per long ton before the war, but are at present $15.05 per long ton. It has hitherto been impossible to import American coal owing to the high cost of the freight.

[A list of importers of coal in northwestern Spain can be obtained from the Bureau of Foreign and Domestic Commerce or its district or coöperative offices by referring to file No. 116007.]

Imports of Coal Into Denmark

According to an excerpt from *Finanstidende*, Copenhagen, Mar. 5, 1919, transmitted by Commercial Attaché Erwin W. Thompson, the armistice gave Denmark hopes of larger imports. With regard to coal, however, the development has been different, because of the difficulties due to the revolution in Germany and the English mining strikes. The combined import of coal, coke, cinders and briquets to Denmark was as follows: In 1913, 3,573,000 metric tons; 1914, 3,612,000 tons; 1915, 3,890,000 tons; 1916, 3,704,000 tons; 1917, 2,165,468 tons; and in 1918, 2,242,124 tons.

From the summer of 1917 until the armistice was declared the coal imports were about 200,000 tons per month, whereas the average in 1913 was nearer 300,000 tons. On account of the German revolution, however, this was reduced to about half during the last two months of 1918. In January the imports were about 160,000 tons, 40,000 tons of which were German coal, by special agreement; but at present the imports from Germany may be considered as practically stopped, except for 16,000 tons of gas coke per month. At the same time the imports

Hampton Roads Coal Exports

NORFOLK

			Cargo	Bunkers
Lamberts Point				
May 19	Nor. S.S. Imperator	Tela, Honduras	1,072	214
May 21	Ital. S.S. Crema	Gibraltar FO (Italy)	6,534	704
May 21	Amer. S.S. Ulysses	Cristobal, C. Z.	12,083	1,130
May 22	Amer. S.S. Callooh	Havana, Cuba	2,733	517
May 23	Ital. S.S. Battinin Accame	Gibraltar FO (Italy)	5,726	782
May 24	Ital. S.S. Luigino Accame	Gibraltar FO (Italy)	4,039	465
May 24	Amer. S.S. Lake Agomak	Bridgetown, Barbados	3,020	511
Sewalls Point				
May 19	Amer. S.S. Lake Charles	Havana, Cuba	2,369	242
May 22	Amer. S.S. Lake Lida	Kingston, Jamaica	2,491	243
May 22	Amer. S.S. Dancey	Arica, Chile	2,400	585
May 22	Amer. S.S. Lake Janet	Sagua la Grande, Cuba	1,822	353
May 24	Amer. S.S. Lake Fondulac	Havana, Cuba	3,285	286
Newport News				
May 17	Amer. S.S. Serpentine	Puerto Plata, S. D.	987	341
May 22	Amer. S.S. Garfield	La Plata, A. R.	2,335	1,005
May 22	Amer. S.S. Lewis Luckenbach	Rio de Janeiro, Brazil	12,032	.....
May 22	Am. Sch. Jacob W. Hook	Guayanilla Bay, P. R.	911	.....

from England have increased somewhat, but even if they amount to 200,000 tons a month, which is considered the maximum, the quantity would be no higher than the average during the last war years. This is quite insufficient at a time when the Danish industrial demands are so great.

Whether Denmark can get coal from countries other than Great Britain depends upon America's willingness to supply the European market with fuel. Already the Swedish State railways have bought 30,000 tons of American coal for delivery in Goteborg inside of a few weeks, and it is rumored that the Dutch Government has closed for 50,000 tons to be shipped to Rotterdam. The offers of American coal to Denmark are also lively. Export license has already been secured for 500,000 tons at prices which are about the same as for British coal—that is, $30 c. i. f. Danish port. This low price is probably due to the fact that coal can be brought in ships engaged in the transportation of war material from France.

April Coal and Coke Exports

Exports of coal and coke, as reported by the Department of Commerce for April, 1919, and the figures for April, 1918, as finally revised, are as follows:

	April, 1918	April, 1919
Anthracite, tons	340,861	285,190
Bituminous, tons	1,554,501	811,128
Exported to:		
Italy	2,016	32,309
Canada	1,128,549	501,940
Panama	70,870	19,088
Mexico	12,675	6,200
Cuba	212,355	58,173
Other West Indies	28,063	31,302
Argentina	9,869	14,914
Brazil	25,097	70,333
Chile	None	4,847
Uruguay	6,107	None
Other countries	58,900	72,022
Coke	141,003	44,883

Bunker coal loaded on vessels in the foreign trade amounted to 682,592 tons in April, 1919. Imports of coal in April, 1919, totaled 60,550 tons, as compared with 91,334 tons in April, 1918. Practically all of the imports came from Canada.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for the week ending May 26 states that a number of steamers were chartered to carry coals to ports in Brazil, Argentine Republic, West Indies and in Europe, all at the chartering executive's rates. Additional tonnage is also being offered for these destinations, at the chartering executive's rates, and although many shippers have endeavored to secure a reduction in these rates to South American and West Indian ports, they have not met with any success.

The chartering executive's rates are as follows:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50; 300 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons dis.; Rio, $19.50 net, 1000 tons dis.; Santos, $19.50 net, 1000 tons dis., or $21 net, 600 tons dis.; Buenos Aires or La Plata, $18.50 net, 1000 tons dis.; Montevideo, $19.50 net, 750 tons dis.; Pernambuco, $18.50 net, 500 tons dis.; Bahia, $18.50 net; Bahia Blanca, $20, 1000 tons dis.; To Nitrate Range, $16.50 gross, prepaid.

Sail (maximum)—Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Rio Grande do Sul, $20.50 net, 400 tons dis.; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. To Nitrate Range, $16.50 gross, prepaid.

South Wales Coal Shipments

During the month of April the total coal shipments to foreign destinations from South Wales ports amounted to 1,551,157 tons of a declared value of £2,674,914. Out of this quantity Cardiff (including Barry and Penarth) shipped 925,936 tons of a value of £1,607,200, the composition of the coal being 564,057 tons of large, 294,567 tons of smalls and 67,312 tons of through and through. Newport exported 212,179 tons of large, 112,860 tons of small and 9364 tons of through and through—a total of 334,403 tons of a value of £557,166. Port Talbot shipped 101,670 tons of a value of £164,081; and Swansea 189,148 tons of a value of £346,467.

The coastwise shipments in April last were as follows: Cardiff, 36,399 tons; Newport, 47,600 tons; Port Talbot, 4599 tons; and Swansea, 8676 tons—a total of 97,274 tons. In addition 11,629 tons of coke of a value of £31,472 were exported. These shipments do not include the coals cleared on Admiralty account. The quantity of patent fuel shipped coastwise was as follows: Cardiff, 37,120 tons; Newport, 6955 tons; Swansea, 75,042 tons; and Port Talbot, 16,473 tons—a total of 135,590 tons of a value of £269,809.

The quantity of bunker coals shipped for the use of steamers engaged in the foreign trade during April amounted to: Cardiff, 163,332 tons; Newport, 54,447 tons; Swansea, 24,544 tons; Port Talbot, 12,442 tons; and Llanelly, 895 tons—a total of 255,660 tons.—Journal of Commerce.

German Coal Situation

The coal producers of Germany are complaining that the advances of wages to the miners and the increasing demands of the latter for more wages and shorter hours are seriously injuring the coal industry of the country. The Berlin Chamber of Commerce has submitted to the German Government a memorandum showing the serious injury inflicted on the German coal industry in consequence of the exorbitant demands for higher pay made by the workmen and the officials. The situation is summed up by the Chamber of Commerce as follows:

In Upper Silesia hewers were paid in peace times 9 marks for a nine-hour shift. During the war these wages rose to 13 marks per shift, while the everage output declined from about 1¼ tons to three-quarters of a ton. At the beginning of November the miners demanded and received 18½ marks per shift. Simultaneously with this advance, the average production declined fractionally again. As a result, the cost per ton for the hewers' wages alone is now 24½ marks, as against 7½ marks in pre-war days.

In order to meet this increased cost the coal syndicate owners raised the price of coal 10 marks on Jan. 1, 1919. If to this be added 20 per cent. Government tax on the price of coal, the additional burden placed on German industries by this advance in wages will amount to 3,000,000,000 marks, assuming that the total production of coal in Germany to reach 250,000,000 tons per annum. This sum is 2½ times as much as was expended annually upon the German army and navy prior to the war.

The great increase in coal prices will have a very serious effect upon production costs in the iron and steel industries. Pig iron, which formerly cost 60 marks a ton, cannot now be made for less than 248 marks per ton. It is impossible to estimate all the consequences of this agitation for higher wages, but the competitive capabilities of German industry in the world will be seriously affected by it. As wages in other countries, which are abundantly supplied with cheap raw materials, are far behind the German rates, it will be impossible for the impoverished empire to regain anything like its former prosperity unless the workmen decrease their demands and increase their average output.

Coal and Coke Exports from New York in April

Shipments of coal and coke to foreign countries from the Port of New York during April of this year show a falling off from the shipments for the corresponding month in the two previous years. There was a considerable falling off in shipments of anthracite to Canada in April of this year as compared with the same month in 1917 and 1918, owing no doubt to the lack of bottoms or at least to the high freight rate asked. But three countries received bituminous coal through the Port of New York during April and the tonnage was more than 2000 tons less than was shipped during April of last year, while the average price per ton was 59c. less.

Coke shipments also show a decrease as compared with shipments in previous years, 468 tons having been exported as compared with 633 tons in April of 1918 and 1325 tons in April of the previous year. Comparing the average cost per ton shows than in April of this year it was exactly $10 less than it was in April of last year, but nearly $3 higher than in April of 1917.

Shipments of anthracite, bituminous and coke, compared with the same month in 1917 and 1918, are shown in the following tabulation.

	Anthracite						Bituminous						Coke					
	1917		1918		1919		1917		1918		1919		1917		1918		1919	
To	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Argentina									2,671	$18,391					394	$9,893		
Barbados	51	$574	50	$708														
Bermuda			30	270									4	$33			190	$1,582
Brazil									409	2,895			400	7,582				
British S. Africa													2	44				
British West Indies	15	122			30	$180												
Canada	6,905	42,622	3,829	24,098	1,261	9,954												
Chile	438	3,506					101	$1,325					361	5,592				
Costa Rica													32	594			8	192
Cuba			1,747	15,035			70	449							30	900		
Colombia											15	$260	10	282	5	140	18	515
England													437	3,174				
France	20	240															395	5,600
French West Indies													20	165	8	228	8	206
Haiti									1	18								
Jamaica	4	48																
Mexico	38	270	10	210											112	3,305		
Newfoundland	283	1,429	567	3,561	404	3,234												
Panama													3	22	35	1,050		
Peru	98	1,123											2	57	10	280	33	1,043
Port. Af.											316	2,370						
San Domingo	475	3,126	874	5,903							670	3,698	5	84	4	130		
Salvador													45	412			4	96
Uruguay															20	411		
Venezuela	110	1,169											4	66	15	420	2	59
Total	8,339	$53,106	7,107	$49,785	1,695	$13,368	171	$1,774	3,081	$21,304	1,001	$6,328	1,325	$18,107	633	$16,757	468	$7,711
		$6.36+		$7.00+		$7.88+		$10.37+		$6.91+		$6.32+		$13.66+		$26.47+		$16.47+

COAL AND COKE NEWS

Harrisburg, Penn.

On May 28 the administration compensation bill was re-reported to the Senate judiciary special committee practically as drawn by Attorney General Schaeffer. The committee has not accepted any of the amendments demanded in the measure by Joseph Grundy. Any amendments that are made in the bill will follow hearings on the house side of the Legislature. No changes are now contemplated except such as are calculated to strengthen sections that may not be clear as to their intent. The general principle of an increase in the basis of compensation from 50 to 60 per cent. of the weekly wage, with $20 as the legal maximum and a minimum payment of $6 a week will be adhered to.

The bill reorganizing the compensation board has been reported from committee. This bill raises salaries and makes the board a purely judicial body, all its administrative features being taken away.

The Senate passed the rehabilitation bill. The measure now goes to the House. The bill creates a department of rehabilitation in the department of labor and industry that will be charged with the duty of providing for the rehabilitation of workers injured in the industries and coal mines as well as for the rehabilitation of congenital cripples.

On May 28, a committee of senators was appointed to confer with anthracite coal operators in an effort to solve the mine cave question. Senator Max Leslie, of Pittsburgh, chairman of the sub-committee, states that he will endeavor to have the present voluntary agreement with the coal companies in the Scranton region greatly broadened.

For nearly the entire session Senator Davis, of Lackawanna, has been fighting to have his two bills reported out of committee with an affirmative recommendation. Some members favor reporting out the second bill of the Senate or calling for the appointment of a Pennsylvania Anthracite Mine Cave Commission.

With the exception of Senator Davis, the members of the committee were against reporting out the first Davis bill, all expressing the opinion that it would not remedy conditions, and to put a man in jail would not repair damaged property, etc.

Charleston, W. Va.

Developments during the week ended May 24 in the West Virginia coal fields demonstrated that coal was in far greater demand and that it was only a question of time until it would be difficult to secure all the fuel needed in various markets. While production had not reached its limit yet the average output of the state was from 66⅔ to 75 per cent., and in some instances was even higher. In every market to which West Virginia coal goes there was a lively demand. That applied to tidewater, to general eastern and western markets, and to the Lakes in particular. The volume of lake business up until the latter part of May had been steadily growing.

Market conditions have improved to such an extent and the demand for coal is such that a number of West Virginia producers have disposed of their entire output for some time to come. That is particularly true as to the producers of smokeless coal in the New River and Pocahontas regions. Many of them no longer have any coal to sell. Their output is sold. These smokeless coals are now quoted at $3 a ton.

Regions producing these coals are rapidly reaching full production. Though not yet operating on a full time basis, preparations are being made to work up to full time capacity as soon as labor conditions improve. Scarcity of cars may also prevent getting capacity product to market.

The trend of development in the Pocahontas district may be seen in a rapid reduction in the no-market losses from 88,000 to 64,000 tons—a gain of 24,000 tons. A total of 25,000 tons has been cut off the total production losses, which were reduced from 114,000 to 88,000 tons; production mounted from 285,000 to 289,000 tons. Production is now approximately 66⅔ of capacity. The labor shortage is gradually entailing heavier losses, now being 18,000 tons—an increase of 2000 tons. There was also a 100 per cent. increase in the car shortage loss.

While the market for coal is much improved there is little or no demand for coke, the production being only a little over 8000 tons. Prices are firm, with run-of-mine smokeless quoted at about $3 a ton.

Production in the Kanawha region has been further stimulated by more numerous orders from the Lake areas, though at the same time there is a large tonnage movement to general western markets. Some Kanawha producers are sold up to capacity for some time to come, though not all mines in the district are in operation; mines working operate from four to six days a week. On May 27 production was twice as large as it was on May 1. The output of the district as a whole has now reached about 70 per cent. of normal. Prices are stiffening quite materially.

Conditions in the Logan district were featured chiefly by a car shortage entailing a loss of 56,000 tons; the total production loss jumped from 127,000 to 175,000 tons. The output dropped from 176,000 to 164,000 tons, a loss of about 10 per cent. Last year's production during the same weekly period was 214,000 tons. Figures show a larger demand for Logan coal, no markets costing a loss of only 28 per cent. of full time capacity.

Fairmont, W. Va.

There continues to be a growth in the tonnage of coal mined from northern West Virginia coal fields in response to a much increased demand from all quarters, the total number of cars loaded during the week ended May 24 being in the neighborhood of 4600. Should loadings continue at the same rate until the end of the month, it will mean a total of about 18,000 cars for the month, or 4000 and perhaps 5000 cars more than for April; so it is safe to estimate a production of about 66⅔ per cent. in the northern West Virginia fields. As a result of such conditions idle mines are dwindling in number. Mines heretofore idle are not only now supplying the Lake trade but the export trade as well, and other western consuming areas are also absorbing more coals. However, Lake shipments are exceeding shipments to Chicago and other general western markets. So far the proportion of eastbound is much larger than westbound coal, shipments of railroad fuel swelling the volume of eastern shipments. Some of this coal, however, has been sold at extremely low prices. That a car shortage is impending is the belief of many shippers in northern West Virginia, although few if any operations have so far failed to receive an adequate supply. But only about half as many cars are coming into the district as was heretofore the case.

Louisville, Ky.

Louisville and western Kentucky coal operators, after a long and hard fight, have finally secured justice in connection with discriminatory rates on western Kentucky coals which made it impossible to compete in markets north of the Ohio River and also in Mississippi Valley and southwestern markets. The Ohio Valley Coal Operators' Association has been fighting the rate issue for many months. On May 21 this association secured the order of the Interstate Commerce Commission which directed the railroads to make marked reductions in rates on coal from the district (effective Sept. 1, 1919) to the Mississippi Valley, southwestern territory, Illinois and various northern and western states. The association assailed certain rates as being unjust, naming the Illinois Central and nearly a hundred other lines as instances. The commission held that many of the rates were unduly prejudicial as compared with rates to competing points, although not unduly high.

This will enable the western Kentucky operators to enter the general markets with a much better chance of securing profitable business. Due to the low prices on western Kentucky coals and unreasonable freight rates, it has been impossible to mine coal profitably and market it in many sections, especially north of the Ohio and in the far South. The result has been that western Kentucky operations, except where deliveries have been made by barge, have been held to a rather small field.

Alberta, Canada

Some minor changes were made in the Mines Act of the Province of Alberta at the session which recently came to a close. One amendment provides that the provisions of Section 29 of the act shall not apply to mines where coal is mined by removing all the overlying strata. This section also deals with the management of a mine, making it obligatory that its operations shall be under the "control and supervision" of a certificated manager; laying down rules and regulations to enforce the keeping of underground workings in such condition as will safeguard workmen. Another alteration provides for the semi-monthly payment of wages in coal mines as follows: "Wages earned from the 1st to the 15th day of each month shall be paid on the first Saturday after the 26th day of the same month, and all wages earned from the 16th day to the end of the month shall be paid on the first Saturday after the twelfth day of the following month; provided that if any of the Saturdays in question is a holiday the wages shall be paid on the Friday before." The power given an employer to retain money due for doctor's fees has been repealed. Safety lamps shall be inspected by a person holding a first, second or third class certificate. The two persons appointed by workmen to inspect a mine shall be practical miners.

PENNSYLVANIA

Anthracite

Lansford—The Hauto washery of the Lehigh Coal and Navigation Co., after being idle since the middle of February, resumed operations recently.

Pittston—The Kingston Coal Co., the Conlon Coal Co., the Haddock Mining Co., and the Lehigh & Wilkes-Barre Coal Co. are included in a list of Wyoming Valley employers who have made definite public announcement that former employes who went to war will be reinstated in their old jobs as fast as they return to claim them.

Scranton—The total production of anthracite by the Delaware & Hudson company in 1918 was 9,059,228 tons (long), an increase of 415,505 tons or 4.8 per cent. over 1917 shipments. The year's output was 11.8 per cent. of the total production of the anthracite mines and washeries. The number of breaker hours required for the company's production was 55,191.

Auburn—The South Mountain Coal Co., a new enterprise, has opened a washery at this place in Schuylkill County, where coal will be reclaimed from the Schuylkill River. The plant will have a daily capacity of about 600 tons and the output will be chiefly steam sizes. Capital was supplied by Hazleton and Philadelphia interests.

There are approximately 30 washeries, active and idle, on the Schuylkill River between Pottsville and Port Clinton, and a Pottsville authority says that there is about 50,000 tons of steam coal, for which there is a dull market at present, now stored at these plants.

Pottsville—Deeds recorded at the court house at this place recently show that a total of 3967 acres of anthracite coal lands changed hands. Four of the deeds recorded are from the Schuylkill Coal and Iron Co. to the Hudson Coal Co. The deeds in question include: A tract of 870 acres of land in Norwegian Township; 251 acres in Pottsville and Norwegian Township; 100 acres in Tremont and Tremont Township and 898 acres in Branch Township. Two other deeds recorded show transfer of coal lands to the Hudson Coal Co. as follows: One deed gives title to 529 acres Tremont

and Reilly townships; another deed transfers 1319 acres in Blythe and Schuylkill townships. A consideration of $10 was recorded in each case.

Bituminous

Latrobe—On the night of May 19 the barn of the Ridge Coal Co. near this place, burned to the ground. The barn was a 40 x 60 ft. structure. The loss is covered by insurance.

Washington—The Pittsburgh Coal Co. has purchased two tracts of coal land from William F. Ellwood, Susan E. Mounts and Agnes E. Brownlee, all of Washington, and E. E. Morris, of Waynesburg. One tract in Amwell Township contains 15.8 acres, and the other in Canton Township contains 108 acres. The price paid per acre was $300.

Waynesburg—An important sale of Greene County coal land took place here on May 13. Sheriff J. E. Adamson sold an undivided one-seventh interest owned by James R. Barnes, of Uniontown, in 126 tracts of coal in Center, Franklin, Washington and Morris townships. The interest aggregated 1500 acres. John W. Donnan, of Washington, Penn., was the purchaser of this interest for the sum of $252,000, or $168 an acre.

Pittsburgh—The Bureau of Mines has charge of the making of the moving picture of the coal industry recently authorized by the National Coal Association's board of directors. It is the desire of the bureau and of the association to receive any suggestions which members may care to make. Actual filming of the scenes probably will be begun late in June or early in July. It is intended to present the subject in some detail at meetings to be held in June in Pittsburgh, Chicago, Kansas City and Birmingham. The dates of the meetings are yet to be announced.

Uniontown—A tract of coal land in Springhill Township, Fayette County, appraised at $225,000 brought $40,000 at a Sheriff's sale recently. The tract of 311 acres was bought in by attorney Luke H. Frasher.

Directors of the Taylor Coal and Coke Co. held their annual meeting here recently. C. P. Bolton, of Cleveland, Ohio, resigned from the board of directors because of ill health. The following officers were elected: F. K. Moore, president; D. B. Stauft, secretary and general manager; F. H. Ulmar, treasurer; F. K. Moore, I. H. Elliott, H. A. Fuller, all of Cleveland and M. H. Bowman, of Uniontown, directors.

WEST VIRGINIA

Hartland—An expansion of operations having been decided upon by the Fellabaum Coal Co., it is not only arranging for further openings near this place but it is also building additional side-track to reach these mines.

Sterrett—The Main Island Creek Coal Co. shortly expects to be able to increase its coal production to the extent of 6000 tons a day, through the operation of the six new mines at this place. It is stated that shipments from all the plants of this company will soon aggregate 200 railroad cars a day, under normal conditions, when all the mines are in operation.

Beckley—Many improvements will be made at the various plants of the New River Coal Co., operating in Fayette and Raleigh counties, W. Va., during the summer, all with a view to securing a larger output. The company will probably build new tipples at Summerlee, Whipple and Lochgelly. The present capacity of the company's mines is about 12,000 tons a day.

Norton—The new Y. M. C. A. building erected by the West Virginia Coal and Coke Co. at this place was formally opened recently. General Manager E. Drennen made the presentation speech in turning the building over to the community, which is largely made up of employees of the company. The "Y" building and equipment cost $20,000, and is an expression of the company's interest in its employees. Charles D. Norton, of New York, the first vice-president of the company, was present.

Rainelle—The Chesapeake & Ohio Ry. has granted main line rates on coal to the Sewell Valley railroad coal operators.

The Sewell Valley line taps the holdings of The Meadow River Coal and Land Co., of Rainelle, Greenbrier County, W. Va., and the Gauley Coal Land Co., of Boston; these companies control about 200,000 acres of smokeless coal. Various analyses show it to run 73 to 75 per cent. fixed carbon and only 0.60 to 0.68 sulphur.

The Sewell Valley line connects north and west with the Kanawha & Michigan and the Coal and Coke railroad and to the northeastward with the Baltimore & Ohio.

Charleston—A new company which lately has begun to operate in the Coal River field is the Bradley Mining Co., having recently finished construction work on its plant.

Within a short time the Malleable Coal Co., of which Samuel Butler of Charleston is general manager, will construct about two miles of railroad to connect the company's plant with the Coal River branch of the Chesapeake & Ohio railroad.

Carter Brothers, of this place, are making progress in the construction of a mining plant at Shrewsbury, where coal will be mined from the Cedar Grove seam. This firm counts on beginning the shipment of coal within a short time.

OHIO

Columbus—The state of Ohio has under consideration the purchase of 7000 acres of coal land in Vinton County. The land is to be sold shortly at public auction.

The state is spending $600,000 a year for coal, of which $60,000 is for freight. If the mining were done by penitentiary labor, it is stated, most of the fuel expense could be saved, excepting the freight item, and it would be reduced. The land is said to be underlaid with an eight-foot seam of coal. Excellent shipping facilities would be provided by the Hocking Valley and the Baltimore & Ohio Southwestern.

Pomeroy—After a suspension of work for many months, all the Ebersbach mines—the Rolling Mill, Charter Oak, Forest Run, Dark Hollow and the big new mine at Syracuse—resumed operations May 13. It is expected that work will continue uninterruptedly during the rest of the year. The coal to be mined is for the Lake trade.

INDIANA

Evansville.—With the clearing away of the tipple, the old Ingle coal mine is a thing of the past. It was the first mine to be opened in Indiana and was owned by an English syndicate. When the shaft was sunk it was called the Bodiam mine, and eventually the workings extended under the Ohio River to the Kentucky shore. The last owner of this property was J. H. Moore, the proprietor of the Crescent coal mine in Evansville.

Indianapolis—Many companies, located in southern Indiana, have filed suit in the Federal Court here, naming the Indiana Industrial Board and its members as defendants, and asking that an injunction be granted restraining the board from enforcing the amended compensation act, and elimination of Section 18, which is held to be invalid and unconstitutional, in that it compels acceptance by the coal industry and exempts other industries in similarly hazardous occupations.

ILLINOIS

Chicago—The O'Gara Coal Co., which went into bankruptcy in 1912, with liabilities of almost $5,000,000, has been declared solvent by Federal Judge Carpenter. It was announced that the company would settle every claim against it except the one of Thomas J. O'Gara, former president, for $1,500,000.

Du Quoin—An organization has been perfected in this city under the name of the Du Quoin Correspondence Mining School with D. T. Fox, of Du Quoin, and John Kincannon, of St. Johns, as directors. Through this institution, miners will be given a chance to study at night and the following courses are offered: Mine manager, 1st and 2nd class; hoisting engineer, 1st and 2nd class; mine examiner; firing; instructions in electricity and other underground work.

KENTUCKY

Louisville—The directors of the Liberty Coal and Coke Co., at a meeting in this place named S. T. Ballard, president; M. S. Barker, vice-president; K. T. Cornelius, secretary-treasurer and William N. Ewald, general manager. The company operates large mines in Bell County on the Straight Creek seam.

Russell—The large number of cars passing through the yards of the Chesapeake & Ohio, at this place, is a general index to improved conditions in West Virginia and northeast Kentucky, the daily number of cars having reached an average of about 1700. Western coal from the states mentioned is weighed at Russell and much of the coal is billed from here.

The large Solvay byproduct plant in northeast Kentucky, near Huntington, under the management of A. B. Rawn, started during the week ended May 24 on a full time basis, only seven ovens having been in operation for a time.

Williamsburg—The Southern Coal and Coke Co. and its associate companies, has now reached a daily production of 10,000 tons of coal. This company has acquired and developed additional operations in the Harlan, Ky., field and new operations in the Hazard, Ky., field. Other operations of the company are in the old Jellico field near the Kentucky-Tennessee line and the Careyville field of Tennessee. All of these operations have Louisville & Nashville railroad outlets north and south, except the Hazard field, which ships only north. The Careyville operations serve only the southern trade over the Southern Railway.

ALABAMA

Birmingham—It is reported that 15 miners, employees of the Majestic Coal Mining Co., near this place, are believed to be dead as a result of the recent disaster; 14 employees have been rescued badly burned.

Montgomery—Alabama owns a large acreage of land rich in coal. The state Legislature committee on convicts and roads pronounces the system of leasing convicts to corporations intolerable. The question has come up as to whether the state shall enter the mining field as a competing corporation. The final report of this committee on the coal mining question is awaited with interest by people throughout the state. There are over 1200 convicts in Alabama capable of doing work in the mines; many are so employed now and have become expert by years of experience.

MISSOURI

St. Louis—The Western Coal and Mining Co. and the Weir Coal Co., of both of which W. P. Hawkins is president, are sinking three new mines, one north of Franklin, one near Carona, Kan., and one at Woodrow, Mo. The tracklaying and preliminary work have been completed at each of the new operations.

IOWA

Des Moines—Production statistics of Iowa for the year 1918 just compiled by the state mine inspector's office show that in spite of the agitation for increased output and the storing of coal during the summer months, there was a smaller output in 1918 than in the year preceding. The tonage of 1918 for Iowa was 8,219,138, as compared with 9,049,806 in 1917 and 7,217,979 in 1916. Lack of help, the zoning system and the refusal of the railroads to contract for coal during the spring months of the year because of a disagreement over price are said to be the principal causes for the smaller production of 1918 as compared with the previous year. The average number of employees in and around the Iowa mines was 14,563, as against 15,464 in 1917 and 15,195 in 1916. The average number of days worked in Iowa in 1918 was 207; in 1917, 240 days, and in 1916 212 days. There were 52 mining machines in operation in 1916 and 76 in 1918.

WISCONSIN

Postosi—The surface plant of the Wilson mine at this place has been destroyed by fire. The mine has not been worked for about a year and the origin of the fire is a mystery. The burned structure cost over $20,000 and was owned principally by Platteville interests.

Edwardsville—Work has been started south of this place on a large plant which is expected to begin shipping coal in the fall. The main shaft will be 12 by 16 ft. in dimension The company developing the property controls some 18,000 acres of coal and recently announced its intention to spend $500,000 in constructing a modern mine with every appliance for mining coal successfully.

OKLAHOMA

Fort Smith—Covington and Grant of this place, general counsel for the United Mine Workers of America, has notified miners on the Choctaw and Cherokee Indian coal lands in Oklahoma, to stop paying rental to the land purchasers. This action followed the withholding of confirmation of sale of such lands by the Department of the Interior. Transactions to the extent of $300,000 in Indian lands underlaid by coal are involved. Counsel for the miners interceded for the home owners in Washington, D. C.

Muskogee—President John Wilkinson, of District No. 21 of the United Mine Workers of America, states that any effort made in Oklahoma and Arkansas

to repeal the Workmen's Compensation Act will be opposed. The act as amended by the last Oklahoma legislature increased the compensation allowed coal miners, in case of disability, from 50 to 60 per cent. of the normal wages of the injured man. Coal operators and other employers are making a fight for a repeal of this provision.

MICHIGAN

St. Marys Falls Canal—During the month of April, 1919, there passed westbound through the United States Canal 415,824 net tons of bituminous coal and 142,864 net tons of anthracite. The U. S. canal opened Apr. 10, the Canadian canal opening two days later.

Foreign News

Vancouver, B. C.—The Provincial Department of Mines has voted a sum of $50,000 to aid in the development of coal, petroleum and natural gas, lying under crown lands near the Alberta boundary.

Brussels, Belgium—The International Parliamentary Commercial Conference adopted a resolution inviting the allied and associated governments to appoint an international committee. The object of this committee is to centralize information relating to the production, transportation and consumption of fuel, with the idea of bringing about thrift in its use.

Toronto, Ont.—The annual meeting of the Crows Nest Pass Coal Co. was held on May 20. The financial statement showed profits of $216,984, as compared with $57,635 for the previous year. The coal mined in 1918 amounted to 681,942 tons, and the coke produced to 183,771 tons, as against 504,768 tons of coal and 146,533 tons of coke in 1917. Dividends paid during the year amounted to $279,499, and the total credit balance was $318,497. General Manager W. R. Wilson was added to the directorate as second vice-president.

Nanaimo, B. C.—Water is being pumped from the workings of the Suquash mine of the Pacific Coast Collieries Co., which is situated some distance north of this place on the east coast of Vancouver Island. This mine was closed when the war broke out in 1914 and since then has been practically deserted. It is understood to be the company's intention to put the mine on a producing basis at the earliest possible moment.

Personals

R. W. McFadden has been appointed purchasing agent for the Buck Run Coal Co., and also the Darkwater Coal Co., with headquarters at Buck Run, Penn.

Charles A. Greene, the Chicago representative of the Borden Co., manufacturer of Beaver pipe tools, has opened a downtown office at 549 West Washington Boulevard, Chicago, Ill.

D. L. Caulten, for the past six years assistant superintendent for Berwind White Coal Mining Co., has resigned to accept a position as mine inspector for the Fleming division of the Elkhorn Coal Corporation.

A. C. Watts, the chief engineer of the Utah Fuel Co., of Salt Lake City, Utah, has also assumed the duties of geologist of this company. The office of geologist of the company, formerly occupied by C. H. Gibbs, deceased, has been consolidated with the office of chief engineer.

H. C. Hawes is the new president-manager of the Wells-Elkhorn Coal Co. in charge of the Black Diamond and Salt Lick operations of the company. He was manager of the Salt Lick Coal Co. and succeeds W. C. Hawes, formerly manager of the Black Diamond Coal Company.

Colonel G. A. Burrell, president of the Island Refining Co., 62 Cedar St., New York City, has been awarded the degree of Doctor of Science, by Wesleyan University, Middletown, Conn. Colonel Burrell had charge of gas investigations for the Bureau of Mines for a number of years and from the time this country entered the war he was connected with war work in this and allied lines.

E. C. Mahan was recently made president of the Southern Coal and Coke Co. at its annual meeting, held in Williamsburg, Ky. Mr. Mahan succeeds the late Dr. A. Gatliff, former head of the company. The general offices of this company are at Knoxville, Tenn. T. B. Mahan remains as vice president of the Southern company. N. B. Perkins, of Williamsburg, Ky., was made secretary-treasurer, and N. L. Mahan, of Knoxville, general manager.

C. D. Boyd, formerly with the Louisville & Nashville R.R., as coal traffic manager, has opened offices at 1116 Starks Building Louisville, Ky., for handling traffic matters for the Southern Appalachian Coal Operators' Association, Harlan Coal Operators' Association, and Hazard Coal Operators' Exchange. Mr. Boyd is handling general traffic matters, and has recently gotten out a 19-page bulletin to all members relative to traffic matters and movements in April.

Obituary

Thomas Monahan, manager of the Monahan Coal Co., died at his home in Butte, Mont., on May 13. He was 39 years of age.

H. L. Hubbard, superintendent of the Superior Pocahontas Coal Co., of Davy, W. Va., died on May 17. He was 38 years of age.

John P. Reese, vice-president and general manager of the Chicago & Northwestern coal properties for the past 12 years, died Tuesday, May 27, at his home, 5614 Waterman Ave., St. Louis, Mo., after an illness of several months from a complication of diseases. He is survived by his wife and two children, Ruth and Kenneth. His body was shipped to his former home at Albia, Iowa, for interment.

Industrial News

Prestonburg, Ky.—To meet the increasing demand for its coal on the Lakes, the Middle Creek Coal Co. will add new picking tables and much new loading equipment to its plant at this place.

Bluefield, W. Va.—Sales headquarters of the Pocahontas Sales Co. and of the Glen Alum Fuel Co. have been established in the Fischer Building, Chicago, Ill., with John R. Miller as office manager.

Punxsutawney, Penn.—The Pansy Coal Co., located near Valier, Penn., has completed negotiations for the leasing of about 450 acres of coal, in the vicinity of this place, from the Berwind-White company.

Charleston, W. Va.—The New River Coal Co., operating in Fayette and Raleigh counties, is understood to be having plans prepared for extensive improvements at its various plants to increase the present capacity.

Bluefield, W. Va.—A new tipple costing $15,000 has recently been completed by the Dry Fork Colliery Co. at Yukon, McDowell County, W. Va. The tipple has a capacity of 1000 tons of coal per day. The general office of this company is at Bluefield.

Wellston, Ohio—The Wellston Hill Coal Co., of this city, Homer Goddard, president, and Earl Littler, secretary, has purchased the holdings of the Coalton Fuel Co., in Washington Township, near here, and will mine the No. 2 coal on the property. The tract contains 440 acres.

Terre Haute—The Government mine rescue car which will be permanently stationed at this place was sent to Washington, D. C., for inspection by Secretary of Interior Lane and other officials interested in rescue work. The car is most complete and up-to-date.

Widen, W. Va.—Plans are in process of of formation by T. E. B. Siler, Charleston, W. Va., and associates for the development of a total of about 1136 acres of coal located in Nicholas County, W. Va. Robert L. Porter, Charleston, and Matthew Slush, Detroit, Mich., are also interested in the project.

Johnstown, Penn.—The Cambria Steel Co. is said to be considering plans for the opening of a new mine in the Rosedale district. The company recently started operations in two other mines, and within the past year a colony of approximately 500 employees has been established in the vicinity of these plants.

Birmingham, Ala.—The Macomber & Whyte Rope Co., manufacturer of wire rope and wire, at Kenosha, Wis., announces the opening of a branch office at this place under the direction of James A. Boope, southern manager, 805 American Trust Bank Building. This company's business is reported to have increased rapidly during the past few years in the South.

Charleston, W. Va.—A power house is to be added to the plant of the Kanaelk Coal Co., near Clendenin. The same company will construct more houses and will also install additional side track.

Pittsburgh, Penn.—Now that the United Coal Corporation has become the Hillman Coal and Coke Co., and the management consolidated with other Hillman companies, it is stated that the personnel of the combined management will be: William L. Affelder, general manager of the Hecla Coal and Coke Co. and the Thompson Connellsville Coke Co., general manager; Harris T. Booker, general superintendent of the United Coal Corporation, general superintendent; and J. Dickerson Martin, chief engineer of the United Coal Corporation, chief engineer.

Frankfort, Ky.—Under a decision of the Franklin Circuit Court, of this place, the Federal Coal Co., is entitled to recover $2,700 mortgage tax paid for recording a mortgage on eastern Kentucky coal property. The company purchased the tract and mortgaged it, the tax amounting to the sum sued for. Afterward the company lost its title to the land in a suit in a Federal court and a commissioner was appointed to cancel all encumbrances. The company demanded a return of the mortgage tax, contending that under the conditions the instrument filed was not a real estate mortgage.

Milwaukee, Wis.—The Nordberg Manufacturing Co. is manufacturing a new type of Uniflow poppet valve engine. It is known as the Nordberg-Todd and is built in sizes ranging from 200 to 2000 hp. for any available steam pressure, any available superheat, any available vacuum and any available back pressure. The assertion is made that under any of these conditions the engine will operate with lower steam consumption per horsepower, over wider variations of load, than any steam prime mover thus far developed. The engine can be changed from condensing to non-condensing operation, or the reverse, while running.

Huntington, W. Va.—The Main Island Creek Coal Co. will hereafter have its Western sales office at Indianapolis only instead of at Richmond, Ind., and at Chicago, Ill. The offices at both these latter points have been discontinued, according to an announcement made by D. J. Payne, of this city, general sales agent of the company. A new concern which has just entered the producing field is the Brush Creek Coal Co. Its plant has been completed and is now operating, dumping over three tipples. The company, however, proposes to use three additional tipples and has started construction work on such structures. H. C. Jones, of Logan, is president of the new company and James Gent is superintendent. The plant of the company is at Costa, on Coal River.

Du Quoin, Ill.—The Hamilton Coal & Mining Co., of Weir, Kansas, is now completing plans for the opening of a large strip mine northeast of this city, on a tract of land which was recently acquired by it. This will make the second large strip mine to be opened up in the last year within the city limits of Du Quoin. The other strip mine is owned and operated by the E. J. Scott Coal Co., a St. Louis company; at the present time this stripping has a capacity of 600 tons. The company has sufficient acreage to enable it to operate this mine for five years or more.

Stripping is fast becoming a popular method of coal mining among Southern Illinois operators. Every acre of coal land suitable for stripping is being leased and at the present time there are many tracts near Du Quoin which are under option.

Crooksville, Ohio—The Sunday Creek Coal Co. has taken over all the properties of the Sunday Creek Coal Co. of New Jersey, the Buckeye Coal and Railway Co., and the Ohio Land and Railway Co. By this transaction the Sunday Creek becomes the owner of the larger part of the holdings of the Buckeye Coal and Railway Co., of southeastern Ohio. The holdings of the Buckeye Coal Co. consist of two mines, several hundred houses, a large store, a hospital and theater at San Toy. This is one of the valuable mine properties of Ohio. New tipples, shaker screens and loading booms are being installed by the company in the Sunday Creek Valley mines, which include Corning, Hemlock, Buckingham, Congo and Shawnee. The Tropic Mining Co. has purchased the holdings of the Sunday Creek Co., at Rose Farm, the purchase including all surface, company houses and other property of the Sunday Creek Co. in that section. It is stated that the Tropic company soon will begin development work on its newly purchased territory.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Soft Coal Market Generally Inactive, Although There Is Some Improvement—More Buyers Coming Into Market—Operators Not Eager to Sign Long-Time Contracts—Anthracite Industry Active, Though Not on Steam Coals

SPEAKING broadly, the soft-coal market is inactive, although there is a slight improvement evident all along the line. Coal for prompt shipment can be bought at prices lower than those quoted on contract business, making it clear that operators are taking into account the uncertainties that may surround them later on in the year. In more than one instance operators have refused to bid on contracts, preferring to take the market as they find it. Quotations for future shipments are likely to grow firmer from week to week. A few of the large consumers who had been out of the market for some time are now making purchases quietly at short intervals, but the volume of this kind of buying is small and seems to exert no strengthening effect on the prices for spot coal. In fact, prices on coal for prompt shipment have been lower the past week or two than at any other time this season.

Operators are evidently expecting labor trouble in the near future, for they are insisting on labor clauses in all contracts. Consumers have already begun to realize that it is becoming increasingly difficult to close for their future needs. Production of soft coal for the week ended May 24 totaled 8,719,000 net tons as against 11,569,000 net tons for the same period last year. Prices generally are being maintained, with indications pointing to an early advance in the better grades, such as Pocahontas and New River.

An encouraging note has been struck in the Middle West. About 75 per cent. of the steam trade in Michigan and Indiana has already been covered by contract, and if consumers in Illinois, Wisconsin and Minnesota follow suit it will enable the interior mines to work more regularly than they are now working. In the latter states probably less than 50 per cent. of the industries have contracted for their future coal supply.

There is no apparent let-up in the demand for the domestic sizes of anthracite, and retail dealers continue to be deluged with orders from consumers who are insistent upon prompt deliveries. Egg, stove and chestnut are the sizes in greatest request, while the operators and dealers find that broken and pea coal are being disposed of with difficulty. The steam sizes of anthracite, on the other hand, are somewhat draggy, and extreme cuts in price have been made on the smaller sizes, particularly rice and barley, in order to stimulate buying. On June 1 all the producing companies increased their prices on the domestic sizes of anthracite 10 cents a ton, in accordance with their circular announcement of last March, when the spring prices were established. The output of hard coal for the week ended May 24 totaled only 1,679,000 net tons, which is approximately a decrease of 65,000 net tons compared with the week preceding. During the like period in 1918 the anthracite mines produced 2,005,000 net tons.

The movement of coal to the lake docks, for transshipment to the Northwest, is moderately active. The tonnage of coal available is not sufficient to load all the carriers that offer themselves. It has not been possible to attain a loading total of 1,000,000 tons a week thus far this season.

WEEKLY COAL PRODUCTION

The improvement in production of bituminous coal which was recorded during the past few weeks continued through the week ended May 24, when the output was estimated at 8,719,000 net tons. This tonnage, while considerably in excess of the production during the week ended May 17, estimated at 8,442,000 net tons, was far below the output of the week ended May 25, 1918, estimated at 11,569,000 net tons. The daily average per working day during the week ended May 24 is placed at 1,453,000 net tons as against 1,366,000 net tons for the calendar year to date, and 1,807,000 net tons, the daily average for the same period of last year.

The production of anthracite during the week ended May 24 is estimated at 1,679,000 net tons, a decrease of approximately 65,000 net tons, or 4 per cent., compared with the week preceding. The daily average during the current week is placed at 280,000 net tons, as compared with 246,000 net tons for the calendar year to date and 334,000 net tons, the daily average for the corresponding week of 1918. For the period Jan. 1 to May 24 the production is estimated at 30,538,000 net tons, and is far below that of last year, estimated at 39,149,000 net tons.

Bituminous coal dumpings at the lower lake ports during the week ended May 17 are estimated at 911,309 net tons, and exceed the tonnage dumped during the same week of last year by approximately 115,000 net tons, or 15 per cent. For the season to date the dumpings at the lower lake ports amount to 3,132,157 net tons as against 2,843,011 net tons during the corresponding period of last year.

The demand for coal is improving, the general average of time lost on account of no market decreasing from 39.2 per cent. in the week ended May 10 to 36.4 per cent. in the week ended May 17. Excepting the Westmoreland, Fairmont, Virginia, Iowa and the fields in the western states, all districts recorded improvement in the demand for coal. In eastern Kentucky, two districts—Hazard and Harlan—report no market losses of less than one day a week and to exceed 80 per cent. operating time.

The production of beehive coke in the United States during the week ended May 24 is estimated at 249,828 net tons as against 210,657 net tons during the week preceding, and 620,090 net tons during the corresponding week of 1918. Improvement over the week preceding occurred in all the states, with Pennsylvania making the greatest gain. For the calendar year to date the production of beehive coke is placed at 8,215,277 net tons as against 11,964,490 net tons during the same period of last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is less than the extraordinary large volume of the corresponding week a year ago. More customers are in the market and all report a continuance of excellent retail business. Orders from road salesmen for both immediate and future delivery are greatly in excess of the corresponding week of 1918. Collections are excellent.

The Iron Age—Demand for steel has improved measurably and sentiment throughout the trade has turned for the better. The Railroad Administration has bought under protest the 200,000 tons of steel rails on which bids were taken May 17, paying $47 for open-hearth rails, the price named by the Bethlehem, Lackawanna, Colorado, Carnegie, Illinois and Tennessee companies. The Midvale bid was $57 for open-hearth and $55 for Bessemer rails. The Lackawanna and Bethlehem awards were 40,000 tons, while the Colorado mill received 20,000 tons and the three Steel Corporation subsidiaries 100,000 tons.

Dry Goods Economist—Highly encouraging as an index of demand for dry goods are the reports from agricultural sections, which are unanimous in pointing to continued wealth for the farmer. The labor situation in many textile centers is getting easier. The chief disturbance to production at present is the demand of silk weavers in Paterson, N. J., for shorter hours and higher wages. In one silk mill in Pennsylvania the operatives have struck with similar demands. In the strike of the operatives in New York garment factories there have been no important developments. Conferences between representatives of the union and of the manufacturers are held daily, but these have so far been without practical result.

Atlantic Seaboard

BOSTON

Widening differential between spot and contract business. Spot market reacts unfavorably under stress of present conditions. Undertone begins to change for the better. Fairmont grades still sluggish. Hampton Roads coals unchanged. Local capital shows interest in fuel oil. Anthracite demand continues.

Bituminous—The bids opened by the Navy Department on May 29 are the first

real indication of materially firmer prices on the steam grades for season delivery. It is clear that operators are now taking into account some of the uncertainties involved in contract undertakings for the next ten months, and quotations for shipments beyond the next 60 days are likely now to harden from week to week. In some instances shippers have declined to make prices for futures.

The spot market has been influenced both by the diffident buying that has prevailed from the opening of the season and by the prices at which so much locomotive fuel has been placed. The anxiety to keep mines in operation has also been a factor, but the result thus far has been without any material increase in output. So far as this territory is concerned, receipts show the same low average that has obtained since February and we have yet to see any marked increase in movement either all-rail or by water, although it is probable that the railroads from now on will make an effort to build up their reserve supplies. A few of the larger buyers who had kept aloof from the market are now making quiet purchases from month to month, or even from week to week, but the volume of coal arranged for in this way has been small rather than large and seems to have had no bracing effect on spot prices. In fact, on certain grades all-rail, spot figures have been lower the past fortnight than previously this season.

The undertone, however, is steadily changing. Some steam users have already begun to realize it is not so easy to get covered on desirable grades at the contract prices quoted 30 days ago, and while we are not yet in position to report any considerable advance in the f.o.b. mine basis, it is increasingly evident that operators are insisting upon labor clauses in all contracts.

The Fairmont district seems especially distinguished this year for low prices. The labor situation there has seemed more stable than in central Pennsylvania and there has been more effort to get spot business. At the same time this territory is always slow responding to high-volatile coals and aside from the railroads only a light tonnage has been placed. There are enough low volatiles of known quality to meet requirements thus far and it is the exception where coal of any but medium to high grade has been purchased. The through tariffs operate against coals emanating from the W. M. and the B. & O. in any case, and that is a further reason why West Virginia coals all-rail have had only a restricted market in New England.

Pocahontas and New River show no perceptible change. Prices offshore for deferred loading should soon show an upward trend, however, if the recent Navy proposals are any criterion. For the moment barge transportation is less easy to secure from the Southern ports and that, too, has caused a slight uneasiness on the part of those who continue to depend upon Hampton Roads sources. There are still selling efforts on the basis of $2.35 per net ton f.o.b. mines or $4.69 f.o.b. vessel, but apparently such offerings are more restricted than was the case a few weeks ago. Less is heard of market cargoes and on the whole there is more firmness to quotations for inland delivery. Export inquiry is being closely watched in the hope that better prospects will soon develop. At Hampton Roads the tenders to the Navy Department were in the aggregate considerably less than the requirements advertised and the trade here is interested to see what attitude the bureau officials will take.

A new development in oil is arousing some comment. The Massachusetts Gas Companies, of which the New England Fuel and Transportation Co. and the New England Coal and Coke Co. are subsidiaries, have organized an oil company to fabricate and distribute oil for fuel and other purposes.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.75@3.35
F.o.b. Philadelphia, gross tons	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.35

Georges Creek is quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $4.69@5.14 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $6.89@7.24, and on cars Boston and Providence at from $7.60@7.90 per gross ton, the latter being the contract price f.o.b. cars for season delivery.

Anthracite—There is no slackening in the demand for domestic sizes. The pressure is steady both all-rail and by water to get household coal forward and the retail dealers continue to be swamped with orders from people who are insistent upon prompt deliveries. There are actual cases where small dealers have delivered during April and May a tonnage nearly 50 per cent. of what they received in the 12 months previous to Apr. 1, and instances are numerous where dealers have made deliveries of 20 to 25 per cent. of the year's business. Egg, stove and chestnut are the sizes in greatest demand, while broken and pea are little heard from. The steam sizes are draggy and radical cuts have been made in list prices, particularly on No. 3 or barley, in order to induce buying. Coastwise New England has not thus far had any greater quota than a year ago, and there is a great deal of anxiety over the outlook. If the city markets like Philadelphia and New York would ease up on their demand there would be more chance for New England. Distributors here are hoping there will be something of this kind during June.

NEW YORK

Anthracite market strong and demand steadily increasing. Production far behind and the industry faces a serious situation. Operators lack certified miners. Independent operators find good market and premiums are offered for their product. Anthracite steam sizes plentiful and prices are easy. Tidewater bituminous situation quiet. Coal moves slowly.

Anthracite—The market continues strong so far as the domestic sizes are involved, with the demand steadily increasing and dealers urging more frequent shipments. The trade is no doubt facing a severe winter, and the producers are urging early buying. Production is far behind and consumers who were slow in placing their orders are now beginning to realize that they might have to wait for their coal.

Conditions in the mining regions do not appear to be satisfactory for reducing the loss already existing in production so far this year. One reason for this, as pointed out last week, is the shortage of certified miners. This condition has existed for the past couple of years, while there is an abundance of help for the other jobs about the mines.

The mines are working steadily, but do what they will producers seem unable to catch up, even in a small way, with the heavy demand made upon them for the larger sizes of anthracite. Some operators claim to be sold ahead for several weeks for these sizes, while a few of the so-called Independent operators have let it be known that they can receive no new orders at this time.

The asking of premiums for domestic coals by some of the so-called Independent operators has been heard of, but the practice has not become general. These reports have it that as much as 30c. has been asked for some of the domestic sizes, but retail dealers so far have not been willing to pay anything above the regular company schedule, inasmuch as they have the greater part of the summer before them.

The second monthly advance of 10c. per ton for the domestic sizes, including pea coal, went into effect on June 1. It was said that some of the so-called Independent producers were adding 20c. per ton instead of 10c., while others were adding 15c. per ton.

Demand continues strong for stove, egg and chestnut in the order named. There is also a good call for pea coal.

The anthracite steam sizes are proving a burden to the trade. Factory yards along the railroads are well stocked and some of the larger producers are taking advantage of the situation to store these coals. Prices are easy, buckwheat being quoted at as low as $2.75 at the mines, rice 50c. lower and barley as low as $1.50, much depending upon the quality of the coal. Some of the cheaper grades of barley are reported as being quoted at still lower prices.

The situation regarding the small sizes is becoming serious. Dealers are refusing to make room for the surplus and most manufacturers have taken all they can handle. Then again it is possible to obtain good grades of bituminous at less than it costs to procure the better grades of buckwheat, with the result that some manufacturers are seriously thinking of using bituminous coal altogether.

Dumpings of anthracite at the railroad piers for the week ended May 30 were 4366 cars as compared with 6036 cars the week previous, a decrease of 1670 cars.

Bituminous—It has been many months since conditions in the local bituminous market have been anything like they now are. The situation is practically listless. Demand is slow and free coals are hard to move. Were it not for the quantity of coal shipped on contracts the local market would be "dead" and the piers under embargo. As it now stands, many shippers have been embargoed for a few days at a time.

Operators continue to hesitate before adding to their contract requirements. They are not willing to take on any more obligations although they would have no trouble to obtain their price. With labor as it now is, producers are not positive as to how production will be next winter. On the other hand, consumers who have held back for lower prices are now anxious to get under cover.

During the week ended May 29 the dumpings of bituminous at the various railroad docks were 5378 cars as compared with 5842 cars the week previous, a decrease of 464 cars.

Quotations on the various grades, mine price, for spot and contract delivery, range as follows:

	Spot	Contract
South Forks	$2.90@$3.25	$2.95@$3.50
Cambria County (good)	2.75@ 2.95	2.95@ 3.25
Clearfield County (good)	2.50@ 2.75	2.80@ 2.95
Reynoldsville	2.50@ 2.75	2.75@ 2.95
Quemahoning	2.65@ 2.85	2.95@ 3.10
Somerset County (best)	2.50@ 2.75	2.95@ 3.10
Somerset County (poor)	2.00@ 2.35	2.50@ 2.75
Western Maryland	2.25@ 2.50	2.50@ 2.75
Fairmont	2.00@ 2.25	2.35@ 2.50
Latrobe	2.10@ 2.25	2.25@ 2.40
Greensburg	2.25@ 2.35	2.35@ 2.60
Westmoreland ¾-in.	2.60@ 2.75	2.60@ 2.75
Westmoreland run-of-mine	2.35@ 2.60	2.35@ 2.65

There is a good demand for anthracite from Canada, the trade, according to report, being offered 50c. above current quotations for quick shipments.

Current quotations, white ash, per gross ton at the mines, f.o.b. tidewater at the lower ports, are as follows:

	Mine	F.o.b. Tidewater
Broken	$5.95	$7.80
Egg	6.05	7.90
Stove	6.30	8.15
Chestnut	6.40	8.25
Pea	5.00	6.75
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

PHILADELPHIA

Anthracite retail orders slacken with arrival of summer weather. Dealers differ as to outlook. Operators with short production in sight expect trouble. Retailers storing pea. Egg, stove and nut continue in strong demand. Shippers loath to take new business. Pea coal sizing better lately. Steam coal unstable. June price schedule in effect. Many price rumors afloat. Bituminous dull. Rail fuel mostly covered. Better industrial buying.

Anthracite—With normal June weather prevailing there was a continuance of the slackening of interest on the part of consumers, which was quickly shown in the small number of new filling orders received by the retailers. As is usual when a sudden change in the weather affects buying, the dealers are quick to feel the change. As is often the case, also, we find they do not agree on the outlook of their business on the larger sizes of anthracite. Some argue that as there has been a very perceptible slowing up in the receipt of new business they fully expect to catch up with their deliveries by the end of June. They claim with dull business during July and August it will not be a difficult matter to stock their yards.

Those better posted dread the possibility of short supplies during the coming fall and winter. They know there is little of family sizes in storage, and that there is small possibility of the shippers filling their storage yards, because the demand is strong from all sections of the country. As a consequence there is small chance of there being a surplus.

It is just this condition which has strengthened the pea coal market. A number of the larger and also wiser buyers are slowly accumulating comfortable stocks of this size. Most dealers report their sales small, but many of them have ceased to wait for bargains and are buying slowly but regularly. The winter of 1916-17 convinced them the public will not do without fuel because they cannot obtain their favorite size, but will buy anything rather than do without.

The demand now for egg, stove and chestnut continues unabated, and today there is small tonnage in the yards, and it is nothing at all unusual to find yards without either stove or nut for short intervals.

No house is soliciting business on the family sizes, with the possible exception of pea. As noted above, this latter size has greatly strengthened and whereas some of the larger shippers a few weeks ago were running some of this coal into storage, the entire production is now being absorbed. The big companies are especially careful not to commit themselves to furnish coal to any dealers heretofore known as customers of the smaller operators, or to promise any more coal than furnished in other years. The fear of paying substantial premiums next winter is spreading and no doubt influences many in their efforts to make company connections. The representatives of the latter are very frank in explaining their prospective production does not warrant assuming new obligations.

As for the past six weeks, stove coal is by all odds in the strongest demand and in shortest supply here. Chestnut too is most active and many former buyers of pea coal have turned to it. The dealers account for this by the reason that when the price of pea was increased the size was reduced. Undoubtedly much coal came to market during the past two winters billed as pea coal that in reality was a small amount of pea mixed with large buckwheat.

Most operators have resumed their old standard of sizing and are now shipping a high class pea coal, which if continued will go far toward regaining the lost business. We have found some dealers willing to risk the guess that as the demand increases the size will again be reduced. Their judgment is based on their knowledge of the market being long on buckwheat. The call for egg remains unusual, and if this market has fallen off in its demand for pea it surely has increased on egg.

The steam coal market is quite unstable. The production of buckwheat is beyond the demand of the trade and quite a little tonnage is going into the storage yards. Rice and barley are particularly burdensome to the operators, and the storage yards are almost glutted with these sizes.

With the first of the month all of the companies increased their prices 10c. per ton on the family sizes in accordance with their circular announcement of last March, when the spring prices were established. Some of the smaller houses, following the plan adopted by them last month increased 15c. a ton, making them now 10c. higher than the company figures, and there are rumors of even greater increases.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.95	$7.80	Buckwheat	$3.40	$4.45
Egg	6.05	7.90	Rice	2.75	3.65
Stove	6.30	8.15	Boiler	2.50	3.50
Nut	6.40	8.25	Barley	2.25	3.15
Pea	5.00	6.60			

Bituminous—While some interests profess to see signs of improvement, others are extremely doubtful that any particular change for the better is in sight. It may be that the settlement of the railroad fuel problem has helped the general situation, but certainly the prices received for this coal are far from satisfactory and a good deal of the tonnage has been taken by concerns who have not heretofore participated in this business. The latest company to close was the Philadelphia & Reading, although prices have not yet been published on this business.

There is little spot trade; but some of the industrial plants are increasing their orders and it is just possible that business may pick up slowly during the summer. As a matter of fact many shippers feel that after the peace treaty is finally negotiated there will be something of a general resumption in trade.

There is little fluctuation in prices and they rule about as follows:

Georges Creek Big Vein	$2.90 @ $3.00
South Fork Miller Vein	2.90 @ 3.00
Clearfield (ordinary)	2.75 @ 3.90
Somerset (ordinary)	2.55 @ 2.70
Fairmont lump (ordinary)	2.40 @ 2.50
Fairmont mine-run	2.15 @ 2.25
Fairmont slack	1.90 @ 2.00

BALTIMORE

Improvement expected in soft coal market in near future. Anthracite demand keen with little coal arriving. Export shipments show increase.

With prices holding firm the bituminous market bids fair to show some improvement in the near future. It is the view of the trade that while dealings continue to be confined practically to the spot market, the continued inquiry would make it appear that in the near future many consumers are going to get under cover. The warning that production is not going to be able to meet the demand of the future unless mines are kept working is being heeded by many, and this will doubtless help stabilize market conditions soon.

For the best grade of coals $2.75 at tide was the high mark. This went as low as $2.50, while for the medium grade fuels $2.30 to $2.40 were the best prices. The cheap grade of fuels was offered at as low as $1.90@2, but the buyers here decline to stock any fuel of the inferior grades. The market here is strong for the best grades.

The trade is somewhat agitated over reports sent out from Washington, which set forth that President Wilson favors Government control of coal, oil and gas. Leaders of the industry point out that any further Federal control of coal would sound the death knell of the industry, but there is a sort of feeling of relief in the fact that a Republican Congress holds the whip hand and will not permit any return to conditions of a war nature.

Exports during the week picked up somewhat, and 28,963 tons of cargo and 3700 tons of bunker coal left this port for other shores. Complaint is being made of the red tape surrounding the obtaining of a charter for bottoms for foreign use. As bottoms become more and more available it is expected to provide for the rapidly increasing foreign business here. Brazil, Argentina, Costa Rica, Italy and Sweden are some of the ports of destination of the vessels leaving this port. Foreign buyers had many feelers out, but no business was closed and the cargoes leaving port were taken from the spot market.

In the anthracite market there is little change. Receipts continue to be insufficient and there is no improvement in sight. Dealers continue to urge householders to place their orders for delivery despite the fact that the April business in some instances is not yet out of the way. There is being conducted an advertising campaign by some of the dealers to stimulate buying, even with the shortage.

Lake Markets

PITTSBURGH

Demand slightly improved. Consumers conserving remaining stocks. Steel mill consumption more promising. Slack easier.

There has been a slight improvement in the line demand for coal, and with a further increase in lake shipments production in the Pittsburgh district is somewhat heavier, being estimated at well above 50 per cent. of capacity.

The steel industry has not decreased its coal consumption any farther, as with larger bookings of steel orders in the past two or three weeks than for a long time it is tending to increase its mill operations, whereas since early in the year the trend of mill operation has been constantly downward.

There is no longer much drawing upon stocks for consumption, the disposition being to hold such stocks as remain. Consumers observe that they can buy coal for prompt shipment at lower prices than they can buy for deliveries through the winter. They have to choose between believing that the coal operators are altogether wrong in their price views, or using purchased coal now at the special prices and saving their stocks for later consumption.

Slack continues to grow easier, on account of heavy production due to the movement of ¾-in. in the lake trade, and on steam slack the market is about 10c. easier on both steam and gas slack, while mine-run is unchanged. We quote: Best grades gas coal—Slack, $1.70@2; mine-run, $2.35; ¾-in., $2.50@2.60; 1¼-in., $2.60@2.70. Steam—Slack, $1.60@1.80; mine-run, $1.90@2.35, all per net ton at mine, Pittsburgh district.

BUFFALO

Slight improvement in bituminous. Not much prospect of a stir yet. Shippers confident. Industries moving slowly. Rush for anthracite. Lake shipments light.

Bituminous—The demand picks up a little here and there, but it is remarked by a leading jobber that nobody can sell coal from the office and it takes a good salesman to do much business on the road. Still there are those who do make fair sales and they are kept moving. Canada is buying a little more freely, but it all shows little more as yet than a running out of stock.

The movement of bituminous is about as formerly. Spotty conditions in the trade are reported by many jobbers. This usually precedes an increase of activity, but it may not happen right away. Still the general belief is that it will come before fall. Prices have sagged a little, but only slack shows any marked decline. Quotations: $4.55 for thin-vein Allegheny Valley, all sizes; $4.45 for ¾ Pittsburgh and No. 8 lump; $4.30 for same, ¾ lump; $4.05 for same, mine run, and $3.65 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The trade is hampered by the continued light mining. Somehow the operators are unable to keep up with the demand. Either the lake or the all-rail trade would take most of what comes this way, and the local trade is also still large. Consumers hear that a winter shortage is likely and they are eager to buy. The advancing price is also a spur, but the distributors are not able to meet it. Probably this state of things will last nearly all summer, but if so the consumers will be much better supplied than they ever have been at the outset of cold weather and ought to be able to get along so much better.

The lake trade is showing the decline of mining more than even the failure to meet the local demand. City distributors now say, though, that they are able to fill all orders and do not believe they will increase again right away, unless some new scare is sprung on the public. The lake shipments declined to 48,225 net tons, of which 13,800 tons cleared for Chicago, 8300 tons for Fort William, 7800 tons for Duluth and Superior, 7300 tons for Sheboygan, 3425 tons for the Canadian Sault, 3400 tons for Milwaukee, 900 tons for the American Sault, 3300 tons for Manitowoc.

Freight rates remain at 52½c. to Chicago, 47½c. to Milwaukee, Manitowoc and Sheboygan, 42½c. to Duluth and Fort William, $1 to the Sault.

CLEVELAND

The coal trade is reflecting the general improvement in business, and steam-coal users who for some months now have been indifferent are displaying interest. Slack is going more readily, while the lake trade is absorbing every ton arriving at Lake Erie docks. Prices, especially of domestic grades, are stiffening.

Bituminous—The operator without contracts today considers himself fortunate. In every quarter sentiment is the same—prices are going to advance steadily and a real shortage of coal threatens. Every day seems to bring forth new and larger inquiries, and the operator who has tied up a large part of his production in railroad fuel at $2 to $2.10 and lake coal at around $2.35 and $2.40 is wondering where he is going to get off. Surplus piles of slack will melt away much quicker than anticipated, and even in the face of the huge stocks at the mines some operators are figuring on putting in additional crushing equipment. The prediction is made that Dec. 1 will see slack quite short. As $1.40 slack contracts are ending they are being replaced by $1.50 and $1.60 slack. Mine-run and prepared sizes also have become much firmer, and it is doubtful if much of either grade can be touched for less than 10 to 20c. higher than was asked a month ago. Almost frantic efforts have been made lately by some of the railroads to place $2 coal, but their efforts have been fruitless. Increasing operations in the iron and steel and the rubber industries of northern Ohio insure a steadily advancing demand for coal.

The more domestic bituminous and Pocahontas is advanced the greater the demand that comes out. Forked Pocahontas now is quoted at $9, net ton delivered, by the larger retailers and this figure represents a 75c. advance in six weeks. West Virginia splint also has been marked up, and now is quoted at $7.75 to $8. Dealers continue to do a winter business.

Lake Trade—Lake Erie car dumpers continue handling about 750,000 tons of bituminous, including vessel fuel, a week, which is a slight increase over the rate at this time last year. Coal is so much in demand in the Northwest that some of the large freighters are coming down light for coal, thus reversing the usual order. A large part of the coal that is going up the lakes has not yet been priced.

DETROIT

Demand for bituminous is light in both the steam and domestic branches of the trade, despite price concessions.

Bituminous—Unsatisfactory conditions are still reported in the bituminous coal trade in Detroit. Jobbers and wholesalers

say buyers are not showing the active interest in the market that should be developing to assure an adequate and equitable distribution of coal before winter. In their opinion affairs are shaping themselves toward a situation in the fall that will draw all the buyers into the market, bidding against each other for coal that the mines perhaps may be unable to supply, even at higher prices.

Users of steam coal, with a few exceptions, are holding back. The impression prevails among some of the jobbers that they are waiting in the expectation prices will be lowered as the summer advances. Such an expectation, the jobbers say, is certain to meet with disappointment. They look for an advance as a more probable development of the later season trade.

Though smokeless coal was one of the most popular forms of fuel in many Detroit establishments before the war, little of it is now obtainable. Lump and egg are said to be so rare in the local market that quotations of $3.50@4 a net ton at the mines are conceded to be undependable. Small lots of mine-run are reported to bring $2.75.

West Virginia gas and splint lump are quoted at $2.75, mines; 3-in. lump at about $2.50; mine-run at $2.10@2.25, and slack at about $1.85. For Hocking domestic lump the mine price is given as $2.50; mine-run $2, and slack $1.50, while other coal from Ohio is said to be offered at about the same prices.

Anthracite—Household consumers seem to have forgotten their disappointments and trying experiences of the last two years in trying to get anthracite. The number of buyers stocking up for winter is not so large as dealers would desire. The supply of prepared sizes seems to be large enough to fill a greater number of orders than are being received.

Lake Trade—There is a moderately active movement of coal from mines to docks for lake shipment, but the supply is not sufficient to load all the carriers available and a loading total of 1,000,000 tons a week has not been attained this season. Inability to get downbound cargoes is causing some vessels to come down light for coal.

COLUMBUS

There is a good demand for smokeless and the better grades of domestic coal in central Ohio territory. Contracting for steam tonnage is still slow, owing to uncertainty in price. Lake shipments are becoming heavier as the season advances. A marked improvement is looked for in the near future.

Domestic users are heeding warnings that coal will likely be scarce next fall and are buying more liberally than formerly. This fact is stimulating the domestic trade, more especially in Pocahontas and West Virginia splints. Hocking and Pomeroy coal are also being bought more actively by dealers. Retail stocks are somewhat low for the time of the year, and dealers are inclined to stock up to a certain extent. Retail prices are still fairly well maintained, although some low quotations are being made. On the whole the domestic trade is becoming better and an improved tone to the trade is noted.

Steam business is still slow because of uncertainty as to the future. Reserve stocks are still being used and thus contracting is now active. Large users are able to buy coal in the open market in case they have no reserves. There is an oversupply of the small sizes, and that is the worst feature in the trade. The production of lump is restricted by the inability to dispose of screenings. Rubber plants are still pretty well supplied with fuel, and iron and steel plants are not disposed to contract.

The lake trade is becoming more active as the season progresses. Shipments at the lower lake ports are increasing from week to week. A large part of the shipments are made by concerns having their dock connections in the Northwest and the question of price does not enter into the transaction. Some agreements to move lake tonnage on a tentative contract have been made and a fair tonnage is going forward. The question of lake price is still unsettled although prices seem to be settling around $2.35 for eastern Ohio 3-in. and about the same for Hocking and Pomeroy grades.

The output is fairly good in all of the producing fields of the state. This is especially true where lake tonnage is being mined. In the eastern Ohio field production is about 60 per cent. of normal. In the Hocking Valley and Pomeroy Bend fields it is about 60 to 65 per cent. Other fields are not showing up quite so well as far as production is concerned.

Prices per ton delivered in Columbus are:

Hocking lump	$5.50@$5.75
Pomeroy	5.95
Pocahontas	7.00
Splints	6.00@ 6.25
White ash	6.25
Island Creek	6.25
Semi-smokeless	6.75
Wheeling Creek, Kentucky	6.75

CINCINNATI

Outlook is brighter. No contract business being sought as conditions in the future are being discounted now.

The outlook for the coal trade is brightening up somewhat. The uncertain business of the past few weeks is being replaced by trade of the firmer kind. There has been no exceptional demand for any grade in particular, however, all kinds moving in a satisfactory manner. Domestic grades have shown a decided improvement, and the Queen City coal men consider that this augurs well for the coal business.

The contract business has shown practically no activity, as has been the case in the past month or so. The coal men are not worrying about this, some of them, in fact, are not looking for this business at all. They claim that the state of the coal industry in the fall and winter of this year is quite uncertain, and they are anticipating some little trouble in the matter of transportation. They also claim that the labor conditions at the mine will be a little unsettled this fall, and taking these two items into consideration they are not really anxious for the contract business on a large scale.

The prices of lump coal at the mines are firmer. The movement of coal to the lakes and the northwest is reported as being comparatively light, but the belief is expressed that this trade will begin to pick up in the near future. The receipts from the mines during the past week have fallen off somewhat, but the local coal men say that they are in a position to take care of orders in a satisfactory manner, and no particular anxiety is being felt in regard to this item.

The Hamilton County Commissioners have awarded the contract for coal for the different county institutions to the James P. Bolger Coal Co. The Bolger Company's bid was $5.25 a ton for smokeless run-of-mine, $4.90 for smokeless nut and slack, and $4.49 for bituminous nut and slack.

LOUISVILLE

General movement from Kentucky mines improving, with domestic in excellent demand. Production showing steady increase, but reported to be held back slightly on account of labor shortage in eastern Kentucky field.

The demand for good block coal is better and is increasing somewhat, owing to a greater percentage of summer stocking orders from domestic consumers. Steam coals of all grades are draggy, spot coal being sold at low prices approximately, but contract coal is holding nicely. Low-grade coals are in poor demand in practically all sizes. The greater proportion of the stocking now being done is on high-grade block, as consumers are anxious to lay in sufficient stocks of good coal while it can be had.

It is claimed that with the improvement in demand the eastern Kentucky field is again feeling the effects of a short labor supply. It is held that until European labor is again imported there is not much prospect for any material improvement in the labor supply as a whole. Car supply is adequate, with all mines reporting full deliveries. Mines for the most part are working full time, but are not making full shipments. There is now a good movement to the Lake district, composed mostly of 2-in. and up block, which is increasing the difficulty in disposing of nut and slack. Railroad contracts have taken up a considerable volume of annual production, guaranteeing a fair tonnage and making for a higher and stronger market on contract coal.

A prominent producer and jobber of Louisville, in commenting on the general situation, in part said: "The United States will be in the grip of a coal famine within 90 days if coal production does not increase. Production is far below that of the war period, owing to several factors, chief of which is that the consumer is not buying coal. In eastern Kentucky many mines are short of labor, and western Kentucky mines are idle because of lack of business. Many miners in eastern Kentucky who could work full time are loafing on the job and only putting in part time. Coal companies in the city are afraid to buy heavily because consumers are not stocking and are not taking the customary quantity of coal from the agents' hands."

Prices as a whole are fairly firm and slightly stronger, with average good eastern Kentucky grades quoted at $3@3.25 per ton for block and $2.25@2.40 for mine run. Nut and slack is selling on spot at $1.50@2, with contract nut and slack quoted at $1.85@2. Jellico block is quoted at $3.35@3.50 and some good Blue Gem at $3.75, Straight Creek being offered at around $3.25. Western Kentucky is quoting block at $2.25@2.55, and mine run at $1.90@2.10, with nut and slack at $1.50@1.85 and thin screenings at $1.40 and up.

BIRMINGHAM

Shortage in domestic coal strengthens the market sharply, and when obtainable brings premium prices. Little or no change in actual sales of steam coal, though inquiries are more frequent and encouraging.

The fact that domestic grades of fuel are now so hard to obtain has resulted in the sales of such fuel being made at from 25 to 75c. per ton for the small tonnage available to the trade at this time. Most all of the domestic producers have sold up anticipated output through the year and dealers are now finding it next to impossible to place orders with brokers or at the mines. This scarcity applies to not only the best grades of domestic coal, but in a large measure to the medium and lower grades as well. Quotations effective June 1, based on the schedules arranged Apr. 1, providing for an advance of 10c. per ton each month through September, are as follows per net ton mines:

	Lump and Nut
Black Creek and Cahaba	$3.95@4.60
Carbon Hill	3.25
Corona	3.50
Montevallo	5.00
Big Seam	3.00

There has been no change in the steam situation as regards business actually booked, but indications point to an improvement in the market at an early date. Inquiries are better and of a more encouraging tone and coal men anticipate a material betterment is near at hand.

Coke

CONNELLSVILLE

Second half furnace coke contract negotiations delayed by stiffer price views of operators. Production shows slight recovery.

Connellsville coke operators have become very stiff in their views as to prices of coke, particularly for the second half of the year. Unless the blast furnaces are willing to pay considerably higher prices for second half than they were expecting only very recently to pay, contract negotiations are likely to be blocked. Compromises might be effected by making contracts on a sliding-scale basis, pricing coke from month to month relative to the prevailing market price of pig iron, otherwise coke is likely to be bought and sold from month to month at such prices as have to be agreed upon.

As last week, the usual quotation on spot or prompt furnace coke is $4, but there is less chance than formerly of shading this figure, and the lowest priced sale reported in the past week was $3.85. Off grades might go for less, but there is little production of off grades. The plants regularly making lower grades are closed and those operating are careful to make the best coke possible. Spot foundry coke remains at $4.50 for very ordinary brands, good brands readily commanding $4.75 or $5 as they have done right along.

Three weeks ago there seemed to be a prospect that many operators would offer second half furnace coke at $4, a few, making the best brands, asking $4.25, while furnaces seemed to expect to buy at about $3.50. While they had been paying about $4 for May deliveries against monthly adjustment contracts, and would probably have to pay the same for June, they expected the new half year to present different conditions. Operators, however, failed to name the expected quotations, and have

been indisposed to make any quotations, soliciting bids, while the furnaces do not care to make bids. In the past few days some operators have intimated they would consider a price in the neighborhood of $5, and as that is out of the question from the furnacemen's viewpoint the contract situation will have to await further developments. It is a small matter, however, since between two-thirds and three-fourths of the region is closed anyhow. Many furnaces are out of blast and many of those running are using byproduct coke. No contract market is quotable, and the spot market is quotable at $3.85@4 for furnace and $4.50@5 for foundry, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended May 24 at 108,073 tons, an increase of 24,789 tons over the preceding week, but a smaller tonnage than in any week prior to that ended May 10.

Buffalo—The trade is not improving. Local furnaces are all terribly slack, some of them practically shut down on account of the failure of iron to sell. At the same time it is noticed that the stock market shows a decided advance in the quotations of some of the securities. Ore is not moving any faster than formerly, so that much of the lake fleet will be idle soon unless an improvement sets in. Quotations remain weak at $7.25 to $7.60 for 72-hour Connellsville foundry, $6.60 for 48-hour furnace, and $6.10 for off grades.

Middle Western

GENERAL REVIEW

Business is picking up all along the line. The latest reports from our mid-western coal fields are all encouraging, so far as sales are concerned. The current demand for coal is good, as is the number of contracts reported closed.

As was expected, as soon as the big buyers of coal learned that the railroads were purchasing heavily, they came into the market and also showed a desire to cover their requirements with contracts. The result has been that an encouraging number of large tonnages have been sold, but it is rumored at figures more advantageous to the operators than the coal sold to the railroads.

In Michigan and perhaps Indiana, the majority of big steam plants have covered their coal requirements by contracts, which have been closed in the last few weeks. In one Michigan manufacturing center a careful investigation showed that practically all of the big steam users now get their coal on contract. It is probably a fact that at least 75 per cent. of the steam trade in Michigan and Indiana is covered by contracts. This situation is not true of Illinois, Iowa, Wisconsin and Minnesota, as probably less than 50 per cent. of the industries are covered. It is pretty generally thought that the states just mentioned will follow in the footsteps of Michigan and Indiana, as the general public is becoming more acquainted with the seriousness of the situation, and realizes that if it does not get its requirements covered soon it will undoubtedly have serious troubles over obtaining an adequate supply a little later.

It is now pretty widely known that the railroads have succeeded in purchasing their coal considerably below the figures set forth by the Fuel Administration. It is also well known that the railroads were unable to get any concessions from the steel manufacturers, and as a result have had to pay the price on whatever purchases were made. This situation has taught rather a bitter lesson to local operators, and has shown them the advantages of a strong association. It is fairly well known that the railroads' tactics in purchasing Indiana coal have given a big setback to several operators' associations in the Indiana coal-producing districts. Already a number of operators who made special low prices to the railroads are regretting their action, and it is thought that these operators will continue regretting it as the season advances.

The proposed increase in freight rates on practically all coal used in this territory has raised a protest from the coal-consuming public. In fact, it has added some to the present unpopularity of the idea of government ownership for the railroads. The proposed increase, however, has had one beneficial result, in that it has stimulated buying, both by steam users and domestic trade. When the advances are in effect, the demand for coal will probably be so strong that the increase will have but little effect on the current market. The coal trade is now confidently looking for better business and indications are that the trade will not be disappointed.

CHICAGO

Price cutting on low-grade coals, but good grades bring maximum. Prepared sizes of Pocahontas hard to obtain.

Until a day or so ago, Chicago was having a very backward spring, with cold raw weather and plenty of rain. This stimulated both the domestic and steam situations and has forced considerable buying.

The Franklin County operators report much better business in Chicago and suburbs, and this is also true of the Indiana Fourth Vein operators. The coal from less favored districts continues to be a drag on the market, and some price cutting is reported. The high-grade coal prices remain firm, with no sign of weakening; in fact, on the contrary prices in some cases advance ten cents per ton on domestic sizes, effective June 1.

The Pocahontas situation is getting stronger every day, with many dealers offering to place orders for mine-run at $3 mines, with few takers. Prepared sizes of either Pocahontas or New River are almost impossible to obtain, with prices firm at $4.25 to $4.50 f.o.b. mines.

The demand for southeastern Kentucky coals, especially from the Hazard district, continues strong, and prepared coal from that field is moving at from $3.25 to $3.50.

ST. LOUIS

Market is quiet on all sizes of steam and domestic. A little country business in evidence on threshing coal, but otherwise market is inactive.

June comes in under favorable auspices. The buyers seem to be awakening in a general way to the fact that coal is not going to be plentiful and easy to get from now on, and there is an inclination on the part of some few to get in under contracts. The largest piece of contract business reported the past week was that of the Light and Development Co., which went to the Big Muddy Coal and Iron Co. for approximately 105,000 to 110,000 tons of steam coal for its plants in St. Louis and southeast Missouri. The contract covers a period of one year. The prices were not made public.

Locally, the situation is bad. Little domestic coal has been ordered for storage so far, but indications point to June as a good storage month with the climax perhaps in July. There is a shortage of anthracite in the St. Louis market, owing to the sudden demand for anthracite storage coal. The scarcity is principally noticeable in the egg size, and there is little hope held out for any great tonnage of this coal moving in for some time to come. A little Carterville is being put away, but the business has not started as yet.

In the Standard field the mines continue to work one and two days a week and coal is selling below cost. Screenings have stiffened up a little, but not enough to justify any material advance in price. Many mines are loaded up with lump that has been on track for upward of two weeks. In the Mt. Olive field conditions are somewhat improved, but are not anywhere near being satisfactory.

A little railroad coal is moving out of both the Standard and Mt. Olive fields, but not in the volume that it should in view of what the condition is likely to be in the future.

In the Carterville field of Williamson and Franklin Counties, as well as in Perry County, screenings are long. Many mines are unable to move their screenings, while domestic sizes, as well as the smaller sizes of nut, are in good demand. Working time is exceptionally good in these fields, everything considered. Cars are plentiful and service shows a little improvement.

The country demand for Illinois coal is better, especially from threshing section, and this is likely to continue for the next few weeks.

MILWAUKEE

Coal market enters upon summer stage of quiet. Deliveries increasing. Receipts of anthracite at a pause.

The coal market at Milwaukee has reached the summer stage of quiet, but deliveries are increasing, now that consumers are seemingly convinced that fuel prices will advance rather than decline as the season advances No additional consignments of anthracite have reached port since last week's report, but soft coal stocks at the various yards have been increased by 111,340 tons. The total receipts of coal thus far since the opening of navigation foot up 158,539 tons of anthracite and 578,051 tons of bituminous. Last year the receipts up to June 1 represented 93,564 tons of anthracite and 389,547 tons of soft coal.

The City of Milwaukee will advertise for bids on the coal supply for various public institutions, between June 10 and 15. Last year the fuel for such use cost the city $390,847.

General Statistics

NORFOLK & WESTERN TONNAGE

Below is a statement of the coal tonnage from mines on the Norfolk & Western R.R. and from other railroads, for the month of March, 1919:

From	Net Tons
Pocahontas Field	1,244,660
Tug River Field	255,581
Thacker Field	171,921
Kenova Field	68,089
Clinch Valley Field	81,838
Other Norfolk & Western Fields	4,212
Total Norfolk & Western Fields	1,826,301
Williamson & Pond Creek R.R.	102,978
Tug River & Kentucky R.R.	51,544
All other railroads	91,217
Grand total	2,072,040

Coal and Coke Securities

New York Stock Exchange Closing Quotations June 2, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com	(BB)	151	153
Burns Brothers, Pfd	(BB)	100	115
Central Coal & Coke, Com	(CK)	55	...
Central Coal & Coke, Pfd	(CK)	63	...
Colorado Fuel & Iron, Com	(CF)	49½	50
Colorado Fuel & Iron, Pfd	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com	(EH)	30	30½
Elk Horn Coal, Pfd	(EH)	...	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, Pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	63	63½
Pittsburgh Coal, Pfd	(PC)	95	97
Pond Creek Coal	(PD)	17⅝	18
Virginia Iron, Coal & Coke	(VK)	72	74

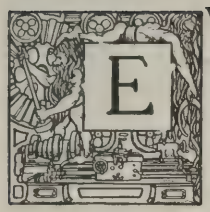
BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	93½
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	76⅝	77½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	92½
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99	100½
Lehigh Valley Coal, Gtd. Int. Red. to 4½, 1933	79⅜	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	84½	86
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	88	88½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	...	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	92	95
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	88½

COAL AGE

Volume 15 New York, June 12, 1919 *Number* 24

Every Period Has Its Own Ambitions

By R. Dawson Hall



EVERY active man has his ideals and purposes, and it is only in their accomplishment that he finds any pleasure. In every period of the world's history there has been a certain definite trend toward an ideal. If that ideal was one that was good for the world at large, then the results were good. But on the whole, much the same effort and much the same idealism always stirred active men regardless of the way in which they wended.

There has been a period when, as we put it, men strove solely for money. It would be better to say they sought for industrial power as measured pecuniarily, for nearly all the profit made they put back into industry. It was a period of real frugality. Few industrial leaders spent much money on their own comforts and pleasures. The captains of industry were master cogs in the industrial machine, who, while they helped to drive it with much noise and heat, were also driven by it. Their ideal was large industrial accomplishment. It was no mean ideal after all. It was often attacked by those whose ends were solely to acquire money and the comforts that went with it, and who wanted no part in the industrial machine, either as master cogs or as specks of sand on the brake wheel.

But there have been times when money figured but little, directly or indirectly. Many have represented them as better than the times of what they please to call "money-lust," but most of us know they were not. Thus it was in the days of the Crusades, when the desire of every active man was to spend himself in the wars, when the rich man was regarded with little but contempt. At other times the call that sounded largest to the world's leaders was to build spacious cathedrals, miles of cloisters and acres of nunneries. In others, as in England before the war, the aim of the idealist lay in public life and rarely, if at all, in making money. General approbation, whether in public or in private, whether expressed volubly at the hustings or quietly by the fireside, was all that the Englishman of family believed was really worth the while.

They come and go these moods of men. Active men are always active in seeking such ends as present themselves as being worthy. Today it seems as if a new period approached when the leaders of men would aspire, not merely to control the finances of industry, but to be acclaimed leaders of the rank and file employed at their plants. They will care less about the dividends of their factories and, therefore, about the extension of them, than upon the reaction of their operations upon the lives and hearts of their employees and their families.

Ambition they will still have. They will still scurry along the road as before, but it will be a different road. A new goal as compelling and as pleasing as the one they will have deserted will lead them on.

Where before they looked at success of the industry, now they will look at turnover, not indeed as an uneconomical and inefficient leak in industry, but rather as being an evidence of their unfortunate unpopularity as industrial leaders. Where before they sought to lay off every unnecessary man, now they will try and keep all their employees working steadily, even at some loss, because the happiness of their men will be their aim rather than such success as will place them in control of larger industrial forces.

The change may come slowly, but it seems to be on its way. It will not be without its drawbacks to the Nation as a whole, and it will not be without its advantages. A sheltered workman is sometimes a contented man and produces a large product. Again, he is sometimes an inefficient man, seeing that efficiency is no longer a *sine qua non* for employment. In a nation when men are inefficient, wages must be low and living conditions hard. So the desire for the approval of the workingman may work to the detriment of that sheltered employee. The rough-and-tumble ideals of the passing day may after all—who knows?—be more kindly than the industrial-leadership ideal that seems to be likely to dominate tomorrow.

Vesta Coal Co.'s Modern System of Mine Haulage

By Ralph W. Mayer
California, Pennsylvania

WESTERN Pennsylvania coal mines have some of the most extensive wire-rope haulage systems in the country. In some of the modern mines of this section underground and surface transportation of coal is effected by a combination of rope and electric haulage. The lowest coal haulage cost in the world, per ton-mile, from the working face in the mine to the point of consumption is probably that of the Vesta Coal Co., at California, Penn., a subsidiary of the Jones & Laughlin, Ltd., of Pittsburgh, Penn. The mines of this company possess a number of natural advantages all of which are fully utilized. The Jones & Laughlin company consumes the entire output of the Vesta mines, which in 1916 amounted to 3,000,000 tons; since that time this tonnage has been increased. These mines work steadier than operations which sell their coal in the open market, and thus the Vesta company is enabled to reduce overhead expenses.

The Vesta coal-haulage system includes electric motor transportation from the coal face to a central underground station where the motors leave their loads; a tailrope haulage system handles the cars from this point to the tipple. The haul from the tipple to the point of consumption is by water, the cheapest transportation known. The main electric haulage roads leading to the central gathering station vary, being from 2 to 5 miles in length; the central station is about 4½ miles from the tipple, which is on the Monongahela River. Thus the distance from the tipple to the innermost workings is something like 10 miles. The coal seam outcrops about 40 ft. vertically above the river and a steel trestle a half mile long connects the mine opening with the tipple (Fig. 1). The trestle and haulage road with the unique overhead arrangement for carrying the electric power cables is shown in Fig. 2. The coal runs by gravity from the tipple into barges on the river and is unloaded again at its destination by huge power shovels. A conveyor line for loading coal into railroad cars near the tipple is shown in the background of Fig. 1, in the illustration to the left.

The coal seam is practically level in the Vesta mines, but in case of variation from this rule the dip is toward the river and in favor of the loads. The method of mining here includes main haulage roads driven on the butts of the coal; face entries are driven from the main roads, and butt entries, in turn, are driven from these face entries and practically parallel to the main haulage roads. Thus nearly all the rooms turned off the butt entries are driven on the face of the coal and mining is facilitated thereby. Throughout the mine the tracks are run right up to the face, no coal being shoveled twice; it is shoveled direct from the bottom at the face in both rooms and entries.

Mechanical haulage is used exclusively at the Vesta mines, no animal transportation of coal being employed at all at this plant. There are 44 electric haulage locomotives used underground here, a 30-ton six-wheel motor being the largest size in service at these mines. Thirteen-ton motors are used generally on main haulage roads. The gathering motors are 4-, 6-, 8- and 10-ton machines equipped with cable and reel to enable the motors to run into rooms. The gathering motors handle the cars from the partings on the main haulage roads to the rooms.

All main haulage roads meet at a central station where



FIG. 1. VESTA COAL CO.'S NO. 4 PLANT ON THE MONONGAHELA RIVER IN PENNSYLVANIA
Left—Tipple for loading barges; conveyor for loading railroad cars in background. Right—Steel trestle connecting tipple with mine

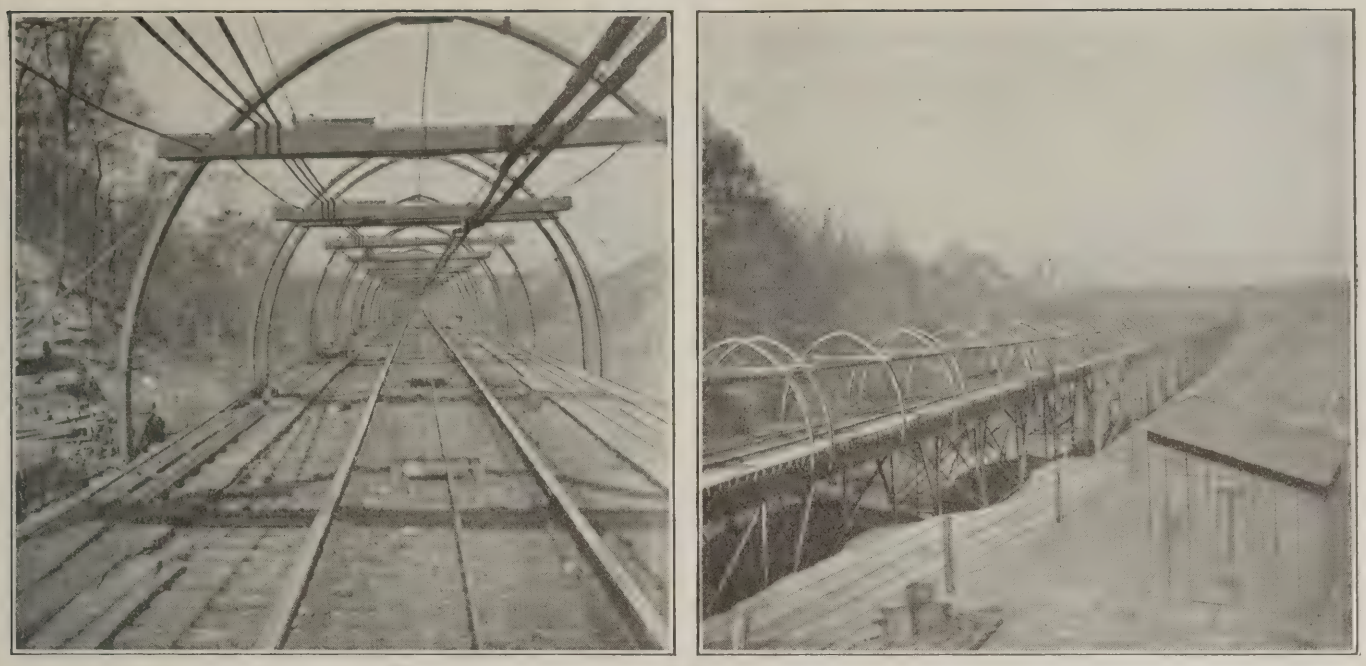


FIG. 2. VIEWS OF STEEL TRESTLE CONNECTING VESTA NO. 4 TIPPLE WITH THE MINE

the motors leave their trips of loaded cars. This station has both an empty and loaded track, each being about 2400 ft. long and holding some 240 cars. The length of the main haulage roads feeding this central station varies from 2 to 5 miles. The longest of these haulage roads has three partings and haulage sections on it, to which the gathering motors pull coal. The coal left by the gathering motors at the partings on this road is hauled by a 30-ton motor to the central gathering station. This giant motor is easily capable of handling 400 tons of coal on one trip; its usual load is about 100 cars. There are six main haulage roads; the five not covered by the 30-ton motor are served by 13-ton motors.

The section gathering stations on the main haulage roads are made by driving an entry through the solid coal. A pillar, locally called a rib, is left between it and the main haulage track. This entry is driven wide enough to accommodate both an empty and loaded track; it is usually about 1400 ft. long and parallels the main haulage track. Thus these local gathering stations serve as partings for the main haulage road, which is kept clear for through traffic at all times. Each of these partings is in charge of a parting boss who is under the supervision of a motor boss. The duty of the parting boss is to see that the empty cars are apportioned to the different motors of his section and that they are ready at the partings for the motors. He sees that the coal is hauled off the partings promptly so that there is no congestion of cars. In general he performs the duties of an assistant motor boss.

Various types of gathering motors are in use at the Vesta mines, some special motors being employed for specific purposes. For example, in sections where pillars are being robbed (locally called rib workings) the tracks run across the ends of the pillars, necessitating some sharp curves. Motors with a short wheel base are used for this work; also, motors with low frames are used in sections where the bottom has heaved or creep has occurred, leaving a low top.

All the entries have trolley wires, and when a gathering motor is about to enter a room, a copper hook on the end of the motor cable is hung on to the entry trolley. The motorman fastens the trolley pole down to the motor frame. Steel rails are used entirely and act as the return circuit from the room face. On the face entries the track rails are connected to copper cables which act as the return circuit to the power house. The track rails in the rooms are not bonded but depend on the fishplates connecting the rails to carry the return circuit. All rails on entries throughout the mine are bonded with copper connections. Two men form a motor crew—a motorman and a snapper—the latter coupling and uncoupling cars, attending to hand brakes and throwing switches.

The motors have a trolley pole on each side, various sections of the mine having the trolley wire on that side of the track best suited to local conditions. A clearance space of 2½ ft. is left between the cars and the rib of the entry on the side of the entry opposite the trolley wire. The wheels of all the motors are outside the motor frame, but they are protected by suitable frame construction against damage from accidents. Anyone who has had to do with a derailed motor appreciates how much easier it is to place rerailing devices under outside wheels than under those of the inside type.

All room switches have bridles on the latches, which are thrown with levers. The switch points are held in position by a weight on the lever. This lever may also be installed so as to act as an automatic switch for a car coming out of a room onto the entry.

In gathering cars from a panel of rooms the following method is adopted. The motorman runs the trip of empties into a nearby vacant room and leaves it there while he pulls the loads out of all the rooms. Starting at the inby end of the entry the loaded car is pulled out of each room in turn and left standing on the entry at the room until all the loads are out of the rooms. The motorman then shoves the loads up the entry toward the face until they clear the last room inby, the snapper meanwhile coupling them together as they move up the entry. He then backs the trip of empties into each room, starting at the outby room, and leaves the end car in each room.

In case pillars are being drawn on an entry and

no empty track is available in a vacant room, then the cars are changed differently. Commencing at the outby end of the entry, an empty car is left in each room neck. Then the motor starts at the last room inby and pushes the empty car to the room face, where it is coupled up to the loaded car. The two cars are now pulled out to the entry and the load left on the entry just inby of the room while the empty car is pushed up the room again to the face and left there to be loaded. This operation is repeated at each room in the panel. Then the loads are coupled up and moved to the nearest parting or gathering station. One motor gathers the coal from all the rooms on a butt entry and three to six motors collect the loads for each gathering station.

All coal in the Vesta No. 4 mine is brought from the face to the central gathering station by electric motors; from the central station to the tipple the transportation is by wire tailrope haulage over a single track road of 90-lb. steel rails. The entire output of the mine passes over this haulage or dilley road—coal as well as slate. This road also is provided with a trolley wire and is equipped for motor haulage. With the exception of some pillar work, no coal is being mined along the rope haulage road.

The rope haulage road underground follows the coal seam for about 4 miles of its length. Halfway, or about two miles from each end of this mine section, a gully cuts out the coal seam and the road is carried across from one hill to another by a steel bridge, shown in Fig. 3. The rope haulage engines and boiler plant are situated in this gully. The rope haulage is divided into two sections at this power house, one unit pulling the coal from the central gathering station as far as the power house, another unit handling it from here to the tipple. Each unit is independent, both as regards engines and boilers; both outfits are in the same building but in different rooms.

Each haulage engine in the power house (Fig. 3) carries on its drums 2200 ft. of 1-in. tailrope and 1100 ft. of 1⅛-in. headrope. The coal is pulled from the central station in the mine to the power house by a 3500-hp., 52 x 60-in. engine built by the Vulcan Iron Works, of Wilkes-Barre, Penn. It is probably the largest mine haulage engine in the United States. A 1000-hp. 25 x 48-in. engine handles the trips of cars from the power house to the tipple. A round trip on the dilley road is about 9 miles, and the run is made in from 17 to 22 min. when hauling coal. This includes the time required for making the four stops at the power house necessary to change the ropes from one haulage unit to the other. To make the trip in the time noted requires running at express train speed on some parts of the road. A good track and road bed are absolutely essential. As a matter of fact a wreck on the dilley road is practically unknown unless the haulage rope breaks, or cars get away from the partings without a rope coupled to them.

In operation each trip carries a rider who signals the engine room when necessary by means of two light galvanized wires alongside the track. A piece of copper held against these wires closes the circuit and gives the signal. At regular signaling points a switch is used for this purpose. Signaling apparatus in the engine rooms includes both a bell and a gong, and two sets of these signals are installed at each engine; if one set gets out of order the other set is thrown in circuit by means of a switch. Current for these signal wires is furnished by miniature dynamos.



FIG. 3. POWER HOUSE AND TRESTLE CONNECTING HILLS NOS. 2 AND 3

Electrical power for the mine is furnished by three 750-hp., cross-compound engines operating generators delivering current at 550 volts. Eight Babcock & Wilcox stokers are used to fire the boilers in the large haulage unit and four of the same type of stokers are used on the other unit. The boiler-house coal is delivered by the rope haulage road. The dilley road passes under the roof of the boiler house and over the boilers. Cars with coal for the boilers are switched to a 1000-ft. sidetrack at the power house, where they are weighed. Then the coal is crushed preparatory to feeding it to the stokers; it is handled by rubber belt conveyors.

The dilley road is divided into four sections, each of which is inspected by a track walker before the man-trip runs over it in the morning. During the day these four men replace rope rollers and sheaves; the



FIG. 4. BRIDGE AND HAULAGE ROAD ENTERING HILL NO. 3

former carry the rope between the rails and the latter carry the return rope alongside the track. Miners and other employees are carried to work in the morning on the man-trip by rope haulage to the central gathering station in the mine, where the man-trip is split into three parts and each trip is hauled by a motor over the main haulage roads of the mine. There is an entrance to the workings at the end of the rope haulage system by which miners from the surrounding villages enter and get on one of these man-trips. The man-trips stop at the different face entries to allow the miners to get off at the nearest point to their work. In the evening the miners are collected and hauled out of the mine. The track grade is light and the danger of accident is reduced to a minimum.

The central gathering station is connected to the tipple by a trunk line of single track, of 90-lb. rail. Eight miles of 90-lb. steel rails are used on the main haulage roads; the entries are laid with 50-lb. rail and the room tracks have 30-lb. rail. Wood ties are used. The mine has about 300 miles of track—175 miles in entries and 125 in rooms. When a room is finished or temporarily abandoned the track is removed. Few ties are used in rooms, the following plan being adopted: As the mining machines leave some bottom coal, channels are cut in it, the track rails are placed in these channels and connected with fishplates. This makes a firm even bed for the rails, track is prevented from spreading as the rails are held in position by the channel, and they are prevented from turning by ties placed at intervals, say at the end of machine cuts.

Ties are necessary at curves in rooms—for example, around the ends of pillars or in case track is carried into side cuts; here the motor would tend to pull the track out of alignment. Track rails are easily pulled out from under a roof fall; a short length of strong chain is used, being provided with a car coupling link at one end and a pair of fishplates bolted through the links in the other end. In removing a rail the fishplates on the chain are bolted to the exposed end of the rail and the other end coupled to an empty mine car; a motor then jerks out the rail. In this way several lengths of rail have been recovered from beneath a fall of rock.

In entries the inequalities of the bottom cause an uneven grade on tracks, unless provided for; the track is surfaced by raising low points with long blocks or wedges. This makes a firm and even road bed which is further secured by waste between the ties as ballast. No timbering which a runaway trip of cars might displace is used on the main haulage roads or on the dilley road. A large fully equipped motor repair shop and supply store room is situated about ¼ mile inby from the central gathering station. A second motor pit is being constructed nearly 4 miles inside this point at the innermost workings of the mine.



FIG. 5. ROPE HAULAGE ROAD AT VESTA NO. 4 PLANT
Left—Bridge between hills Nos. 1 and 2. Right—Portal to hill No. 1. Guard rails at the side protect the bridge and the masonry from runaway cars

The track gage is 48 in. A road boss under the mine foreman has general charge of all track and trackmen, together with their laborers. The trackmen, when working on an assistant foreman's section of the mine, usually take orders from the assistant foreman. The motormen report on forms the number of cars of coal, rock and bugdust hauled during the day. The number of cars in each trip is posted on a large blackboard at the central gathering station; this gives the total daily number of cars moved to the mine end of the rope haulage. At the power house, midway in the rope haulage system, the number of cars passing that point are posted on a blackboard. At the tipple an itemized count of the cars and the weight of each car is kept.

The mine cars at the Vesta No. 4 mine are mainly made of ¼-in. sheet steel and the wheels have roller bearings. Stiff, double spiral springs slipped over the end of the drawbar under the car tend to lessen the strain on the car in starting and stopping. Special types of cars are used in this mine for specific purposes, such as cars for handling reels of cable or trolley wire, cars for hauling sand, water and various kinds of equipment.

Flare-up in Baltimore Tunnel

Cause of Catastrophe Still Unknown, but Evidently Was Not Due to Electricity Passing Through the Drawbars of the Mine Cars

AT 6:35 A.M. on the morning of June 5 a trip of 13 wooden mine cars, hauled by an electric locomotive, started into the water level drift, known as the Baltimore Tunnel, at the Baltimore colliery of the Hudson Coal Co. Investigations to date seem to establish: (1) That there were approximately 150 men riding in the empty cars; (2) that there were 14 twenty-five pound cans of black powder in the trip.

The powder seems to have been placed in the cars as follows: Seven cans in the rear car, one can in the third car from the rear, five cans in the fourth car from the rear and one can which was found outside the trip along the rib about opposite the fourth car from the rear.

The trip had proceeded to a point where the locomotive on the head end was approximately 150 ft. inside the mouth of the tunnel, the rear car being from 15 to 20 ft. inside the mouth of the tunnel. At this point a tracklayer, walking out of the tunnel, shouted to the motor runner that the trolley wire at a point about 200 ft. further in the tunnel was loose from a hanger. The motor runner stopped his trip, disconnected the electric locomotive from the trip and ran in a distance of about 250 ft. beyond where he left the trip standing and about 50 ft. inside the point where the trolley was loose from the hanger. He had about reached this point, stopped his locomotive and got off. Looking back he saw a flash in the trip. In some manner, not yet actually determined, the powder in the fourth car from the rear became ignited and in turn ignited the powder in the third car. After the ignition had taken place most of the men who were in the forward cars rushed back toward the mouth of the tunnel and, coming in contact with the flames and products of combustion by the powder, were either killed by burning or suffocation.

The total number of men who were killed or have since died in the hospitals is 91. The injured in the hospitals number 43, with a possibility of one or two of these men not recovering.

In August, 1918, a number of the men employed at Baltimore Tunnel refused to go to work because the foreman would not grant them an empty trip to go into the workings, the rules being that the men must walk in with their explosives. Some of the working faces to which these men had to walk were 2½ miles from the mouth of the tunnel, the large percentage of them being over a mile from the mouth. The morning on which they refused to work, Mr. O'Hara, the mine foreman, and Mr. McCrystle, the assistant colliery superintendent, met the men and persuaded them to go to work and stated that they would meet the mine grievance committee in relation to the matter. The men, from time to time, had been in the habit, instead of walking to their working places to go as far as the inside of the tunnel and wait until an empty trip would go in, at which time they would "jump" the trip and ride in. This practice was difficult of detection and extremely hard to stop. Mr. O'Hara and Mr. McCrystle, after considering the whole matter, decided that in their judgment it would be safer to grant the request of the men for an empty trip at 6:30 a.m. each morning if the men on the mine committee would in turn agree that no powder should be carried except in the last car of the trip, and that no men should ride in either the last car or the car next to it. At the meeting with the mine committee this was agreed to, with a further provision that the mine committee would each morning check up the trip to see that each and every term of the agreement would be carried out. The mine foreman and assistant mine foremen from time to time checked up the trip and found the rule being obeyed, but on this particular morning the mine foreman was about 1000 ft. from the drift on his way to the office from his home when the trip went in.

The seven cans of powder in the rear car were not burned or exploded and were taken from the car intact after the accident.

First Meeting of Coal Mining Electricians and Mechanics Institute

The first meeting of the Coal Mining Electricians and Mechanics Institute was held in the Y. M. C. A. auditorium at Charleston, W. Va., May 29 and 30, with about 300 in attendance. In spite of excessive heat and the fact that May 30 was a holiday, much interest was manifested and everyone stuck to the finish.

In all, eleven papers were presented, most of them illustrated with moving pictures or lantern slides. Considerable interest was shown by the audience in the various papers, as was evidenced by the many questions asked and the discussions that arose. The educational advantages of such meetings were made clearly apparent and many expressions of satisfaction were heard on the large amount of information, applicable to everyday work, that was derived.

It should be remembered that those present voluntarily gave up a holiday and attended this convention in order to secure knowledge that would be of benefit to themselves and their employers. This speaks volumes for their enthusiasm. That the exchange was a wise one was the consensus of opinion among those present.

Coal Pyrite Resources of Tennessee*

By E. A. Holbrook and Wilbur A. Nelson

SYNOPSIS—*Pyrite occurs in coal, usually in a more or less detached form. Experiments conducted upon certain Tennessee coal-mine refuse would indicate that such pyrite might be commercially extracted therefrom. The extraction plants would be simple and comparatively inexpensive.*

THE brassy-yellow mineral pyrite (FeS_2), a combination of iron and sulphur often known as "fools' gold," is of common occurrence in many kinds of rocks. Commercially it is important only as the basis for the manufacture of sulphuric acid, an acid essential in the manufacture of explosives, fertilizers and other chemical products. On roasting, the pyrite gives up its sulphur to form the gas, sulphur dioxide, which in turn is converted into sulphuric acid in large chambers, chiefly by the use of steam.

Formerly most of the pyrite used in the United States came from Spain, although some sulphuric acid was manufactured by burning or roasting pure native sulphur mined in Louisiana. At the beginning of the present war the Spanish supplies were cut off and it seemed essential, in view of the increased demand for sulphuric acid, to develop every available source of supply in this country. Many pyrite mines were opened in the Appalachian Mountains, especially in northern Georgia; and increased attention was given to the sulphur deposits in Louisiana and Texas.

It is well known to those engaged in coal mining that frequently balls and bands of pyrite occur with the coal, and this impurity must be removed before the coal is placed on the market. Because the coal in a mine contains pyrite balls or bands, however, does not mean that the product of this mine is high in sulphur, or inferior in quality, for often the contrary is true; that is, the sulphur, having concentrated into definite balls and bands, leaves the true coal comparatively free from sulphur.

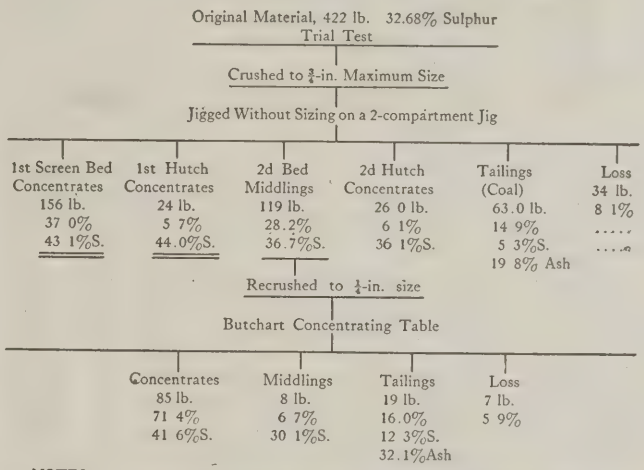
Knowing that there were possible pyrite resources in certain of the coal mines in Tennessee, the State Geological Survey effected a coöperation with the United States Bureau of Mines, by which a survey of the pyrite in Tennessee coal mines has been made, and favorable material has been tested in the laboratory used by the Bureau of Mines at Urbana, Illinois.

At the present time (October, 1918) it appears that the great demand for pyrite has been met, partly by an unexpectedly favorable development of new sulphur resources in Louisiana and Texas, and partly by development of pyrite mines in the Appalachian Region and in Canada. Also it has not been considered opportune to interfere in any way with the production of coal. For these reasons the demand for coal pyrite has not been as great as was expected earlier in the year. However the supply known to be available constitutes a great reserve in time of need, and calls attention to a potential resource for the future.

This report outlines the known coal pyrite resources of Tennessee and details tests made at Urbana, Ill., on crude pyrite from the mines of the Bon Air Coal and Iron Corporation, to learn if the material could be mechanically treated to produce a pyrite of commercial purity.

Outside of the large deposits of pyrite and pyrrhotite in east Tennessee in the Ducktown region, the state has an additional source of pyrite from certain of the coal seams of the Cumberland Plateau.

The mines in the Bon Air-Clifty district all contain pyrite in the form of bands, nodules and kidneys, which are easily separated from the coal and can be recovered as a byproduct. It is estimated that the amount of



NOTES.—1st Screen Bed Concentrated means the coarse concentrates saved on the 1st bed of the jig.

2d Hutch Concentrates means the fine concentrates passing through this screen and saved at the bottom of the jig.

Middlings means a product of pieces containing part coal and part pyrite which have to be crushed finer before any separation of clean pyrite can be made.

FIG. 1. FLOW SHEET OF COAL PYRITE CONCENTRATION MATERIAL FROM EASTLAND MINE

pyrite, if all is recovered, from the mines in this district when operating at full capacity will be at least 50 tons daily. This estimate was made to include all the mines operating on the Bon Air branch of the Nashville, Chattanooga & St. Louis Railway.

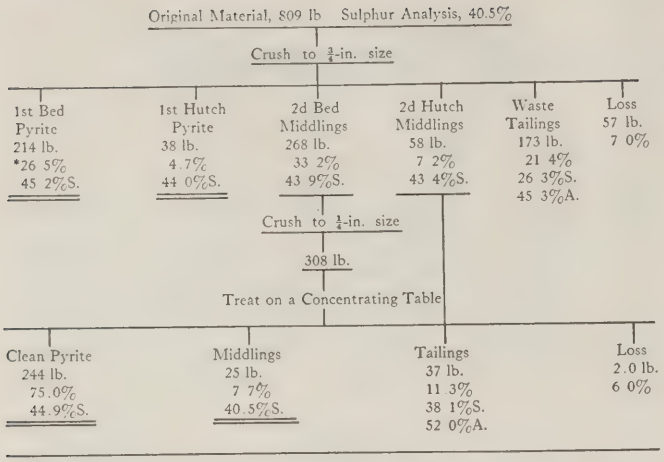
Clean samples of pyrite from some of these mines gave the following analyses:

Carola Shaft, Bon Air, Tenn.	47.0 per cent. sulphur
Braeburn Mine, Eastland, Tenn.	47.6 per cent. sulphur
Ravenscroft Mine, Ravenscroft, Tenn.	46.4 per cent. sulphur

The mines on the Monterey branch of the Tennessee Central contain pyrite in a recoverable form. This pyrite is similar to that from the Bon Air district, on which tests were made. It is estimated that probably 40 tons of pyrite a day could be recovered from this district. Clean samples of pyrite were taken from some of these mines, which gave the following analyses:

Fentress Coal Co., Wilder, Tenn.	46.4 per cent. sulphur
Peacock Mine, Big Mountain Coal Co., Obey City, Tenn., Weather surface pyrite	46.1 per cent. sulphur

*Article published in "The Resources of Tennessee," Vol. IX, No. 1. It is based on an inquiry made by the Tennessee Geological Survey in Coöperation with the Bureau of Mines, through the Middle West Station of the latter, located at Urbana, Illinois.



*26 5% means that 26.5 per cent by weight of the original material was saved here.

FIG. 2. MINE REFUSE FROM RAVENSCROFT OPERATION OF BON AIR COAL AND IRON CORPORATION

Hand cobbed samples of pyrite were taken from these mines, so as to show the approximate percentage of sulphur in carload lots of unwashed pyrite as it would be shipped from the mines if no plant for treating the pyrite was installed. The following analyses show these results:

Carola Shaft, Bon Air, Tenn.	43.88 per cent. sulphur
Braeburn Mine, Eastland, Tenn.	46.40 per cent. sulphur
Ravenscroft Mine, Ravenscroft, Tenn.	43.72 per cent. sulphur
Clifty Mines, Clifty, Tenn.	42.72 per cent. sulphur
Fentress Coal Co., Wilder, Tenn.	45.08 per cent. sulphur
Peacock Mine, Big Mountain Coal Co., Obey City, Tenn.	40.36 per cent. sulphur
Brier Hill Collieries, Crawford, Tenn.	36.08 per cent. sulphur

The pyrite from the Fentress Coal Co. has been shipped to an acid manufacturer for some time, with satisfactory results to both the mine owners and the acid makers. The pyrite from all these mines, with the probable exception of the Brier Hill collieries, would be satisfactory for acid making after having been crushed and cleaned.

Pyrite is also found in a few of the mines in the Tracy City-Coalmont district, but not in sufficient quantities to justify saving and shipping. In the northeastern Tennessee coal field some pyrite occurs but no detailed investigation was made of this area.

Tests Made at Urbana, Illinois

About Sept. 1, 1918, two shipments of crude coal pyrite were received at the laboratory of the U. S. Bureau of Mines, University of Illinois, Urbana, Ill., from the Eastland and Ravenscroft mines of the Bon Air Coal and Iron Corporation, of Bon Air, Tenn. The possibilities of utilization of coal pyrite on a large scale for the manufacture of sulphuric acid made it desirable to conduct tests on this material to learn if mechanical crushing and washing would produce a high-grade commercial pyrite free from coal and other impurities and with possibly clean coal as a byproduct. The report following gives an outline of the final tests, together with a flow-sheet outlining a possible method of mechanically treating these materials.

This lot, about 500 lb. of crude coal pyrite marked from the Eastland mine, consisted of lenses of pyrite up to 10 in. in width and 4 in. in thickness, together with considerable adhering coal. To the eye, about 50 per cent. of the lumps by volume was pyrite and the remainder was coal.

Preliminary tests showed that the clean pyrite in the material was high grade, and that crushing to about 1-in. size would produce a clean pyrite concentrate, and consequently fairly clean coal as a byproduct. During crushing, a comparatively small amount of pyrite fines was produced, and therefore the largest sizes were the richest in pyrite. In other words, this coal pyrite, unlike the usual pyrite mineral, is stony and amorphous in structure and does not slime on crushing. This very important point made it possible to recover most of the pyrite by jigging alone, and the concentrating table was necessary only in treating the recrushed middlings. Even this product might be fed into the jig and saved as a hutch product, providing the capacity of the jig was ample.

The accompanying quantity flow-sheet (Fig. 1) shows the results of the final test run on the pyrite from the Eastland mine. Four hundred and twenty-two pounds were crushed to ¾-in. size in a gyratory crusher followed by rolls. This was jigged in a two-compartment Harz jig with ¼-in. screen beds. The coarse concentrates were saved as a screen-bed product and the fine concentrates were saved as a hutch product. The second screen-bed product contained some coal adhering to the pyrite and was a true middling product. It was therefore crushed through a ¼-in. screen and treated on a Butchart concentrating table. The table cleaned this product and produced a high-grade concentrate.

The crude coal pyrite from the Ravenscroft mine was of about the same physical appearance as the material from the Eastland mine[1]. Some of the lenses, however, were of rather light weight and had a peculiar gray color. To the eye it appeared about 75 per cent. pyrite by volume while the remainder was adhering coal. This material was tested in a preliminary way and the tests indicated that the same treatment could be used as with the material from the Eastland mine. This is a point of importance, because in any concentrating plant it would allow indiscriminate mixing of the material from the various mines before treatment. On crushing, the crude pyrite produced only a small percentage of fines, and it appeared that in regular practice, crushing to 1 in. round hole size would be sufficient before attempting concentration.

TABLE I. RESUME OF RUN OF EASTLAND MINE, BON AIR COAL AND IRON CORPORATION

Total, 422 lb.; 32.7 per cent. sulphur

Product	Concentrates Analysis Sulphur, Weight	Per Cent.	Middlings Analysis Sulphur, Weight	Per Cent.	Tailings Coal Analysis, Weight	Per Cent.	Loss
First bed concentrates.	156	43.1	..	....	..	.....	....
First hutch concentrates	24	44.0	..	....	..	.....	....
Second bed middlings (see table products)	...	....	..	....	..	.....	....
Second hutch	...	....	26	36.1	..	.....	....
Jig tailings	...	....	..	....	63	5.3S. 19.8A.	....
Table concentrates	85	41.6	..	....	..	.....	....
Table middlings	...	....	8	30.1	..	.....	....
Table tailings	...	....	..	....	19	12.3S. 32.1A.	....
Jig loss	...	....	..	....	..	.....	34
Table loss	...	....	..	....	..	.....	7
Totals	265	42.7	34	34.7	82	6.9S. 22.6A.	41

Practically 265 lb. of commercial pyrite was recovered, or 62.8 per cent. of the total material treated. On further treatment, the 34 lb. of middlings could be expected to yield 25 lb. of commercial pyrite, making a total recovery of 290 lb. of pyrite or 68.7 per cent. The coal tailings were 82 lb. or 19.4 per cent. The treatment loss was 41 lb., or 9.7 per cent.

[1]The pyrite which occurs in the mines on the Monterey branch of the Tennessee Central R.R. has the same physical appearance, and it is thought could be prepared for market in a similar way to the pyrite tested.—Wilbur A. Nelson.

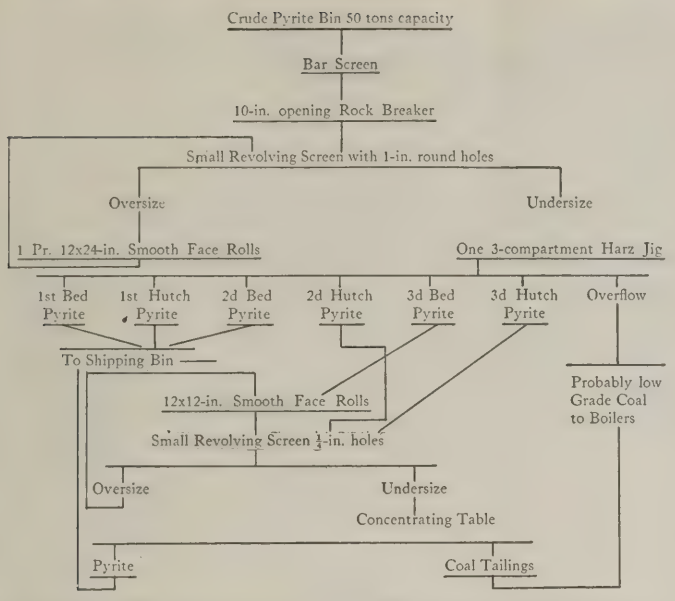


FIG. 3. FLOW SHEET OF 50-TON PYRITE CONCENTRATING PLANT FOR BON AIR-CLIFTY DISTRICT

The accompanying flow-sheet (Fig. 2) shows the final test treatment of the crude pyrite, together with the products, their quantity and analysis. The résumé sheet (Table II) shows the various products and gives an idea of what might be accomplished in percentage of recovery, etc., in a commercial plant.

The material from both the Eastland and Ravenscroft mines is high-grade pyrite with only a small percentage of attached coal. There is no technical difficulty in crushing it to about 1-in. size and, by jigging alone, to save nearly all the contained pyrite in a pure form. While the coal can be recovered in a size and purity such that it can be used as ordinary coal of screening size, yet if most of the pyrite contained as little coal as that sent for testing, it is not commercially important to save and clean the small amount of coal produced.

TABLE II. RÉSUMÉ OF TEST ON PYRITE FROM BON AIR COAL AND IRON CORPORATION, RAVENSCROFT, TENNESSEE

Weight, less sample, 790 lb.

Product	Pyrite Recovered Weight	Pyrite Recovered Sulphur Analysis Per Cent.	Middlings Weight	Middlings Sulphur Analysis	Coal Tailings or Refuse Weight	Coal Tailings or Refuse Analysis Per Cent.	Losses
First bed pyrite	214	45.2	...	....	...	.....	..
First hutch pyrite	38	44.0	...	....	...	.....	..
Second bed middlings (see table products)	...	....	...	....	..	.....	..
Second hutch middlings (see table products)	...	....	...	....	...	.....	..
Jig coal tailings	...	....	...	....	173	26.3S. 45.3A.	..
Table pyrite	244	44.9	...	....	...	.....	..
Table middlings	25	40.5	...	....	...	.....	..
Table coal tailings	...	....	...	....	37	38.1S. 52.0A.	..
Jig loss	...	....	...	....	...	.....	57
Table loss	...	....	...	....	...	.....	2
Totals	521	44.7	...	....	210	28.4S. 46.5A.	59

From 790 lb. treated, 521 lb. of pyrite was recovered, analyzing 44.7 per cent. sulphur. This is a recovery of 66 per cent. The middlings were fine enough to be included in this pyrite column.

The coal tailings were 210 lb., or 26.6 per cent. of the original material. They analyzed 28.4 per cent. sulphur and 45.6 per cent. ash. This material is useless for coal on account of its high sulphur and ash content. Technically, there would be no difficulty in crushing this material finer and in extracting some of the remaining pyrite.

The treatment losses were 59 lb. or 7.4 per cent.

The concentrating table is recommended only as an auxiliary machine to clean the middling products. For a small plant the recrushed middlings could be fed back to the jig and a concentrating table dispensed with. However, this plan lessens the capacity of the jig.

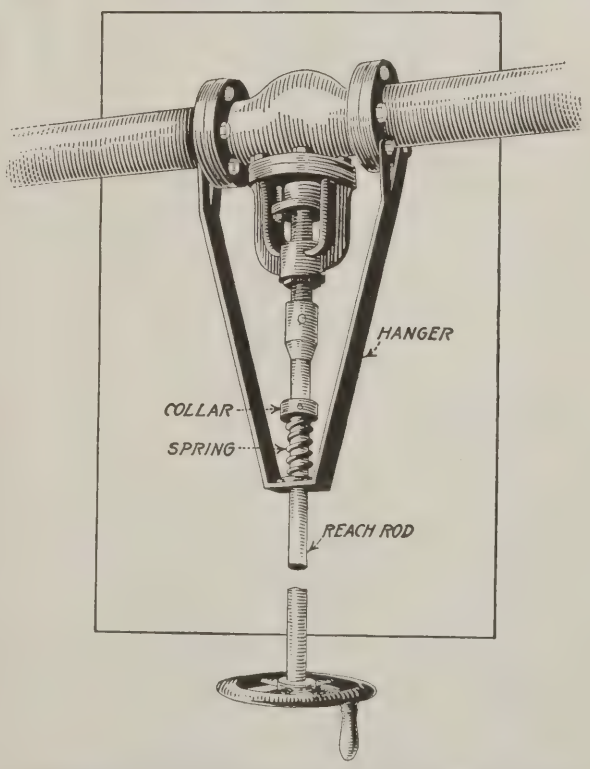
Fig. 3 is a flow-sheet of a proposed concentrating plant for the crude pyrite from these mines based on an estimated treatment capacity of 50 tons per eight-hour day. It should be remembered that on account of the low value per ton of the pyrite it is necessary to keep a treatment plant as simple as possible, and that while better recoveries might be made with a more complicated plant, yet from the test it does not seem advisable to install expensive apparatus necessary if the small sizes were to receive special treatment. Moreover, the coal pyrite slimes but little on crushing, and the small sizes are the lowest in pyrite content.

As a preliminary estimate, a plant to treat 50 tons per eight-hour day of crude pyrite should have crushing machinery consisting of a common Blake or gyratory rock crusher, followed by a pair of smooth rolls. This should be followed by a three-compartment plunger jig having compartments about 2 ft. square. Following this jig should be a pair of small rolls for recrushing the partly cleaned middling products from the jigs, and following these rolls should be a concentrating table for saving pyrite from the crushed material.

The necessary power, building, water supply and bins would probably bring the total cost of a pyrite concentrating plant up to about $14,000 at the present time. For a 100-ton plant per eight-hour day the total cost would be about $20,000.

Valve Reach-Rod Support

Nine out of ten reach rods that are used to operate overhead valves have either a poor bracket support or none at all, simply being pinned to the valve stem. In the accompanying illustration is shown a good way to support valve reach rods. A suitable light-weight hanger is bolted to the valve flanges. A spring placed under a collar on the rod on this hanger, as indicated, takes the weight of the rod. A support like this prevents wear on the threads of the valve stem.



METHOD OF SUPPORTING VALVE REACH ROD

Preparation of Bituminous Coal—IV

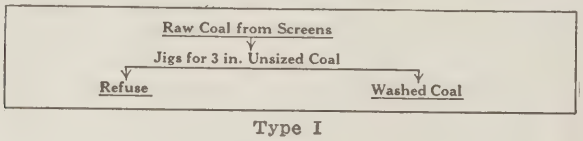
By Ernst Prochaska
Benton, Illinois

SYNOPSIS—*Many types and sizes of jigs as well as washing plants have been developed. The size of jig screen, the comparative size of plunger, the length of plunger stroke, the rapidity of stroke and the thickness of jigging bed, if any, are all factors that influence the efficiency attainable in the washing of any given kind and size of coal.*

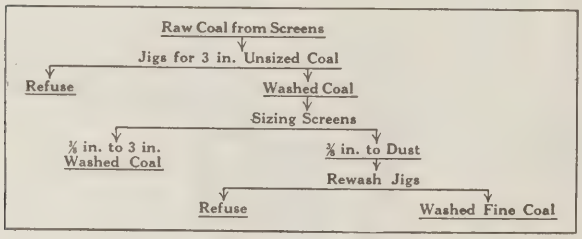
BESIDES the character of the raw coal, which represents the base upon which the washing of the coal must be established, the type of the preparatory methods to be chosen must be considered. The rules for the proper selection of these methods have been given in a previous installment of this article. They are in close relation with the mechanical equipment of the jigs. According to the preparatory processes and the construction of the jigs, several main types of plant can be established. These are shown in the accompanying flow sheets.

In regard to the flow sheets shown, the following remarks may be made: The system of rewashing according to Type IV can in some instances also be used when the character of the raw coal itself does not require such rewashing. But when it is desirable to be independent of the human factor and the continuous care of the operator, especially when the washed coal must be exceedingly clean and is sold under strict specifications, the coal is washed very closely in the primary jigs and the resulting unavoidable loss of good coal in the refuse is recovered in the rewash jigs.

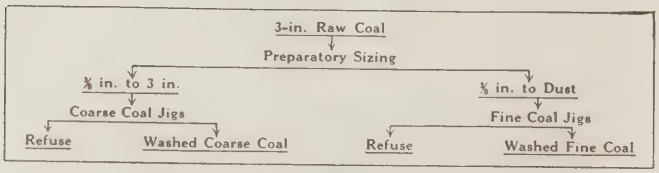
In Type VI the rewash jigs for the middle products of the primary jigs could be located ahead of the recrushing plant. This transposition should also be considered in Type V, and its advisability will depend much



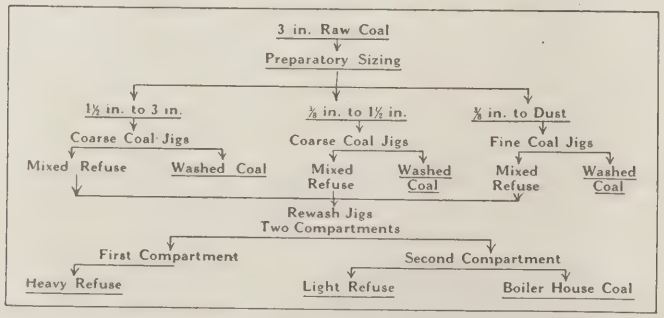
Type I



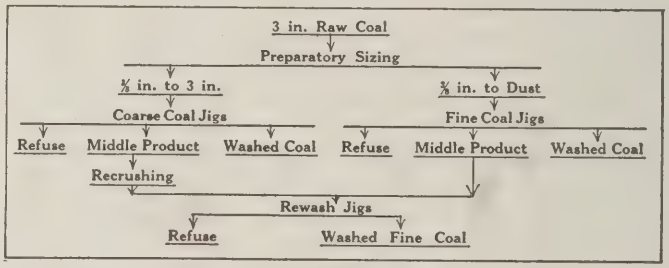
Type II



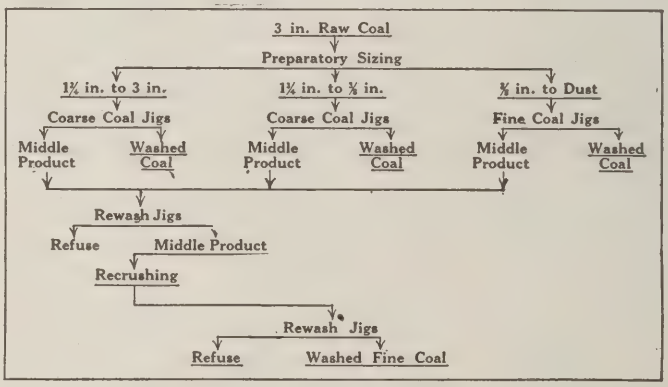
Type III



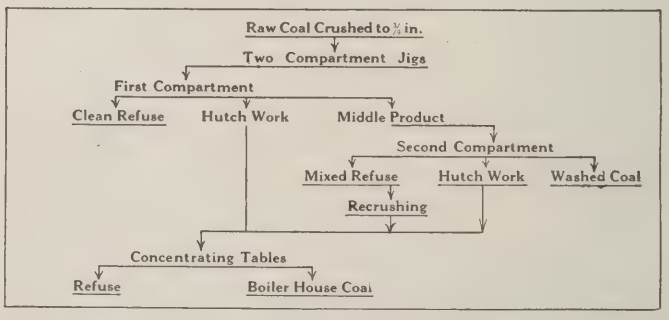
Type IV



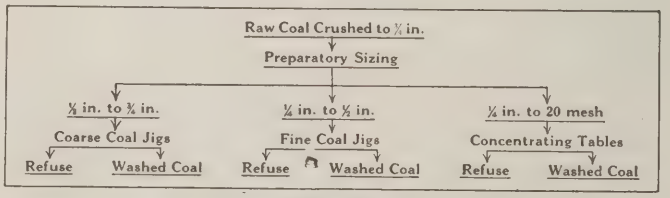
Type V



Type VI



Type VII



Type VIII

FLOW SHEETS OF SEVERAL MAIN TYPES OF PREPARATION PLANTS

Type I—Easily washed coal, impurities not disseminated. Type II—Impurities not disseminated in the coal; coarse coal easy, fine coal difficult to wash. Type III—Impurities not disseminated in the coal; coal not easily washed. Type IV—Coal difficult to wash; impurities not disseminated. Type V—Coal not easily washed; impurities partly disseminated. Type VI—Coal difficult to wash; impurities partly disseminated. Type VII—Coking coal not easy to wash; impurities not disseminated. Type VIII—Coking coal easy to wash; impurities disseminated.

upon the character of the middle product. If this contains a considerable amount of slate, picking tables can be used for the purpose of removing the heavy, pure slate, which when crushed would interfere with the proper operation of the rewash jigs. The foregoing types can be changed to suit local conditions. Only the most typical cases have been selected.

The raw coal is fed to the jigs direct from the raw coal elevator if unsized coal is to be washed; and if the coal is sized before washing, from the discharge chutes of the screens either by means of gravity chutes or in sluiceways with water. This method, however, has been largely abandoned and modern washers have in the rear and above the jigs small equalizing bins to further secure an even and uninterrupted supply of

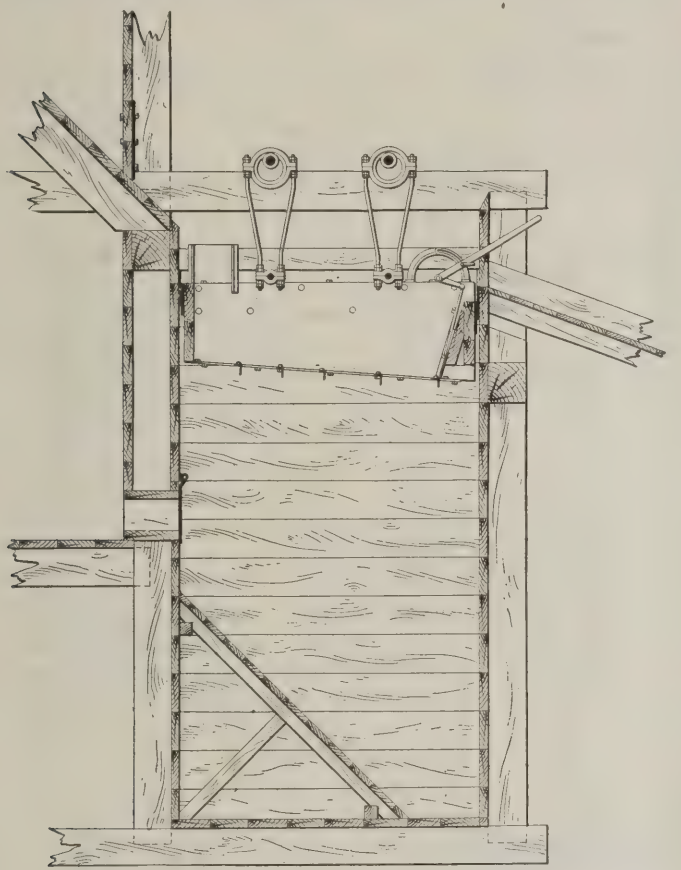


FIG. 2. STEWART JIG IN CONNECTION WITH JIG TANK

coal to the jigs. It is also advisable to feed the coal to the jigs by means of mechanically operated feeders. In most installations the flow of coal into the jigs is merely regulated by a slide gate. This, however, does not give an even feed, especially with coarse coal.

The simplest and best type of feeder is a slowly revolving drum with a slightly corrugated surface. The speed of the drum should be adjustable. This is accomplished most easily by means of a ratchet wheel and pawl, actuated from the jig eccentric shaft. Provision should be made whereby the pawl may be made to cover a greater or less number of teeth on the ratchet wheel so that the drum will revolve faster or slower as desired. Shaking or oscillating apron feeders are also in use, but these are more complicated, take up more room and cannot be adjusted with such nicety as the revolving drum feeders.

The coal from the feeders should flow into the jigs in such a way that it will be discharged below the surface of the water, so that all the coal is totally sub-

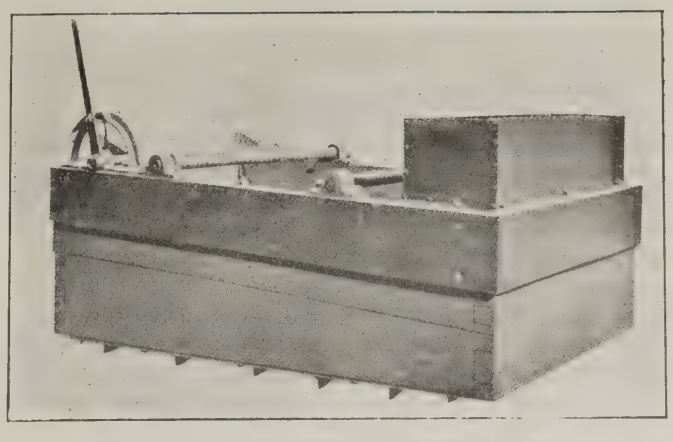


FIG. 3. SIDE VIEW OF STEWART JIG

merged. For fine and dry coal it is advisable to spray the coal before it enters the jigs, to prevent the formation of dry lumps.

It has been previously remarked that the construction of the jigs depends upon the character of the material to be washed. The jigs can be divided into three main types—coarse coal jigs, fine coal jigs, and jigs for unsized coal. According to the flow sheets, we find also jigs making only two products—that is, refuse and clean coal—and jigs making three products such as clean refuse, middle product and clean coal; or refuse, hutch work and clean coal.

Jigs can also be classified according to the means used to produce the pulsation of the water. Thus there are machines where the whole jig basket is moved up and down, and jigs with stationary screens in which the pulsation of the water is produced either by a plunger or by means of compressed air; or as in the Richard pulsator jig, by hydraulic shocks. The plungers can also be arranged differently. They may be located either in a separate compartment, which again can be placed in the rear of the jig compartment, or on one or both sides of the screens. We also have jigs with the plunger directly underneath the screen. One type of jig, with the plunger placed in a vertical position below the screen has, however, been proved a failure.

The jig screens are usually made of perforated steel plate; cast-iron grate bars are also sometimes used. The method of fastening the screen plates shows numerous variations. The methods used for refuse discharge are too numerous to mention, but they can be broadly divided into plain slide gates, either adjustable in a vertical position or swinging outward; double

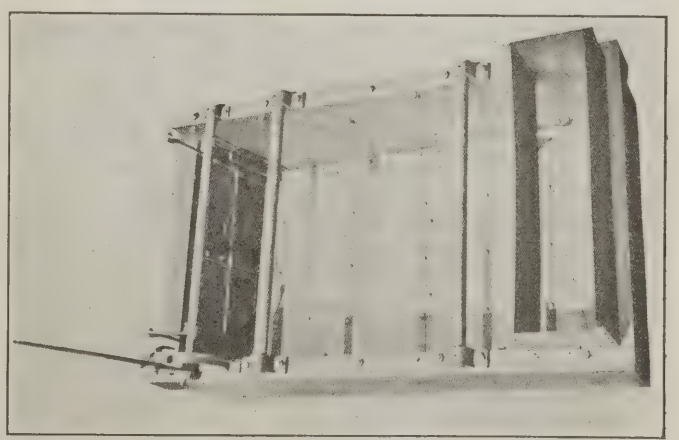


FIG. 4. TOP VIEW OF STEWART JIG, SHOWING SLATE GATE

gates, in which the lower gate regulates the height of bed and the upper gate regulates the outflow of refuse; revolving slate valves; kettles or pot valves and, finally, discharge of refuse through an artificial bed.

Furthermore, jigs can be classified as one, two or three compartment machines. If we consider that in addition to the differences mentioned in construction jigs can be built either of wood, steel plates, cast-iron plates or even of reinforced concrete, and that the plungers can be actuated by fixed or adjustable eccentrics or by means of crank-arm mechanisms, and that each single type of each group can be used without great changes in any other group, we get so many varieties that a systematic classification of the jigs into distinct types is almost impossible. By considering, however, so far as is feasible all the important differences, we can distinguish the following three general types:

Jigs with Fixed Screens—These include (a) coarse coal jigs, making two products only—refuse and washed coal. The plungers are in rear of the jigs, actuated either by fixed or adjustable eccentrics or by a crank-arm mechanism giving a differential motion. (b) Fine coal jigs with an artificial bed. These have the same plunger arrangement and drive as those of class (a). Refuse is withdrawn from the hutch and washed coal overflows at the front of the jig. (c) Coarse coal jigs with plungers underneath the screens. Either eccentric or crank-arm mechanisms are employed for giving the plunger motion. The refuse is discharged and the washed coal overflows. (d) Jigs with plungers on both sides of the screen. The plunger motion may be like that in type (a). These machines have either simple refuse and washed coal discharge or a third discharge for middle product. This type is chiefly constructed as two- or three-compartment jigs. (e) Jigs with one plunger between two compartments. This type is hardly ever used. (f) Jigs without plungers. The pulsation is actuated by puffs of compressed air or by hydraulic shocks.

Reciprocating Jigs or Jigs with Movable Screen—The construction of this type of jig does not show so many varieties as that of the fixed-screen type. Jigs of this type are used for unsized coal and make but two products. The only difference in the construction of the jigs is found in the arrangement of the slate gate and the methods used to diminish the suction on the upstroke. Fig. 2 shows the Stewart jig in connection with the jig tank. Fig. 3 shows the side view and Fig. 4 the top view, or rather bird's-eye view, of the jig basket. Fig. 5 shows the "American" jig. This machine is provided with adjustable wearing plates on the sides, securing a water-tight joint between the jig basket and the tank. The swinging slate gate, operated by the reciprocating motion of the jig basket, is opened at intervals but always to its fullest extent, in order to prevent the accumulation and jamming of large pieces of refuse in front of the gate. The interval between successive openings of the gate can be changed at the discretion of the operator. To obtain a closer regulation of the slate discharge, the operator can easily regulate the length of time the slate gate remains open. This is accomplished by means of a sliding cam which changes the time that the slate gate remains open by infinitesimal increments.

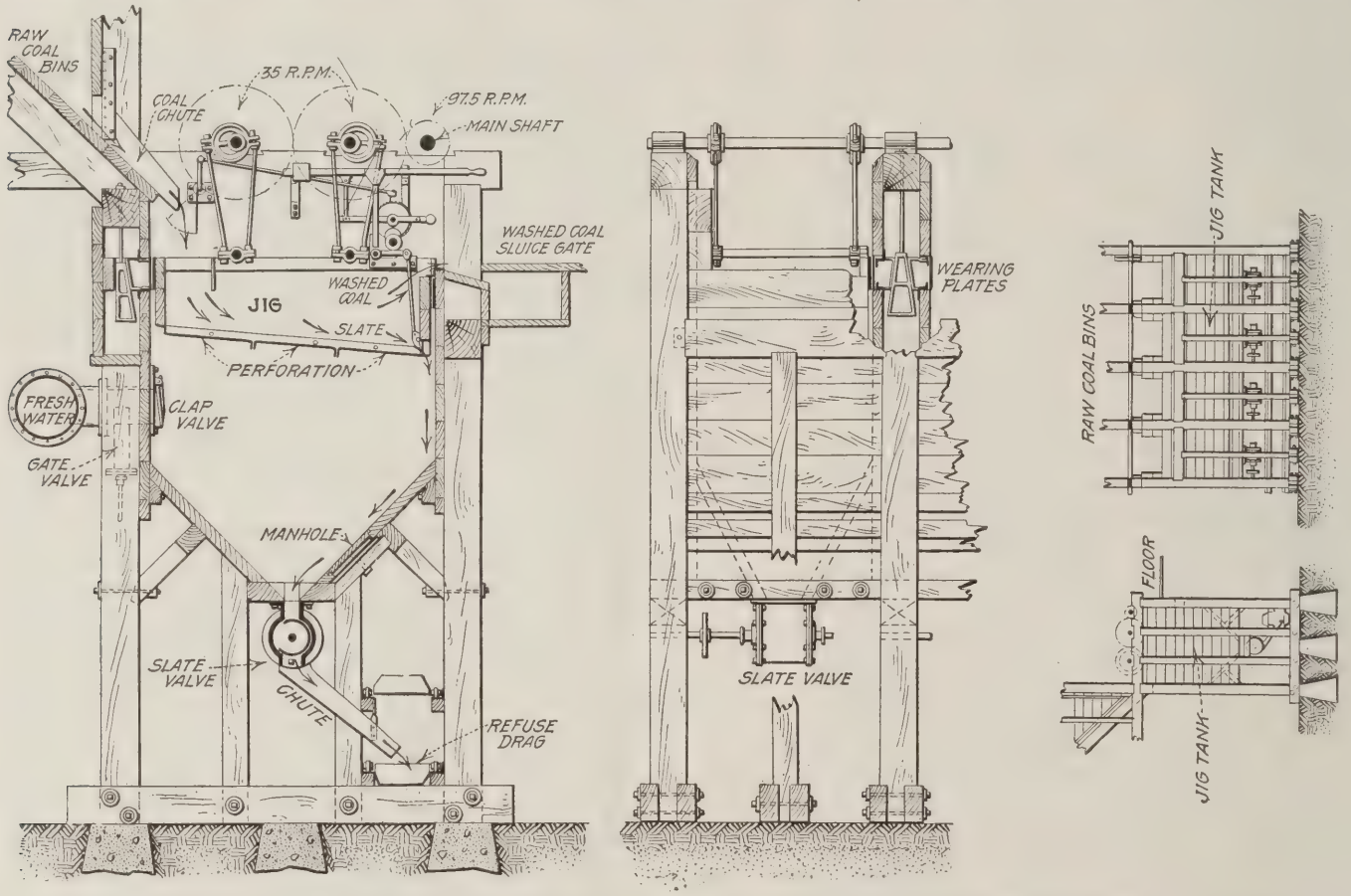


FIG. 5. SECTIONAL AND ELEVATIONAL VIEWS OF "AMERICAN" COAL JIG, SHOWING MECHANICAL DETAILS

Jigs with an Artificial Bed—This type is used only for fine coal, and the refuse is discharged through the perforations of the screen into the hutch. The difficulties of jigging increase with the fineness of the coal. The artificial bed is used to permit the discharge

of the refuse through the screen. A refuse discharge through a slotted opening or a gate would result in either too great a loss of good coal in the refuse or too much refuse would be carried over with the washed coal. Also, the small perforations in the screen required by the fineness of the materials would clog up easily and thereby nullify the pulsations.

In order to avoid all this trouble a screen is used with perforations somewhat larger than the largest size of material to be jigged. On top of this screen an artificial bed is laid, the material of which has a greater specific gravity than the refuse. The refuse finds its way through the interstices of the bed and drops into the hutch. The best material for an artificial bed has been found to be feldspar. For the first compartment feldspar between ¾ and 1¼ in. in size, and for the second compartment pieces that have passed through a 2¼-in. and over 1¼-in. round holes, is used. In some instances iron punchings or heavy slate have been used for a bed.

The discharge of the refuse is regulated in addition to the proper adjustment of the plunger stroke and speed, by the correct thickness of the bed and by using feldspar of a proper size. Both these values can only be determined by experiment. A deep bed consisting of small-size feldspar will give cleaner coal than a shallow bed made up of larger pieces.

Feldspar is especially well adapted for the purpose of making an artificial bed on account of its specific gravity, which lies between 2.5 and 2.6. On account of its hardness it resists abrasion, and being sharp-cornered makes a safe bed, permitting the small particles of refuse to pass through but keeping back the larger pieces of good coal. Slate being soft, wears off its sharp corners too easily and must be renewed frequently. Iron is too heavy a material and kills or at least weakens the pulsation of the water.

Fine-coal jigs are often arranged in tandem, forming in reality a two-compartment jig. This arrangement exposes the material to the jigging action during a longer period, but restricts the capacity. Fine-coal jigs show the same variations in regard to design, operating mechanism and materials used in their construction as the coarse coal jigs. Fig. 6 shows a fine-coal jig, with feldspar bed, built of timber.

On account of the novelty of the construction a description and illustration of a two-compartment jig for unsized coal will be given. This machine makes three products, and the pulsation of the water is produced by compressed air of 1½ to 2 lb. pressure per square inch. This reduces the moving parts to simple air valves located above the rear or water compartment of the jig. The construction of the air valve is shown in Fig. 7. Here *P* is the inlet port for the compressed air. The piston valve *V* is moved up and down by the eccentric drive *c*. In the highest position of the valve, as shown in the illustration, the air in the water compartment *b* can escape through the exhaust ports *R*. In the lowest position of the valve the compressed air enters through the port *P* and expands at first to some extent on account of the increase of area; but soon the pressure in the valve will be equal to the pressure in the supply pipe. The motion of the water is reversed on the exhaust stroke of the valve. The amount of air can be regulated by the length of stroke, the intensity of the pulsation by the pressure of the air, and the frequency of the pulsations by the speed of the eccentric shaft.

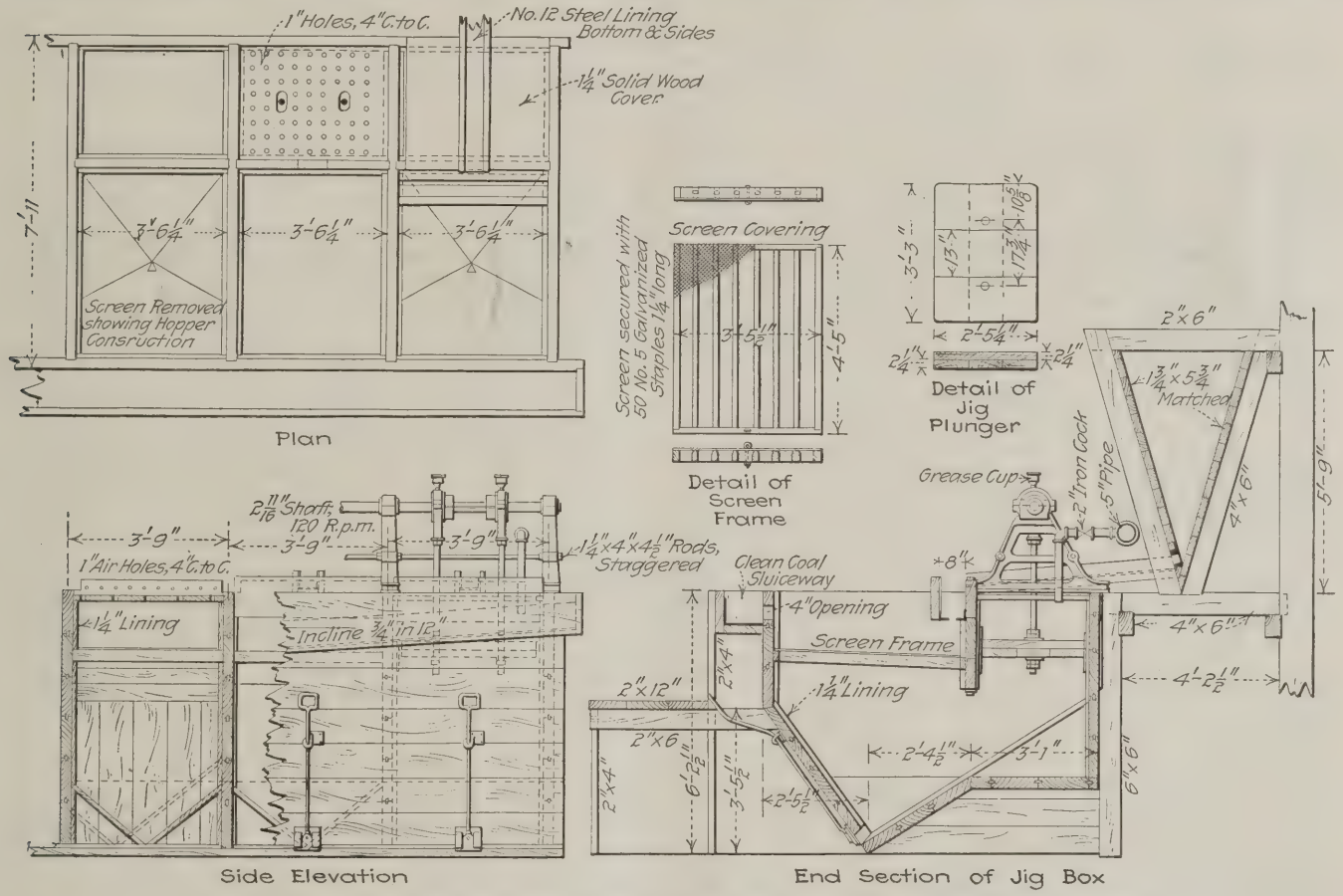


FIG. 6. DETAILS OF A FINE-COAL JIG, WITH FELDSPAR BED, BUILT OF TIMBER

The jig shown in Figs. 8 and 9 has two screens, *d* and *e*, both of which are slightly inclined against the direction of the flow of materials. The first and larger screen has three and the second or smaller one two air valves. The heavy slate is discharged immediately at the feed end of the jig through the slate gate *f* and falls through the chute *g* into the elevator *h*. This peculiar method of slate discharge prevents the disseminating of the soft and triturable refuse with the coal, and also prevents the choking up of the screen with heavy slate. On the second screen *e* the clean coal is separated and overflows at *i*. Light refuse or the middle product, according to the character of the coal, is discharged at *k* and falls through the chute *l* into the elevator pit *m*. The sludge and fine refuse which passes through the perforation of the screens is conveyed by means of a right- and left-hand screw conveyor *n1* and *n2* to the elevator pits *h* and *m*. The water is regulated at *p*.

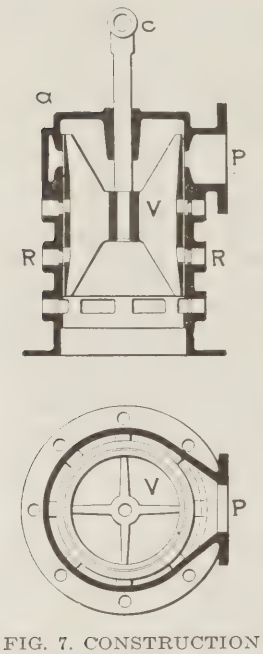


FIG. 7. CONSTRUCTION DETAILS OF AIR VALVE OF TWO-COMPARTMENT JIG

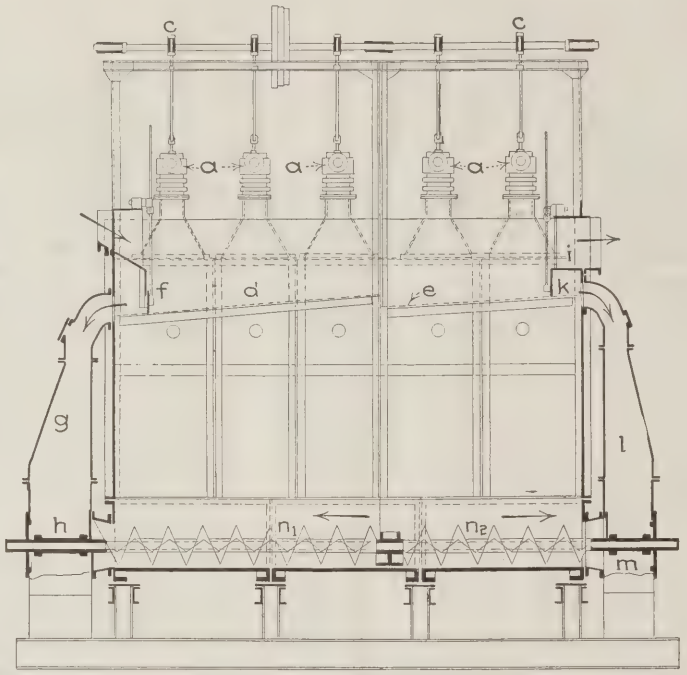


Fig. 8

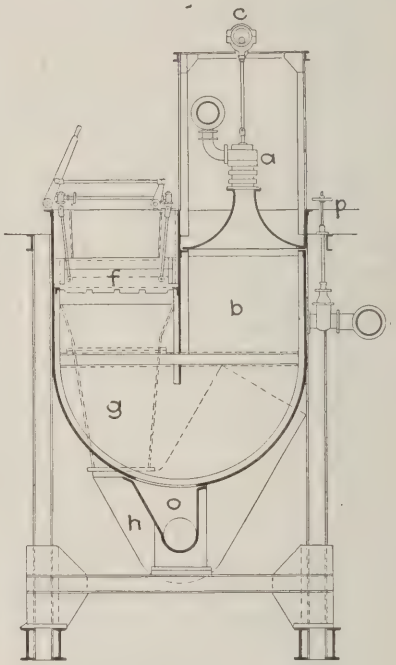


Fig. 9

FIGS. 8 AND 9. TWO-COMPARTMENT JIG FOR UNSIZED COAL

No fundamental difference exists between the method of operation of the jig described above and other machines. The peculiarity of the use of compressed air can be partly explained by the large size in which the jigs are built. But plunger-jigs also are built in equally large sizes for the treatment of unsized coal and are quite successful.

Owing to the great variety in the construction and arrangement of jigs, it is hardly possible to give authentic figures in regard to the work performed. This furthermore becomes more complicated, as the work and the output of a jig depend not only on the proper selection of certain dimensions such as length and width of jig screens, proportion between plunger and screen area, height of overflow above screen, and the size of perforations in the screen, but also on the proper regulation of the plunger stroke, speed of eccentric shaft, size of materials, thickness of bed, water supply and many other considerations.

The details of construction and the methods for securing a proper adjustment were developed by each builder of jigs independently and according to his own ideas. For these reasons we have a multiplicity of designs and data on operation which, however, give similar final results. In any case, however, the tabulation of the most important data for each type of jigs (see the table) requires some explanation.

The methods used will change the relation between the different factors independently of the capacity, which naturally influences the size of the jig. If coal is sized before washing, a series of small jigs will be required; whereas if unsized coal is to be treated, quite frequently one large coarse-coal jig will suffice. This will explain the considerable difference in the dimensions and the capacity of the jigs. The character and the size of coal on the one hand and the type of the jig on the other strongly influence the length of the plunger stroke. The number of strokes per minute must be increased in inverse proportion, and the length of the stroke in direct proportion to the size of the coal. That is, coarse coal requires a slower and longer stroke than fine coal, for which a short, quick pulsation is more advisable. The size of the perforation in the screen must be smaller than the smallest size of the coal. The big difference in the power consumption can be explained by the different sizes of the jigs.

Jigs for unsized coal are mainly built for great capac-

TABLE OF THE MOST IMPORTANT JIG DATA

	Coarse Coal Jigs	Unsized Coal Jigs	Fine Coal Jigs
Width of jig screen...	24 in. to 6 ft. 6 in.	30 in. to 6 ft. 6 in.	20 in. to 7 ft. 3 in.
Length of jig screen..	3 ft. 3 in. to 16 ft.	6 ft. 6 in. to 19 ft. 6 in.	6 ft. 6 in. to 21 ft. 4 in.
Capacity per hour in tons.....	5 to 150	30 to 150	5 to 70
Capacity per square foot of screen area in tons.....	0.4 to 1.0	0.8 to 1.5	0.3 to 0.5
Number of strokes per minute.....	20 to 100	35 to 110	100 to 200
Length of stroke in inches.....	1½ to 16	1¼ to 6	⅜ to 2
Proportion of area of plunger to screen area.....	0.7:1 to 1:3	1:2 to 1:2.5	1:1 to 1:1.5
Size of perforations in screen in inches...	⅛ to ½ in.	5/32 to ¾	⅜ to ½
Size of bed material in inches.....	.....	.....	9/16 to 1¼
Thickness of bed in inches.....	.....	.....	1¼ to 2½
Horsepower required.	1 to 6	3 to 7	1 to 5

ity. In some cases the whole amount of raw-coal screenings is put over one jig only, and I know of some machines treating 150 tons of raw coal per hour. The perforations in the screen are larger than in the screens of coarse-coal jigs, because a heavier pulsation is required to loosen up the unsized coal. This, however, will make the size of perforation in the screen larger than the size of the smallest particles of the material to be treated, and the refuse collecting on the screen must prevent the downward passage of the fine coal.

In addition to the foregoing considerations it is of great importance to determine the correct thickness of the artificial bed and the proper size of the material to be employed therefor. The data shown in the table can be used only as a guide. Different coals will require different beds.

(To be continued)

Coal in the Peace River District of British Columbia

By Robert Dunn
Victoria, B. C.

For years the Peace River country of the Canadian Northwest has been known to sportsmen as a bear hunters' Mecca. Within recent years, however, important discoveries of coal and other minerals have been made along the upper waters of this stream and its tributaries. Sergt. C. F. W. Rockfort, of the Canadian Engineers, recently returned from three years of active service overseas, after long search some years ago was rewarded by finding the outcroppings of several coal beds on the banks of Carbon Creek. He is a firm believer in the future of this region.

The Sergeant states: There are several outcroppings showing beds totaling nearly 100 ft. These beds vary in thickness in most cases from 3 to 6 ft., while six of the beds range between 5 and 7 ft. The series culminates in a vertical bed having an exposure of 15 ft. 9 in.

Samples were taken and analyses obtained from Thomas Haynes & Son, analytical chemists of Toronto, Ont., which are reported as follows:

	No. 1	No. 2
Moisture at 110 deg. C	4.07	0.93
Volatile hydrocarbon	23.31	38.51
Fixed carbon	71.28	59.12
Ash	1.34	1.44
	100.00	100.00
B.t.u.	13,693	15,313

It is confidently believed by the locater of this property that an improvement in quality will be proved by development, but as it stands he thinks it must be admitted that a field of fine bituminous coal, of which little is generally known, has been to an extent demonstrated. No. 2 sample indicates a high-class coking coal for smelting purposes according to the chemists entrusted with the analysis of the specimens. As no Canadian railroad is using better fuel, it is thought that the opening up of these deposits would furnish the Grand Trunk Pacific Ry. with a desirable source of supply for its western lines.

With reference to the railway situation, Sergeant Rockfort is looking forward to projected extensions of transportation facilities through the Peace River district to lead to the active development of the Carbon River coal deposits. His opinion, and that of most of the settlers in that territory, is that the continuation of the Pacific Great Eastern Ry., which now traverses the province from the tidewater terminus known as Squamish, situated on the lower mainland north of the City of Vancouver, to Chasm, which is 180 miles inland and generally in a northeasterly direction, is of vital importance to British Columbia. The road has been surveyed to the town of Prince George and some further construction work on the unfinished sections is to be undertaken this summer.

But those interested in the Great Northern district are not satisfied with the present program. They want the railroad carried north from Prince George through the Peace River Pass to tap the immense area beyond. The resources of this section embrace not only thousands of square miles of uncultivated lands, but promising oil possibilities as well as coal.

Legal Department

Injury Through Fall of Slate—In an action for fatal injury to a miner resulting from a fall of slate in an air course, testimony of an assistant state mining inspector that the air course was too wide, that the roof was not safe unless cross-timbered, and that the mine foreman had been so advised before the accident, was properly admitted as tending to show that the operator was negligent in permitting the dangerous condition to remain in the face of actual or constructive knowledge of its existence. The injured man did not assume the risk of the accident unless the peril was so manifest to him that an ordinarily prudent man would not have encountered it. (Kentucky Court of Appeals, Lay vs. Carter Coal Co., 206 Southwestern Reporter, 769.)

Organizing Coal Corporations—One who transfers to a corporation a lease of coal lands pursuant to a contract made with the promoters of the company and accepted by the corporation when organized, in consideration of a block of stock representing a one-fifth interest in the value of the mining property when equipped for production, is entitled under such contract to be treated as a subscriber for such stock, and may compel a transfer of the stock to him according to the agreement. In this case it is found that provision in the contract for a "one-fifth interest in the property fully equipped" is referable to equipment of the property with tipple, tracks, haulways, cars, and all necessary machinery and motive power to successfully operate the property. (West Virginia Supreme Court of Appeals, Wallace vs. Eclipse Pocahontas Coal Co., 98 Southeastern Reporter, 293.)

Enforcing Sales Agency Contracts—Plaintiff and defendant entered into an agreement whereby defendant, a coal-producing company, appointed plaintiff as its exclusive agent to market defendant's output, on condition that defendant would load first-class merchantable coal and ship same on plaintiff's orders, and that plaintiff should use his best endeavors to sell defendant's output at prevailing market prices, at a stated commission, etc. Held, that the contract was not invalid for want of mutuality as purporting to bind defendant without any reciprocal obligation on plaintiff's part. And where it appears under a contract of this kind that the producer's refusal to make deliveries would involve injury to the agent which could not be adequately compensated in damages, by reason of his inability to obtain coal of like quality elsewhere to supply his trade, a court will grant relief by injunction to restrain the producer from wrongfully breaking the agreement. (Kansas City Court of Appeals, Warren vs. Ray County Coal Co., 207 Southwestern Reporter, 883.)

Fusibility of Ash from Pennsylvania Coals*

Samples of Coal Tested Were Practically All Standard Mine Samples Gathered in Accordance with the Method Adopted by the Bureau of Mines—The Lower and Older Coals Contain More Refractory Ashes

By W. A. Selvig and A. C. Fieldner
Fuels Chemical Laboratory, U. S. Bureau of Mines, Pittsburgh, Penn.

PREVIOUS papers[1] gave a description of the standard gas-furnace method used by the Bureau of Mines in making ash-fusibility tests, a discussion of the relation of fusibility tests to clinker formation, and complete tables giving results obtained for West Virginia and the Interior Province coals. This paper includes a table giving the results obtained for the coals of Pennsylvania, which is by far the greatest coal-producing state in the Union.

The various coal beds of the bituminous coal field of Pennsylvania are arranged according to their geological succession, the uppermost beds being listed first. Under each bed the arrangement is alphabetical according to county, town and mine. The samples tested are practically all standard mine samples collected according to the methods used by the Bureau of Mines.[2] A few car samples which were considered representative of the output of the various mines were also included.

> FUSIBILITY of ash is one of the coming problems of the coal industry. Manufacturers are highly interested in the subject, but as yet the mine owner has regarded it with indifference and as a problem which gives him no concern. A coal with an ash of low fusing temperature is apt to give a bad performance because the fluxing of the ash may clog the grates and prevent the passage of air.

The various coal districts of the anthracite region are arranged alphabetically under the field to which they belong. Under each district the arrangement is (as before) alphabetical, according to county, town and mine. The samples tested are practically all delivery samples of the various sizes as marketed, only a few standard mine samples being represented.

The number of samples from each mine, the lowest, highest and average softening temperatures in deg. F., and the per cent. ash and sulphur in the dry coal are tabulated for each mine tested. Average values for each mine were computed from the individual samples, and from these values averages representing each bed or district were obtained. In some instances the average values given for the beds or districts represent only a few mines and are in such cases not truly representative.

The point taken as the softening temperature is that at which the ash when molded into solid triangular pyramids $\frac{3}{4}$-in. high and $\frac{1}{4}$-in. at the side of the base, and mounted in a vertical position, has fused down to a spherical lump. Samples remaining unfused at 3010 deg. F., which was the highest temperature attained in the test, were marked plus 3010 (+3010) and used as such in figuring the average values for the mine from which the average values of the beds or districts were computed.

As stated in a previous paper[1] on the fusibility of coal ash from the Interior Province coals, the softening temperature of coal ash from the various fields of the United States range in general from 1900 to 3100 deg. F. This range of softening temperature for convenience in discussion is subdivided into the three following groups: Class 1, refractory ashes, softening above 2600 deg. F. Class 2, ashes of medium fusibility, softening between 2200 and 2600 deg. F. Class 3, easily fusible ashes, softening below 2200 deg. F.

The softening temperature of the ash from the bituminous coal beds of Pennsylvania are found in Class 1 and Class 2, principally in the latter. The beds of the Monongahela, Conemaugh and Allegheny series, with the exception of the Lower Kittanning, Fulton and Brookville beds of the Allegheny series, are quite uniform as regards fusibility and come in Class 2. The Lower Kittanning bed of the Allegheny series contains a large number of mines which give ash of high fusibility and the average for this bed almost places it in the lower part of Class 1. The Fulton and Brookville beds of the Allegheny series, as also the Bloss bed of the Pottsville series, come in Class 1.

It is interesting to note that the coal beds which show high softening temperatures are geologically the lower and older beds of the bituminous coal field. This was also found to be true of the coal beds of West Virginia. It has been found that in general the beds of the Monongahela and Allegheny series of Pennsylvania give a more refractory ash than do the same beds found in West Virginia.

The ash from the anthracite region of Pennsylvania is highly refractory, coming in Class 1. The softening temperature in practically every instance is above 3000 deg. F.

The tables on the pages that follow show the fusing temperatures of the ash in the coal beds of Pennsylvania and the percentages of both ash and sulphur which the coals are found to contain.

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[1]Selvig, W. A.: "Fusibility of Coal Ash from West Virginia Coals"; *Coal Age*, Vol. 15, No. 1, 1919, pp. 12-16.

Selvig, W. A., Ratliff, W. C., and Fieldner, A. C.: "Fusibility of Coal Ash from the Interior Province Coals"; *Coal Age*, Vol. 15, No. 16, 1919, pp. 698-703.

[2]Holmes, J. A.: "The Sampling of Coal in the Mine"; Technical Paper 1, Bureau of Mines, 1911, 18 pp.

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM PENNSYLVANIA COALS

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
MONONGAHELA SERIES								
Pittsburgh Bed								
County	Town	Mine						
Allegheny	Bruceton	U. S. Experimental	4	2280	2510	2400	6.82	1.23
Allegheny	Elizabeth	Patterson No. 2	2	2300	2580	2440	6.04	0.80
Allegheny	Oak Station	Oak	1	....	....	2430	6.13	1.22
Fayette	East Millsboro	Hustead	4	2110	2440	2290	8.40	1.79
Washington	Avella	Penobscott	2	2040	2110	2080	6.36	2.12
Washington	Baird	Schoenberger	6	2310	2520	2440	5.98	1.08
Washington	Finleyville	Cincinnati	3	2350	2550	2420	6.58	1.20
Washington	Greer Station	Henderson No. 1	5	2010	2200	2120	8.12	2.26
Washington	Monongahela City	Catsburg	6	2140	2610	2420	6.58	1.17
Westmoreland	Greensburg	Jamison No. 4 (car sample, lump coal)	1	....	....	2550	10.66	1.41
Average of mines in Pittsburgh Bed			34	2190	2440	2360	7.17	1.43
CONEMAUGH SERIES								
Little Pittsburgh Bed								
Somerset	Pinehill	Consolidation No. 112	2	2350	2420	2390	8.13	1.70
ALLEGHENY SERIES								
Upper Freeport (E or Lemon) Bed								
Armstrong	Ford City	Campbell	2	2000	2030	2020	17.75	5.04
Armstrong	Logansport	Raridan	2	2140	2170	2160	10.80	3.29
Beaver	Smith's Ferry	Island Run	1	....	....	2260	5.09	1.45
Bedford	Hopewell	Cambria No. 3	5	2460	3010	2670	12.43	2.01
Blair	Glen White	Glen White No. 2	4	2120	2460	2210	7.56	1.96
Butler	Butler	Muntz	1	....	....	2030	7.75	3.07
Butler	Butler	Vogeley	1	....	....	2050	9.90	3.73
Butler	Chicora	Cunningham	1	....	....	3000	8.67	1.26
Butler	Evans City	Country Bank	1	....	....	2110	5.55	3.71
Butler	Jamisonville	Victoria	2	2020	2360	2190	11.56	2.98
Butler	Jefferson Center	Weamer	1	....	....	2150	8.41	1.32
Butler	Unionville	Eagle	1	....	....	2220	6.50	2.67
Cambria	Barnesboro	Cambria No. 2½	4	2410	2490	2450	8.48	1.54
Cambria	Beaverdale	Beaver Run	6	2070	2980	2380	8.49	1.81
Cambria	Bens Creek	Wilmore No. 1	5	2140	2470	2280	6.80	2.04
Cambria	Bens Creek	Wilmore No. 3	4	1990	2490	2270	7.27	2.28
Cambria	Fallen Timber	Peerless No. 4	2	2270	2330	2300	10.05	1.78
Cambria	Gallitzin	Gallitzin	5	2280	2490	2370	6.77	1.43
Cambria	Sonman	Sonman Slope	6	2050	2280	2170	6.44	1.78
Cambria	Van Ormer	Peerless No. 1	3	2420	3010	2760	8.94	0.86
Clearfield	Brisbin	Lenore No. 1	1	....	....	2640	8.04	0.81
Clearfield	Brisbin	Lenore No. 2	2	2450	2540	2500	8.49	1.02
Indiana	Ernest	Ernest No. 2	2	2190	2240	2220	10.70	2.94
Indiana	Glen Campbell	Indiana No. 6	4	2410	2550	2490	8.58	1.28
Indiana	Homer City	Lucerne No. 1	6	2080	2590	2290	7.97	2.12
Indiana	Homer City	Lucerne No. 3	3	2190	2350	2240	8.28	1.98
Jefferson	Brockwayville	West Clarion	1	....	....	2300	9.98	1.74
Somerset	Edie	Levi Berkey	1	....	....	2680	11.22	1.57
Somerset	Somerset	Neva	1	....	....	2270	12.07	2.49
Somerset	Somerset	Sanner and Shaffer	1	....	....	2630	9.62	1.69
Somerset	Zimmerman	Ralphton No. 6	1	....	....	2600	15.61	1.52
Westmoreland	Ligonier	John Dyer	1	....	....	2450	11.90	1.99
Westmoreland	Lucesco	Lucesco	4	2000	2140	2090	10.79	3.27
Average of mines in Upper Freeport Bed			85	2190	2470	2350	9.35	2.13
Lower Freeport (D, or Moshannon) Bed								
Armstrong	West Kittanning	Meals	2	2070	2070	2070	10.06	3.28
Armstrong	Yatesboro	Cowanshannock No. 2	2	2050	2100	2080	10.88	3.20
Cambria	Barnesboro	Cambria No. 1	5	2430	2570	2490	6.57	1.50
Cambria	Barnesboro	Delta	5	2410	2540	2490	6.70	1.52
Cambria	Beaverdale	Logan No. 6½	4	2010	2390	2250	8.49	2.73
Cambria	Hastings	Penna. No. 11	5	2430	2640	2540	7.14	1.46
Cambria	Hastings	Penna. No. 12	5	2200	2580	2380	7.63	1.86
Cambria	Spangler	Penna. No. 21	4	2240	+3010	+2550	6.49	1.32
Cambria	Spangler	Penna. No. 22	6	2530	2880	2620	6.57	1.27
Cambria	Van Ormer	Peerless No. 2	3	2330	2500	2410	10.38	2.12
Center	Clarence	Poormansite	1	....	....	2220	8.08	1.86
Center	Gillingtown	Lehigh Valley No. 15	1	....	....	2300	11.64	2.75
Clearfield	Berwindale	Reed	5	2100	2420	2200	9.36	3.47
Clearfield	Carnwath	Carnwath No. 1	5	2390	3010	2620	6.74	1.14
Clearfield	Carnwath	Carnwath No. 2	4	2140	2410	2280	7.77	2.23
Clearfield	Dubois	Eriton	1	....	....	2280	8.82	2.05
Jefferson	Brockwayville	West Clarion	1	....	....	2140	10.48	2.97
Jefferson	Punxsutawney	Eleanora	5	2120	2490	2330	7.98	2.04
Jefferson	Sykesville	Sykesville	4	2330	2720	2510	12.68	2.28
Somerset	Elklick	Eagle	1	....	....	2460	8.94	1.59
Somerset	Somerset	Stauffer No. 3	1	....	....	+3010	5.34	0.65
Average of mines in Lower Freeport Bed			70	2250	+2560	+2390	8.52	2.06
Upper Kittanning (C Prime) Bed								
Butler	Butler	Thompson	1	....	....	2230	7.33	2.09
Butler	Butler	Zenith No. 1	2	+3010	+3010	+3010	4.54	0.90
Cambria	Johnstown	Smokeless No. 1	3	2160	2260	2210	9.71	2.19
Cambria	Johnstown	Sunnyside	4	2240	2450	2340	10.40	2.47
Somerset	Confluence	Linmer	1	....	....	2190	8.44	2.42
Somerset	Holsopple	Oneida	4	2120	2460	2280	11.06	2.81
Somerset	Seonor	Eureka No. 39	3	1980	2390	2190	9.20	2.24
Average of mines in Upper Kittanning Bed			18	+2300	+2510	+2350	8.67	2.16
Middle Kittanning (C) Bed								
Butler	Claytonia	Stage	1	....	....	2130	13.97	3.89
Butler	Harmony Junction	North Pgh. Realty	1	....	....	2050	11.37	4.54
Butler	Nealy	Nealy	1	....	....	1990	10.77	3.92
Clearfield	Morrisdale	Morrisdale No. 1	2	2850	+3010	+2930	8.94	1.12
Clearfield	Morrisdale	Morrisdale No. 2	2	2620	2980	2800	10.26	1.41
Average of mines in Middle Kittanning Bed			7	2740	+3000	+2380	11.06	2.98

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM PENNSYLVANIA COALS—Continued

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
ALLEGHENY SERIES—Continued								
Lower Kittanning (Miller or B) Bed								
County	Town	Mine						
Armstrong	Kittanning	Snyder	2	2090	2220	2160	10.38	4.22
Cambria	Beaverdale	Pennsylvania No. 15	5	2280	+3010	+2440	7.26	1.92
Cambria	Colver	Colver	9	2450	+3010	+2820	5.75	1.14
Cambria	Dunlo	Henriette	5	+3010	+3010	+3010	4.82	0.66
Cambria	El Mora	Peerless No. 1	5	2380	+3010	+2610	6.81	1.57
Cambria	Lilly	Sonman No. 2	3	+3010	+3010	+3010	6.36	0.67
Cambria	Llanfair	Scalp Level No. 2	4	2960	+3010	+3000	4.93	0.72
Cambria	Nanty Glo	Lincoln No. 1	12	2150	2480	2340	6.58	1.89
Cambria	Nanty Glo	Springfield No. 1	5	2080	2280	2210	6.68	2.18
Cambria	Portage	Miller No. 1 shaft	10	2260	+3010	+2730	6.22	1.15
Cambria	Portage	Puritan No. 1	4	2230	2580	2380	7.65	2.07
Cambria	St. Michael	Maryland Shaft	15	2630	+3010	+2880	6.13	0.93
Cambria	Vintondale	Vinton No. 6	3	2100	2410	2310	6.95	2.08
Cambria	Windber	Eureka No. 40	8	2520	+3010	+2650	7.38	1.22
Center	Clarence	Poormansite	1	....	....	+3010	12.83	0.91
Center	Osceola Mills	Electric	4	2370	+3010	+2680	7.96	2.07
Center	Osceola Mills	Moshannon No. 10	5	2380	2550	2470	7.52	2.11
Center	Osceola Mills	Weston	3	2450	2690	2580	7.93	2.11
Clearfield	Boardman	Potts Run No. 3	5	2530	+3010	+2850	8.95	1.44
Clearfield	Karthaus	Horseshoe	1	....	....	2440	8.97	3.23
Clearfield	Morrisdale	Morrisdale No. 1	3	2230	2320	2280	8.53	3.54
Clearfield	Morrisdale	Morrisdale No. 3	3	2500	2660	2550	7.12	1.98
Clearfield	Munson	Colorado No. 5	5	2300	3010	2600	7.87	2.08
Clearfield	Munson	Ghem	4	2300	2470	2350	9.72	3.10
Clearfield	Phillipsburg	Acme No. 2	1	....	....	2430	7.58	2.61
Clearfield	Smoke Run	Viola	3	2600	+3010	+2750	7.75	1.10
Elk	Brandy Camp	Elbon No. 5	1	....	....	2140	8.90	2.97
Elk	Byrnedale	Byrnedale No. 31	1	....	....	2350	6.49	2.59
Elk	Dagus	Dagus	1	....	....	2240	9.95	4.04
Elk	Wilmere	Dents Run No. 1	1	....	....	2050	9.66	3.56
Huntingdon	Jacobs	Barnet	1	....	....	+3010	6.38	0.83
Indiana	Robindale	Robindale	4	2440	2490	2470	7.86	2.20
Indiana	Scott Glen	Brush Valley	6	2150	2380	2240	8.10	3.00
Jefferson	Brockwayville	West Clarion	1	....	....	2120	10.60	3.45
Somerset	Cairnbrook	Loyal Hanna No. 6	2	3010	+3010	+3010	6.75	0.86
Somerset	Holsopple	Lenore	4	2210	2600	2360	8.00	2.38
Somerset	Holsopple	Haws No. 3	6	2180	2440	2370	8.18	2.48
Somerset	Windber	Lochrie Arrow	5	2320	+3010	+2520	6.79	1.45
Sullivan	Bernice	Randall and Shaad (semi-anthracite)	1	....	....	+3010	12.09	0.84
Average of mines in Lower Kittanning Bed			162	+2420	+2750	+2550	7.86	2.03
Fulton Bed								
Huntingdon	Jacobs	Jacobs	3	2770	+3010	+2880	8.64	1.63
Huntingdon	Jacobs	Starr	1	....	....	+3010	8.34	1.08
Huntingdon	Robertdale	Robertdale	5	2370	+3010	+2880	6.56	1.06
Huntingdon	Woodvale	Woodvale	3	+3010	+3010	+3010	5.92	0.95
Average of mines in Fulton Bed			12	+2720	+3010	+2940	7.36	1.18
Brookville (A) Bed								
Center	Clarence	Lehigh Valley No. 22	1	....	....	+3010	14.85	1.01
Clearfield	Karthaus	Shinola	1	....	....	2390	13.48	3.13
Somerset	Cairnbrook	Hitechew or Fleegle	1	....	....	+3010	10.60	1.43
Average of mines in Brookville Bed			3	....	....	+2800	12.98	1.86
POTTSVILLE SERIES								
Bloss Bed								
Tioga	Antrim	Annas	1	....	....	2500	12.78	2.92
Tioga	Landrus	Bear Run	1	....	....	2500	12.99	2.53
Tioga	Morris Run	New	1	....	....	2900	10.11	1.31
Average of mines in Bloss Bed			3	....	....	2630	11.96	2.25
MISCELLANEOUS								
Morgan Bed								
Tioga	Morris Run	New	1	....	....	2620	9.39	1.76
Stoner Bed								
Somerset	Pinehill	Consolidation No. 113	1	....	....	2470	11.20	1.96
PENNSYLVANIA ANTHRACITE REGION NORTHERN FIELD								
Pittston District								
Luzerne	Pittston	Colliery No. 14	1	....	....	+3010	6.03	0.58
Plymouth District								
Luzerne	Kingston	Gaylord (Egg)	1	....	....	+3010	12.69	0.75
Luzerne	Plymouth	Gaylord (Stove)	6	+3010	+3010	+3010	12.35	0.92
Average of mines in Plymouth District			7	+3010	+3010	+3010	12.52	0.84
Scranton District								
Lackawanna	Dunmore	Sloan	1	....	....	+3010	11.94	0.48
Lackawanna	Scranton	Marvine Collieries	2	+3010	+3010	+3010	13.99	0.80
Lackawanna	Scranton	(Chestnut)	1	....	....	+3010	12.40	0.65
Lackawanna	Scranton	(Furnace)	1	....	....	+3010	11.38	1.26
Lackawanna	Scranton	(Egg)	1	....	....	3010	14.46	0.91
Lackawanna	Taylor	Pyne (Egg)	1	....	....	+3010	10.19	0.66
Average of mines in Scranton District			7	+3010	+3010	+3010	12.39	0.79
Wilkes-Barre District								
Luzerne	Nanticoke	(Stove)	1	....	....	+3010	15.46	0.80
Luzerne	Nanticoke	(Furnace)	1	....	....	+3010	10.16	0.80
Luzerne	Nanticoke	Susquehanna Colliery (Egg)	2	3010	+3010	+3010	13.89	0.75
Average of mines in Wilkes-Barre District			4	3010	+3010	+3010	13.17	0.78

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM PENNSYLVANIA COALS—Continued

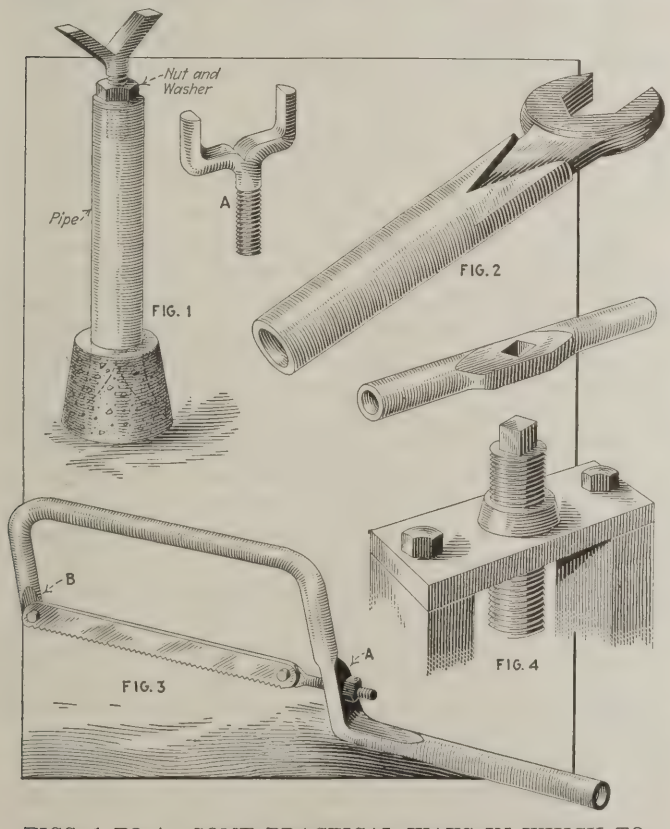
Locality, Bed, Etc.	Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
		Lowest	Highest	Average	Ash	Sulphur
1	2	3	4	5	6	7
EASTERN MIDDLE FIELD						
Hazelton District						
County Town Mine						
Luzerne.... Beaver Brook.... .... (Egg)....	1	....	....	2960	14.50	0.61
WESTERN-MIDDLE FIELD						
Shamokin District						
Northumberland.... Shamokin.... Buck Ridge (Pea)....	1	....	....	+3010	17.00	0.95
Northumberland.... Shamokin.... Katherine....	1	....	....	2910	16.17	0.85
Average of mines in Shamokin District....	2	....	....	+2960	16.59	0.90
West Mahanoy District						
Schuylkill.... Raven Run.... Girard Mammoth (Buckwheat No. 1)....	1	....	....	+3010	....	....
Schuylkill.... Shenandoah.... Hudson (Buckwheat No. 1)....	1	....	....	+3010	....	....
Schuylkill.... Shenandoah.... Kehley's Run (Buckwheat)....	1	....	....	+3010	....	....
Average of mines in West Mahanoy District....	3	....	....	+3010	....	....
SOUTHERN FIELD						
East Schuylkill District						
Schuylkill.... Darkwater.... .... (Egg)....	1	....	....	3010	9.04	0.92
Schuylkill.... St. Clair.... St. Clair Colliery (Egg)....	1	....	....	2960	13.33	0.64
Average of mines in East Schuylkill District....	2	....	....	2990	11.19	0.78
West Schuylkill District						
Schuylkill.... Minersville.... Buck Run (Buckwheat No. 1)....	1	....	....	2730	18.07	0.82

NOTE—A plus sign (+) placed before a given value denotes that the true value is above that indicated.

Handy Uses for Old Pipe

By Charles H. Willey
Concord, N. H.

An adjustable long work support (or "old woman") for holding one end of bars, shafts, pipe, etc., while working on the other end in a vise or machine can easily be made from a length of 2-in. pipe, as shown in Fig. 1. The lower end of this pipe is split and spread apart, as indicated by the dotted lines, and a base of concrete molded around the anchors thus formed. A satisfactory mold can be made from an old bucket by removing its bottom and setting it bottom up on a board. The adjustment of height is provided for by the use of a Y- or U-bolt and a nut and large washer. These yokes are easily made by splitting the round body of the bolt in half for a certain distance and then bending to the desired shape.



FIGS. 1 TO 4. SOME PRACTICAL WAYS IN WHICH TO UTILIZE OLD PIPE

Fig. 2 shows how a useful set of skeleton wrenches can be made from short lengths of steel pipe. Select the size of pipe most suitable to the size of wrench desired. Split open one side of one end; open it out flat and cut to fit the nut. Much time can be saved by the use of such light-weight skeleton wrenches running on or off nuts that go a little too stiff to be turned with the hand.

Hacksaws are always being borrowed by somebody and lugged off. One day I made up several homemade frames such as shown in Fig. 3. They are simple to make, using $\frac{1}{2}$-in. pipe bent to the regular frame shape and flattened at *A* and *B*, fitted with a pin and a tightening bolt, and provided with a blade. When I loan these tools it does not deprive me of my good adjustable kind.

Often the hand wheels of various valves about the run of piping become lost, and if they cannot be found I replace them with T-handles made by flattening the center of a short piece of pipe and cutting a square hole through it, as shown in Fig. 4.

Both No. 4 and No. 5 anthracite buckwheat has been used successfully in briqueting. It has decidedly passed the stage of experimentation. Briqueting with this material is a commercial success in spite of the fact that the price of No. 5 buckwheat has gone up considerably on account of the increased demand for this size fuel. When culm can be cleaned successfully on a commercial scale it has a wide field of usefulness. This size of anthracite has been burned successfully by mixing one part of culm with two parts of good coking bituminous coal. A fire of this mixture can be burned successfully with a bed of fuel 16 to 20 in. thick, using natural draft. This mixture can also be used in a stoker much the same as when burning straight bituminous fuel.

EDITORIALS

Shall the Government Loan Mechanical Equipment to Technical Schools?

THE so-called Caldwell Bill, proposing to loan the Government's surplus machine tools, especially those adapted particularly to the manufacture of munitions that are now no longer needed, to the various technical institutions throughout the country, was reintroduced in the House of Representatives on May 26. This bill was introduced in the last Congress but failed to pass. Practically the only change in the present measure from its predecessor lies in the inclusion of "scientific instruments" as well as machine tools.

Unlike much legislation proposed and enacted, this measure is short and to the point. It reads as follows:

A Bill to provide for further educational facilities by requiring the War Department to loan certain machine tools and scientific instruments not in use for Government purposes to trade and technical schools and universities, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the Secretary of War shall lend to trade and technical schools and universities and other recognized educational institutions which in the discretion of the Secretary of War should have such equipment the machine tools and scientific instruments suitable for their use which are owned by the United States of America, which are under the control of the War Department, and which are not being used for Government purposes: Provided, however, that each institution so equipped shall be responsible to the United States of America, under regulations to be prescribed by the Secretary of War, for the proper care and safe return of such equipment when demanded, ordinary wear and tear excepted.

It is a matter of common knowledge that the advent of the struggle just past (while there was absolutely no reasonable excuse therefor) "caught us napping." Our army, of course, was small, but in addition our arsenals were not only practically bare of modern weapons but, worst of all, adequate machinery for the manufacture of arms and ammunition in sufficient quantity was lacking. It takes time to build machine tools, particularly if they are of a special design adapted to a specific purpose. Fortunately, when war was declared many factories had been equipped for making munitions for various foreign governments, particularly England and Russia. After some compromising as to design, these plants were able to turn out a product that answered the purpose, although not exactly the product to be most desired. Thus many of our troops went overseas armed with the modified Enfield rifle instead of the Springfield.

The idea of loaning to colleges and universities the Government's special instruments and machine tools for which the country now has no pressing need, we believe is a good one and worthy of strong support. If it is enacted into law not only will educational institutions receive some much-needed equipment that will serve a valuable purpose in training future engineers, but these instruments and tools will yet remain the property of the Government and be subject to immediate call should a national necessity again arise.

We all hope that such a necessity may never come, yet we all realize its possibility. Should we then repeat the blunder of the past or would it be wiser to profit by bitter experience and be ready?

Friendship in Business

WHAT constitutes friendship in business? is a question that is more or less puzzling the selling end of the coal trade at the present moment. Does it really profit a man to play on the level with his customers in times of distress? or is it the better policy to throw all moral scruples to the winds and play the "game" for all it is worth, content in the knowledge that customers are as ready to forget a good turn as to overlook a scalping—if the latter is softened by honeyed explanations?

The time is now at hand when the conscientious coal man is hoping to reap his reward for pulling his various customers through the trying coal shortage of the past year. Still ringing in his ears are their voluble and emphatic assurances that they would remember him in the future if he but took care of them in their hour of need. And in the majority of cases the coal man did play the friend in need. But today he is questioning his judgment in so doing, and also doubting mankind in general.

Promises are not materializing, and it appears that instead of gaining his customers' confidence and good will the coal man has lost caste. There can be no denying that the coal people in the past few years have lost standing which it will be difficult to win back. If coal was sold at cost, the charge of being mercenary would still be laid at the coal man's door. In public opinion he is branded as an arch-pirate.

To what extent, then, can he rely upon the pretended or luke-warm friendship of his trade? The matter of price, on the whole, always interests the buyer most; and while the quality of the coal is also now considered with more care, nevertheless there remains a grave suspicion of the disparity in prices resulting because of this feature. The friendship of a customer in business, as it is commonly understood, is after all nothing more in substance than a card of entrée to the inner sanctum of the buyer. If it is valued at anything else, it is trying to realize on watered stock. So coal men are learning today—and bitterly, too.

Should friendship be eliminated from business? Assuredly not. Our conception should be changed, however, as to what constitutes business friendship. We have not yet learned to distinguish clearly between friendship in business and business friendship. The two terms are regarded as synonymous, and therein lies the germ of misunderstanding.

Friendship in business has already been defined: it is the card of entrée. Business friendship, on the other hand, is efficient service: a service such as the customer

will feel it unprofitable to dispense with. He will consider it as much a part of the purchase price as the actual material itself. When the customer is frankly willing to pay this premium, we have business friendship of a high order. And it is to this conception of friendship that all business must reconcile itself. The coal trade would do well to apply it more thoroughly and universally, and, perhaps, thereby earn a modicum of the public's favor.

Labor of Anthracite Mining

THE output per underground worker in the anthracite mines during 1918 was only three-quarters that of the underground workers in the bituminous mines. One would expect that the average relative price of anthracite and bituminous coal would be deducible from that proposition when the relative wage scale in the two regions was taken into account.

It is, however, not so, for the Pennsylvania anthracite regions employ 2⅓ times as many men outside per ton of coal mined as the bituminous regions in the same state. This larger employment of outside workers at the hard-coal mines largely accounts for the high cost of the fuel. The careful preparation given the products is largely the cause for the disproportion of surface employees.

The average employee in the anthracite region, including both underground and surface workers, handles only two-thirds as much coal as the average employee in the bituminous region of Pennsylvania. And it must be remembered that the coal-handling costs of Pennsylvania are higher than those of many states, owing to the fact that at Pennsylvania bituminous coal mines there are many long outside hauls. The large number of coke ovens and washeries also tends to increase the number of surface workers per ton of coal mined.

Otherwise the rates in the number of outside employees per ton produced in the anthracite and the bituminous regions would be still more marked.

Coal-Mine Accidents by Nationality

THE UNITED STATES Bureau of Mines and Albert H. Fay, its statistician, are to be congratulated in securing the record of fatalities and injuries by nationalities to be found in an article in our last issue. It will be noted how low is the fatality rate of Americans. Those of us who talk glibly about the carefulness of the English miner will be somewhat surprised to see how poor is his showing. The "reckless" Irishman, like the "reckless" American, has also a splendid record in the anthracite region for avoiding fatalities second only to the Tyroleans and Hungarians, who are always admirable workers from every point of view—efficiency, safety, reliability and good citizenship. The Irishman does however, carry the honors in the bituminous region of being the "most frequent deceased" of all the English-speaking group.

The Hungarian record accords with general experience. The people of that nationality are both frugal and careful. The Greek record is consistently bad from end to end, and all records are worse in West Virginia than even in the anthracite region of Pennsylvania, the mines of which are by no means as dangerous as commonly supposed, if fatality ratios are an indication. It must be remembered that the tables cover a period during which occurred the explosion of Layland No. 3 when 112 men were killed, and the accident at the Kempton plant of the Davis Coal and Coke Co. when 16 men lost their lives. Then followed the Barrackville explosion at Jamison No. 7 when 10 men were killed. All these explosions took place in West Virginia. Pennsylvania had during that time only the explosion at the Ernest mine of the Jefferson & Clearfield Coal and Iron Co. when 27 men lost their lives.

Accidents like these are no respectors of nationality, and being more numerous in West Virginia than in Pennsylvania, they run up the fatality record of that state. It would be interesting to know how the tables would look with catastrophic accidents of the kind mentioned excluded. Still the injury record suggests that the revision would not appreciably increase the safety status in West Virginia.

The argument in favor of increasing education among foreign mine workers advanced by the Bureau of Mines is worthy of careful consideration. An enumeration based on schedules of ability to read and write the English or other languages, and a careful tabulation of the accidents suffered by men of the different schedules, would be extremely interesting and might be well worthy of collection. We should surely know how large a proportion of our mining population is in need of elementary school training. The fatality and injury rate could easily be recorded on that basis when the educational status of all the men was once determined.

Mine Supply Accounting

THERE are undoubtedly some coal operators of the old school who look askance at the installation of any comprehensive system of accounting for mine supplies. The natural tendency is to view a matter of this kind as an expensive luxury, the results of which are not commensurate with the expenditure involved. However, no one can longer maintain such views who has looked into the matter carefully.

Modern mine accounting in general is so carefully handled in these days that a scrutiny of expenditures for supplies and consequent necessity for the adoption of a fairly adequate system of accounting in that department is made necessary for this reason if no other. In addition to this, it has been found on a number of occasions that careful accounting of supplies has checked serious cases of pilfering, waste and loss of material in other directions. For example, take the case of mine rails; where careful checks of the amounts on hand are kept, there is small probability that the mine foreman will fail to recover all his old rails as fast as the track of which it is a part has ceased to be of use. Again, an inadequate supply of rail, which might also result from poor management of the supply department, will frequently cause the men to pull up a short piece of track close to a room mouth, thus breaking the connection for bringing out the balance of the rail from the interior of the room and either discouraging the recovery thereof or making the cost excessively high, if not prohibitory.

The continued existence of the wasteful beehive coke oven, said Secretary of Commerce Redfield recently, ought to be an offense against accepted business standards, just as higher business standards, will some day think it an economic offense to allow black smoke to escape from a chimney for lack of careful firing.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

If our peace with Germany loiters much longer on the road, and if in consequence our contract with the bituminous miners is much longer delayed, then the call for a short day and a short week and for other short measures (including, as is inevitable with all other things short and stubby, the short dollar) will not be necessary for everyone will be working steadily.

The short day and the short week, the short pound, the short pint and the short foot, the short dollar and short sustenance all line up together. They are all part of the same unhappy and woebegone yet well-known family of Shorts. A few years ago we regarded them as dishonest and led them somewhat resistingly to court, but now they are being openly avowed by the best industrial company. If we agree that everyone shall have a short pound or a short pint, well and good. No harm will be done. If everyone has the short day and short week, we shall be giving one another the same short measure; it will be a fair exchange. The day's work will line up gracefully with the short sack of flour and the undersized loaf, and as the mine-worker is given the short day he will, of course, not make a plaintiff sound when the baby sack or the tiny loaf is handed to him. He is a sport. If he "does" other people, it will be because he expects them to "do" him.

BARREL OF ORDERS FILLS FROM BOTTOM UP

The news from eastern Kentucky, West Virginia and Virginia is largely to the effect that coal is beginning to be sold steadily at a higher price than the Government once set. The barrel of orders is beginning to fill up and, of course, it begins to fill up from the bottom. After a while it will commence to trickle up to Illinois, and the short day and short week will be seen to be contrary to public interest and not at all necessary for the mine-worker—not even for the mine-worker in Illinois.

The labor shortage is troubling every section. In West Virginia an operator was heard lamenting the fact that Count Karolyi had been around to visit the men in his vicinity just before the United States entered the war, and that he had sold the Austrian miners a lot of Austrian bonds. Today all the Austrians in those parts, he said, were getting ready to go to Europe to see if the bonds the Count sold them were really good and negotiable.

A GENERAL EXODUS OF ALL BUT NATIVE BORN

Others are complaining that men are returning to the lands of their nativity in the hope of reuniting and supporting the broken families of their parents; still other foreigners see a chance to satisfy their hunger for the estates of the landed aristocracy. Whether the desertion will be considerable remains to be seen. Inquiries seem to point to a general exodus in West Virginia. The interesting outcome of inquiry is, however, an acknowledgment that the exodus is still in the future and has hardly begun yet.

The State Labor Commissioner of West Virginia is of the opinion that less than 500 aliens have left the state. He bases his estimate on an examination of the records of the two United States marshals in the state and upon reports from coal operators' associations and on those of the United Mine Workers. Though there are plenty to say his figures are too low, one is obsessed with the idea that when the whole condition is sized up the loss of men will not be as great as is prognosticated. That was the case when prohibition was made law in West Virginia. Mining went on more steadily than ever, yet we heard all manner of baleful predictions at the time the law came into operation. Perhaps there is no more reason for fear of a man shortage now than there was then.

In southern Illinois it is said that nearly all the foreign population is scheming to leave. It is said that the credit of the banks is impaired owing to the foreigners withdrawing their savings. It is seriously stated that some mines have lost over a third of their force and that the demand for steamship transportation is beyond the capacity of the agents who are canvassing the field, whatever that may mean. As a matter of fact, slow work is making many foreigners and others in Illinois change their working affiliations, and even causing them to seek other employment. The loss to Europe may not be as great as the loss to more active industries and to more active plants in the same industry. In order to keep their foreign-born miners from returning home the Chicago, Wilmington & Franklin Coal Co. at its Orient mine, Orient, Franklin, Ill., has distributed the button herewith portrayed. It is in the colors of our national flag.



"ONE BIG UNION" DOES NOT APPEAL TO MINER

However much the mine-worker is attracted by the prospect of shorter time and bigger wages and more accident compensation, he does not in general favor the One Big Union. If he thinks his wages too small, he wants to get them raised even if other men suffer. With a single Big Union he would not be able to get any such adjustment. Wages would be raised all around and prices everywhere would go up accordingly, and where then would the miner be? If he is satisfied with his wage, he cannot see where the "One Big Union" can help him. He is beginning to see dimly that he is not merely the "Wage Earner"; he is also the "Wage Payer." When he quits buying business stops. The "One Big Union" of employee against employer does not appeal to him, for is he not employer and employee both—a master when he buys the product of other people's labor and a servant when he sells his own labor? If the "One Big Union" were formed he would not know where to align himself, whether as one of the selling proletariat or one of the buying bourgeoisie.

An operator said the other day that he had 35 automobiles at his mine and that the men were in a hurry to quit early to get into them. Some of the mine-workers hardly know whether they rightly belong to the proletariat or the bourgeoisie, and the "One Big Union" seems better fitted to Europe than the United States or Canada.

WOULD HAVE OPERATORS GIVE BOND FOR WAGES

A peculiar strike in a mine of the Wasson Coal Co. of Harrisburg, Ill., arises from the business failure of the Evans Coal Co. of Equality. The Evans concern contested the payment to its men of certain moneys which they claimed. On an appeal the Wasson company went on the Evans company's bond. As the filing of this bond delayed a settlement, 400 mine-workers in the employ of the Wasson Coal Co. at No. 1 mine of that concern went on strike and a tie-up of all the mines of the company is threatened.

Several operators in the coal fields of Illinois are said to have put up bonds for the payment of the wages of their men who have questioned the ability of the corporations to run the mines at such low figures as they are obtaining for their coal. At the Gus Blair mine, which is controlled by the West Virginia Coal Co., of St. Louis, the men have for some time felt that the coal was being sold at too low a figure to insure the continued payment of their wages. President Farrington of the Illinois United Mine Workers made several attempts to induce the com-

pany to put up the bond. He did not want to see the mine-workers lose their pay, as has often happened during the past six or eight years. Corporations would sell considerably below cost, and as a result fail, depriving the mine-workers of the wages that were their due.

Finally, as the West Virginia Coal Co. refused to put up bond, the mine-workers went on strike. This idleness lasted only a few days, the company giving the men the necessary assurances. The company has seven other mines and the men threatened to close these also if the desired action was not taken. There was a great deal of bitterness as it was alleged that certain other operating interests were annoyed by the "unfair" competition of the West Virginia Coal Co. and wanted the mine-workers to put an end to it by demanding either a bond or the charging of a reasonable and profitable price for the coal mined.

Reports received in Des Moines, Iowa, indicate that the mine workers in that region are looking for an increase in wage when the contract is made.

On June 2 reports from Béthune in the Department Pas de Calais were to the effect that a strike was to be called on that day. It was expected that the mines of the Anzin coal field would soon join in the suspension.

Agitators Work on the Unenlisted Foreigners

The Western Coal Operators' Association of Canada presented a memorandum to the Industrial Relations Commission (which is taking evidence throughout the Dominion of Canada with regard to the relations between employer and employee) advocating the appointment of an independent board to take control of the coal industry in western Canada. "Such a board," the memorandum states, "should, in our opinion, be made up of one man thoroughly familiar with the problems of the operators; one man familiar with the problems of the workmen; and a third with such qualifications and experience as would commend him to all as a reliable chairman. The industry has reached a point where, although permission is granted to sell coal at a given figure, it is impossible to do so on account of competition from other fields, chiefly American."

Discussion and consideration of the position of the coal industry occupied practically the whole time of the Commission on the afternoon of Saturday, May 3, and the operators appeared to be one in the opinion that joint councils of the employers and employed could not bring harmony to the industry at the present time because most of the miners—85 per cent. of them according to a Drumheller operator—were foreigners whose ignorance made them a prey to agitators. It might be different were the proportion of English-speaking miners large, but that was not so and was not to be looked for, as most of such men had enlisted and many of those returning were not fit to go back to their former work. The Board of Control which the operators recommended, it was thought, should have the same power as was given W. H. Armstrong, the war-time director of coal operations in District 18, as established by the U. M. W. of A. (Eastern British Columbia and the Province of Alberta).

W. F. McNeill, secretary of the operators' association; John Shanks, manager of the Brazeau collieries; Jesse Gouge, operator; and W. S. Henderson, operator of Drumheller, represented the organization indicated.

Mr. McNeill stated that two mines were on strike against the order issued by the director of coal operations, but he admitted that the strikes were unauthorized by the union officials. Discussing housing conditions, witness said there were no complaints from the permanent camps, but only from new camps where bunk houses had to be used.

The markets of the British Columbia mines were in Montana and Washington, and those of the Alberta mines were in Alberta, Manitoba and Saskatchewan. Freight rates hampered the operators in competing in Manitoba with Pennsylvania anthracite.

John Shanks, manager of the Brazeau collieries, described in detail the arrangements made between his company and its employees. The collieries are situated 120 miles west of Red Deer and six miles from the nearest village. The government leases land to the miners through the company, which has erected four-room houses at a cost of about $900 and rented them to the employees at $10 a month. Five-room houses are rented at $15 a month. A subsidiary company runs a store in the mining village. The desire for better working conditions is one of the primary causes of that discontent which has become acute since the war began in 1914. "Blanket men," who brought their own blankets and slept in bunkhouses, are no longer content with such meager conditions. A hospital charge of $2 a month is made to each man, and for this a doctor has been engaged. He pays a nurse and the staff of the institution.

Men in the mines, said the witness, are not disposed to neglect their work or be dilatory on the job, but it is fair to say that they have become very independent. The "labor turnover" is large, because many young men are employed, and when they have earned a considerable sum they go away to the cities and towns.

Two operators from Drumheller gave evidence, John Henry Gouge and W. S. Henderson. Mr. Gouge declared that the cost of getting out coal was $2.53 for labor alone, exclusive of the cost of management and overhead charges. He did not think that any operator would be opposed to joint councils, but they would be unworkable because the employees, mostly foreigners, would not coöperate with them.

Mr. Henderson said that he employs when working 150 men, but that he had practically shut down his mine since Apr. 1. The price of coal was high, he said, because wages had been boosted to such a level as was unfair to the operator, to the general public and to the miners themselves. He testified that "If coal can be marketed at $1 a ton less, we can compete in Manitoba with the hard coal" [from the United States].

Mr. Anderson stated that there were 22 mines in the Drumheller district, each of which had its own small system of lighting and its own water supply. This duplication of effort is expensive business, and Mr. Henderson suggested that the government should take over the mines, install a central lighting and central water system, and thus cheapen the cost of running the mines. Enough slack coal, not worth shipping, was wasted in the vicinity of the mines to supply fuel for a power station for the operation of all of them. Attempts to run the mines amicably had been made, but "foreign-born agitators had upset the whole thing by Bolsheviki talk."

E. Mart, general manager of the Canadian Coal Co. collieries, the first witness at the meeting on Monday (May 5) said that calculations showed that the advance in wages in mining had more than compensated for the increased cost of living. He spoke feelingly about agitators who felt no responsibility like an ordinary British subject, yet earned from $10 to $20 a day. These agitators, he declared, were the chief causes of the undue discontent.

Illinois no Longer Pays Union Dues

The severe industrial depression, which has decreased the running hours of the Illinois coal mines to less than half of full time and has closed down many of the mines altogether, is given as the reason for the abandonment of dues and assessments by the United Mine Workers in the Illinois District. Frank Farrington, president of that district, announced recently that the 85,000 members of that state would be relieved of the obligation to pay dues for at least three months and perhaps longer.

May Not Use Boys on West Virginia Tips

Under a ruling of the Commissioner of Internal Revenue received by the State Labor Commissioner of West Virginia, no boys can be employed in or around coal mines. The State Labor Commissioner had put the question to the Revenue Commissioner as to the employment of boys on tipples. The commission replied that such employment was forbidden and that any company which employed boys in violation of the ruling would be called upon to pay as a penalty an amount equal to ten per cent. of the annual net income of the company.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Certification and Safety

Letter No. 6—I can endorse much that has been said by by J. M. Roddie, in his letter, *Coal Age*, Apr. 17, p. 723, regarding the examination of candidates for positions of responsibility, in coal mines. If my memory serves me right, the Coal Mines Regulation Act of Great Britain requires that the examining board shall be composed of three operators, three local men appointed by the Government, and, further, that the applicant must have five years' practical experience in mines or have been under the supervision of a mining engineer for three years'.

It was in England that I obtained my first certificate to act as mine manager. It was the practice then that a young man of 20 years of age, of wealthy parents, could be apprenticed to a mining engineer or general manager for a period of three years and would then be eligible to take charge of mining operations.

The young man would be taken into the mine every day by the mine boss or overman, who would generally be pestered to death with his stupid questions, and this would continue for the three years of the young fellow's apprenticeship. During the same time, the lad would attend mining classes every Saturday. At the examination, which was regularly held once a year, such a candidate was seldom refused a certificate, after which he was generally pushed into a good job.

THE PRACTICAL MINER AND THE STUDENT BOSS

On the other hand, the practical, experienced miner, who managed by hard study to pass the examination and get his certificate was rarely ever given a position higher than under-manager or foreman and made responsible for getting out the coal. The student boss would come into the mine for a short time each morning, find some fault and go on top again. Such were the conditions regarding certification in England at that time.

In this State (Indiana) the examining board is composed of chief and deputy mine inspectors, appointed by the governor. From what we read of appointments under politics, in this and other states, leads one to fear that many members of examining boards have not had the practical experience in coal mining that would qualify them to pass the examination given by their own board.

This statement, of course, does not apply to all examining boards; but it teaches the lesson that politics should have no bearing or influence in matters pertaining to the safe management and inspection of our mines. Coal mining is a dangerous occupation at the best. It is a business that should be supervised by careful and experienced men who are fully qualified for that work.

Speaking of the influence of politics in mining appointments, a friend of mine, whom I know was fully qualified to sit on any board, applied for the position of examiner. A little later, however, the vacancy was filled by the appointment of another who, though less qualified, had a stronger political pull.

In his letter, Mr. Roddie suggests that a mine foreman candidate should have an experience of nine years in practical mine work. Let me say that, while some men would learn a lot of mining in that time, others would require three times nine years to qualify them for the position of mine foreman. Mr. Roddie regards it as a mystery that mine inspectors do not take more part in discussion; but my observation is that it is the fear of the loss of their position that deters them from giving expression to their views.

Linton, Ind. MINE FOREMAN.

[1]At present, the Coal Mines Regulation Act of Great Britain (1911) provides that the Secretary of State shall form an examining board for mining examinations, which shall be constituted as follows: Six representatives of owners or agents of mines, or managers of mines, or mining engineers; six representatives of workmen employed in mines; the chief inspector and two divisional inspectors of mines; two persons eminent in mining and scientific knowledge. The act further provides that the candidate must be at least 23 years of age and have had practical experience, in mining, of not less than five years, a portion of which must be in mines of the United Kingdom. But an applicant holding a diploma or having an approved degree, is required to have but three years of practical mining experience.

The Burrell Gas Detector

Letter No. 1—Some two or three years ago, I remember there was a full description given in *Coal Age* of a new instrument that was devised by George A. Burrell for the detection of gas in mines (Vol. 9, p. 157). In that article, I believe the claim was made that the instrument was ten times as sensitive as an ordinary safety lamp.

Since that time, I have had excellent opportunities for making a large number of practical tests with this instrument in the mine and, at the same time, taking samples of the air tested and submitting them to careful chemical analysis. The results show a remarkable accuracy in the practical tests made in the mine with the instrument, and I take pleasure in submitting the following table of the tests made, 149 in all, which I trust will prove of interest to the readers of *Coal Age*.

Many of these tests were made by myself personally, and I have no hesitancy in saying that the detector gives good results when carefully handled. Particularly, in making a test where the percentage of gas is so small as to be liable to escape detection with the most sensitive safety lamp in use, the results obtained with the Burrell detector are extremely gratifying.

IMPROVEMENT MADE IN THE ORIGINAL CONSTRUCTION INCREASES ACCURACY OF TEST

It should be known that the original construction of the detector has been slightly altered, recently. A letter received a short time ago, from J. T. Ryan, vice president and general manager of the Mine Safety Appliances Co., Pittsburgh, Penn., the sole manufacturers of this instrument, states that the alterations were made for the purpose of taking better care of the changes in temperature that result from the ignition of the methane when that gas is present within the instrument. Mr. Ryan says, "The essential difference in the con-

struction of the new type detector is that, instead of having a single brass tube, it now has two concentric tubes, the outer one having about a half-inch larger diameter, and the space between the tubes being filled wih Keiselgor, an insulating material."

Following are the results of the practical and chemical tests to which I have previously referred:

COMPARATIVE TESTS TAKEN WITH BURRELL GAS DETECTOR AND CHEMICAL ANALYSIS IN THE CROW'S NEST DISTRICT

Sample No.	Chemical Analysis	Burrell Detector	Sample No.	Chemical Analysis	Burrell Detector
158	0.45	0.4	304	1.54	1.0
168	0.47	0.6	317	1.35	1.0
192	0.64	0.8	172	1.38	1.5
193	0.57	0.7	185	1.55	1.8
162	1.92	1.5	200	1.40	1.5
176	1.26	1.5	240	1.21	1.1
180	2.10	2.2	280	1.21	1.2
205	1.69	1.5	306	1.34	1.0
234	1.95	1.6	160	0.43	0.2
290	2.28	2.0	166	0.30	0.3
321	2.44	2.0	202	0.49	0.4
373	1.11	0.9	278	0.72	1.0
381	1.19	1.3	294	0.72	0.5
442	1.05	1.0	308	0.44	0.3
443	0.89	0.7	165	1.15	0.9
289	1.93	1.5	191	0.57	1.1
320	1.78	1.3	201	0.75	0.5
161	1.00	1.3	279	0.96	1.2
179	1.78	1.6	309	1.24	1.0
204	1.46	1.2	203	0.69	0.4
233	1.67	1.2	277	0.66	0.7
153	2.54	2.2	295	0.72	1.1
183	2.17	2.5	307	0.68	0.6
198	2.30	2.6	296	0.76	0.8
241	2.55	2.2	311	1.23	1.0
287	1.94	2.0	370	1.20	0.9
301	1.82	2.2	297	0.57	0.3
313	2.34	2.5	312	0.61	0.6
364	1.61	1.6	298	0.99	0.9
377	1.62	1.6	343	1.62	1.5
169	0.79	0.8	352	1.43	1.3
182	1.23	1.9	409	0.99	1.3
197	1.47	1.5	423	0.68	0.5
242	1.68	1.4	432	0.80	0.5
302	1.53	1.4	433	0.75	0.5
314	1.46	2.0	434	0.69	0.5
340	0.93	1.0	151	1.01	0.9
387	1.28	1.1	152	1.48	1.2
163	1.28	0.7	153	2.54	2.2
184	1.26	1.6	159	1.20	1.0
199	1.38	1.5	177	Michel, 0.73, Colliery,	0.8
243	1.16	1.0	169	1.78	2.0
303	1.27	1.1	193	1.67	1.4
588	1.09	1.0	135	0.99	1.4
389	1.78	2.2	170	1.34	1.4
174	1.08	1.3	181	0.95	1.2
196	1.88	1.7	194	0.81	1.1
238	1.59	1.6	168	0.85	0.5
282	1.67	1.2	172	0.85	1.3
305	1.46	1.2	178	0.74	0.6
318	1.65	1.5	192	0.85	0.5
173	2.52	2.5	127	1.01	1.4
239	1.38	1.5	136	0.96	1.5
281	1.44	1.2	143	1.18	1.5
			161	1.11	1.0
			171	1.13	0.7
			182	1.20	1.1
			211	1.01	0.7
			123	0.13	0.3
Average of 54 samples.....		1.52	147	0.18	0.1
Average of 60 samples.....		1.4	...	0.98	0.94

VANCOUVER ISLAND

Sample No.	Chemical Analysis	Burrell Detector	Sample No.	Chemical Analysis	Burrell Detector
117	0.29	0.4	156	1.76	1.9
89	0.41	0.5	179	2.27	2.1
113	0.34	0.3	183	2.16	2.2
142	0.35	0.7	184	2.18	2.0
95	0.76	0.8	185	2.12	1.7
112	0.83	0.8	186	0.17	0.2
143	0.83	0.9	192	0.78	0.6
98	0.34	0.4	100	0.75	0.4
114	0.35	0.3	125	0.93	0.5
145	0.33	0.3	157	1.07	1.0
101	1.63	1.3	180	1.88	1.6
127	1.50	1.4	128	0.79	0.5
158	1.49	1.7	159	0.88	1.0
126	1.34	1.5	182	1.18	1.2
188	1.81	1.9	108	0.29	0.2
189	0.34	0.2	129	0.29	0.3
99	1.83	1.7	131	0.13	0.3
124	1.59	1.6			

Average of 35 samples—1.02 0.98

Totals average of 149 check samples taken during 1918—Chemical analysis 1.17%; Burrell gas detector, 1.10%.

The Burrell gas detector is now being used by all the mine inspectors in this province, and is also provided by the coal companies operating in the province, for their officials to search for percentages of gas lower than can be detected with the ordinary safety lamp.

GEORGE WILKINSON,
Chief Inspector of Mines.

Victoria, B. C., Canada.

Efficiency of Mine Workers

Letter No. 1—Much has been said in the columns of *Coal Age* about the efficiency of mine officials, foremen and firebosses; but long and close observation has convinced me that not enough attention is being paid to the efficiency of the "prime producer," who, I would say, was the miner or the general worker employed in the mine.

The average coal-mining man will agree with me that no matter how efficient a foreman may be, he cannot get results unless he has some efficient workers at the coal face. The foreman may be an excellent manager and able to direct the work, but that will not take the place of the work that must be performed by the men who break down and load the coal.

It is quite true that the output of a mine depends on many different things and, perhaps, the most important of these is a good foreman. This is true, today, more than ever before, because of the increasing exhaustion of the high coal and the extended development of our mines, together with the varied equipment now employed in large up-to-date mines. It is clear that it will require greater efficiency in the miner to produce his shift of coal when working a 2½ or 3-ft. seam than where the coal runs from 8 to 12 ft. in thickness.

Need of Training Miners To Be Efficient Workers

It is these conditions that lead me to believe that more attention must be paid to the efficiency of mine workers, particularly the miners. They must be trained, by every possible means, to become better workers, for their own good and that of the industry. There will then result a noticeable increase in the production of coal and a proportionate decrease in the number of mine accidents. In the past, coal-mining companies have confined their efforts, in securing greater efficiency, too much to the colliery officials and neglected the importance of training the workers and developing in them an equal efficiency.

In respect to wages, it is true that in every mine there are those who make high wages and others who make very low wages. For some time past I have been studying the payroll of contract miners and find that, while some miners have produced from 60 to 70 cars of coal in two weeks, others working in the same seam and under the same conditions produced but one-half or two-thirds of that amount. This fact reveals a low standard of efficiency and argues for the need of training our miners.

The question will be asked, How is this to be done? Looking at the situation and comparing the daily production of six, eight and ten cars of coal by some miners, with the four, five and six cars produced by others, under the same conditions; and, considering the complaints made by these latter men that the coal was "hard to cut," "worked poorly," or some similar excuse, one is convinced that there is something radically wrong with the men themselves. Either they have not the same knowledge of the structure of the coal, or they fail to use their judgment, or they are less industrious than their fellows who are better producers and more efficient workers.

This comparison of results suggests the remedy to apply to secure greater uniformity in the work of the miners, by striving to make then all equally efficient with the best workers. It would seem that a good plan

to adopt would be to single out the best workers and make each of these instruct about a dozen of the poorer class. The results should appear in the increased production effected in a month. To my mind, this matter is of sufficient importance to warrant the making of a reasonable trial.

Another feature that should be considered, in this connection, is the waste of mine supplies, on the part of inefficient workers. More timber, tracking and other material will be required by the inefficient worker, for the same production of coal. Take, for instance, two company miners employed on dead work, the one being efficient and the other wasteful. It will often be surprising to note the difference in the cost of powder, dynamite, spikes, tracking, and tools furnished these men on the company account. Here, again, the need of training the less efficient worker in the proper methods to employ is plainly evident.

Inefficiency of Workers Causes Accidents

Lastly, the frequency of mine accidents, owing to the inefficiency of workers, is a factor demanding the same careful consideration. Practically all coal companies are doing everything in their power to reduce the number of accidents in their mines, but few realize that the lack of training inefficient workers is a most prolific cause of accidents and loss resulting therefrom. Close observation shows that the majority of mine accidents result from the violation of some rule or regulation, by a careless, indifferent or ignorant worker.

While it is true that accidents will happen, it is equally true that many mine accidents can be avoided, by the careful training of all mine workers and by greater discipline in the mine. One of the best means of educating and training men, in respect to what is required to insure their own safety and that of their fellow workers, is to get the men together for the purpose of discussing questions relating to their work and the dangers to be encountered.

Many of the larger companies hold such meetings monthly or semimonthly and it goes without saying that the good accomplished thereby has been far reaching and effectual in reducing the number of accidents in the mines of those companies. To vary the monotony and make the meeting more attractive, the regular business is preceded by a little entertainment, by local talent. This always puts the men in good humor and opens the way for a more animated and general discussion of the topics that are presented later.

Joseph R. Thomas, Asst. Foreman,
Plymouth, Penn. Colliery No. 3, Hudson Coal Co.

Letter No. 2—It was pleasing to read the foreword in the issue of *Coal Age*, Apr. 24, entitled "Meeting the Situation." It is just such temperate discussion of the trials that miners are going through, at the present time, that will aid largely in the solution of labor troubles following the war.

As a miner, or rather a mine examiner, I could not help but feel that I would like to have voiced a protest, at the reference made to the suggestion of a 6-hr. day for coal miners, which appeared in *Coal Age*, Apr. 3, p. 629. After all that has been said in regard to the efficiency of mine officials, I feel that it would only be justice to the common miner to consider the question of developing greater efficiency in the work that he performs as his share in the industry.

When I think of the many wrongs imposed on the miner, in the operation of our coal mines, it makes me think that the claim of the Kaiser that "Might makes right," is prevailing to a great extent in the management of our large coal corporations. It does not require a volume of statistics to reveal the great waste of energy in the production of coal, to say nothing of the sacrifice of thousands of lives of mine workers.

Long Hours in the Mine Increases Accidents

Many of us whose lives are spent, day after day, in the dark recesses of the mine, realize the destruction of manpower through the senseless system enforced by the coal companies, in keeping their men underground longer than is required to meet the demand for coal. No man can be an efficient worker and continue as such under these conditions. Also, there is no question but that there is greater liability to accident caused by prolonging the hours of mine labor beyond what is required for the performance of the necessary work to meet the demand for coal.

Formerly, it was the agreement between miners and operators that eight hours should constitute a working day, and the miner was required to be at work at the coal face that length of time. In many instances, the miner must travel long distances, a mile or more, to reach his place, after entering the mine. This means both an increase of labor and loss of time to the miner, keeping him from home and underground ten or even twelve hours of the day.

Shorter Hours Mean Greater Efficiency

The miners' viewpoint is that greater efficiency would result from a shorter working day. The suggestion is not prompted by selfish motives; it is logical and reasonable when one considers present conditions and has in mind the attainment of the highest efficiency in the worker. Today, there is a certain amount of coal needed in the country and for export. It is estimated that this coal can be produced in half the present contract time.

Someone will suggest that this is an outgrowth of Bolshevism, but it is not; it is only common sense. Speaking of the spread of Bolshevism to this country, coal operators are alone to blame for the large proportion of this low-class of the foreign element now employed in our mines. When the fortunes of war were imperilled, it was the firm, loyal attitude of our American miners that withstood the attempt of this foreign element to tie up the coal industry of the country. It was rare to find an American miner, who was in sympathy with the strike movement demanded by that element, whose cry was "Throw down your tools and end the war," to which our miners replied, "Pick up your tools and win the war."

Having won the war through their fidelity and loyalty, the American miner wants an American living. He is convinced that the present order of things is wrong, and the conditions prevailing at the mines today support him in his conclusion. Since the armistice was signed, there has been no work worth mentioning at the mines, or that would afford an industrious miner the living he is able to earn. Notwithstanding this, our miners have been patient, thanks to the true-blues among them, and the determination grows that in the future "Americanism" must be the watchword if we are to develop the highest efficiency in mine workers.

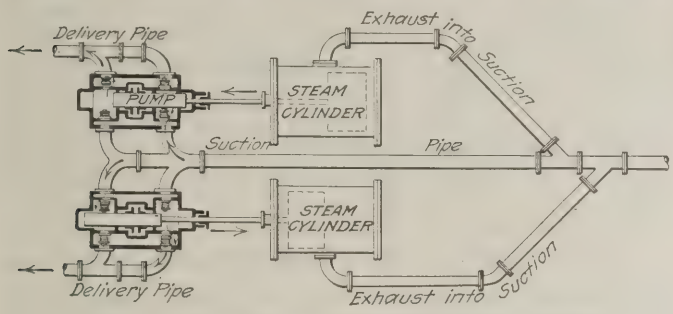
Staunton, Ill. W. M. Chambers.

Exhaust from Steam Pump

Letter No. 7—In connection with the proper disposal of the exhaust steam from a mine pump, I am submitting herewith a sketch or diagram of the plan of a duplex, double-acting, plunger pump, having the exhaust port of each steam cylinder connected with the suction line of the pump.

The length of the suction line was only 18 ft. and the pipe was most of the time submerged in the water of the sump, which greatly reduced the head under which the pump operated. Only when the water in the sump was low was there any trouble. At such times, the pump would knock a little, which was a warning that it was time to shut off the steam and stop pumping.

The arrangement shown in the sketch gave good results. I agree fully with the editor in the point he



PLAN OF DOUBLE-ACTING, DUPLEX PUMP

makes that, should the exhaust connection enter the suction pipe at the top of a long suction lift, there would probably result a back pressure and possibly water-hammer, owing to the steam not being quickly condensed by immediate contact with the water as it enters the pipe.

In another arrangement, adopted at another mine, I conducted the exhaust steam from the pump into a tank that was always kept full of cold water. This was supplied from the rising main or column pipe, a 1-in. pipe being used to conduct the water from the main to the tank. The flow of water into the tank was regulated by opening or closing a valve in this connection.

In a short suction lift where the suction pipe is kept full of water during the operation of the pump, the exhaust should be conducted into the suction pipe as close to the pump as convenient, unless the plan is adopted of using a cold water tank such as I have just mentioned. In my opinion, the exhaust from a mine pump should never be connected with the column pipe, as that would have a tendency to interfere with the uniform discharge of the pump to the surface and oppose its regular action and would probably cause a water-hammer that would not only be harmful but very annoying.

WM. DICKINSON, SR.

Oak Hill, W. Va.

Letter No. 8—In connection with the discussion of the question of disposing of the exhaust steam from a pump in a mine, allow me to cite an instance where this was done to great advantage, in a mine of which I had charge.

The pump, in that case, was located at the foot of a 32-ft. shaft and drew its water from a sump 600 ft. back in the mine, although the total suction head was only 12 ft. Previous to the time of which I speak, the pump had exhausted its steam into the air shaft. However, the development of the mine now required the installation of a ventilating fan at the top of the shaft; and, because the men were unable to work over the shaft when the pump was in operation, it became necessary to make some arrangements for disposing of the exhaust steam.

To do this, I resorted to the scheme of turning the exhaust into the suction pipe of the pump. For that purpose, we tapped the suction line at a distance of 70 ft. from the pump, making the connection between that point and the pump by means of a pipe of the same size as the exhaust port of the steam cylinder. A tee was inserted in this pipe near the pump and provided with two globe valves, one on each side. By closing one of the valves, the other being open, it was possible to exhaust either into the atmosphere or through the pipe into the suction line, as desired.

The scheme worked well. When starting the pump and until it had caught the water and filled the suction pipe, the two globe valves just mentioned were arranged so that the exhaust steam was discharged into the atmosphere. But, as soon as the suction pipe was full of water and the pump was operating properly, these valves were changed. One was opened and the other closed as nearly as possible at the same time, so as to avoid drawing any air into the suction line. The pump now exhausted into the suction and the result was that its speed increased from eight to ten strokes a minute, which was a considerable gain in the quantity of water discharged, per pound of steam used to operate the pump.

Not only did this arrangement get rid of the annoyance of the exhaust steam in the shaft but the pump worked quietly, and there was no water-hammer such as had proved a great annoyance in its previous operation. Turning the exhaust steam into the suction pipe produced a cushioning effect on the piston before the steam was wholly condensed. Also, the partial vacuum produced in the suction lift, owing to the condensation of the steam in that pipe, effected a considerable saving in the power required for pumping.

Referring to the suggestion of exhausting the steam into the column pipe into which the pump discharges its water, let me say that such an arrangement would be very unsatisfactory, and I question whether it would work at all. There would certainly result a back pressure when the pump was compelled to work against its own exhaust, to say nothing of the back pressure due to the water column, which would be very much greater and would seriously interfere with the working of the pump. Let me advise that this should never be done.

Meadowland, Penn. D. F. M.

Letter No. 9—The question of exhausting steam into the suction pipe of a mine pump, as discussed in *Coal Age*, has led me to make some interesting figures for the purpose of ascertaining how much the steam exhausted, in any given case, would raise the temperature of the water pumped. My figures appear to show that the rise in the temperature of the water would not ordinarily be sufficient to interfere seriously with the pumping.

Assume, for example, that a pump is lifting water from a sump 12 ft. in depth and is located, say 2 ft. above the surface of the water, making the total suction lift 14 ft. Suppose, further, that this pump is discharging under a total head of 70 ft., including friction.

A head of 70 ft. corresponds to a water-end pressure of 70 x 0.434 = say 30 lb. per sq.in. and, assuming an available steam pressure of 120 lb. gage, at the throttle of the pump, the ratio of the area of the steam end to that of the water end of the pump is 120:30 = 4:1. This means that for every cubic foot of water pumped, there will be required 4 cu.ft. of steam.

Calculating the Rise in Temperature Due to Heat in the Exhaust Steam

At sea level, a gage pressure of 120 lb. corresponds to an absolute pressure of 135 lb., practically. At this pressure, a pound of steam contains 1191.5 B.t.u. and has a volume of 3.35 cu.ft. Therefore, for every cubic foot of water raised, there will be required, in this case, 4 cu.ft.; or, 4 ÷ 3.35 = 1.194 lb. of steam. The heat in this steam is 1.194 × 1191.5 = 1422.6 B.t.u. and this is, therefore, the heat required to be absorbed by each cubic foot of the water pumped. Now, taking the weight of a cubic foot of water as 62.4 lb., the heat required to be absorbed, per pound of water pumped, is 1422.6 ÷ 62.4 = 22.8 B.t.u. This calculation shows that the temperature of the water will be raised 22.8, or say 23 deg. F., since 1 B.t.u. is the quantity of heat required to raise the temperature of 1 lb. of water 1 degree of the Fahrenheit scale.

Therefore, assuming the original temperatrue of the water in the sump is, say 60 deg., its final temperature in the pump and the column pipe would not much exceed 83 deg. under the assumed conditions. It appears to me that these figures are suggestive of the advantage to be gained by condensing the exhaust steam in the suction pipe of a pump.

To carry the calculation a step further, we may ascertain the temperature at which vapor would form under the pressure due to the suction head. In this case, we find an absolute pressure of 14.7 — (14 × 0.434) = 8.6 lb. per sq.in. Reference to steam tables shows that steam or water vapor, at this absolute pressure, has a temperature of 186 deg. F. Therefore, condensation of the exhaust steam will continue in the suction pipe, in the case assumed, where the temperature cannot exceed 83 deg. F.

Frederick L. Serviss, Sr.

Golden, Colo.

Living Conditions at Mines

Letter No. 5—No one who has lived much of his time in mining camps can fail to read with interest the letters that have been written thus far emphasizing the need of good living conditions in mining towns and particularly in camps, which are often neglected.

The coal-mining industry is in a class by itself, in respect to the living conditions surrounding its workers. Unlike a factory, a coal mine must of necessity be located where the coal is to be found. This is often in an isolated place far from any railroad other than a branch track laid to the mine.

Isolation of Mine an Important Consideration

The isolation of the mine makes it all the more important that the operator or company should provide, not only means of transportation to and from near-by towns or villages, which would enable their employees to go and come as occasion may require, but the company should build good houses for its men and start a little town of its own at or near the mine.

In most of these isolated camps, there is no means of reaching the outside world, except to go and come on a coal train that has no regular schedule, but is liable to run at any time. Frequently, an old stage is used to convey passengers back and forth over roads deep in mud, which makes traveling slow and tedious.

It is clear that such conditions as these, at a coal mine, makes it difficult to hold men, except the poorest class of workers. No miner who has a family or has children to educate would consider for a moment living in such a place, especially if there are no schools, churches and other privileges at hand. I recall an instance that occurred some years ago when I was working at a mine in West Virginia where the conditions were much as I have just described, the mine being located at a considerable distance from any town or village.

It happened that, owing to slack work at the mines in the Middle West, a number of miners came to West Virginia from that locality and applied for work at our mine. The men were good coal miners, but they stayed only a short time and left to seek work elsewhere. In answer to my inquiry as to why they wanted to leave, one of them said that he had had to lose a whole day each week in order to get a shave.

Poor Conditions Keep Good Workers Away

It can well be imagined that a small place where there was no barber would not afford many other conveniences of life, and it will cause no surprise to learn that such was the case in this place. A coal train was the only means of transportation to the nearest town. It carried an old caboose and had no regular schedule for running. On the whole, there was nothing about the place to invite good workers or to hold the men already employed there.

At another mine, in the same state, conditions underground were ideal; but living conditions, on the surface, were poor indeed. It was not uncommon for 25 or 50 men to leave the place every payday and not return for a week or ten days. The mine was equipped with the most up-to-date machinery and appliances, but the company had yet to learn that good conditions in the mine are not all that is required to get a good class of workers and to hold them. As a result, breakdowns were frequent and the cost for machine repairs was high, because the men did not know how to run and care for the machines in their charge.

It is a mistake to think that higher wages will hold men in a camp where the living conditions are poor and there are no amusements and other privileges. We have much yet to learn in this direction when we fail to realize that the improvement of living conditions, at mines, is a profitable investment.

In the excellent foreword that appeared in *Coal Age*, Apr. 24, entitled "Meeting the Situation," it is stated "if the war has taught nothing more than that money is not the universal cure for all labor troubles, it has done some real good." The foreword emphasizes the fact that what the laboring man most desires is to give his own home folks a recognized position in society and make life worth living. The boys coming home from the war will seek work where they can enjoy the highest privileges and any company that does not realize this fact will experience a scarcity of labor, for there will be no oversupply of mine workers for some time to come.

Cleaton, Ky. Ostel Bullock.

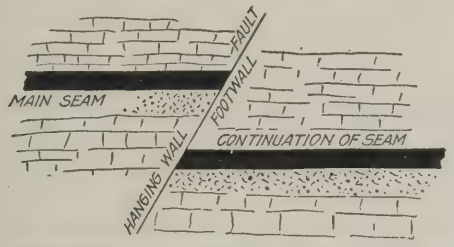
INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

"Hanging Wall" in Mining

Please explain the meaning of "hanging wall?"
Shamokin, Penn. STUDENT.

The expression "hanging wall," as used in mining, refers to the upper portion, geologically, of a slip or fault of dislocation. Where the strata are regular, or have not been folded, the hanging wall is above the



SHOWING A FAULT OF DISLOCATION

fault line, as shown in the accompanying figure; but if the strata have been folded, as occurs at times even in the coal formations, the hanging wall may be below the fault line. The opposite wall is the "footwall."

Meaning and Determination of "Candlepower" in Lighting

When estimating the intensity of light, in comparing the illuminating power of different sources of light, the value is always given in "candlepower." It is a common expression and, yet, I believe few understand its real meaning or, in other words, know what determines the candlepower of a lamp, in actual practice. In searching for the meaning of this expression, I have been unable to find a satisfactory explanation.

Also, kindly explain the means and method employed for determining the candlepower of any source of light, such as a mine lamp, an electric bulb or other means of lighting. CURIOUS.

Salt Lake City, Utah.

A full explanation of the term "candlepower," as expressing the intensity of any light, is given in the treatment of the "Photometry of Safety Lamps," p. 290, *Mine Gases and Explosions*. In the pages following (291, 292) will also be found the method employed to determine the candlepower of any source of light.

A candlepower is a unit of measure adopted arbitrarily to express the value of the illuminating power of different lamps when burning different illuminants. This unit of measure is the intensity of light produced by the burning of a well-trimmed sperm candle (6's), weighing six candles to the pound. The so-called "standard candle" is of such proportion that its flame will consume exactly 120 grains of spermaceti in an hour, when burning in a quiet atmosphere of pure air.

As is well known, candles are made of different materials, such as paraffin, stearin, tallow, wax and spermaceti. The last-named material, having the greatest illuminating power except extra-refined paraffin, has been chosen as the standard of candlepower.

Taking the illuminating power of a standard sperm candle as unity or 1, the candlepower of different materials is as follows: Paraffin, 0.76; stearin, 0.77; tallow, 0.83; wax, 0.92; spermaceti, 1.00; extra-refined paraffin, 1.14. The degree of refinement of the paraffin, however, being somewhat uncertain, spermaceti has been taken as the standard of candlepower. The quality of pure spermaceti being constant, the standard sperm candle burns with a uniform intensity of light and furnishes a good standard of measurement for determining the illuminating power of different sources of light.

In ascertaining the candlepower of any given source of light, as for example, a common Davy safety lamp, burning sperm, lard or cottonseed oil, it must be remembered that the intensity of light from any source varies inversely as the square of the distance at which it is measured. For example, taking the light of a standard sperm candle, measured at a unit distance (1 in. or 1 ft.) from the candle, as unity or 1, its intensity at a distance of two units is $(\frac{1}{2})^2 = \frac{1}{4}$. The same is true in regard to the intensity of any source of light to be tested.

Now, in order to apply this principle in the comparison of the illuminating power of a Davy lamp with that of a standard sperm candle, these two sources of light are placed on opposite sides of a screen. The screen consists of a sheet of white paper, having a spot the size of a half-dollar at the center, made translucent, with a little grease or melted wax. When this screen is lighted equally on both sides, the translucent spot at the center disappears.

Utilizing this fact, the sources of light, the sperm candle and the lamp to be tested, are arranged on opposite sides of the screen. Suppose, for example, the distance of the standard candle from the screen is ten inches, the inch being taken as the unit of measurement, the intensity of light thrown on the screen by the candle being inversely proportional to the square of the distance is $\left(\frac{1}{10}\right)^2$, or $\frac{1}{100}$, the candlepower of the candle being 1.

In like manner, according to the same principle, the candlepower of the lamp tested, assuming that at a distance of 4 in. it gives equal illumination of the screen with the candle, is $\left(\frac{x}{4}\right)^2$, or $\frac{x}{16}$.

Then, since the illumination of the screen by the lamp at a distance of 4 in., is equal to that due to the standard candle at a distance of 10 in., we have

$$\frac{x}{16} = \frac{1}{100}; \quad \text{and} \quad x = \frac{16}{100} = 0.16 \textit{ candlepower}$$

Therefore, the candlepower of a Davy lamp burning sperm oil, as determined in this manner, is 0.16 candlepower. In other words, the light given out by one hundred of such lamps would be equal to that given out by sixteen standard sperm candles.

EXAMINATION QUESTIONS

EDITED BY JAMES T. BEARD

British Columbia Examination First Class, Nov. 20, 1918

(Selected Questions)

Ques.—In an air-course 6 x 8 ft. in section and 5500 ft. long, what is the velocity of the air current when the water gage stands at 2 inches?

Ans.—A water gage of 2 in. corresponds to a pressure of 2 x 5.2 = 10.4 lb. per sq.ft. The sectional area of the airway being 6 x 8 = 48 sq.ft., and its perimeter, 2(6 + 8) = 28 ft., the velocity of the air circulated in this airway by the given pressure is

$$v = \sqrt{\frac{p\,a}{k\,l\,o}} = \sqrt{\frac{10.4 \times 48}{0.00000002 \times 5500 \times 28}} = 402.6\,ft.\ per\ min.$$

Ques.—(a) Explain the principle of the ventilating fan. (b) What conditions in the mine would govern you in determining the diameter and width of the fan?

Ans.—(a) The action of all centrifugal ventilators depends on the centrifugal force developed by the revolution of the air contained within the fan blades. The weight of the revolved air develops a force acting radially outward from the center of the fan, which forces the air from the center toward the circumference, where it is discharged into the annular space surrounding the fan blades and passes into the fan chimney, if the fan is exhausting the air from the mine; or is conducted into the fan drift and thence into the mine when the fan is forcing the air or acting as a blower.

(b) Every mine has a certain resisting power, depending on the length and size of its airways and number of splits and which is expressed by the ratio of its area of passage to the rubbing surface. This ratio is properly the potential factor of the mine, as it determines the possible circulation in that mine, produced by a given pressure or power.

The calculation of the proper dimensions of a fan required to circulate a given quantity of air against a given mine potential is a problem for the engineer. Briefly, it may be said that the diameter of the fan or the diameter of the circle described by the blade tips is a factor of the unit pressure required to circulate the given quantity of air against a given mine potential. Roughly speaking, a certain peripheral speed or velocity of the blade tips is required to produce this given pressure, which enables a fairly close estimation of the diameter of the fan.

On the other hand, the width of the fan is largely a factor of the quantity of air required to be circulated. For example, in average mining practice, the width of a centrifugal fan, having radial blades with lips curved forward in the direction of motion to lessen the shock of the entering air, may be taken as 1/64 of the square root of the quantity of air required. Thus, the width of a fan designed to circulate 150,000 cu.ft. of air per min., in ordinary mining practice, is approximately $1/64\sqrt{150{,}000}$ = say 6 feet.

Ques.—(a) If, in an airway 72 sq.ft. in sectional area, the velocity is 550 ft. per min., what will be the velocity if the area is decreased to 60 sq.ft.? (b) What is the horsepower in each case, if the water gage is 1.9 inch?

Ans.—(a) This question is indefinite, being incomplete. For the same quantity of air in circulation, the velocity would vary inversely as the area. The area being reduced in the ratio 60/72, or $\frac{5}{6}$, the velocity would be increased in the ratio 6/5; and would then be 6/5 (550) = 660 ft. per min. However, this would not conform with the condition of a constant water gage (1.9 inch).

It is reasonable to suppose that the reduction of area took place through the settlement of the roof. It may be assumed that the original airway was 6 x 12 ft.; sectional area, 72 sq.ft. The settlement of the roof reduced the height of the entry to 5 ft., giving a sectional area of 5 × 12 = 60 sq.ft. Now, for a constant water gage, the length of the airway remaining unchanged, the velocity varies directly as the square root of the area and inversely as the square root of the perimeter; or directly as the potential factor, $\sqrt{a/o}$. Finding the potential factor in each case, we have

Airway 6 × 12, $\sqrt{a/o} = \sqrt{72/36} = \sqrt{2} = 1.414$

Airway 5 × 12, $= \sqrt{60/34} = \sqrt{1.7647} = 1.328$

But, since the velocity varies directly as the potential factor, the velocity ratio is equal to the potential ratio, and calling the required velocity x, we have

$$\frac{x}{550} = \frac{1.328}{1.414} = 0.939$$

$$x = 0.939 \text{ x } 550 = 516.5\ ft.\ per\ min.$$

which shows that the velocity is decreased when the sectional area is decreased in the airway, the pressure being maintained constant.

(b) The quantitiy of air passing in the original airway is 72 x 550 = 39,600 cu. ft. per min. The water gage being 1.9 in., the horsepower producing circulation is

$$H = \frac{Q\,p}{33{,}000} = \frac{39{,}600 \times 5.2 \times 1.9}{33{,}000} = 11.86\ hp.$$

Again, the quantity of air passing under the same gage when the sectional area has been reduced to 60 sq.ft., is 60 × 516.5 = 30,990 cu.ft. per min. The horsepower required for this circulation is, therefore,

$$H = \frac{30{,}990 \times 9.88}{33{,}000} = 9.28\ hp.$$

Ques.—What system of haulage would you install in a dry and dusty mine? Give reasons fully.

Ans.—If the mine plant is equipped to furnish compressed air for haulage motors, no better system can be adopted, in a dry and dusty mine, than a compressed-air system, because the air exhausted by the motors will assist the ventilation. If compressed air is not available some form of rope haulage should be employed. Electric haulage should never be considered in such a mine, because of the danger of ignition of dust by sparking of wires, especially if a little gas is present.

COAL AND COKE NEWS

Harrisburg, Penn.

A bill is scheduled to pass the state Senate and be sent to Governor William C. Sproul for signature. It is claimed that this bill will drive 10 of the largest insurance companies of the country from the field of Pennsylvania as regards workmen's compensation and result in monopolistic state insurance, notwithstanding the fact that these companies combined to take care of workmen's compensation in the coal fields. Because of its technical nature, the bill went through the House without opposition, few, if any of the members understanding it. Little opposition to it is expected in the Senate.

The bill was introduced by Representative Hess and carries amendments to the act of June 2, 1915, which create a rating bureau to be approved by the insurance commissioner and absolutely under his control, this bureau to fix all rates for compensation insurance. The bill is said to have been drawn and presented in the interests of the mutual insurance companies of the state.

The mutual companies are said to expect to reap great advantages in the insurance field through the elimination of the stock companies, also expecting to cripple the state insurance funds. Commissioner Donaldson of the State Insurance Department is reported to have said that if this bill passes it will eliminate the 10 per cent. differential rates now enjoyed by the state fund. The state fund was granted authority to sell insurance at 10 per cent. less than other companies with a view of building it up. The Hess bill therefore might result in placing the state fund on a straight competitive basis with other companies.

Friends of the state fund, among them being some of the large coal companies, are supporting the Hess bill. They see that by means of this bill the state fund eventually will hold the compensation field to itself. This will mean monopolistic state insurance in this particular field and no doubt in time will spread to other lines of insurance.

A few days ago the Legislature passed and sent to Governor Sproul a bill designating what resources shall be set aside by companies for protection of holders of policies for workmen's compensation insurance. This bill allows mutual companies to set aside less reserves than stock companies, notwithstanding that mutuals have no assets.

On June 4, the Senate passed the McConnell bill granting authority to the insurance commissioner to ascertain whether rates made by insurance companies, individual associations or rate making bureaus are excessive or adequate and to determine "reasonable" rates in such cases. This would place insurance companies under direct control of the commissioner.

Senator Albert Davis of Scranton, on June 2, iptroduced a bill aimed at mine cave conditions in the anthracite field. The main provision of the new bill makes it unlawful for coal companies to damage cemeteries or disturb graves by mining operations.

Fairmont, W. Va.

The best indication of improving conditions in northern West Virginia sections was seen during the week ended May 31 in the decreased number of idle mines as well as in the increased number of cars loaded. In the Fairmont region proper there was an increase over the previous week, the total number of cars loaded being close to 5000 for the week. In April the total number of loads was only about 14,000 in all. A large factor in increasing shipments from northern West Virginia regions has been and was (during the last of May) the heavy tonnage for export; although it was apparent that more coal was being bought in all markets, judging from the increased western movement of coal. Decoration day, of course, tended to cut down the volume of coal mined and shipped during the week. Lake tonnage was somewhat increased. Cars were also more plentiful. No serious labor shortage has developed in the region. Prices are much firmer and further increases are expected in that respect.

Sentiment of the operators of northern West Virginia as to the resumption of cost sheets to be submitted to the Federal Trade Commission is being sounded out by Vice President George T. Bell, of the Northern West Virginia Operators' Association. This is a matter which will also come before the West Virginia Coal Association.

Charleston, W. Va.

With a larger production in West Virginia mines there has also developed in several producing regions of the state a car shortage most pronounced during the last week of May and in the first few days of June, interfering with the prompt shipment of coal particularly to tidewater and in some instances causing a shutdown of two days. Such a car shortage came just at a time when regions were striking their gait in response to a quickened demand confined to no particular section or market. Consumers in general had begun to realize the necessity of buying coal now; consequently further increases in tonnage from all regions was not confined to exports nor to railroad coal, but to all kinds of fuel, coke alone failing to move in any considerable quantity. In nearly every producing district mines were being operated throughout the week. The pressure of a demand from exporting sources made itself felt during the last few days of May and at the outset of June, more ships being available. The demand for West Virginia coal in the West, and particularly on the Lakes, continues to grow in proportion. With inquiries more numerous for coal and with some producers (especially in the smokeless regions) out of the market, prices have materially stiffened; run-of-mine in the Kanawha and Logan regions averaging from $2.10 to $2.50 a ton on spot sales and much higher in the smokeless fields. Labor is becoming somewhat scarce.

Under a steadily increasing demand, mines in the Kanawha region were, during the final week of May, being operated over a longer period per week; a scarcity of miners, however, limiting the running of mines to about two-thirds of the week. Consequently production during the last week of May was not over 60 per cent., or about 125,000 tons, although some operations were engaged throughout the week in getting out coal. In West Virginia the markets are beginning to seek the coal instead of the coal seeking the market, some companies no longer being in the market. Consequently prices are stiffening and much Kanawha coal is beginning to be sold around $2.50 a ton in connection with spot sales.

New River operations were unable to furnish the full quota of coal for which they had a market during the last week of May, owing to adverse transportation conditions. Cars were so scarce that in certain portions of this field mines lost two days out of the six, although warranted by orders on hand in running to capacity. Such a condition was extremely inopportune, as there were a number of vessels at tidewater waiting to be loaded with New River coal. Of course it was impossible under such transportation conditions to meet all requirements of general Western and Lake markets. At the same time a shortage of miners, amounting to about 25 per cent., also contributed to hold down production; it otherwise would have been up to capacity, market conditions causing spot coal to go over $3 a ton for run-of-mine in the New River region.

Springfield, Ill.

Miners, operators and school authorities, in conference at Springfield, Ill., went on record as favoring the apportionment of a part of the Smith-Hughes fund for vocational education of Illinois miners. Illinois has been allotted $400,000 for distribution among the industries for the training of workers, upon the appropriation by the state of an equal sum. At the meeting unqualified approval of the plan was given by Joseph C. Thompson, State Director of Mines and Minerals, and also by other speakers. When Thompson, however, said that every boy in the mines had an ambition to become a mine manager or superintendent, Peter Joyce, of Springfield, member of the sate Mining Investigating Commission, dissented. Union miners, he said, would oppose it if it was designed solely to manufacture mine managers. "What we want is technical education for all," he said. "The miners need greater knowledge of mines and mining that they may be better able to cope with the dangers which surround them at work. Heretofore the state and Federal governments have been anything but willing to encourage such training."

The conference adopted a resolution endorsing the bill pending in the Legislature for the appropriation of $10,000,000 to the state school distribution fund. This fund is now $4,000,000. The increase is intended to facilitate vocational instruction in mining communities.

President Frank Farrington of the United Mine Workers presided at the afternoon session. W. S. Deffenbaugh, specialist in city school systems of the United States Bureau of Education, spoke on: "Some Suggestion for Improvement of School in Mining Towns." F. L. Heehn, superintendent of Gillespie public schools, discussed: "What Industrial Occupation Should be Given to Regular Day Pupils in Mining Communities?" E. A. Wreidt, State Supervisor of Industrial Education, spoke on "State and Federal Aid for Practical Instruction in Mining." Coal operators of the district were represented on the program by President H. C. Adams of the Central Illinois Coal Operators' Association, who heartily approved the plan for vocational training. The action in favor of vocational training was unanimous.

PENNSYLVANIA

Anthracite

Pottsville—A local company recently started work on a new stripping for the Buck Run Coal Co. at its Darkwater colliery near St. Clair.

Scranton—It is stated that four buildings in a block on West Lackawanna Ave., of this city, were demolished on June 2 by surface subsidence over the workings of the Oxford mine of the Peoples' Coal Co.

Sunbury—The Philadelphia & Reading Coal and Iron Co., on June 1, paid $103,000 for land taxes for 1918 into the Northumberland County treasury. This covers assessments on coal properties held by the corporation, which are now assessed at an average of $200 an acre. There is an agitation for an increase in valuation of this property.

Shenandoah—The Lehigh Valley Coal Co. announces changes of officials at Packer Nos. 3 and 4 collieries. Reuben Ball, for 20 years inside foreman at Packer No. 4 is retired on account of failing health. Richard Kane, inside foreman at No. 3 succeeds Mr. Ball, while John Rudd, assistant inside foreman at No. 4 is promoted to the foremanship at No. 3.

The Lehigh Valley Coal Co.'s Packer No 5 colliery, which has been idle since February because of a scarcity of labor, resumed operations on June 2. The colliery is one of the largest in the district, and while the operation will be shorthanded, it is expected enough men are available to keep the place operating full time. All unemployed contract miners and laborers were given employment.

Wyoming—The Mount Lookout Coal Co. has filed appeals from the county assessment and valuation of its property in Wyoming, West Wyoming and Exeter bor-

oughs. They allege that the valuation is in excess of the price the property would bring at a bona fide sale. The value fixed on the coal was placed at $300 an acre for every foot of coal in thickness and lesser sums down to $120 a foot-acre.

Wilkes-Barre—In offering prizes for the best garden plots and the most attractive yards, the Lehigh & Wilkes-Barre Coal Co., is extending its policy of improving the homes and living conditions of its employees. During recent years the company has not only done away with the red houses of the old mining towns—row on row, all alike—substituting for them neat and individual homes, but has also developed whole villages of modern homes. These houses are leased at low rentals to its employees, rentals far below what would be ordinarily charged tenants for houses of the same grade.

Bituminous

Chicasaw—The Allegheny River mining Co., of this place, intends to install additional boilers and stokers for all boilers at its Chicasaw mine. Mr. G. White is superintendent at this plant.

New Bethlehem—Mr. James Sullivan is operating a small mine at this place but expects to enlarge the operation in the near future by putting in a siding and tipple in order to load coal onto railroad cars.

Library—The Montour No. 10 mine of the Pittsburgh Coal Co., which has been under construction for nearly a year, expects to commence shipping coal about July 1. This plant will be a big producer and has two slope openings. The coal will come to one tipple which is equipped with Marcus screens and picking tables. This operation is on the Montour railroad, near this place.

Uniontown—The Orient Coke Co. held its annual meeting at the plant in Redstone Township near this place on May 15. The following officers were elected: Julian Kennedy, president; Robert Bentley, first vice president; J. W. Kennedy, second vice president; J. O. Miller, secretary-treasurer, and R. M. Fry, general manager. The directors are Julian Kennedy, Robert Bentley, Youngstown, O.; J. W. Kennedy, J. O. Miller, Julian Kennedy, Jr., and David Davis, Pittsburgh, and R. M. Fry, Uniontown.

Waynesburg—A sale of Greene County coal took place here recently. An undivided one-seventh interest in 37 tracts of coal in Cumberland, Jefferson and Monongahela townships, owned by James M. Hustead, of Uniontown, was sold at sheriff's sale. The interest in the several tracts aggregated 453⅓ acres and the total consideration was $226,905.

Another sale aggregating 275 9/10 acres was purchased by W. J. Kyle, of this place, for the Cumberland Coal Co., of Pittsburgh; consideration $138,100. An interest, including 177 3/10 acres, was purchased by W. C. Montgomery, for Paul J. Bickle, of Cleveland, Ohio; consideration $88,805.

Pittsburgh—Negotiations for the sale of the J. V. Thompson estate have recently approached the final stages of a deal which may rank as the largest single transaction in coal lands. The trustees of the Thompson estate and the members of the J. V. Thompson Creditors' Committee have had conferences with the legal representatives of probable buyers. While there is much conjecture as to the identity of the buyers, the ultimate purchaser is generally supposed to be the H. C. Frick Coke Co., a subsidiary of the U. S. Steel Corporation.

On June 1 the name of the United Coal Corp. was changed to Hillman Coal and Coke Co., at which time the business of J. H. Hillman and Sons Co. was taken over. The general offices of the company are in this city. The following are the officers of the Hillman company: J. H. Hillman, Jr., chairman of the board; F. W. Guthrie, president; A. B. Sheets, vice-president; Ernest Hillman, vice-president; Thomas Watson, vice-president and secretary; Robert W. Flenniken, treasurer; F. B. Lockhart, Genl. Mgr. of sales, and M. D. Flanigan, asst. general manager of sales.

An important meeting was held on June 3 by the Pittsburgh Coal Producers' Association at this place. The coal situation as it is today and for the coming fiscal year was discussed by J. D. A. Morrow, vice-president of the National Coal Association; R. W. Gardiner, commissioner for the Pittsburgh Coal Producers' Association, and a number of the association members also took part in the discussion.

Branches of the National Coal Association have been established in Chicago, Cincinnati as well as Pittsburgh and soon one will be established in Washington, D. C. A general warning is being sounded by prominent government and other officials connected with coal production and distribution in regard to a serious coal shortage impending.

WEST VIRGINIA

Princeton—On May 28 the Virginian Railway exceeded all previous records; one train out of this place bound for tidewater was made up of 100 cars carrying 7922 tons of coal; this train was being moved east. The 100-car train was about 20 cars longer than the average train.

Fairmont—F. R. Lyons, of the Consolidation Coal Co., conferred with the division managers of this company recently; the purpose of this conference was to discuss problems of operation growing out of the changed conditions of the last few months. The division managers present were: C. H. Tarleton, of West Virginia; J. M. Gilbert, of Maryland; J. G. Smythe, of Jenkins, Ky.; E. R. Rice, of Van Lear, Ky., and S. Steinbach, of Pensylvania.

Welch—Officers were re-elected at the annual meeting of stockholders of the Panther Coal Co., Lathrop Coal Co., and the Leckie Collieries Co., held here on May 28. The president of all three companies is Wm. Leckie. Other officers re-elected were W. R. Graham, vice president of the Lathrop and Panther Coal companies; A. F. Leckie, vice president of the Leckie Collieries Co.; A. E. Jennings, secretary and treasurer, and A. F. Leckie, assistant general manager of the trio of companies.

Huntingham—Coal operators of West Virginia and eastern Kentucky are endeavoring to press into service about 20,000 new coal cars which were constructed under Government orders last year; since that time these unnamed cars have been standing idle on side tracks. The U. S. Railroad Administration purchased cars for a number of coal carrying roads for $3000 each; some of the cars were accepted by the Chesapeake & Ohio railroad but other carriers turned them down. The growing demand for coal makes the use of this equipment imperative, operators say, and a move is on foot to get them into service at once.

Morgantown—The seventh annual short course for miners will be held at the West Virginia University at this place from June 16 to July 26. Professor Callen will have charge of the course and he will be assisted by R. Z. Virgin and H. E. Gray—all connected with the university. The only entrance requirements for this course are the ability to read and write. There is no charge for instruction and no fees of any kind. Address R. Z. Virgin for further particulars.

OHIO

Wellston—The Wellston Hill Coal Co. has recently completed negotiations for the purchase of the properties of the Coalton Fuel Co., located in Washington Township. It is understood that the tract comprises a total of about 440 acres.

McArthur—Frederick C. Newberry, Jr., of Philadelphia, has purchased at sheriff's sale 7,019 acres of coal land in Clinton, Vinton and Elk townships, of this state, for which he paid $109,000. The lands have been inspected just recently by a legislative committee with a view of purchasing them for state mines.

Columbus—Public utility interests are discussing the Robinson bill, which has passed the Ohio House of Representatives and is expected to pass the Senate after the recess. Some profess to see an effort to bring coal mines under the authority of the Ohio Utilities Commission; coal mine owners are investigating the bill and having legal talent go over it.

ILLINOIS

Edwardsville—A new mine has been started south of this place by the Donk Coal Co., of St. Louis, Mo. The engineering and constructing firm of Allen & Garcia, Chicago, is connected with the work and it is understood that the plant will have a capacity of 5000 tons daily. It is planned to be a high class modern plant with a skip hoist. Operations commenced May 20 and contracts have been let for machinery. The plant should be producing by fall.

Divernon—The Madison Coal Corporation broke the record for hoisting coal for the second time during the month of May at its No. 6 mine at this place. It is stated that the first record was established on May 7 when a total of 4003.6 tons or the equivalent 1352 mine cars were hoisted. On May 24 the total tonnage raised to the surface from No. 6 shaft, during an 8-hr. day, was 4106.2 or 1376 mine cars. This company has 700 employees of which number 375 are loaders. The engineers at the throttle during the hoisting were, J. F. Woolford, Frank McVeigh and J. G. Larken.

KENTUCKY

Louisville—Some big coal land developments in eastern Kentucky are in sight as a result of a decision by the Court of Appeals, ordering dissolution of the Louisville Property Co., and appointment of a receiver. This organization is a subsidiary of the Louisville & Nashville Railroad Co., which has held large tracts in eastern Kentucky said to be approximtaely 75,000 acres. The company is reported to have blocked development, endeavoring to secure arrangements whereby all coal from the district would go over its lines. Minority stockholders brought action.

ALABAMA

Kennebunk—The Yolande Coal and Coke Co., Birmingham, has awarded contracts for electrical mining equipment, including hoisting machinery, pumps, etc., to be used in connection with the development of a new mining property. Contract has also been awarded for a new electrical haulage road for the works. The contracts are estimated to amount to $150,000. N. B. McClary is president and general manager.

Birmingham—At the annual meeting of the Alabama Coal Operators' Association held on June 3 the following officers were elected: George B. McCormack, president; Chas. F. DeBardeleben, vice president, and James L. Davidson, secretary-treasurer. All of these executives succeeded themselves in office. George G. Crawford, president of the Tennessee Coal, Iron and Railroad Co., was elected chairman of the executive committee, with George F. Peter, J. B. McClary, F. H. Crockard and Walter Moore as associate members.

The Corona Coal and Iron Co. has closed a contract with the Universal Coal Washer Co., of Birmingham, Ala., to erect a 600-ton washery at its No. 2 mine at Townley, Ala. The washer company will install Burks & Hayes jigs in the new plant which is to be ready for operation by Sept. 14.

MONTANA

Sheridan—O. P. Hood, chief mechanical engineer of the Bureau of Mines recently visited the sections of the Northwest having lignite deposits. The Government recently authorized the expenditure of $100,000 for a lignite experimental plant and it was with a view of investigating this territory for a possible site for such a plant that the trip was made.

Personals

O. C. Huffman has been appointed general superintendent of the W. E. Deegans Coal Co., in charge of the mines of this company on the line of the Virginian Ry. as well as on Coal River.

John Huns has been appointed superintendent of Mine No. 11 of the Jamison Coal and Coke Co.; this mine being known as the Lehigh operation of the Jamison company. He succeeds **John Malloy,** resigned.

H. L. Garbutt, for the last six years manager of the line material section of the Westinghouse Electric and Manufacturing Co. at East Pittsburgh, Penn., has been appointed manager of the supply division of the Westinghouse San Francisco Office.

H. C. Hawes, formerly manager for the Salt Lick Coal Co., has been made resident manager of the Wells-Elkhorn Coal Co., in charge of the Salt Lick and Black Diamond operations, succeeding W. C. Hawes, at one time manager of the Black Diamond Coal Co.

James W. Paul, secretary of the Mine Inspectors' Institute of the United States of America, has just returned to Pittsburgh from a trip to Indianapolis where he completed the arrangements for the holding of the decennial meeting of the institute, July 8-11, the announcements of which will soon be issued to the members. A good program

will be presented and all mine inspectors and deputies and assistant inspectors are urged to be present.

W. C. Tyler, formerly district manager for the Poole Engineering and Machine Co., has been appointed general sales manager in charge of all the selling activities of the company. On May 1 this company removed its general sales office from Baltimore, Md., to 50 Church St., New York City, where all correspondence pertaining to sales should be addressed.

James Inglis, president of the American Blower Co., of Detroit, Mich., sailed from New York recently as a member of a commission appointed to confer with a certain European industrial interest on post war conditions in the industry throughout the world. Mr. Inglis will also visit Belfast, Ireland, to confer with his associate in the blower business, **Mr. Davidson, of the Sirocco Engineering Works.**

A number of changes have been announced among the officials of the Mining Department of the Cambria Steel Co., of Johnstown, Penn. **Frank Horton**, former superintendent of Franklin mines Nos. 1 and 3 has been promoted to assistant superintendent, taking the place of **Joseph Lewis** who goes to Mariana, Penn. **David Malcolm** becomes superintendent of the Rolling Mill mine. **Duncan May** takes the place of Mr. Horton as superintendent of the Franklin mines.

William A. Holley, assistant general freight agent in charge of coal traffic for the Burlington railroad, resigned recently to accept the position of traffic manager for the Central Illinois Coal Traffic Bureau, with headquarters in Chicago.

This Bureau was organized recently by the coal operators in the Springfield District of Illinois, which produces approximately forty per cent. of the coal mined in the state.

This new organization is formed for the purpose of handling in a uniform manner all traffic matters of interest to the membership and their customers.

Obituary

James T. Armstrong died recently at the age of 65. He was formerly president of the Mansfield Coal and Coke Co. He was also connected with several banking institutions.

James Wrigley, senior member of Cutter-Wrigley Coal Co., died May 29 of heart trouble. Five years ago he was instrumental in the organization of this company, of which his son, Robert Wrigley, is now the president.

Coming Meetings

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

American Society of Mechanical Engineers will hold its spring meeting at the Hotel Statler, Detroit, Mich., June 16 to 19. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

American Institute of Electrical Engineers will hold its annual convention at the Lake Placid Club, Adirondacks, N. Y., June 24 to 27. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Northeast Kentucky Welfare and First Aid Association will hold a first-aid contest July 4 at Pikeville, Ky. Secretary, E. H. Sowards, Pikeville, Ky.

The Rocky Mountain Coal Mining Institute will meet in Salt Lake City the first week in July, 1919. Secretary, F. W. Whiteside, Denver, Colo.

American Society of Civil Engineers will hold its forty-ninth annual convention in St. Paul and Minneapolis, Minn., June 17 to 20. Secretary, C. W. Hunt, 33 West 39th St., New York City.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind. Secretary, J. W. Paul, Pittsburgh, Penn.

Recent Coal and Coke Patents

Briquet Machine. G. Kormarek, assignor to St. Louis Briquet Machine Co., St. Louis, Mo., 1,295,764. Feb. 25, 1919. Filed Feb. 5, 1918. Serial No. 215,445.

Coal Pile. A. C. Johnston, assignor Link-Belt Co., Chicago, Ill., 14,598. Feb. 25, 1919. Filed Dec. 14, 1918. Serial No. 1,256,569.

Pneumatic System for Cleaning Coal. W. E. Winn, Pittsburgh, Penn., 1,295,248. Feb. 25, 1919. Filed Mar. 3, 1917. Serial No. 152,251.

Locomotive Stoker. N. M. Lower, assignor to Locomotive Stoker Co., a corporation of Pennsylvania, 1,296,541. Mar. 4, 1919. Filed May 9, 1918. Serial No. 233,453.

Coal-Fired Boiler Furnace. G. Wilkinson, Harrowgate, England, 1,296,247. Mar. 4, 1919. Filed May 14, 1917. Serial No. 168,456.

Combined Coal and Gas Burning Furnace. H. C. Smart, assignor to Standard Oil Co. of New York, N. Y., 1,296,224. Mar. 4, 1919. Filed Sept. 11, 1917. Serial No. 190,739.

Furnace. P. Moquist, Minneapolis, Minn., 1,296,306. Mar. 4, 1919. Filed June 11, 1917. Serial No. 173,946.

Mine Car Wheel. H. W. E. Brosi, Girard, Kan., 1,296,914. Mar. 11, 1919. Filed Nov. 2, 1918. Serial No. 260,877.

Trade Catalogs

Vesuvese. Swan & Finch Co., New York, N. Y. Folder. Pp. 4; 3½ x 6½ in.; illustrated. Notes the application of this waterproof lubricant to wire rope, exposed gears, etc.

The Steam Motor. The Steam Motors Co., Springfield, Mass. Bulletin No. 5. Pp. 24; 8½ x 11 in.; illustrated. Notes the various points of the design and application of this steam turbine.

Electrical Insulation. Chicago Mica Co., Valparaiso, Ind. Catalog No. 26. Pp. 48; 6 x 9 in.; illustrated. Describes fully the company's line of standard and special mica insulation in its various forms.

Zelnicker's Bulletin—No. 263. W. A. Zelnicker Supply Co., St. Louis, Mo. Folder; Pp. 4; 3¼ x 8½ in.; illustrated. Describes portable hand power pipe threading machines; steel tray bodies, special lamps, etc.

Boss Mixers. Boss Hoists—Elevators. American Cement Machine Co., Inc. Catalogs Nos. P20 and H20, respectively. Pp. 10 each; 8½ x 11 in.; illustrated. These catalogs describe concrete mixers and hoisting engines and elevators used by builders.

Chain Drives, by J. S. White. Morse Chain Co., Ithaca, N. Y. Pamphlet; reprint from 1919 Year Book of National Association of Cotton Manufacturers. Pp. 12; 6½ x 9 in.; illustrated. A short synopsis of the general subject of chain driving showing application to textile industries.

Metal Melting Pots. Soldering Irons. Sockets to Harmonize. The Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Folder—pp. 6; 3½ x 6 in.; illustrated. Booklet—pp. 8; 3½ x 6 in.; illustrated. Folder—pp. 4; 3½ x 6 in.; illustrated. These publications describe specialties of the Cutler-Hammer company.

Industrial News

DuQuoin, Ill.—The Victory Collieries Co., of this city, operating the Victory mine at Tamaroa, north of here, has recently moved its main office to Chicago. This company formerly went under the name of the Paradise Franklin County Coal Co.

Steubenville, Ohio—Rapid progress is being made in the opening of the new Rigby mine of the Akron Coal Co. here, and it is planned to have the plant in operation as quickly as possible. The J. W. Williamson Contracting Co. of Columbus, Ohio, is doing the work.

Paintsville, Ky.—The Wells-Elkhorn company is planning the development of 2000 acres of coal land on Beaver Creek where it will mine the Elkhorn seam. At the Salt Lick and Black Diamond mines of the company new mine openings will be made. The company is under the management of C. O. Messenger.

Huntington, W. Va.—A $100,000 concern has been organized in this city for the purpose of manufacturing mine equipment of various kinds. H. T. Lambert of this place is at the head of the company which will have its plant here. Associated with Mr. Lambert are H. G. Clark, Gladys Baker, C. F. Cunningham and R. M. Davis.

McCuneville, Ohio—About July 1 the Kehota Mining Co., opened another stripping operation here near Shawnee. With the three stripping operations of this company going, the capacity will be about 5000 tons daily. The product is sold through the Pittsburgh & Bessemer Coal Co., of Columbus.

Childs, Penn.—The coal mine owned by H. R. Stone & Co. changed hands recently, when the interests were purchased by W. T. Spruks of Scranton. There is a small breaker on the tract, but it is stated that the new owner intends to make extensive improvements, enlarging the breaker and the mine so as to ship coal on a larger scale.

Beckley, W. Va.—The Simrall Coal Co., recently incorporated, has completed preliminary survey work in connection with the proposed development of its properties in the Winding Gulf district in Raleigh County. Dr. George Hogg is president; P. M. Snyder, vice-president, and F. T. Drumheller, secretary-treasurer.

Charleston, W. Va.—Surveys have been made for the plant of the Fryland Coal Co., which is to operate near Cedar Grove, in Kanawha county; no time will be lost by the company in proceeding with construction plans. The company was recently organized by William T. Slicer of Charleston; C. G. and Johnson Fry, of Ceredo; Floyd Chapman of Huntington and Charles E. Howland, of Nitro.

Carlinville, Ill.—Development of a large tract of coal land in Macoupin County will soon be started by the Sinclair Oil and Refining Co. The land is next to the coal rights purchased several years ago by the Union Coal Co. It is said that another company known as the Hunt Construction Co. will also develop the Sinclair field and that the two large mines will each have a daily capacity of 4000 tons.

Steubenville, O.—The Commonwealth Coal Co. has recently completed negotiations for the purchase of the mines and holdings of the Genree Coal Co., located in the vicinity of Martins Ferry, W. Va., for a consideration of about $40,000. It is understood this company is planning improvements to increase the present capacity. This company recently acquired the holdings of the Burlington Coal Co., located in the same section, for a consideration of about $60,000.

Minneapolis—Representatives from the Northwest appeared before Robert Wright of the Federal Railroad Administration recently to protest a freight advance of 30c. a ton on coal shipped from Illinois mines to the Northwest. Minnesota, the Dakotas, Wisconsin and northern Iowa, get coal from Illinois. It is estimated that 9,000,000 tons will be shipped to this section this year. The new rate which is being opposed is supposed to go into effect July 1 and the freight increase amounts to $2,700,000.

Du Quoin, Ill.—Activity in coal development in the vicinity of this place continues. Announcement is made of the sinking of a new shaft about two miles southwest of Du Quoin to be operated by the J. R. Crowe Coal and Mining Co., of Kansas City, Mo. When completed it is expected that the new plant will employ from 800 to 900 men. Charles Duncan, of Pittsburgh, Kan., completed the drilling of this property about a year ago. This new plant will make a total of seven shaft mines and one stripping within a radius of five miles of this town.

Birmingham, Ala.—The stockholders of the Railway Fuel Co., will meet in Birmingham, June 16, at which time they will vote on the proposition of issuing a first mortgage on their coal properties to secure a loan of not exceeding $1,000,000. Consideration will also be given to increasing the capital stock of the company $150,000. The Railway Fuel Co. owns extensive coal properties in Walker County, near Parrish, Ala., and is producing coal from a mine developed about a year ago. The company is allied with the Southern Railway interests and the entire output of the mine is used by the lines of that system.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Bituminous Market Slowly Improves—Shortage in Late Fall If More Consumers Do Not Stock Coal—Anthracite in Good Demand—Domestic Sizes Scarce—Steam Sizes Hard To Move

ABSOLUTELY devoid of any untoward incident, the coal market this week presents much the same characteristics that have distinguished it during the past month or more. The bituminous coal operators are slowly winning a more advantageous position, while the producers of anthracite are enjoying what gives promise of being an unparalleled summer business.

Again it must be emphasized that unless consumers take in more soft coal during the next few months than they have been stocking, there will be a coal shortage in the late fall. The mines must be stimulated to produce maximum tonnages, for output is growing smaller. Bituminous coal production is now 30 per cent. of the production in the same period last year. The output of soft coal in the last week of May, estimated at 7,930,000 net tons, is more than 2,600,000 tons lower than the production of the corresponding week in 1918.

From the figures at hand, it would appear that the production of bituminous coal this year cannot be greater than 500,000,000 net tons. At the beginning of the calendar year investigation disclosed that there was a reserve stock of bituminous coal in the hands of consumers of about 30,000,000 net tons. Most of this reserve is now gone. There is sure to be a scramble for coal late this year—and prices will soar.

The domestic grades of soft coal are holding up well in price, but steam coal at the present time is going at all sorts of prices. Few contracts are reported.

Anthracite production during the week ended May 31 dropped to 1,285,000 net tons. Stove, egg and chestnut continue to be in urgent request. The steam sizes, such as pea, buckwheat and barley, are hard to move and price concessions are being made to dispose of them.

WEEKLY COAL PRODUCTION

The production of bituminous coal, which gained steadily for four weeks and reached a maximum since Apr. 1 of nearly 9,000,000 tons in the week ended May 24, declined in the last week of May to 7,930,000 tons, a decrease of 9 per cent. The production in the last week of May, 1919, was more than two and one-half million tons, or 25 per cent. below that of the corresponding week of last year. The production of bituminous coal in the first five months of 1919 is 177,340,000 tons. The production in the corresponding period of 1918 was 234,632,000 tons, which exceeds the production for the same period of this year by 57,000,000 tons, or 24 per cent. In the six years 1913 to 1918 the percentage of annual output of bituminous coal in the first five months of the calendar year averaged 40 per cent., the lowest being 36 per cent. in 1915 and the highest being 41 per cent. in 1914, in 1916 and in 1917. If the production of the first five months in 1919 represents 40 per cent. of what will be mined this year, the production for 1919 is thus indicated to be but 446,000,000 tons; if, as in 1915 the output in the first five months is 36 per cent. of the total for the year, an output of 495,000,000 tons is indicated for the calendar year 1919. These facts appear to indicate that the production of bituminous coal this year cannot be greater than 500,000,000 net tons. Whether this quantity added to the surplus stock on hand at the first of the year, estimated around 30,000,000 tons, will be sufficient for the needs of the country depends upon whether general industrial activity recovers sufficiently to approximately equal that of the later part of 1916 and the early part of 1917.

The production of Pennsylvania anthracite in the week ended May 31 is estimated at 1,285,000 net tons compared with 1,656,000 net tons for the week ended May 24 and 2,005,000 tons for the last week in May, 1918. From the records for the first five months of 1919 an output of approximately 80,000,000 net tons is indicated for 1919, a decrease compared with 1918 of 9 per cent., and a decrease compared with 1914, the lowest output recorded in the past six years, of more than 8 per cent. The rate of production of anthracite in the first nine weeks in the present coal year has been approximately 1,600,000 net tons compared with 1,940,000 net tons for the same period of last year and 1,900,000 tons for the calendar year 1918. The rate of production of anthracite has shown a tendency to increase slightly and can be increased even more if domestic consumers will enter the market to even a greater extent for their supply of household fuel for next winter.

Production of beehive coke in the United States in the week ended May 31 is estimated at 264,645 net tons compared with 250,810 net tons in the week ended May 24, and 582,204 net tons in the week ended June 1, 1918. For the calendar year to date the production is estimated at 8,481,000 tons compared with 12,547,000 tons for the corresponding period of last year. Excepting West Virginia, all beehive coke districts recorded improvement in production in the last week of May, but in all districts the output for the week and for the year to date is much below that of the corresponding period of last year.

Bituminous coal dumped at the lower lake ports, including vessel fuel, for the week ended May 24 is reported as 906,201 net tons compared with 911,309 tons in the week ended May 17, 1919, and 713,126 net tons in the week ended May 25, 1918. The season's dumpings to May 24 are 4,038,358 tons compared with 3,556,137 tons in the corresponding period of last year. Shippers of lake coal, particularly those shipping on their own account, are taking advantage of the slack demand in the central competitive markets to forward their supplies to the head of the lakes.

BUSINESS OPINIONS

The Iron Age—The activity in the steel market continues in an encouraging way, without broadening to any marked degree. Mill operations are on a slightly increased scale. Some phases have been overrated, particularly the amount of third quarter and second half buying, which is quite moderate. Price irregularities continue, but the schedule of Mar. 20 holds its place as the market standard. The concessions are in sheets, hot rolled strips, steel bands and some other of the lighter products.

American Wool and Cotton Reporter—There has been heavy rain in the cotton belt and unless the weather changes a number of the fields will have to be abandoned as the crop is getting grassy. An advance in prices last week caused certain hesitation and the buying has been rather scattered. This advance also affected the dry goods market as it has caused buyers to hesitate to pay the high prices that the mills have to ask.

Marshall Field & Co.—Current wholesale distribution of dry goods is running slightly ahead of the large volume of the corresponding week a year ago. Merchants are visiting the market frequently and were in the house in greater numbers compared with the corresponding week of 1918. Retail business continues excellent. Orders from salesmen on the road for both immediate and future delivery are much greater in volume than for the corresponding week last year. Collections are satisfactory.

Atlantic Seaboard

BOSTON

Signs of improved market. A distinct upward swing needed, however, before buyers put much faith in prices for fall and winter. Export prices advance at Hampton Roads. New York and Philadelphia pier markets very dull. Increasing allocations of steamers for over-sea coal trade indicate heavy movement later. Anthracite demand continues. Boston retail prices advance.

Bituminous—Almost it would seem that prices are on the point of changing. There is nothing tangible to report as yet, and only in scattered instances is there any less anxiety to place spot tonnage, but beyond question the outlook for the near future is much improved. The recent Navy bids and the fact that relatively so small a tonnage was offered have shown how much better is the feeling in the trade as to prices for fall and winter delivery. Some shippers have now definitely declined to take more contracts until the general situation is somewhat cleared up, and from this attitude on their part it will only be a short period, probably, before buyers show a belated interest in contract prices.

There may be an absence of price movement until July, for much will depend upon the extent to which consumers will enter the market. The undertone is distinctly favorable to higher prices for season delivery and it is only a matter of a few weeks now before spot quotations will be on a higher level than has obtained recently. A large number of buyers who have been "trying coals" have now about made up their minds to purchase, and it is likely the next fortnight will disclose some more or less active buying. This market, however, will be still confined very largely to Pennsylvania grades, both all-rail and by water, for the Southern smokeless coals are on the same high basis alongside that has prevailed for several months.

Buyers in general find it hard to reconcile the low prices so recently submitted to the railroads with the contract figures now being asked by the trade. It is as if various operators had now decided they

had sold all the low-priced coal necessary and for the rest of their tonnage were determined to get a better return. Of course, the railroads have not been the only beneficiaries, but railroad purchases have been well advertised and their effect upon the current market has been quite pronounced. It will take a distinct upward swing to convince New England buyers that a shortage next winter is a real possibility.

It is rumored here that export prices at Hampton Roads have been advanced from $5.60 to $6 f.o.b. ship, and it is known that certain of the smaller agencies who were naming spot prices down to $4.69 have now withdrawn quotations that were below $5.14 for coastwise business. For the first time in months a few steamers have met with delay at the loading piers, and although the detention has not been at all serious it gives point to firmer quotations. Distinctly there is a better feeling among the Pocahontas and New River shippers, and while New England apparently has little to do with it the factors here are encouraged by the prospect for export business which will doubtless have some reaction here. Distributors of the smokeless coals in cities like Boston and Providence have been closing up retail business lately in more volume than at any time thus far this season. The city of Providence bought 13,000 tons Pocahontas this week at $9 per net ton of 2000 lb. delivered by truck.

All-rail there is better inquiry than a fortnight ago. A few large buyers are coming into the market, but they are very coy about it and it is difficult to get much line on prices.

At New York and Philadelphia the demand for coal over the piers continues light. Shippers who submitted prices to the Navy Department are still in doubt as to the tonnage that will be required and this makes for a good deal of uncertainty as to sales for future delivery. There are those who think that the strong arm of the Fuel Administration will be made use of to get the Navy Department's stated quota. At the same time the spot market is listless and prices are about on the same level as for weeks past. There is some difficulty over arranging for barge transportation on contract through the winter and that has a depressing effect on efforts to arrange for contract coal. To an increasing extent shippers are insisting upon labor clauses in all contracts.

Perhaps the biggest factor in trade prospects is the amount of tonnage being allocated for oversea shipment. It is understood these allocations are to be steadily increased from month to month because of the heavy movement of American coal that will be absolutely required to keep Italy and other countries sufficiently supplied to enable industries and service plants to function properly. Taken together with labor shortage in the Pocahontas and New River districts this will probably mean a steady drain of a very large tonnage of the smokeless coals from Hampton Roads.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.75@3.35
F.o.b. Philadelphia, gross tons	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.35

Georges Creek is quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $4.69@5.14 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $7.10@7.34, and on cars Boston and Providence at from $7.50@7.90 per gross ton, the latter being the contract price f.o.b. cars for deliveries to April 1.

Anthracite—The city markets in New York and Philadelphia have eased just enough to make loading for New England a shade less difficult. This has been noticeable only since the 10c. advance became effective June 1 and it remains to be seen whether the same condition will hold true the latter part of the month. Egg, stove and chestnut are still the sizes in greatest demand and there is continual detention at most of the piers. It is expected dispatch will improve this month and the various factors will make every effort to get coal forward to this territory where dealers' stocks are at a minimum. Retail demand is still insistent, and there are as yet no signs of letup. The Boston retail dealers advanced prices on June 2 50c, to $12 for egg, stove and estnut, per ton of 2000 lb., sidewalk delivery. Broken and pea were allowed to remain at the May figures.

NEW YORK

Demand for egg, stove and chestnut continues. Supplies short and retail dealers receive barely enough to keep their help employed. Household consumers want their coal before vacation time. The steam sizes move slowly, and prices are being shaved. Bituminous tidewater market dull. Little coal moving, but dealers are optimistic. Large consumers soon to come into the market.

Anthracite—The anthracite market continues strong, with the so-called Independent domestic coals bringing premiums and the steam coals being let go at large concessions. The slogan, "Buy Your Coal Early," and the publicity of the various coal agencies, to say nothing of the warnings issued by the various Government departments, have all had their effect upon the consumer; and instead of the feeling of a few weeks ago that there was no hurry on their part, consumers are now anxious to get their bins filled.

Shipments are so slow at this port that retail dealers receive hardly enough of the larger sizes to keep their help busy, while their books contain orders enough to keep them busy for the next few months. The heaviest pressure on the dealers will come this month, as most household consumers desire to leave the city and are desirous of receiving their winter fuel before their departure.

The increase in production hoped for by the trade does not materialize to the satisfaction of the dealers because of various conditions, principally the lack of certified miners and the many holidays.

Stove, egg and chestnut, in the order named, continue to be strongest in demand and those in a position to speak hesitate to give their opinion as to what might be the conditions next fall and winter knowing that the operators are not storing any of these sizes.

Pea coal is plentiful, but it is not necessary to use much force to effect sales as most dealers are willing to take some in order to get the larger sizes. The buckwheat coals are long and prices are easy in nearly all grades. A considerable tonnage is being stocked by the large producers and, so far as they are concerned, little is heard about concessions; but for the so-called Independent product there has been, so reports have it, much cutting of prices. Manufacturing plants are well stocked and there is a large volume of the three small coals in cars along the roads. Some grades of buckwheat are being quoted at the mines around $2.75, while for rice $2.25 has been heard and from $1.25 to $1.50 for barley, depending upon the quality of the coal.

During the period from May 30 to June 6 inclusive there were dumped at the local railroad terminals 5380 cars of anthracite as against 4366 cars the previous week, an increase of 1014 cars. During the 30 days of May there were dumped at the piers 26,138 cars of anthracite as compared with 19,448 cars in April and 6439 cars in March.

The city will soon be in the open market for nearly $100,000 worth of coal for the Fire Department, and Bellevue and Allied Hospitals. This is necessary because of the high prices submitted at the opening of bids on May 14, which in most instances were higher than the appropriations made for them.

Current quotations, white ash, per gross ton at the mines, f.o.b. tidewater at the lower ports, are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	6.05	7.90
Stove	6.30	8.15
Chestnut	6.40	8.25
Pea	5.00	6.75
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The local trade continues to be optimistic even in the face of the demoralized trade conditions here. There is little demand and free coals move slowly, yet notwithstanding these conditions there are tradesmen who are talking better prices within the next few weeks.

Their hopes are based on the knowledge that manufacturers as a rule have been burning high-priced coal bought early last winter and that they are now able to see the bottom of their bins. This condition will drive consumers into the market soon, and those who have failed to close contracts will have to take what the market offers.

Existing conditions are anything but favorable. The tidewater situation is particularly unsatisfactory. There is practically none of the free coals moving and embargoes are the rule, not because shippers are sending large tonnages forward, but because of the lack of demand. The coal coming to tidewater would readily be absorbed under normal conditions, but with the slow buying someone stands a chance of losing out because of extra charges.

There is a strong desire on the part of some buyers to close contracts, but operators are in no hurry to take on additional burdens, especially for the better grades, even though the prices offered are strong and tempting. They are not so sure as to what might be expected from labor.

Conditions along the line are in much better shape than locally. Prices are strong and there is a better demand. Here quotations on coal in Pools 1, 9 and 71 range from $2.25 to $2.75, based on mine prices; Pool No. 10, around $2.20; and Pool No. 11 around $2.

With so many large consumers running low of coal indications point to an active demand in the early fall and a big shortage in production to be overcome.

There were dumped at the local railroad piers 6511 cars of bituminous during the period May 30 to June 6, inclusive, as compared with 5378 cars the previous week, a gain of 1233 cars. During May there were dumped 25,271 cars of bituminous as compared with 20,708 cars in April and 11,516 cars in March. There were 4664 cars standing on tracks at the docks on June 6.

Quotations on the various grades, mine price, for spot and contract delivery, range as follows:

	Spot	Contract
South Forks	$2.90@$3.25	$2.95@$3.50
Cambria County (good)	2.75@ 2.95	2.95@ 3.25
Clearfield County (good)	2.50@ 2.75	2.80@ 2.95
Reynoldsville	2.50@ 2.75	2.75@ 2.95
Quemahoning	2.65@ 2.85	2.95@ 3.10
Somerset County (best)	2.50@ 2.75	2.95@ 3.10
Somerset County (poor)	2.00@ 2.35	2.50@ 2.75
Western Maryland	2.25@ 2.50	2.50@ 2.75
Fairmont	2.00@ 2.25	2.35@ 2.50
Latrobe	2.10@ 2.25	2.25@ 2.40
Greensburg	2.25@ 2.35	2.35@ 2.60
Westmoreland ¾-in.	2.60@ 2.75	2.60@ 2.75
Westmoreland run-of-mine	2.35@ 2.60	2.35@ 2.65

PHILADELPHIA

Anthracite production fully absorbed. Torrid weather slows retail demand. New orders from consumers decrease. Stocks on hand light, except pea. Good buying expected all summer. Slight falling off in egg demand. Stove extremely short, but not in moderate supply. Pea being stored by dealers. Steam sizes quiet, with some of all sizes going to storage. Collections good. Bituminous displays slight activity. Prices firm.

Anthracite—The torrid weather of the past week, with the temperature going beyond ninety on successive days, has apparently made the dealers less eager in their call for increased shipments. It may be that many of the retailers have exaggerated their needs and now find they have been able to clean up most of their orders much earlier than they thought. We have interviewed quite a number of dealers the past few days and most of them admit they expect to deliver every order on hand during the present month. Practically every dealer states that the new business being booked is very light.

Most yards contain only a small tonnage of egg, stove and chestnut, and the dealers will surely continue to buy until they have capacity stocks; in fact all representative dealers have so expressed themselves. It has been pointed out, however, that when deliveries fall off it requires no extraordinary tonnage to fill the several hundred yards located here, the majority of which are of but small capacity.

Opinions vary as to how the different family sizes will hold up during July and August. It is taken for granted that none of them will cause any concern until then. When the situation is analyzed, though, we believe that the demand for coal all summer will be heavy, much more so than normal.

Egg at this time is commencing to show a slight falling off, and while a substantial demand continues it will hardly remain that way throughout the summer. This will cause no uneasiness to the shippers, as the New England market will absorb all of the surplus. It will be recalled that New England was slow to respond to the buying movement this spring, but now that it is under way coal cannot be sent there fast enough to suit the dealers.

Stove remains extremely short, and most dealers are embarrassed for the want of it. They claim that practically every order they receive calls for at least a part of this size, and as they are behind in their deliveries it is causing their customers to withhold payment of their bills pending the completion of their orders. With little or no stove in most of the yards and an abnormal demand from all other markets, it cannot be seen how the requirements are to be filled before fall, by which time it is sure to be renewed most vigorously.

Chestnut has been shipped here much more freely than either egg or stove, and as a consequence most of the urgent cases have been cared for. The dealers have small stocks of this size, but as they now seem to have filled most of their orders they are not quite so insistent in their demands for it; in fact, some shippers believe they may need business for chestnut before the fall orders begin to arrive.

The shippers continue to hold orders for pea coal sufficient to take up the production several weeks in advance, but it must be said that the dealers are not disposing of their tonnage as rapidly as it is being received. Quite a stock is accumulating and a number will be compelled to order the suspension of shipments before many weeks. There seems to be a possibility of the big companies, who without question will hold to their circular price, being compelled to store this size before it comes into its own in the fall. If this happens there is a likelihood, of which we have heard fairly well founded rumors, that the dealers will be charged about 50c. a ton to cover the expense of storing and picking up. This is borne out by the fact that one of the large companies on a small quantity of prepared sizes recently picked up made a charge for this service.

There is no particular activity in the steam sizes. A good tonnage of buckwheat is being taken and some of the smaller shippers claim they have little of this size that is not under contract. The larger producers are still placing a small tonnage in storage and it is believed this will increase up to a month or more. There is a general feeling broadcast that the industrial revival cannot be long delayed and that beginning with the fall there will be a heavy demand for all steam sizes. Most of the present quantity of buckwheat being sold is being taken in by plants in anticipation of car shortage and other difficulties during the fall and winter. There is no change in the demand for rice and barley. While a good tonnage of rice is being shipped on contracts, there are few sales outside of this, while practically the only outlet for barley now is the city pumping stations, the contract for which was recently awarded to the leading anthracite company at a price 75c. under present quotations.

Shippers report that collections are good. While the accounts are not so closely collected as they were in war times, still it can be said that there is less money outstanding than for several years at this time of the season. Inquiry among the retailers develops that they are gradually giving more credit than they had expected, but they all claim it is only for a short time and is extended to gilt-edge customers.

Bituminous—There is little action in the bituminous trade. The production is about the same as it has been for a couple of months past, most of the output being applied on contract business. It is true that with the settlement of the railroad fuel problem there has been a greater number of inquiries from consumers for both contract and spot coal. Some companies have taken the stand that they have about all the contract business that they desire to handle and do not care to commit themselves to any further tonnage, as they want to be in the position of having some free tonnage when the expected boom actually arrives. Even as it stands now the good coals are hard to get and it is not going to take a very greatly increased general demand for fuel to make the pinch felt. A survey of the plants throughout the city shows gradually decreasing stocks and a frequent tendency on the part of buyers to add to them when they can get the coal they want. There have been very few price fluctuations, the quotations holding closely within the range of the past six weeks.

BALTIMORE

Little business in soft coal. Rumors of large export contracts. Anthracite scarce.

Little business in bituminous was noticed during the week, while there was evidence of increased activity in the export business. Local business was confined to small spot tradings with prices holding fairly firm and continuing around $2.75 for the best grade of fuel. Some trading in the better coals was done as low as $2.50, but most of it sold around the $2.75 mark. Contracting is still being held back, although buyers are being warned the market is liable to go up rapidly and that unless they evidence a tendency to get under cover many firms will find themselves short when the open market becomes light and there is little coal to be had. Contract figures are slightly above the present open market prices. The opinion here is that mines will not increase production until there is sufficient contract business to warrant a fair price for their product. No change was noted in the price of medium and cheap grade fuels, $2.30 being the top price for the former and under $2 for the latter.

The trade heard a rumor during the week that one of the large corporations had been able to close a contract for export amounting to about 3,000,000 tons. It was impossible to verify the report, but it was gossiped pretty well about the city. In most quarters it was taken for granted that it was O. K. South American ports, Sweden, Switzerland and Holland were points to which 28,414 tons of cargo and 3399 tons of bunker coal were carried during the past week.

Receipts of anthracite continue light, and the dealers here are hard put to it to handle the situation in view of the fact that their April orders are still undelivered. The dealers will likely announce a 25c. increase in the price of hard coal to householders on July 1, there being no change to date in the April schedule.

Lake Markets

PITTSBURGH

Runaway market predicted if consumers do not stock up.

Coal operators of the Pittsburgh district express anew their conviction that there will be a coal shortage late in the year. This was brought out forcibly at the last monthly meeting of the Pittsburgh Coal Producers' Association. J. D. A. Morrow chanced to be present and made an interesting address, referring to the fact that the country's coal production thus far this year is 30 per cent. short of production in the same period last year. The Pittsburgh district operators state that if consumers do not take more coal during the next few months a shortage will develop late in the year which will produce a runaway market, and this the operators wish to avoid for various reasons, one of these being the sentimental influence it would exert on wage scale negotiations for the period beginning Apr. 1, 1920.

Coal consumers are acting conservatively and evince no disposition to lay in stocks of coal, although before the coal scarcity of the past two years that was the usual procedure. Excess stocks that consumers held at the close of the war have now been eliminated and current buying has increased somewhat, though it is still only for current consumption. The steel industry shows no further decrease in activity, and there is perhaps a slight increase in mill operations. Lake shipments from the district are fairly heavy and are running at a rate that will readily make up the district's quota for a 20,000,000 ton movement up the lakes for the season. Coal production in the district is in the neighborhod of 60 per cent. of capacity.

Slack is easier in the market while prepared sizes are a shade firmer and mine-run is unchanged. Mines selling slack and prepared coal claim to be securing a shade more than the mine-run average. We quote: Best grades gas coal: Slack, $1.65 @1.85; mine-run, $2.35; prepared sizes, $2.60@2.70; Steam: slack, $1.50@1.70; mine-run, $1.90@2.35, per net ton at mine, Pittsburgh district.

TORONTO

Coal situation easier. Dealers overtaking delayed deliveries. Less fear of shortage. Bituminous quiet. Industrial crisis over.

The coal situation is considerably easier. Supplies of anthracite are coming forward from the mines in about normal quantities and dealers are gradually overtaking deliveries in arrear. New orders are only taken subject to prices prevailing at time of delivery. There is less fear among consumers of a shortage, and business is getting on a more satisfactory basis. Bituminous is little called for, owing partly to extensive strikes, but the industrial crisis is now over and market conditions are likely to show improvement in the near future.

Quotations for short tons are as follows:

Retail:	
Anthracite, egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	8.25
Slack	7.25
Domestic lump	10.00
Cannel	11.50
Wholesale f.o.b. cars at destination:	
Three-quarter lump	5.75
Slack	4.56

BUFFALO

Slight changes in bituminous trade. Consumers still hold off. Anthracite in great demand. Shippers trying to keep lake loading up

Bituminous—Consumers do not seem to be interested in coal at any price. Jobbers say it requires a good salesman to do business on the road, and that it is almost useless to stay in one's office and attempt to do business. Industries that use steam coal are in no condition to buy lavishly, and in addition the idea still prevails that prices will come down.

Bituminous prices are not steady, quotations remaining about as last week: $4.55 for thin vein Allegheny Valley sizes; $4.45 for Pittsburgh and No. 8 five-quarter lump; $4.50 for same, three-quarter; $4.05 for mine-run and $3.65 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The situation is much the same, except that the hot spell has discouraged ordering somewhat and consumers appear to be filled up, so far as summer stocking is concerned. Users of the chestnut size usually do not buy much till fall, as they are mostly poor people who move a good deal and buy coal only when it is needed. This size of anthracite is therefore more plentiful than either stove or the larger sizes of hard coal.

There is a general shortage of anthracite. Mining suffered during the holiday, almost three days being lost. There is a scarcity of men and it is hard to catch up when mining once gets behind. The winter supply is still a problem. It may be adequate but everybody fears it will not. Much depends on the winter, but no restrictions are likely to be imposed.

The prices of anthracite advanced 10c. a ton on some sizes June 1, and are now quoted as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8 65	$10.35
Egg	8.65	10.35
Stove	8.90	10.40
Chestnut	8.90	10.60
Pea	7.20	9.25
Buckwheat	5.80	7.85

The showing in the lake trade is better, though it is feared that it cannot be kept up if the rail and local demand continues. The amount loaded for the week was 102,-125 net tons, of which 13,100 tons cleared for Chicago, 24,000 tons for Milwaukee, 6300 tons for Manitowoc, 3400 tons for Sheboygan, 1825 tons for Sault, Can., 1800 tons for Sault, Mich., 22,500 tons for Fort William and 15,200 tons for Duluth-Superior.

Freight rates continue at 50c. to Chicago and Sault, 47½c. to Milwaukee and Sheboygan, 42½c. to Manitowoc and Fort William and Duluth.

CLEVELAND

Growth in demand is slow, but it is steady and reassuring. Slack is gaining strength constantly, and it is expected that the stockpiles at the mines will be cleaned out by early fall. Many of the larger industrial users of coal now place August as the

time when they again will be operating at 100 per cent. Domestic consumers are still buying heavily, especially of Pocahontas.

Bituminous—Each week sees more consumers of steam coal entering the market and while their buying is of small proportions, it is just that much more than it has been. Last winter's accumulations now are practically out of the way, and the coal being bought today represents actual requirements. Business appears to be picking up gradually, but the pull seems to be hard. In several cases fairly large users of steam coal have foreseen a sudden inflated demand, with consequent soaring of prices, a few months ahead, and are buying while they consider the buying good. The large steel mills in the valley believe the beginning of August will see their order books jammed. The general opinion in Cleveland, too, is that about 60 days must elapse before business becomes really pressing again.

Practically without exception eastern and southern Ohio operators are bulls on the market, and mine operations are being speeded up. The lake trade continues to take all that is sent to the Lake Erie ports. In seeking to market all the coal they can in the lake trade operators are finding themselves pinched on labor. It is safe to say every operator could use at least 20 per cent. more mine workers. The foreign element especially is becoming restless, and is not producing; the greater part of it is awaiting steerage quarters for Europe. Cars, too, appear somewhat short despite the big surplus reported by the Railroad Administration.

Domestic coal users now are making quite a run on Pocahontas. Except for apartment and public building use, bituminous is a drug on the market. Anthracite demand, while gratifying, is not what most dealers believed it would be. Pocahontas, however, does not stay long on the yards. Talk of another 25-cent advance in price is heard. In the last seven weeks 75 cents has been tacked onto the price of forked, while mine-run has continued at $7.20, delivered.

Lake Trade—Tonnage is reported coming out fast, but with the lake carriers getting good dispatch, none is piling upon the docks. A few days ago 4860 cars, or approximately 240,000 net tons, were dumped in one day; this is a high mark for the season to date. A number of large freighters are coming down light from the head of the lakes to take coal back, whereas the freighters usually go up light for iron ore on the down trip. Receipts of anthracite at Duluth in May totaled 129,700 tons, compared with 56,600 tons last May, while bituminous coal received amounted to 1,039,200 tons, as against 777,300 tons in May, 1918.

DETROIT

Consumers of steam coal continue to hold off on orders. Domestic buying slumps with period of hot weather.

Bituminous—Sluggish inacivity is a prominent feature of the local market for bituminous coal, according to jobbers. Consumers of steam coal seem to be slow to realize that those who delay taking advantage of present opportunities for stocking up may encounter obstacles difficult to overcome when they enter the market later.

Receipts of bituminous are unusually light for this season of the year. Jobbers and wholesalers are not encouraging shipments except on the basis of direct-from-the-mines to consumers. One result of this policy is that little free coal on tracks is reported in Detroit, which is a condition in sharp contrast with the period before the war.

Some of the buyers, however, seem to have formed the opinion that the supply of coal awaiting sale is quite large. This impression is created, the jobbers explain, by the fact that several brokers may be working to sell one consignment and may each in turn offer it to the same group of prospective buyers. Little smokeless coal is available. Lump and egg sizes are said to be virtually out of the market, with mine-run selling at $2.75 at the mines for a short ton.

West Virginia mine-run brings from $2.10 to $2.25 and mine-run from Ohio is quoted around $2. Slack is apparently difficult to place with Ohio coal quoted at $1.50 and stock from West Virginia at about $1.85. Hocking lump is held at $2.50, while West Virginia gas or splint lump is quoted at $2.75 and three-quarter lump at about $2.50.

Anthracite—Retailers find that the extreme heat of the last few days has produced a noticable reduction in volume of business coming from household consumers. Anthracite is not reaching the city in large amount, but the principal dealers seem to be getting sufficient stock to supply customers. Efforts of a number of retailers to encourage early buying of anthracite have not brought the volume of orders expected.

Lake Trade—Shipments of coal on the lake routes are holding at a considerable tonnage. Despite the holiday May 30, vessels loaded 966,063 tons in the week ending May 31, of which 39,137 tons was fuel coal. Some vessels are making the downbound trip without cargo to load coal.

COLUMBUS

Improvement is reported in the domestic and lake trade. Steam business is still slow. Fancy domestic grades are strong. Screenings still drag.

The domestic coal trade is now active in central Ohio territory. Buying on the part of retailers is more noticeable as stocking has now started to a certain extent. The fancy grades are moving actively. Pocahontas is selling well and the same is true of West Virginia splints and other smokeless and semi-smokeless grades. Retail stocks are not large in any section, and consequently there is a fairly good buying movement. Prices for Pocahontas continue to advance and the usual figure is $4 at the mines. Consumers are placing orders for their next winter's supply, to be put in in June and July.

Steam business is quiet in most sections. There is a better demand for screenings, which has been the hardest grade to dispose of. Reserve stocks are generally used up and going concerns are now buying in the open market, where rather low prices are offered. Iron and steel concerns are not using so large a tonnage as formerly. Rubber plants are busy but they have some reserve stocks on hand. General manufacturing is gradually expanding and as a result a better steam demand is expected within the next few months.

The lake trade is running along about the same as usual. The movement is slowly increasing but has not reached the proportions of last year. Uncertainty as to price is still holding up some lake contracts. Dock interests are busy filling their docks at the head of the lakes. Vessels are plentiful and chartering is going on fairly well.

Production is not increasing in any of the Ohio fields. This is due to the uncertainty in the steam situation. The Hocking Valley is credited with about 50 per cent. of normal during the past week, and operations in the Pomeroy Bend field were about the same. Eastern Ohio is producing about 55 to 60 per cent. of normal. Other fields are not showing up very well.

CINCINNATI

Market comparatively quiet, but future looks encouraging. Labor troubles expected. Prices hold up. Pocahontas coal scarce.

The market is comparatively quiet. There has been no startling business transacted during the past week, but the outlook is encouraging. A survey of the large dealers shows an improvement, and the near future is expected to see the resumption of the normal trend of business. All the local dealers are dubious about the conditions for this fall, and are endeavoring to educate the consumer of the possibility of a serious shortage. There is also a new problem becoming more and more conspicuous as the weeks pass on. The local dealers are anticipating labor trouble at the mines along about the time when it will do the most harm.

The prices of coal in Cincinnati continue to remain the same as the past few weeks, but the heavy demand in some lines has caused a shortage. Coal from the Pocahontas fields is hard to obtain. There is an acute shortage in this particular grade, and the local dealers claim that it is out of the question to obtain any of this coal. Anthracite also is running short in this vicinity, with no immediate prospects of a normal supply being obtained.

LOUISVILLE

Block demand increasing with stronger market as result of better consumer stocking. Steam grades generally draggy, with spot coal selling at considerably under market. Contract prices fairly firm.

The market as a whole has shown little price change, other than a little stiffening on the part of concerns with fair orders on hand. Domestic coal is strong in price, but steam coal is selling at all kinds of prices. However, industrial consumption is slowly but steadily improving as old stocks run out, but little contract making is being indulged in at this time.

Consumers are beginning to get a little uneasy, and are placing fair orders, with the result that retailers are fairly busy, and are buying nicely. During the past three weeks one retailer has developed business until he is now operating four out of his six trucks, which is a considerable improvement considering the fact that he had been operating but one small truck.

Some of the eastern Kentucky mines are operating full, while others are operating as full as labor conditions will permit. There appears to be a general shortage of labor, resulting in only about 70 per cent. operations for eastern Kentucky.

The Lake movement is now in full swing, and some fair business is coming from byproduct, gas plants and other consumers.

There is also a good deal of coal moving into textile districts of the South, and to Southern ports for export or bunkering.

Jellico, Straight Creek and Blue Gem block coal is selling at higher prices, ranging from $3.25@3.75 per ton. Nut and slack and mine-run from these districts is selling at approximately the same prices as good eastern Kentucky.

The demand is largely for better grades of coal, resulting in low grades going begging. In steam coal the better grades are being quoted at such low prices that operators making low grades have no chance to compete.

BIRMINGHAM

Domestic market shows great strength and little free coal can be found. Prices advance on all grades. Little activity in steam trade, but schedules remain firm and there is no accumulation in the hands of operators.

Inquiry for domestic fuel is exceedingly brisk for this season and it is practically impossible to find any free coal of the higher or even the medium grades. Schedules adopted Apr. 1 providing for an increase of 10c. per ton per month through September have been abandoned except on contract business, and there is a possibility of a runaway market before fall. Quotations on domestic grades are as follows per net ton mines for lump and nut:

Cahaba	$4.50@5.00
Corona	3.50@3.75
Black Creek	4.00@4.50
Carbon Hill	3.25@3.50
Climax and Montevallo	5.00
Big Seam	3.00

The steam trade is still drifting along quietly, but brokers predict a decided change for the better between now and July 1, when a number of large railroad contracts expire and will have to be renewed. It is thought that this will bring about more active buying from commercial consumers generally. Government prices are holding firm and when the market again becomes active sales will be based on that schedule.

Coke

CONNELLSVILLE

Operators have still stiffer views. Sliding scale contracts may be made. Production slightly increased.

Coke operators have become even stiffer in their views as to the value of coke for the second half of the year, owing no doubt to the better reports lately coming from the iron and steel industry, and it now seems improbable that it will be possible for operators and furnacemen to get together on a flat price for second half contracts. In the majority of cases May and June settlements on monthly adjustment contracts were at $4. The furnaces would hardly care to pay as much as that as a flat price over the second half, while on the other hand there is no operator who would accept such a price. They all feel that even if coke is hardly worth $4 now it will be worth much more later in the year. Accordingly some effort is being made to figure out sliding scade contracts for presentation to furnacemen. The difficulty is experienced, however, that present pig iron prices are more or less artificial, representing the remains of wartime control. Taking basic pig iron at $25, valley furnace, which is approximately the quotable market now, there may be a decline

in the next few weeks and afterward a recovery based on demand. If in such circumstances a $25 price were again reached, the coke operators feel that the furnaces would be able to pay a better price for coke than they can now, when pig iron is also quotable at $25. There is some talk of formulating scale contracts whereby $25 pig iron would call for $4.75, with other prices in proportion, with a proviso that until the pig iron market shows strength of its own, a special price, say $4, will be made.

Foundry coke is in better demand and consumers are taking more interest in the better grades. Operators would not sell foundry coke on contract at prices now ruling for spot, particularly as the usual contract runs for a twelvemonth. The spot market remains quotable at $3.85@4 for furnace and at $4.50@5 for foundry, depending on grade, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended May 31 at 111,335 tons, an increase of 3262 tons.

Buffalo—The only indication of change in the dull state of the smelting trade is the chartering of 100,000 tons of iron ore to be brought down at once by boat to Lake Erie ports. This is the first stir of the season, and is small in amount, but it may be the forerunner of much more. Local furnaces are running light and are not buying much ore, which is still quoted at $7.25 to $7.60 for 72-hour Connellsville foundry, $6.60 for 48-hour furnace and $6.10 for off grades.

Middle Western

GENERAL REVIEW

Conditions more hopeful, with plenty of coal moving forward. Price increased on good grades. Labor shortage in fall.

The coal market in the Middle West is at last showing some hopeful signs of a return to a healthy state of activity. The public are buying more freely than heretofore, and each day shows an improvement over its predecessor. A considerable tonnage is moving daily on the open market, and a number of contracts have been closed, although no big contracts. Prices have advanced on prepared sizes on all of the high grade coals mined in these fields, and further advances are predicted for July 1. Franklin County prepared coals are now $2.85 per ton f.o.b. mines, and we understand from a reliable source that some Indiana Fourth Vein lump sold as high as $2.95 f.o.b. mines. The retail trade is affected by these price increases, as there have been few, if any changes in steam coals, although the railroads appear to have prevailed upon certain operators and jobbers to shade their prices.

What little eastern coal is moving into the Middle West is sold, and will continue to be sold, at good prices. This is a decided improvement over conditions a month or so ago, at which time the gas and by-product people received quotations in every mail from West Virginia operators quoting prices on byproduct coal from 50c. to a dollar per ton under the Fuel Administration prices. High grade eastern coals for domestic purposes are in great demand and hard to get. It is generally believed that whatever eastern coal is to move into the west will have to move fairly promptly, as the demand in the east is increasing rapidly.

The labor situation at the Middle-Western mines is continuing without much change. Men are leaving the coal industry for more favorable fields, and the big exodus of the foreign element continues. As conditions are, at present, Illinois and Indiana operators have as many men as are needed, but when the demand for coal comes, as it will come, and soon, it will find a serious shortage of labor at our mines. As no new labor is coming into the field, it is easy to understand why the operators are so anxious to have their favored customers go into the fall and winter months with an adequate storage pile.

CHICAGO

Steam coal demand still inactive, while domestic coal demand is picking up. Little anthracite.

Trade conditions continue without much change, especially in regard to steam coal. The demand for mine run and screenings keeps up, perhaps a little better than in the immediate past, but the movement of steam coal into the Chicago market is still far below normal. It is believed, however, that the steam buyers will come into the market heavily a few weeks from now, when they understand what the coal situation is today.

The domestic situation is changed some. Dealers realize that from now on it will be extremely difficult to obtain eastern coals, such as Pocahontas, etc., in sufficient quantities and they are therefore turning to the nearer fields such as Franklin County and the Indiana Fourth Vein district. Operators in the two districts mentioned above report a great improvement in their Chicago trade, which they believe will continue for some time to come.

We understand that some of the Chicago retailers are having difficulty in obtaining anthracite, and are far behind on their orders. It is predicted by some very closely in touch with the market that what is now true of anthracite will also be true of all high-grade domestic coals sixty or ninety days from now.

MILWAUKEE

All grades of anthracite advanced 10c. per ton, with the exception of buckwheat. Market continues quiet, with selling movement slow.

The coal market at Milwaukee continues quiet. Dealers say deliveries are only fair in volume, due apparently to a disposition on the part of consumers to hesitite at paying present prices. However, an addition of 10c. per ton on all grades of anthracite except buckwheat, which became operative June 1, may tend to dispel this feeling. Dealers have been looking for an advance in bituminous coal also, as Western operators are charging from 75c. to $1 more at the mines; but thus far the soft-coal schedule remains undisturbed.

Receipts by lake thus far aggregate 177,980 tons of anthracite and 725,672 tons of soft coal, a gain of 76,519 and 271,131 tons respectively over the receipts during the same period last year.

The City of Milwaukee will soon be in the market for about 60,000 tons of coal, mainly bituminous. During the war the city was supplied through a pooling arrangement between city dealers, but competitive bids will now be sought.

Prices of anthracite are now as follows: Chestnut, $12.40; stove, $12.30; egg, $12.10; pea, $10.90; buckwheat, $9.75.

ST. LOUIS

Business generally quiet with increase in inquiries from country for threshing coal. A slight increase in local call for domestic coal, while steam continues to lag. Condition shows little improvement.

The local situation shows some improvement, but not to any marked extent. Orders for storage coal have been more numerous in the last week, and there will no doubt be a general movement from this time on that will not reach its highest point until perhaps July or August so far as storage fuel is concerned for domestic purposes. The greater portion of that moving now seems to be anthracite. There is an increasing call for smokeless coal.

On the Illinois coals the Carterville grades are leading. The call for Arkansas coal is light and there is nothing to indicate that any of this fuel will move in here in tonnage worth considering.

Steam business continues to have a depressing effect on the market. The large steel plants in East St. Louis and Granite City are running short time, and some of them have suspended altogether, putting a large tonnage of steam coal on the market. This has kept screenings and small nut down. The steam business throughout the country does not seem to be anywhere near normal either.

Conditions in the Standard field show no improvement. As a matter of fact, they continue to grow worse. The steam-coal problem is a serious one, and in the face of a poor steam market the prices on domestic sizes seem to go down instead of up, on account of the over-production. Nearly every mine in the field is selling coal at about the cost of production and below, in order to keep their organization together, anticipating a big demand in the near future. Competent observers contend there will be no extraordinary demand for Standard coal until the middle of the winter, and then only if the weather is severe and an unusual car shortage occurs. The mines continue to work two and three days a week. The railroad tonnage has increased some this week.

In the Mt. Olive field the railroad tonnage does not seem to be large, but there is a fairly good movement of both steam and domestic to Chicago and the Northwest. A considerable tonnage of this coal, especially the washed sizes, was recently contracted for at Kansas City, and some is moving to Omaha. The conditions in the Mt. Olive field are satisfactory, everything considered.

In the Carterville field of Williamson and Franklin County, Illinois, and the Duquoin field, the one great problem now is the steam sizes. At Benton, Ill., it is estimated there will be 100,000 tons of coal piled up at the mines, and at other mines in the field screenings and sizes from No. 2 to No. 4 have been piled up. This is accounted for by the fact that industrial conditions in the Middle West are bad, and there is no call for steam coal that usually at this season of the year was greatest in demand.

The demand for domestic sizes shows a steady improvement, especially to the Northwest. Locally there is a small tonnage moving in, but this is not a factor in the situation. Cars are plentiful and the movement is good, and a general way conditions show improvement, except on steam coal. Some mines still continue idle and all are working short time. The railroad tonnage from this field shows up fairly well and is the only important factor in keeping the mines going at this time.

Coal and Coke Securities

New York Stock Exchange Closing Quotations June 9, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com	(BB)	149½	150
Burns Brothers, Pfd	(BB)	99½	115
Central Coal & Coke, Com	(CK)	55	...
Central Coal & Coke, Pfd	(CK)	63	...
Colorado Fuel & Iron, Com	(CF)	50½	51
Colorado Fuel & Iron, Pfd	(CF)	103	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com	(EH)	99½	99½
Elk Horn Coal, Pfd	(EH)	...	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, Pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	64½	65
Pittsburgh Coal, Pfd	(PC)	92½	94½
Pond Creek Coal	(PD)	19½	20
Virginia Iron, Coal & Coke	(VK)	70	72

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	93½
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	80	...
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	80½	...
Jefferson & Clearfield Coal & Iron, Sec, Mort. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	98½	100½
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79½	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	85	...
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	87½	88
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	...	83
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	93	95
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	88½

COAL AGE

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That These Men Shall Not Die in Vain

By R. Dawson Hall

THE terrible loss of life in the Baltimore Tunnel must not be allowed to be forgotten till all the important lessons that it has taught have been driven home. Admittedly the law in the anthracite region, as far as the transportation of explosives is concerned, is wholly inadequate. The coal company that operated the tunnel tried to make up for that defect, but the men, finding the cure involved them in much trying labor, demurred. As a result there was a compromise, and the company devised a plan with the union which would have prevented the accident in question had it been adhered to.



One of the Cars After the Explosion, Showing Powder Kegs and Dinner Pails.

The powder was always to be hauled in the rear car of a long trip, and an empty car was to separate it from the cars conveying the men. The union was to be responsible for the execution of the order. Unfortunately the grievance committee, which represented the union at the mine, allowed the men to violate the agreement, and the accident happened.

Men like to keep their kegs of powder in their own possession. They do not like to deposit them in a car trailing some distance behind, for there is always a risk of theft. On the other hand, they can only with difficulty be induced to carry them two or three miles to the working face. When they do that they must lug their tools and dinner pails also, for they will not trust their equipment on the trip without being there to watch it.

Though, in the Baltimore Tunnel disaster, the powder in the rear car did not burn or explode, yet there is always just that risk where powder is hauled by an electric locomotive, even when it is placed in the last car of a long trip, unless the powder is carried in a properly insulated box. This for other reasons should be lidded and locked, and in care of an attendant with an electric light in his cap. It may not be necessary to follow the Illinois law and place the explosive near the working places in the interval between shotfiring and the entrance of the day shift, while the current is turned off on the roadways along which the explosives are hauled, but it is necessary that the powder be hauled in a dry and nonconducting box to which sparks and lights cannot have access.

The Illinois plan has some advantages, but there will be danger nevertheless if powder is stored in the mine and distributed in the presence of a lot of excited miners, with lights on their caps, who are anxious to get to work; and more dangerous yet, if there is no one on hand to do the distributing.

Every state should scan its mine laws with care to discover defects that may make a recurrence of a disaster like that at the Baltimore Tunnel possible. In few bituminous mines could it have occurred without stirring up the coal dust and causing a violent explosion.

Sealing Up Old or Abandoned Workings in Gaseous Mines*

The Good or Bad Effects of Sealing Off Worked-out Portions of a Mine Have Never Been Definitely Agreed Upon. The Proper Ventilation of Such Places Is Difficult. A Method of Procedure That Is Neither Difficult nor Dangerous Is Outlined

By C. Thompson
Director, Department of Mines and Minerals, Illinois

THE advantage of sealing up old workings in fiery or gaseous mines is a subject that has received but scant attention among mining men. It is true, however, that every once in a while this matter is raised without any definite conclusion being arrived at or any system being suggested. I think the reason for this is obvious and arises from the fact that it has been dealt with as a matter of personal opinion and in consequence was a subject that could not be argued to a logical conclusion.

Neither have the tremendous possibilities and dangers arising from the extensive working of deep beds generating large quantities of methane presented themselves to men's minds, inasmuch as they had until quite recently only mined in the shallow measures, where little or no gas of this kind was generated. In some instances what deep mines were in operation had not been extensively developed, and therefore the need for intelligent precautions had not become obvious. Today conditions are different, and we stand face to face with an important and serious situation; consequently, it becomes our duty as thinking individuals to put aside all matters of personal opinion and deal with this question as becomes men who realize that the subject is one fraught with the greatest possibilities in regard to the safety of human life and limb, the protection of property and the successful recovery of a valuable mineral for the benefit of the nation.

IT WOULD seem that the chief arguments of those who are opposed to the system of sealing off old or abandoned works may be summed up in one sentence: Is it not better to ventilate old works, and keep the gas out, than to seal them up and allow the gas to accumulate behind the seals? To this question the amateur would probably answer, Yes.

But the experienced and observing mining man would likely say, "Yes, if this can be done." It must be realized that this is not fully accomplished, and as the works become more extensive the difficulties increase, and as they grow still more extended, it will ultimately become a physical impossibility to seal them effectively.

To illustrate: Suppose you have an extensive area to work, say, the cross-entries have a mile and a half to go from the main entry to the boundary line. This would give 7920 ft.; and if the panels were 420 ft. between each pair, this would give a 200-ft. room with a 20-ft. barrier between panels. This would mean 15 pairs of panels on each side of the cross-entry. Suppose that it was intended to have 14 rooms on each panel; the panel entries are 10 ft. wide and the coal 8 ft. high, the rooms 25 ft. wide on 50-ft. centers and 200 ft. deep. Then, when this pair of panels was finished, there would be a space of over 1¼ million cubic feet. This, if not properly ventilated, would fill up with deleterious gases, chief among which would be methane.

Now, consider what the position will be when there are, say, ten pairs of panels finished. Take those panels on the intake aircourse side. It would be necessary to install some sort of regulating door across the aircourse to force the air into these panels, or they would not be ventilated. This would have to be done with every pair of panels; and, provided there was available a reserve of ventilating power to make this possible, do you believe that any intelligent and experienced man would or could take the responsibility of asserting that this air, affected as it would be by the transpiration of the various occluded gases, would be fit to sustain health and life? Certainly not.

AGAIN, it must not be forgotten that it would be necessary to have some means of forcing air into the panels on the return side. This would mean an overcast or air crossing over the haulage road from the intake air-course, or a door on the haulage road. Such a crossing would have to be made for each pair of panels. When all this is done, what condition do you suppose the air would be in on the inby side of this, where the miners all have to work? It would certainly not be an atmosphere that contained a reasonable amount of pure oxygen.

Yet, again, it must be remembered that the stoppings between the entries would probably decay in a comparatively short period; certainly some of them in less time than that represented by the life of such a district. When this occurs all the area on the inside of that point would be unventilated and would fill up with gas. A sudden fall then occurring might force out thousands of cubic feet of methane. This would be carried by the air current to the first open light or even the trolley wire with the motor coming along. And then, well, may God in His mercy help those that were there!

The question quite naturally arises: What method should be adopted in sealing off panels? I am of the opinion that there is only one distinct method that can be adopted with success and a fair guarantee of safety, and that is, when the first pair of panels in a district is finished, leave them open and ventilate them until the second pair is finished and the third pair started; then seal up the first pair. When the third pair is finished, seal up the second pair, and so on, always taking care that the pair of panels on the inside of the pair

*Paper entitled "Advantage or Disadvantage of Sealing Up Old or Abandoned Workings in Mines Generating Methane," presented before the annual meeting of the Illinois Mining Institute, May 23, 1919.

next to be sealed is finished. It will readily be seen that this method offers the best guarantee of safety against inadvertently holing into a confined body of gas pent up behind the seals.

On the other hand, if the first pair were sealed up as soon as finished, there would be a possibility of holing some room from the second pair into the first pair, with serious consequences.

The question has been asked, What kind of gas would exist behind the seals and what condition might it be expected to be in? To answer this it is necessary to call attention to the condition in which the gas exists *in situ*. One scientist has asserted that it must exist *in situ* in the form of a perfect gas. Such a condition, however, is difficult to comprehend as it suggests the existence of something that is a tangible substance yet occupies no space.

However, we do know something about occluded gases. A gas is occluded—that is "hidden"—when it exists in the pores of a solid substance. A familiar example of the occlusion of gases is found in the coal beds, where gases often exist in large quantities and are a source of danger in mining.

The conditions that have held these gases in the coal and adjoining strata till set free by the penetration of mine workings are largely a close coal and an impervious roof and floor. The gases most commonly occluded in coal beds are methane, nitrogen, carbon dioxide, carbon monoxide and some other hydrocarbons. The relative percentages vary largely in different localities and even to a considerable extent in freshly mined coals.

THE pressure of occluded gases has been shown by a number of experiments in England, France and Belgium to reach as high as 250 lb. to the square inch. Whatever degree of exactness these experiments may have they serve to show at least the enormous pressure under which occluded gases may be projected from a newly exposed face of coal.

The term "transpiration" as here used relates to the more or less steady outflow of occluded gases from the pores of the coal. It has been found by experiment that the velocity of transpiration, like the velocity of diffusion, is different for different gases subjected to the same pressure. However, it has been demonstrated that the velocity of transpiration, unlike that of diffusion, is independent of the density of the gas.

The rate of transpiration of the different gases occluded in the coal has an important effect in determining the character of the gaseous mixtures issuing from the seam and consequently the gaseous condition of the mine.

The more rapid transpiration of the hydrocarbon gases such as methane or firedamp and ethylene tends to increase the percentage of these gases in the mine air, while the percentage of carbon dioxide and nitrogen which are always present to some extent in the coal is decreased owing to the same cause. In some coals methane has been shown to form 93 per cent. of the occluded gases. In others nitrogen and carbon dioxide have formed 54 per cent. Oxygen rarely exceeds 4 or 5 per cent.

Once we clearly comprehend how the transpiration of gases proceeds under ordinary conditions, we are better able to understand what would be likely to take place behind the seals. It is true that some of the opponents of this method have suggested that the gases behind the seals might reach a high pressure and possibly cause a sudden outburst of gas. This, however, is a remote possibility, if it is possible at all.

It must be remembered that the pressure of the occluded gases has already been much reduced during the working process, and the increased pressure of those gases still pent up behind the seals would further retard the transpiration of those yet occluded, until it is probable that transpiration would cease.

Again, we must remember that the gases behind the seals should be much less dangerous than those accumulating in old workings where the mouths of the entries are open to the atmosphere, because where the entries are thus open the gases diffuse with the oxygen of the atmosphere, while those behind the seals have practically no oxygen but will be mixed with some of the other occluded gases.

To my mind all the evidence and possibilities are in favor of the method of sealing off old or abandoned workings. Such a procedure would insure a more healthful atmosphere for miners to work in and increase their efficiency; it would afford an almost incalculable safeguard to property and reduce the danger to human life and limb to an extent that would reflect credit to the mining industry.

In conclusion, I wish to state that the members of the Department of Mines and Minerals of Illinois, which includes the inspectors, has no desire or intention of being arbitrary, neither do they wish to dictate their opinions to others. They are anxious, however, to impart to others their ideas and knowledge of known natural laws which experience has taught them, with the hope that all may coöperate and help to reduce the risks of a hazardous occupation. We may all thus do our duty to our fellowman, to the state and to our country.

Health in Its Relation to Industry

Large organizations are beginning to realize what every employer of labor must sooner or later learn: that the success of an industry lies in the health of its workers. Given an incentive, every workingman will labor to his maximum endeavors. But your worker, first of all, must be sound physically and morally in order to be of value as an industrial unit. Just what has been accomplished in the way of health insurance and disease preventive measures, and its effect on the industries in which the plans are being operated successfully, is admirably set forth in an article headed "Health and Industry," by Floyd W. Parsons, in the June 7 issue of the *Saturday Evening Post*. It would repay every coal-mine executive to read this article. In passing, it may be mentioned that Mr. Parsons, who as the former editor of *Coal Age* needs no introduction to the coal-mining world, will shortly start his Science and Industry Department in the *Saturday Evening Post* as a regular feature of that periodical, the editorial staff of which he is now a member.

MOST OF the coals received by the Bureau of Mines came in barrel-lot shipments for test in small low pressure boilers; therefore, domestic rather than steam sizes predominated. To determine the weight per cubic foot, the coal was shoveled loosely into a box measuring 2 x 2 x 2 ft. inside and the coal was leveled off with a straight-edge.

Interesting Summer Sessions of Three Coal-Mining Institutes

By R. Dawson Hall
Managing Editor, *Coal Age*

A description of the summer sessions of three lively state institutes, one held on the Mississippi River between St. Louis, Ill., and Kenova, Mo., another at Huntington, W. Va., and a third at Lexington, Ky.

Institute De Luxe in Illinois



TO S. T. JENKINS and his committee of arrangements in the Illinois Mining Institute must be credited the extremely favorable circumstances under which the institute met. A boat was chartered, the "Golden Eagle," and, for two days and a half the institute traveled the waters of the Mississippi from St. Louis, Mo., to Quincy, Ill., thence to Keokuk, Mo., and back to St. Louis. Many of the participants enjoyed the affair so well that they stayed up all night so as not to shorten the pleasure unnecessarily by anything so prosaic as sleep.

The boat left St. Louis on Thursday, May 22, with 96 members aboard, and on its cruise to Quincy read and discussed two papers, one on "Power Transmission Methods in and Around Coal Mines," by S. W. Farnham, and the other on "What Constitutes a Proper and Lawful Examination of a Mine by a Mine Examiner," Steve Gosnell, of Holidayboro, Ill., being the exponent. The number in attendance constituted a full capacity load for the good ship "Golden Eagle," when captain, pilots, bandsmen, cooks and waiters were taken into account.

The boat turned her paddles so industriously that despite the unusually high river she bade fair to get to Quincy ahead of time. So the boat was stopped for an hour and a half and one of the papers read in the silence resulting, for it must be remembered that a river boat does not fail to give evidence of its progress in sundry creakings and paddle noises such as make speechmaking a trifle labored and hearing a little difficult.

The boat arrived at Quincy at 10 a.m., and the Quincy Chamber of Commerce was on hand to take the members over the pretty town and through a seemingly endless chain of parks, beginning with the 275-acre park surrounding the State Soldiers' and Sailors' Home, where 2000 veterans and their wives are pleasantly passing their declining years. Quincy boasts of the following parks: Parker Heights, Gardner Park, Sunset Hill, Riverview, Edgewater, Indian Mounds Park and South Park. There are so many trees that from the heights the city looks more like a wood than a town of 36,000 inhabitants.

After a short session at the Chamber of Commerce, where the members were welcomed as guests of the city of Quincy, they returned to the boat, which slipped cable and stood for Keokuk, Mo. In the afternoon a session was held with the paper of Joseph C. Thompson as the subject of discussion. This contribution appears on page 1110 of this issue. It is entitled "Should the Abandoned Workings of a Gassy Mine Be Sealed or Ventilated?" There was no adverse opinion, everyone agreeing that Illinois mines at least should always seal off their abandoned workings. The dangers of mine fires in the old gobs make this practice more necessary in Illinois than elsewhere.

Another condition in Illinois which makes sealing more necessary than elsewhere is the practice of leaving pillars of such a size that they will sustain the roof over old workings. As a result, large areas remain open in such a degree that they can give off gas. The surface property is worth more than the coal, and the coal companies in general do not own the surface. When that surface is cracked or waters removed (even where the waters have been an annoyance and not an assistance) the juries of Illinois have habitually given awards to landowners far in excess of the value of the land. Consequently coal operators have had to leave much mineral to sustain the surface. That being so, the areas are not self-sealing in any way, but nevertheless the condition of the abandoned workings soon becomes such that these workings cannot be traveled and adequately ventilated. Sealing is the only alternative and it should be done soon—before fire invades the pillars.

It was pointed out that a large part of the gas where it did not come from the roof was emitted not from the ribs of a mine but from the coal face and from the coal broken by cutting, blasting and loading. When the coal was not disturbed it ceased to give out any large volume of gas. Any sealed area, it was said, soon had an excess of carbon dioxide and a depletion of oxygen. When properly sealed it did not gain pressure as time passed; in fact, as Mr. Needham pointed out, the pressure was as often negative as positive. The ribs actually absorb oxygen and probably turn it to carbon dioxide and water or else occlude the oxygen in their porous structure.

Mr. Needham remarked that in western mines where there were heavy bumps he had sealed off many levels and left observation holes in the stoppings which he could open and close at will. On removing the plugs the mine examiner found that, at times, the holes inspired air and at other times expired the atmosphere of the gob. He added that while a cap could be obtained near the mouth of an expiring hole, the gas was not of such a quantity that a cap could be obtained in the entry near the stopping. Moreover, he added, falls of rock did not seem to increase the flow of air from the holes even when these falls were severe.

Drilling abandoned areas from the surface was also considered by some speakers. Some have put a mercury seal on such openings so that they would discharge the excess air, if the pressure became excessive, and a seal of this kind was suggested for use with the holes provided in stoppings, but no one seemed to think such mercury seals necessary in view of the small excess of pressure in a sealed area above the normal pressure of the atmosphere. One member suggested that a more profitable subject for discussion was where stoppings should be placed in the sealed area and of what materials they should consist.

The boat reached Keokuk in schedule time and, passing the city, went up to the dock and landed its passengers for a view of the great power house and dam of the Mississippi River Power Co. The dam is 4278 ft. long, not including in this the east abutment of 290 ft. and the west abutment of 81 ft. Altogether it measures 4649 ft., or 88-hundredths of a mile. Its width is

Now that hostilities are ended, the institutes revive their activities and prove more active than ever before. The Illinois men met on the Mississippi River, in a well-equipped river steamer, and the Kentucky men revived most successfully their first-aid contests. The West Virginia managers discussed with ardor the problem as to the possibilities of coal conservation in the Kanawha and New River fields.

29 ft. at the top and 42 ft. at the bottom. Its height is 53 ft. There are 119 arched spans of 30 ft. with 6-ft. piers between.

The power house is almost exactly a third of a mile long (the actual figure is 1718 ft. instead of 1760 ft., which constitutes a third part of one mile). Its width is 132 ft. 10 in. and total height 177 ft. 6 in. There are 15 power units, each consisting of one 10,000-hp. turbine with an overload capacity of 13,500 hp., an hydraulic chamber having four intakes converging on a scroll chamber 39 ft. in diameter and an electric generator of a capacity of 7500 kw., generating 25-cycle, three-phase 11,000-volt alternating current, which is stepped up to 110,000 volts for transmission.

After the party had visited the power house it was taken by the automobiles of Keokuk citizens through the town and surrounding country, including the grounds of E. I. Dupont de Nemours & Co. Returning to the landing the regular addresses of welcome and of thanks were given in good measure. Having had a chance to sample the hospitality and to visit the town, the guests were well equipped to express their appreciation, so if the welcome was belated, the response was in good season.

In the morning all hands turned to the disposal of the remainder of the program. The first paper read was one by T. H. Tracy entitled "Know Your Battery Better." It has appeared already on page 1036 of the issue of June 5. The discussion was quite animated.

The following statement in the paper was traversed quite severely, but without budging the author from his position: "Operating instructors for storage batteries say little about discharging. As a matter of fact, a battery may, without injury to the plates, be discharged at any rate of current that it will deliver. There has been a widespread opinion that high rates of discharge are detrimental to the life of a battery. I can find no justification for this opinion with modern storage batteries."

It was said that too rapid a discharge was apt to cause undue heating and that discharge rates should accordingly be kept down, but the author, while admitting this, declared that it was unlikely, under any condition of operation, that there would be any such excessive temperature. There is a limit to the energy in a storage battery. If a battery is used in such a manner as to draw so rapidly on its capacity as to unduly heat it, it will lose energy so fast that it will be no longer capable of an excessive output. Thus the battery will protect itself from overheating. Its own limited energy will prevent excessive temperatures.

The character of water to use in batteries was also discussed. One speaker said that practically the only safe water to use was that which had been distilled. The water from the Great Lakes would serve the purpose, but in 95 per cent. of the places one could not feel safe without an analysis.

A representative of the Edison Company remarked that many of the statements in the paper about lead batteries applied quite closely to the Edison batteries. The voltage of the Edison cell was somewhat lower, namely 1.2 volts per cell. In consequence it was necessary to have more cells. The change in gravity of the electrolyte was practically nil. There was some change in specific gravity, this, however, being due not to discharging and charging but to evaporation.

The Edison cell is not affected adversely by a total discharge, this being in marked contrast to the lead battery which should not be allowed to part with more than a certain amount of its stored energy. Lights should not be permitted where Edison batteries are charged, for these batteries liberate explosive gas just as does the lead battery. The Edison people recommend that, in charging, the attendant keep the temperature below 110 deg. F., but where the temperature of the cells on commencing the charge is already high, this is sometimes difficult and all that can be asked is that care be taken not to exceed 110 deg. by any unnecessary margin.

For charging the storage batteries it was stated that the charging panel was the cheaper to provide, but a motor generator set is more economical in the long run though more expensive in first cost. With a simple charging panel the voltage is uncertain, and the results are not of the best.

In place of Martin Bolt, H. M. Wilson, director of the Department of Inspection and Safety of the Associated Companies, made a short address on industrial democracy. It was decided by the meeting to hold the next session of the Illinois Mining Institute in Springfield, Ill., on the third Saturday in November (Nov. 15). The officers of the institute were continued in office till that date. Many encomiums were tendered the committee of arrangements and the citizens of Quincy and Keokuk.

The secretary announced that contributions aggregating $3005 had been received from coal and supply companies. Other donations are expected. As the mining institute does not publish proceedings it does not have much need for money, and the funds on hand are now quite large. The expenses of the institute in the river excursion were largely, if not entirely, met by the fares collected from the participants. The fund now provided will enable the institute to arrange in the future for the perpetuation of their proceedings.

A superintendent should worry less about what he does not have and make more of what he does have in the way of available human equipment. In any good country good citizens are more numerous than bad. Every superintendent can bank on the support and fair dealing of most of his men if he can only avoid that common habit of seeing only the grouches of the grouchy while overlooking the smiles of the good-natured, thus embittering those who are most ready to stand by him.

West Virginia Coal Mining Institute

THE twentieth semi-annual meeting of the West Virginia Coal Mining Institute was held on June 3 and 4 in the Frederick Hotel, Huntington, W. Va., the genial Josiah Keely being in the chair. I. J. Harshbarger, the mayor of the city, welcomed the members present, and then the institute, in the person of its president and vice presidents, began to look over the session in the well-recognized disparaging way which institutes affect, despite the fact that the number present was larger than usual. When will institutes cease looking at themselves in the glass like a vain but freckled girl of sweet sixteen? Too much time is devoted to this uninteresting job. Let the president and secretary do their work and leave the rest to fortune. So much introspection wastes time and spoils the pleasure and value of the meeting.

In the absence of Floyd W. Parsons, R. Dawson Hall led the discussion on the Labor Situation with a few words of encouragement regarding the signs of the times, which are not nearly as menacing as some seem disposed to think. Only about 10 per cent. of any body of men in any industry are unreasonable. There is a reliable 90 per cent. of really good fellows, who, if they aren't already, will eventually make excellent American citizens. Vote they will or vote they do, and if we trust them to vote at the polls to direct everybody's affairs as well as their own, surely we can trust them when directing their own affairs.

True the 10 per cent. of evildoers are to be noted on every hand hard at work making trouble. We see them a hundred times as often as we see the reasonable men who do their work, put their dinner pails under the arms and go home quietly to their families. Like a sore thumb, the eye lights on the trouble maker every moment. We cannot see the 90 per cent., for they are

farther from the eye. As the physicist would say, "They subtend a smaller angle of vision." But the 90 per cent. are there, nevertheless, partly led by and partly resisting the aforesaid 10 per cent.

The operator can address himself to the 90 per cent. whereas the agitator has only 10 per cent. as his natural audience, and with a little diplomacy the operator, having all the advantage, should be able to get what he wants, if what he wants is right. His start is good if he does not anger or displease the members of the larger group, who will stand for fair play and sober measures, when real explanations are given to them as to what constitutes fair play and what measures are within reason.

The operator should, like a "movie" camera man, patiently turn aside the lens when the troublesome men place themselves before the rest for a "close up." He should take a view of the 90 per cent. behind. In none of his plans should he forget them. He should be patient with them that they may have patience with him. With the numbers on the operator's side he should never despair.

The logic of unchanged wages and hours was then presented by the speaker; and the power of a knowledge of facts to produce reasonable action by unions was shown by a reference to the known conservatism of men long engaged in union labors. They soon begin to see the facts and to become less radical. The man with the pick is apt to realize the problem inadequately and to think that the largest wage he can secure is fair to other workingmen and helpful to labor as a whole.

However, a little discussion will convince him that he must not demand of the workers in other industries an undue rate of pay, merely because coöperative bargaining, made powerful by the right to strike and the power to boycott, can secure him what he would like to obtain. The business of mankind is swapping services, and the labor of the miner is not worth twice as much as the labor of the bricklayer or carpenter who works an equal or longer time.

James A. Hall of the *Black Diamond* and Wightman D. Roberts of the *West Virginia Mining News* did not speak as scheduled, the first not being present and the second being present, but not in good health.

In the afternoon, in the absence of J. L. Thomas, president of the Carbon Fuel Co., a paper was read by his representative on the question, "Is There an Overproduction of Coal in America?" His answer to that question was that there is and always has been such an overproduction despite the increased demand. Coal output has always had to wait on car service. The coal industry has been unfailingly adequate when it had railroad cars enough to supply the demand for coal. According to the speaker, this was the case all through the war.

However, it must be confessed, there was a short period during which the railroads did outstrip the mines, but the mining plants at that time were producing more than the country could use because they were trying to build up immense stocks, all coal piles being completely exhausted during the previous period when coal cars were so infrequently delivered that the mines worked only a small part of the week.

The problem of production is a transportation problem and, as was stated in the discussion, perhaps the best solution would be one in which power would be transported electrically, the coal being burned at the mines to drive electrical machinery.

Mr. Keely made the statement that the failure of the railroads to supply cars was the only redeeming feature in the coal business, that only the high prices then obtainable made the industry one which could show a margin, for the competition when the railroads afforded enough cars to fill the demand was so great that the business was in such periods conducted at a loss. This is true, but there is no denying the fact that the car shortage stimulates business unduly and makes many investors enter the industry who should stay out, glutting the market with coal whenever a proper car supply again becomes obtainable.

> Runaway coal markets may bring a fleeting profit to the coal operator but the modern business man would rather have a steady and reasonable profit which would save him from aspersions as a profiteer. For these reasons he is looking around for a flywheel warranted to keep the industry running at an even number of revolutions, month in and month out. He knows that high prices only flood the coal region with unneeded producing plants and make mining unprofitable 90 per cent. of the time.

No industry can be equitably and satisfactorily conducted that requires runaway prices at some times to overcome down-at-the-heel prices at others. The coal industry should be conducted on the basis of steady and reasonable returns at all times without plethora or famine. If only it could be arranged that it would pay the consumer to buy the year over, keeping the men engaged in the industry busy all the time, we would have a business which would meet the approbation of the public. Every effort should be directed to that end. A freight differential, and even a wage differential, in the summer would have just that effect.

It would make it customary for the buyer who had or could secure storage facilities to buy coal then. It is the duty of the buyer to lay in for the winter. It is not right for him to memorialize the public to compel fair prices and large output during the winter months so that he can crowd production into a few hectic weeks when all the rest of the year mine workers and equipment lie idle. Operators have a right to make hay when the sun shines if the sun shines only once in ten years.

It is to the best interest of the buying public as a whole to spread its purchases, but without differentials self-interest is so strong that each individual buyer will not buy unless he has a reasonable assurance that winter will bring a higher rate for coal. All parties—public, railroads, operators and mine workers—should combine to keep the coal industry in steady operation at a reasonable rate of profit. But unfortunately, the coal industry is now prince and now pauper. A better way would be a condition with less of a gambling chance.

Short Time Due to Meager Demand

As it is now, a lack of need for coal is accompanied by an even greater shortage of demand, for when the coal requirement falls the demand falls below even the small need and the mines work only a fraction of the time. The certainty of a bigger price in the winter would regulate the industry, as has been proved by the experience in the anthracite region. The differentials obtaining in that branch of the coal trade, bitterly opposed as they have been by the uninstructed public, have been approved by Government officials, and anything tending to establish such a 100 per cent. of production from month to month would be a blessing to every one, whether public, employers or employees. There is a terrible waste in the ebb and flow of the coal industry.

Waiting for work and then overworking, the business of producing coal has become a gamble. A slightly lower rate in the summer, when coal production is least difficult and when railroading is conducted under favorable circumstances, would put the coal business on a wholesome basis free of apparent profiteering, recriminations between operator and employee, and quarrels between the public and the industry.

The discussion on the recovery of coal developed the usual doubts as to the feasibility of mining all the coal in, at least, certain of the seams of West Virginia and a question as to the possibility of mining beds above those worked if the lower beds are mined completely. As usual the Pocahontas and the Fairmont men believed an 85 per cent. recovery of almost any bed was possible and there were many who felt that the damage to beds above had been over-rated as a general proposi-

tion, but the representatives from the Kanawha river field were unconvinced as to both the former propositions. These matters must always be approached with some diffidence till someone has gone into the field in question and shown how, and how easily, the trick can be turned by a proper observance of the correct rules of the game.

C. R. Jones, dean of the West Virginia University, followed with an address on "Labor-Saving Devices," saying truly that labor had every reason to support their introduction and extension. Before such devices were put into operation the working man made the barest of subsistence. Today he has more leisure and a much more generous living. The difference is due entirely to the labor-saving devices that have been installed.

In the discussion which followed much was said as to the work of the coal-loading shovel at the mine face. Prof. E. N. Zern said that the shovel *per se* was without question an unqualified success. The difficulty was to get the cars to the shovel. Mr. Bowman of the American Mine Door Co. stated that at the salt mines in Retsof, N. Y., Cadwallader Evans was loading 450 tons a day with three men and a driver.

The roof of this mine is of great strength, and rooms of ballroom size can be extracted without the use of any timbering and as a consequence it is possible to shoot, it is said, enough salt in one room to keep a single shovel busy for a full day. The problem to be solved is one of supplying the shovel with cars and not of shoveling.

The manufacturer has supplied the operator with the tools for his purpose, and it is up to the industry to provide the means by which the shovel can be kept operating steadily at capacity. In short, the shovel being provided, it remains for the industry to discover some means of building the mine around the shovel so that the tonnage may be safely and expeditiously loaded by it. This is the problem. The manufacturer has not failed, it is the mine manager.

Some Remarks on the Future

On Wednesday, Prof. E. N. Zern addressed the institute on "The Coal Supply of the Future." He said:

"While felicitating ourselves on having trillions of tons of coal in this country, we have failed to take into account that the greatest bulk of coal is of low rank, and that the highest rank of coal has been relatively scarce. Production in all these years has been coming not from areas of greatest quantity, but from the areas which contain the best coal.

"The situation into which we are rapidly drifting is illustrated by the story of a large coal user in an eastern city, who some years ago in his bewilderment called a salesman and inquired why he was being given inferior steam coal, whereas in the past he had always used Moshannon coal. 'The explanation is simple,' said the salesman, 'there is not enough Moshannon coal to go around.'

"The statement that our coal resources are rapidly approaching exhaustion is every bit as misleading as to say that 99 per cent. of our coal deposits still remain untouched and there need be no concern for the future. Both statements are in need of qualification.

"Many of the various mining localities, producing high-grade coal from our most valuable and accessible seams, are reaching, or have already passed, the peak of production and must steadily recede in output.

"This is especially true of coal deposits tributary to the industrial region of the Middle Atlantic.

"After a century of marked advantage in mining, we are passing through the twilight zone and must soon emerge from this to encounter more difficult mining in seams of widely varying quality.

"Not only will coal mines of the future be attended with more difficulties and hazards, but, furthermore, it will be more costly. The initial investment will needs be greater. Until recently, comparatively few shafts have been sunk, and most of these of shallow depth A time is rapidly approaching when mining by shaft will be the rule, instead of the exception.

A paper by W. T. Heatherman on "The Most Common Violations of the Mining Law" and by J. W. Bischoff on "Preparation of Coal" concluded the meeting. Mr. Bischoff quite wisely said that the reputation of a coal was quite largely determined by the presence of pieces of slate and bone which if taken count of by analysis would not be considered of any great importance. One per cent. of visible ash would lead to the rejection of a whole carload of coal where 5 per cent. of excess intrinsic ash would be overlooked by the consumer.

After all, the loose slate and bone are the operator's and miner's fault, and not their misfortune, and it is much easier to overlook a misfortunate inability to deliver good coal than to pass over an apparently deliberate indifference as to quality. As the motto goes, "What can't be cured must be endured," but slatey coal can be cured where high-ash coal cannot.

The miner and operator regard coal as being worth what they get for it. They do not see why they should spend more time and money eliminating impurities than the purchaser pays for them. But they should never forget that the purchaser has a right to entertain a different view. The coal he gets is coal plus railroad transportation, plus delivery from the yard, plus the fireman's wage, plus the ash remover's charge (unless the last item can be saved by the value of the ashes for concrete or filling or the ash can be dumped without expense). To him also ash causes actual coal waste by imperfect burning. He does not regard the ash impurity as indifferently as the operator. It reduces his boiler capacity and makes it hard to run his machinery. The operator must sense his point of view or give way to someone who will.

Many were the necessary and advantageous assumptions of authority during the period of the war. Among these was the act of Josiah Keely and Karl F. Schoew, president and secretary, respectively, of the West Virginia Coal Mining Institute, in extending the period of their service beyond the period contemplated in the by-laws of the organization. No meeting having been called during the war, they could not provide for an expression of the mind of the members and carried on most manfully and prudently without any mandate. The institute before it closed its session voted to extend their period of office till the winter session, when an election will be held.

Kentucky Mining Institute

A GOOD attendance was secured at the Kentucky Mining Institute which met in the Phoenix Hotel, Lexington, Ky., on June 6 and 7. The members saved themselves a lot of time by not looking themselves over and wondering why they were not assembled in larger numbers, which is the regular way in which mining institutes waste time and discourage membership.

Professor Freeman was introduced by the president, K. U. McGuire, and he made a statement regarding a project of the universities and institutions of learning generally to erect memorial buildings in honor of those who fought and who died in the war. The University of Kentucky proposes to erect a Students' Activities Building in Lexington on Limestone and Winslow Streets, facing the latter, to cost $300,000. From 3 to 290 persons in each of the 120 counties in Kentucky died in the war, a total of 2736 Kentuckians, counting both the male and female members of the service. The institute, before it adjourned, voted an indorsement of the commemorative movement.

The president then read his annual address. Mr. McGuire is not one of those who are disposed to resist progress, and that his remarks well proved. "The coal operator," he said, "who so desires, will find it futile to oppose the demands of laboring men and women for constantly improving conditions of work and living. He should rather engage in a generous rivalry with other operators and devise and imitate social betterments. By such improvements he can do much to forestall Bolshevism in America."

Mr. McGuire would have mines safer and healthier places to work in. "The interior of a coal mine cannot be made a garden of roses, but fewer men and more machines inside the mine and more men outside in related industries is the desirable situation."

"These related industries, including iron and steel and the distillation of byproducts, dyework, roofing and road-surfacing materials, will be established and colonized in Kentucky, in close con-

junction with the coal industry, which will derive a great benefit thereby."

M. L. Fellmer, safety engineer, T. H. Masten & Co., then discussed "Human Engineering," which he regards as a better word to use than "welfare." Everyone is seeking a synonym for that unhappy word, though it is really not so unfortunately chosen as is generally thought. We may well presume that "human engineering" will not be any more than a temporary solution, seeing that the comparison of a man to a machine which the expression contains is far more objectionable than the implications in the word "welfare." Every word expressing benevolence has to be changed almost every decade, because the older words have become offensive by their use in connection with acts of pretense and grandiloquent phrases. "Welfare" is a homely word which might well be used, if the work it expresses is done with due regard for the sentiments of the people who profit by it. If the manner of the engineering is offensive, "human engineering" will soon be more accursed than "welfare."

A. H. Reed read a paper on "Zinc and Lead in the Kentucky - Illinois Fluorspar District," a paper which, while a distinct contribution to the literature of the subject, had little appeal to men in the coal industry, and in fact was somewhat too erudite for any but a metal-mining geologist.

Col. G. A. Burrell, who was to have read a paper, was called away to the Baltimore Tunnel at Wilkes-Barre, the scene of the recent powder flareup. He was replaced by H. D. Mason, who read an article entitled "Gas and Coal Dust in Mines." H. M. Wilson addressed the meeting on "Schedule Rating of Coal Mines for Workmen's Compensation." He made the important announcement that the Associated Companies purposed to put in operation a combined system of schedule and experience rating in which the rate would be based on the past experience of the underwritten company as well as on its provisions for safety. The schedule rating was made supreme and exclusive by the Associated Companies when the field of workmen's compensation was first created in the United States, and for this reason: There were no statistics that would give a true experience rating or permit the establishment of a rating based partly on absence of physical hazards and partly on experience. Now, however, with the larger companies there have been established statistics sufficiently tangible to permit of venturing on experience rating. However, small companies, whose limited operations made their misadventures appear unduly large or the lack of misadventure unduly important, could not even now be said to have established a reliable experience rating. The averaging of adventitious happenings by breadth of experience had not in their case been sufficiently complete.

The laws of probability have come into full averaging effect with companies with many and large operations, whereas with small companies and a single operation nothing but time will tell the tale. The rating of a large company might be advantageously fixed by the experience of 18 months, but the small concern would not reach a similar basis till its accidents had been tabulated and evaluated over a period of five years.

Some controversies arose as to the origin of schedule rating in workmen's compensation and as to the reliability of the different types of insurance—reciprocal and old line. Reciprocal insurance in the workmen's compensation field has not suffered from as many lapses as in the life or fire insurance fields. There are indicia that this may continue to be the case. A more prudent handling of reciprocal insurance is growing up, and the companies buying workmen's compensation insurance are more prudent and farseeing than many individuals who in the past bought life or fire insurance policies on the mere strength of the appeal of the chromolithography with which the policy was emblazoned or on the personality of the agent who presented the insurance company's claims.

> Purchasing agents are asking for figures on coal which will exhibit the proneness or indisposition of a coal to slag on the grates and make combustion difficult. Those figures are being secured by the United States Bureau of Mines for coals all over the country. Meanwhile microscopic inquiries are going on, so that we will eventually learn the nature of the wonderful complexity of material which constitutes coal.

The test of insurance comes with bad times. Unprofitable operation of the coal mines is apt to bring cancellations. An unfortunate multiplicity of accidents or a big disaster is likely to have the same result. The company is then faced with large expenditures while receiving no new accretions of capital. There is no reason why a reciprocal company should not provide against such contingencies by a large pool of resources. As a matter of fact this is not generally done in this type of insurance. But it by no means follows that this baleful inefficiency of reciprocal insurance in other lines will be followed in workmen's compensation. In fact, so far, since the companies have been working under a compensation law, and not under the common-law provisions for compensation, no reciprocal company has failed.

The last paper in the afternoon session was perhaps the best. Major A. C. Fieldner had the pleasure of describing his own important tests on the fusibility of coal ash and Dr. Thiessen's remarkable microscopic inquiry into the partly mineralized agglomeration of vegetable matter that we call "coal."

Major Fieldner has not yet made the coal industry sit up and take notice of the importance of his fusibility tests, but the manufacturing world is about ready to awaken the coal industry by calling its attention to Major Fieldner's work. The purchasing agents of the manufacturing concerns are keenly anxious to know how readily the ash will fuse in the coal that they are examining with a view to purchase. The president of the institute, it may be said, made careful note of the high temperature at which the coal he is producing will fuse in the furnace, and not a few learned for the first time the importance of facts which have been available to them for a long time in the pages of *Coal Age*.

In an early issue of *Coal Age* Major Fieldner's remarkable contribution to the proceedings of the institute will appear at length. Thiessen's work for a long time looked like a long labor lost. He spent years trying to begin to make his astounding micrographs of coal. It is not easy to slice and grind coal to such a thinness that common light will penetrate it. The time has not arrived that Mr. Thiessen can do this with anthracite, but lignite, Illinois coal and later Pennsylvania coal succumbed to the persistence of his brilliant technique, and the result is photomicrographs of startling brilliancy setting forth a story such as Thiessen alone perhaps can adequately interpret. The masses of vegetation called coal are themselves perhaps the best paleontological evidences of horizon. We are not dealing with a few roof ferns, but with vegetation in mass.

It is likely that we shall be able now to tell just what bed we are mining and solve many knotty problems and even some lawsuits in regard to the correlation of coal measures; though as someone stated, perhaps there was a variety in vegetation with location in any one moment of past time just as there is now. The sycamore rarely passes a certain line. However, temperature conditions were probably more equable, at least in Carboniferous time, and the surface of the coal bog more nearly level than is the case with our modern topography.

The institute held a luncheon in the evening at which H. M. Ernst read C. D. Burdick's paper on "Depreciation and Depletion." Mr. Burdick suggested in his address that depletion might be treated as decreasing with time, for the most easily available and operable coal is depleted first, and the load placed on early operation should be of such a character as to lighten the load on later production, when long hauls and expensive maintenance make the duty of keeping down costs an insuperable burden.

Mr. Burdick desired also to put de-

preciation as a function of tonnage instead of time. It is a fact that both depreciation and obsolescence continue their fatal work when a machine is idle. During a long or short shutdown every kind of equipment is growing old and out of date. However, if the burden is put on tonnage and not on time, the operator is less disposed to run his mines at a loss when business is bad. The temptation to run mines to reduce the losses of idleness is now only too strong. Minimum royalties, overhead, insurance and many other costs are factors of time. If they could be made by any provision factors of production, to be a charge on working mines only, then they would discourage the operation of mines at a loss.

It is a fact that many forms of depreciation are accelerated by idleness, and that much idleness is of such uncertain duration that care cannot be taken to cure that disadvantage. For instance, an idle machine can hardly be brought out when no one knows how soon the mines will start again. So the machine is left in the mine unheated by use and tends to depreciate. Moreover, many machines are worked when the mines are idle — pumps, for instance. It seems, therefore, that while depreciation by tonnage may have some financial advantages and even some argument in its favor, depreciation by time is the preferable plan.

At the conclusion of Mr. Ernst's remarks R. Dawson Hall discussed the question, "Has the Metal Industry Any Lessons for the Coal Industry?" He called attention to the excellent results —21 tons per man-shift—obtained by the Inspiration Consolidated Copper Co., which works on a day-work basis. He compared the efficiency of daymen and miners and pointed out that, owing to the lack of coördination between miners and management, the miners in coal mines were not nearly as efficient as the daymen who received more adequate equipment from the manager and more alert attention from the foreman. Miners are often found idle, but if daymen are idle the foreman is on tenterhooks.

He also showed how on railroads some firemen who are largely paid by the hour exerted themselves over-much in the performance of their duties, causing a waste of fuel. The comments made at the recent meeting of the International Railroad Fuel Association showed that the anxiety of the engineers and firemen to keep a hot fire at all times caused a considerable loss to the railroad companies. It was by no means established that the daymen would do less than the men who received payment by the piece, where there is proper supervision, sufficient encouragement in the performance of the work, suitable machinery and adequate support in the performing of their duties. These desiderata are all found with day labor. The operator finds it pays to supply them and somehow contrives to do so. With tonnage payment the operator coöperates only with a few of his men and employs only such a day-laboring force as will result in the utmost efficiency in the work of that force. He does not coördinate with the men as a whole, and so the mining operation is efficient only in spots and fails of ultimate efficiency. Time prevented extended discussion, there being an address by the chief inspector, Prof. C. J. Norwood, to follow. Professor Norwood discussed the distribution of production among the various counties and districts of Kentucky, and the number of accidents according to a similar distribution.

The following morning, articles with illustrated views were presented as follows: "Mine Rail Bonds," by C. C. Beck; "Storage Battery Locomotives in Mine Work," by J. Appleton, and "Permissible Explosives," by J. E. Miller. Frank Morris, field secretary of the National Safety Council, presented succinctly the claims of the council for the support of operators, urging the ability of that organization to support the managers in their safety plans. He said that in safety the operator found the best ground on which he and his men could work for a common end without any antagonistic points of view. Both wanted safety, and the success of the one did not hamper the other but helped him to attain some of the best objectives. Consequently, safety was the best basis for coöperation and the starting point for a coördination that might ultimately cover for both operator and mine worker the whole work of production.

Officers for Coming Year

THE institute elected the following officers: President, H. M. Ernst, general manager, West Kentucky Coal Co., Sturgis, Ky.; vice presidents, Alexander Frost, superintendent, North Jellico Coal Co., Wilton, Ky.; John P. Gorman, general manager, Hazard Coal Co., Lexington, Ky.; J. Henry Hall, president, Whitesburg Coal Co., Whitesburg, Ky.; H. H. Small, sales manager, Goodman Manufacturing Co., Chicago, Ill.; A. G. Spellman, assistant manager, St. Bernard Mining Co., Earlington, Ky.; R. C. Thomas, superintendent, North East Coal Co., Paintsville, Ky.; H. H. Townsend, Jeffrey Manufacturing Co., Athens, Ohio; Louis Francis, general manager, Lick Branch Coal Co., Coxton, Ky. The reëlection of C. W. Strickland, general manager, Ashland, Ky., to the office of secretary-treasurer was, in view of his popularity and energy, a foregone conclusion. The institute is to be congratulated on his willingness to retain the office.

The afternoon was spent in the Stoll athletic field in a somewhat hastily improvised first-aid contest, but one which was extremely successful. There were many who thought that the war, which has thinned out organizations for first aid, has made practice difficult or done away with it altogether, and has furnished an excitement that made it difficult to hold teams together, would prevent a successful meet being held. However, inquiry proved that such conditions, while they existed, did not prevent a great interest being shown in the event. The program was as follows:

One-man Events: (1) Man has been overcome by gas. It is impossible for bearer to stand erect in carrying him. Carry him 20 ft. to place where bearer can assume erect position; then carry 20 ft. by shoulder-carry. Perform artificial respiration by Schaeffer method for one minute. (2) Man found unconscious on charged electric wire; burned on right hand and forearm.

Two-men Events: (1) Simple fracture of right forearm and scalp wound on back of head. No bleeding. Treat and carry patient 30 ft., without using a stretcher. (2) Compound fracture of right forearm, with punctured wound in the palm of the right hand, which is bleeding profusely. Treat.

Full Team Events: (1) Man has been run over and right arm cut off close to the shoulder; profuse bleeding; several ribs broken on right side. Treat, and carry on a stretcher. (2) Man overcome by gas, requiring immediate removal. Burns on hands, arms, neck and face. Carry patient 10 ft. on an improvised stretcher. Two of the team at a time should be supposedly overcome by gas. Remainder of team carry patient, without a stretcher, for 20 ft. to fresh air and treat the case. (3) Man has been rescued following an explosion and has sustained the following injuries; burn of back of head and neck, simple fracture of right leg below the knee, and compound fracture of the kneecap of the left leg. Treat.

In the full-team event the first prize was awarded to the Jenkins team of the Consolidation Coal Co. They received the "Institute Plaque" of silver, which was won in 1917 by the team of the Stearns Coal and Lumber Co. It will hold the prize a year and the name of the team will be engraved on the back of the plaque. The Phoenix Hotel cup was awarded to the same team, and the institute, having by a collection in the morning session raised $300 for that purpose, promised to pay its expenses to the Bureau of Mines dedication exercises at Pittsburgh. The team will be the champion of Kentucky on that occasion.

The same fortunate fellows each received Red Cross medals for their efficiency. The W. G. Duncan Coal Co. team received $25 as award for being in second place in the contest, the Stearns Coal and Lumber Co. team took third place with $15 and the Federal Coal Co. was fourth and received $10.

The two-team event was won by the W. G. Duncan Coal Co., first; the Federal Coal Co., second; the Stearns Coal Co., third; the Consolidation Coal Co., McRoberts team, fourth.

The one-man event was won by the Federal Coal Co., first; the Pioneer Coal Co., second; and the W. G. Duncan Coal Co., third. The Consolidation Coal Co. had no less than six teams entered. Dr. J. W. Pryor was chief judge and he had six judges under his direction. The contest was under the auspices of the American Red Cross.

Preparation of Bituminous Coal—V

By Ernst Prochaska
Benton, Illinois

SYNOPSIS—*Many features are common to all jigs, and the materials of construction are confined to wood, steel plate, cast iron and reinforced concrete. Each of these has its own advantages and disadvantages. The jigging of fine coal has always been difficult, and for this purpose the concentrating table has many advantages. Such tables also give good results when used upon crushed middle products of the jigs.*

UPON the character and nature of the raw coal depends the selection of the proper type of jigs, as well as the methods to be followed in washing the coal. The different methods have been explained previously, so that we can confine ourselves to a short review of the most important differences existing in the materials used for construction, the methods of drives, apparatus for the discharge of the products and the arrangement of the jigs.

Jigs built of timber are light in weight and cheap in first cost. The jig boxes can be repaired and even totally rebuilt at the washery. But they are hard to keep tight and not very durable. The best wood for the construction of jig boxes and tanks is long-leaf yellow pine of heart specification. In some instances creosoted timber has been used. Timber construction is especially advisable if the wash water becomes acidulous.

Jigs built of steel plates are comparatively light but expensive. They must be stiffened with angle irons and braces to keep the side plates from breathing.

Cast-iron jigs appear to have the preference at present. They are rather heavy but stiff and solid. They are not affected by acidulated water and always represent the value of scrap iron, if for any reason it becomes necessary to change the type of jigs.

Reinforced concrete has been used in several instances in the construction of jig tanks. This material, however, has the great disadvantage that it is affected by acidulated water to a highly disastrous degree. The solid, heavy construction of reinforced-concrete tanks prevents also any changes or alterations. A reinforced-concrete jig tank must remain the way it has been put up in the first place, or it must be entirely rejected if changes become necessary.

The proper selection of the material of which jigs should be built depends on cost of construction, cost of upkeep, nature of the wash water and the design of the supporting structures.

Side or end plungers actuated by eccentrics give, under normal conditions, perfect satisfaction. If the coal is difficult to wash a differential motion drive for the plungers would be advisable. In cramped quarters considerable space can be saved by the use of plungers placed below the screens. For extremely large jigs compressed air can be used to advantage.

The discharge of washed coal is similar in all jigs.

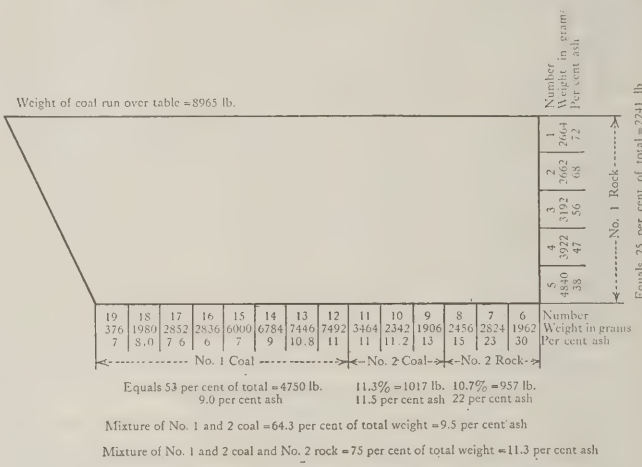


FIG. 10. SEGREGATION OF PARTICLES ACCORDING TO SPECIFIC GRAVITY

It consists of a simple overflow dam or weir. The discharge of refuse, however, shows many variations and has been elaborated previously. For jigs treating unsized or the larger sizes of coarse coal plain gates can be used. This type is almost universally employed on reciprocating jigs. The gates can be either of the slide or swing type. The swing gates offer some advantages over the slide gates as they permit the removal of the heaviest pieces of refuse without disturbing the bed.

The kettle or pot valves are to be recommended for coarse-coal jigs. They permit a close regulation of the slate bed and have the further advantage that they prevent an accidental loss of the slate bed, caused by

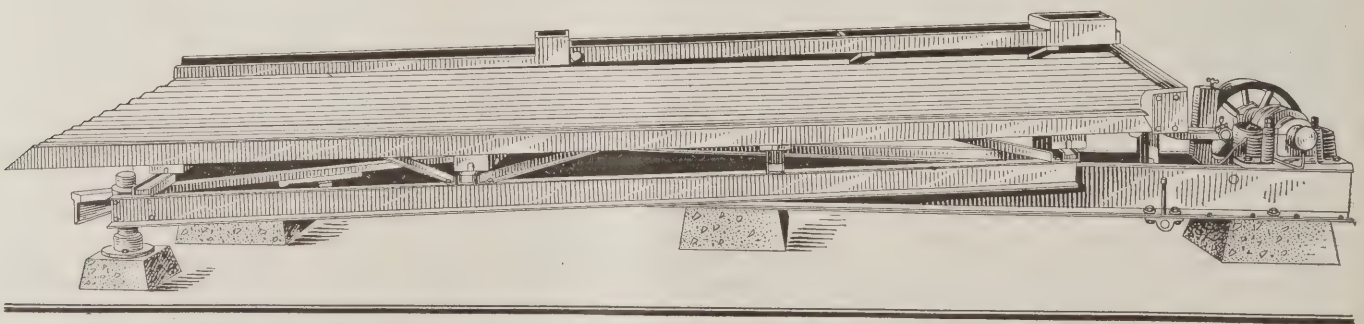


FIG. 11. DETAILS OF CONCENTRATING TABLE USED FOR REWASHING MIDDLE PRODUCTS OR SLUDGE



FIGS. 12 AND 13. HOW IMPURITIES ARE DISSEMINATED IN COAL

inattention of the operator. The kettle valve being open on top permits an inspection of the refuse. The double slate gate is nothing more nor less than a developed kettle valve extending over the whole width of the jig. It is at present the best design known, as it combines the good points of the kettle valve with those of a slide gate.

Revolving slate valves are only to be used for fine-coal jigs, as the heavy refuse accumulating in coarse-coal jigs is apt to choke up this type of valve. For the removal of the fine refuse passing through the perforations of the screens, a common molasses gate is the simplest and best device. Other types of mechanically operated valves for the discharge of hutch work have been designed, but they all appear to be entirely too complicated.

To facilitate the operation and supervision of the washing process it is desirable to locate all the jigs, including the rewash machines, on a common platform.

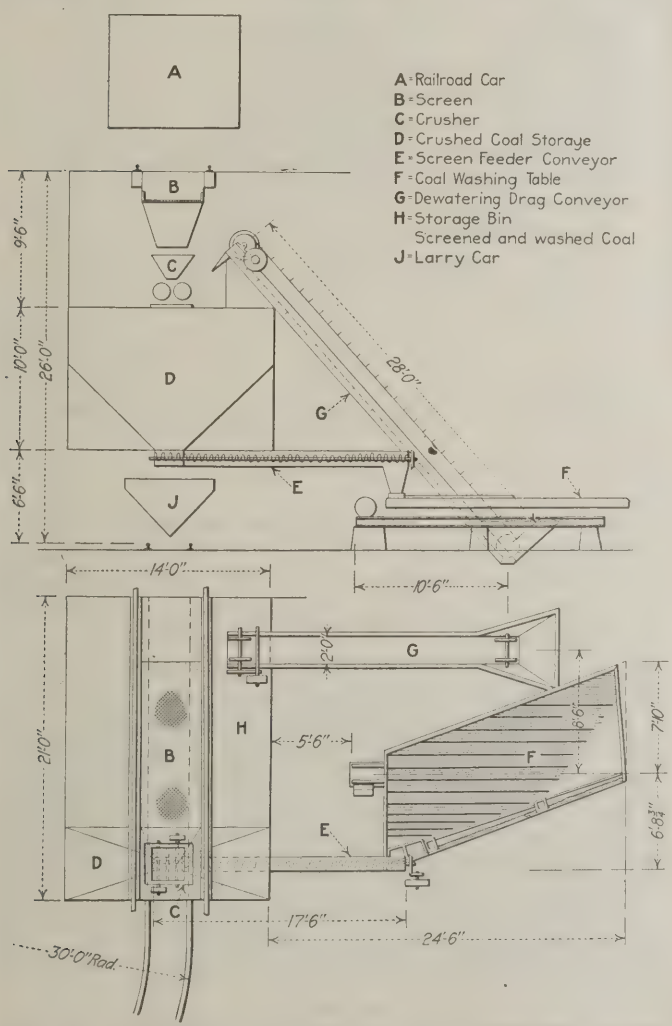


FIG. 14. PROPOSED LAYOUT OF COAL-WASHING PLANT

This permits the consolidation of a number of jigs in a battery thereby saving space and cost of installation. The rule is to provide each compartment of a jig with one separate plunger. If one plunger should be used for two compartments, there would be great danger that the jig work of these compartments would be uneven and unsatisfactory. The second compartment is treating quite different material from the first, and as explained previously length and frequency of plunger stroke must be adapted to the material to be treated. So it can be clearly seen that it will be absolutely wrong to treat two different materials with the same kind of pulsation. The jigs should be placed in such position that they will be accessible from all sides; and to facilitate the inspection of the work performed they ought to be placed somewhat higher than the operating platform.

The products delivered from the jig cannot be used without further treatment. All the products require a more or less extensive and difficult subsequent preparation before they can be placed on the market. This after-treatment depends largely upon the size of the coal. Coarse coal must be dewatered, classified and delivered into the loading or storage bins, avoiding thereby breakage and abrasion as much as possible.

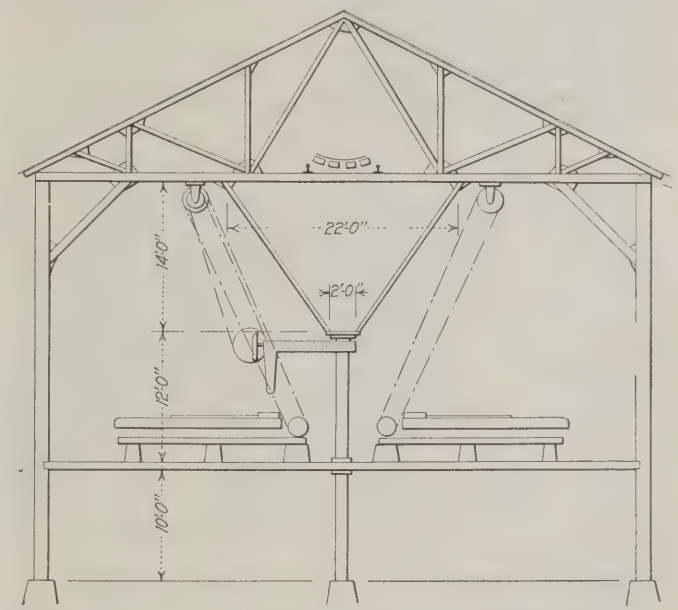


FIG. 15. ELEVATION OF TABLE COAL-WASHING PLANT

Fine coal must be dewatered and delivered into the bins or railroad cars. Middle products are either first crushed and then delivered to rewash jigs or are delivered to these machines without previous crushing. The refuse from the rewash jigs is combined with that from the primary jigs, and the washed coal is either mixed with that from the primary jigs or separately stored in bins as boiler-house fuel, according to its degree of purity. The wash water must be clarified before it can be put back into circulation.

The sludge recovered by the process of water clarification can be subjected to a further treatment, but in any case it must be dewatered before it can be mixed with the washed products. If the sludge is of such a character, however, that subsequent treatment will not improve it, it must be wasted and thrown on the refuse dump.

The refuse is delivered into refuse storage bins and from there by means of self-dumping cars or similar

devices carried to the dump. Before delivery into the bin, however, the refuse must be dewatered by means of a perforated bucket elevator, the overflowing dirty water is clarified and put back into circulation. The resulting sludge is deposited on the refuse dump. If the refuse contains pyrites, a separate installation for its recovery would be advisable. The economic value of such a plant, however, would depend a great deal upon the market value of sulphur.

For the washing of coal too fine to be treated successfully on jigs, concentrating tables are coming into use. Such tables have been employed for many years in ore-dressing plants, and the principle applied for ore concentration can also be used for coal washing. The specific gravity of the material and the size of the grains are two of the most important considerations. Specific gravity comes first and size of grains is second in importance.

Many types of concentrators for fine material have been developed, but among them the machines with the separating surface in motion and having a continuous feed and discharge are the most important. The machines belonging to this group utilize mechanical agitation to separate the grains into layers. The pulp, in its passage across the table deck, stratifies, in accordance with the specific gravity of the different particles, the heaviest seeking the lower strata between the riffles, while the coal or lighter particles remain on top, to be washed off the side of the deck by the cross flow of wash water, the heavier, or high-ash grains, being guided by the riffles and advanced to the end of the deck by the head motion and discharged as refuse. This separation is visible at all times while the table is in operation, and susceptible of exact adjustment and under easy control of the operator.

Concentrating tables for coal use riffles on the table deck. These riffles are produced by tacking cleats on the table surface. The arrangement of the riffles forms at present the main difference between the different tables. Other differences can be found in the manner in which the shaking motion of the deck is produced. In any case the backward motion should be faster than the forward motion. The movement is either parallel to the direction of the riffles or the riffles are placed at an angle to the direction of the table motion. In some cases this angularity of the riffles is only carried on for a short distance in the middle of the deck. Whatever the direction of the riffles, the table motion moves the material toward the refuse side of the machine. The refuse collected on the bottom of the riffles is carried forward faster than the clean coal forming the upper strata of the bed. The wash water, however, washes the clean coal down the slope of the table much faster than the deeper stratified refuse.

In ore dressing the line between concentrates and tailings can be usually clearly defined, but with coal this is not possible. Between clean coal and pure refuse

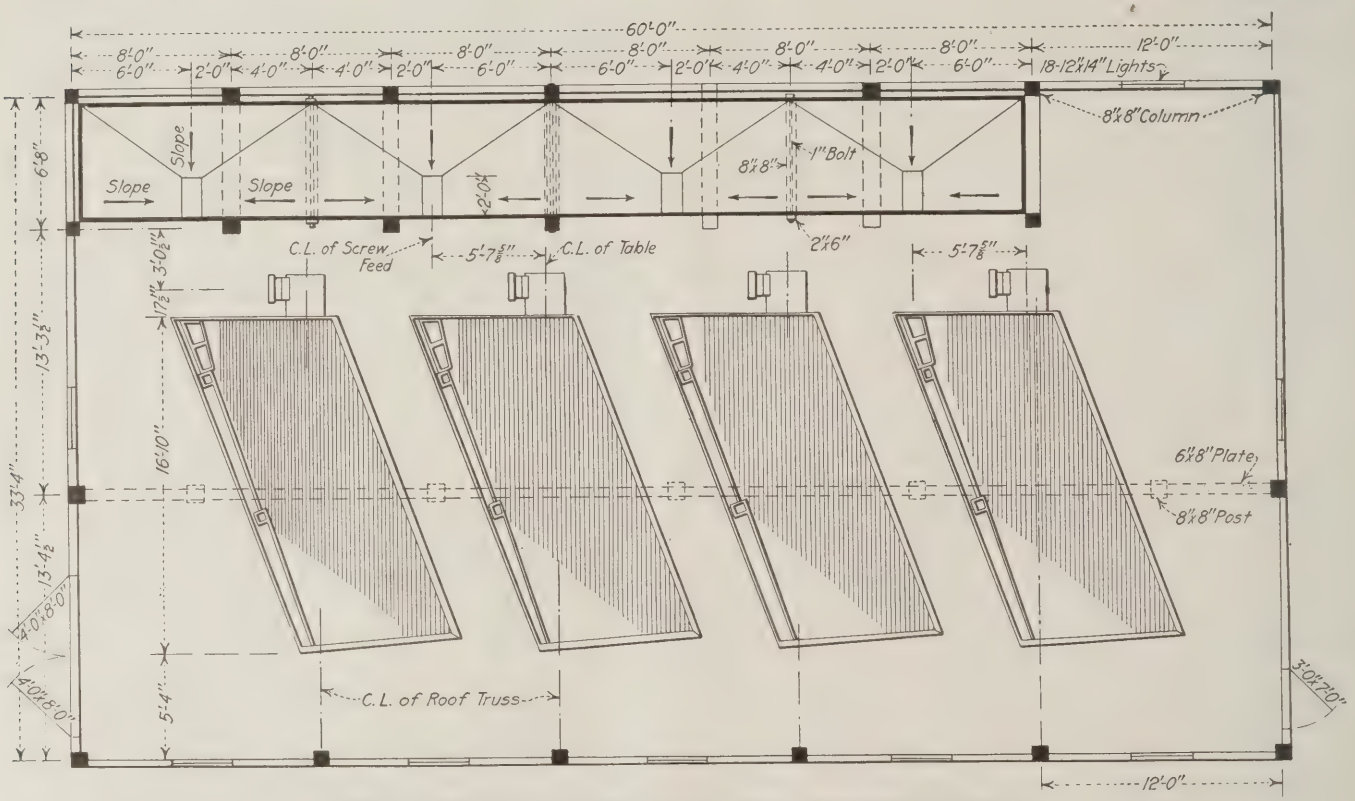


FIG. 16. FLOOR PLAN OF A TABLE COAL-WASHING PLANT

we find a more or less wide area containing the so-called middle products. Therefore it becomes necessary to make either three products or to establish the division between coal and refuse at the most economical and efficient point. Fig. 10 shows clearly the segregation of the particles according to their specific gravity, which is influenced by the amount of ash.

The materials contained in raw coal do not show an increase in specific gravity by clearly pronounced steps. The specific gravities increase by infinitesimal increments, and if we plat the specific gravities of the different materials we will get a continuous ascending curve and not a broken straight line interrupted by distinct steps.

The proper washing of fine coal has for a long time been an uncertain undertaking. With the advent of concentrating tables, however, the difficult problem of washing fine coal has been solved in a satisfactory manner. With coking coal there now exists the possibility

of abandoning the use of jigs entirely, by crushing all the coal to the required fineness and treating it on tables. This fine crushing will liberate more effectively the bone coal, and tables will therefore produce cleaner washed products. The reason for the foregoing is obvious. The finer the coal is crushed the more complete is the physical separation of coal from its impurities, and it only remains now to accomplish the segregation of the coal from them.

Tables require little power, about 1 hp. is sufficient to operate one table. The supporting structure for a table can be much lighter than for jigs, and the building housing such machines does not need to be so massive. Figs. 11, 18 and 19 show a concentrating table adapted for coal washing.

Besides primary washing, tables can be used to good advantage either for the rewashing of recrushed middle products or for the rewashing of the sludge recovered from the water clarification. For this latter purpose a slightly different type of machine should be used, resembling the slime tables used in ore dressing. Concentrating tables can be used economically at every

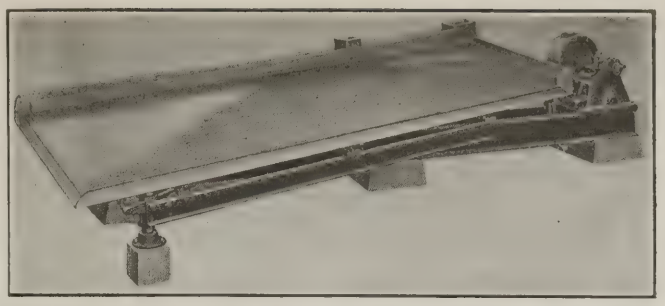


FIG. 19. CONCENTRATING TABLE ADAPTED FOR COAL WASHING

ity tables are equal to jigs treating the same kind of coal. Outputs up to 12 tons per hour have been recorded for one table. Fig. 10 indicates clearly the manner in which the separation is effected on one of these machines and shows the possibility of making any kind of washed product or refuse by simply dividing the outflowing product at any desired point along the side or end of the table.

A=Length of Building
B=Length of Table Storage Bin
C=Coal Washing Tables
D=Table Storage Bin
E=Conveyor (R.B. & C.H. to Table Storage Bin)
F=Screw Conveyor Table Feeder
G=Washed Coal Launder
H=Tailing Launder
J=Washed Coal Dewatering Elevator
K=Tailing Elevator,
L=Overflow Launder (Dewatering Elevator to settling Tank)
M=Conveyor to washed Coal Storage Bin

CAPACITY IN TONS PER HOUR	A	B	C
100	108'-0"	72'-0"	12
200	180'-0"	144'-0"	24
300	252'-0"	216'-0"	36
400	324'-0"	288'-0"	48
500	396'-0"	360'-0"	60

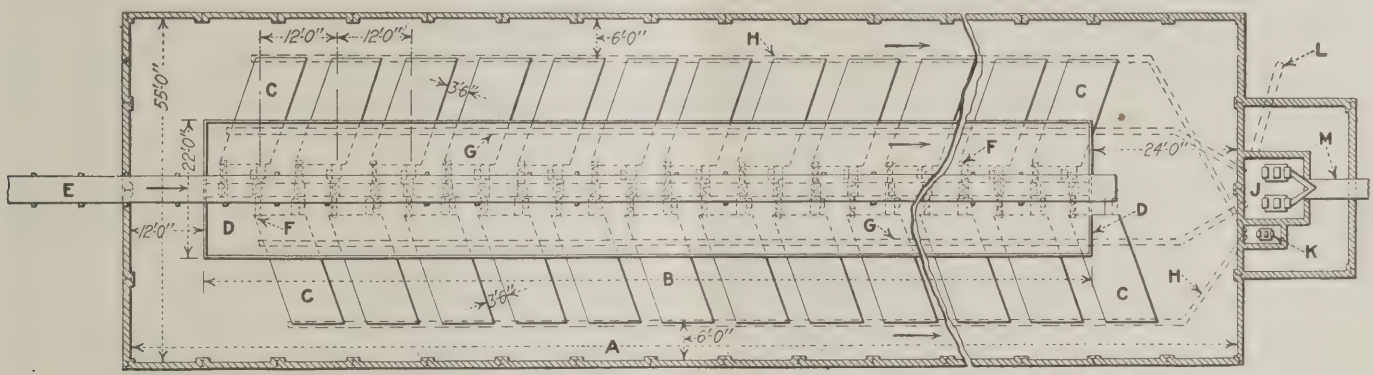


FIG. 17. LAYOUT OF A TABLE COAL-WASHING PLANT

washery, and at present they represent the most feasible apparatus for treating fine coal and sludge. They unquestionably offer many advantages in an economical as well as purely technical way.

The cost of installation is low, they require less expensive buildings and foundations than jigs. The cost of operation is considerably less than that of jigs on account of the small power required, the reduced wear and tear and less supervision. One operator can watch twice as many tables as jigs. In regard to capac-

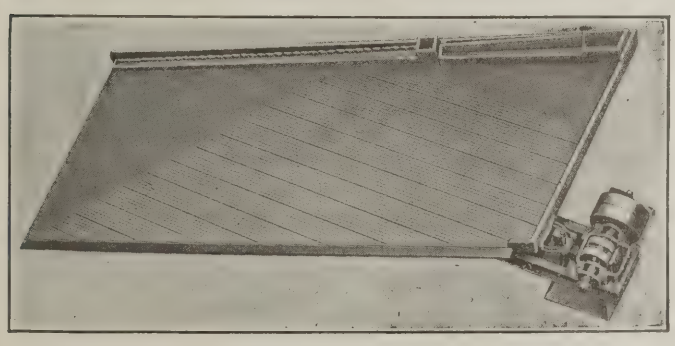


FIG. 18. TOP VIEW OF CONCENTRATING TABLE ADAPTED FOR COAL WASHING

The following tables show some results obtained in table work:

	Weight, Lb.	Per Cent.	Ash, Per Cent.	Sulphur, Per Cent.
Raw coal	481	100	12.50	2.67
Washed coal	406	84.4	6.71	2.04
First middle product	30.5	6.3	29.19	5.72
Second middle product	38.5	8.0	42.65	6.02
Refuse	6.0	1.3	65.00	10.54

SEPARATION BY SPECIFIC GRAVITY

Washed coal	Lighter Than 1.37 Sp.g. 82.2 per cent.	Heavier Than 1.37 Sp.g. 17.8 per cent.
	Lighter Than 1.35 Sp.g.	Between 1.35 and 1.50 Sp.g. / Heavier Than 1.50 Sp.g.
First middle product	12.5 per cent.	21.0 per cent. / 66.5 per cent.
Second middle product	11.4 per cent.	12.7 per cent. / 75.9 per cent.
	Lighter Than 1.45 Sp.g.	Heavier Than 1.45 Sp.g.
Refuse	2.2 per cent.	97.8 per cent.

RESULTS OBTAINED ON TABLES WITH SULPHUR ELIMINATION

	Raw Coal	Washed Coal	Side Middlings	End Middlings	Refuse	Elimination in per Cent.
Per cent. sulphur.	3.31	1.47	1.50	3.02	24.30	55.7
	3.47	1.25	1.38	2.33	23.28	63.9
	3.41	1.37	1.55	2.43	14.68	59.9
	3.12	1.30	1.37	2.55	16.94	58.3

Raw coal sulphur, per cent.	2.76	2.93	2.76	3.21	3.59	3.75	3.08	3.53	4.06	4.74
Washed coal sulphur, per cent.	1.26	1.38	1.29	1.48	1.43	1.88	1.59	1.37	1.37	1.34
Elimination in per cent.	54.3	52.9	53.3	53.9	60.2	49.9	48.4	61.2	66.2	71.7

The great advantage of a table lies in the fact that the process of separation is immediately before the eye and any desired change can be made without interrupting the operation. The outflow of the materials is visible, and by a judicious regulation of the stroke, the water supply and the slope of the table, the operator has full control over the process.

When retreating middle products the materials to be crushed consist of washed but intergrown coal from $\frac{5}{16}$ in. to 3 in. in size. The purpose of crushing is to break up the intergrown particles in such a way that the slate or bone adhering to or disseminated throughout the coal shall be mechanically separated from it. This will give a homogeneous mass of material suitable for rewashing.

Two considerations must be taken into account. The character of the middle product influences, at least in a theoretical way, the crushing process. The most suitable method would be, without doubt, to spall off the slate and bone without crushing them. This would make the subsequent water clarification and sludge recovery much easier. But the foregoing procedure would only be possible if the impurities are attached to the coal as shown in Fig. 12. This condition occurs only in solid coal, where the impurities are to be found at the cleavage line between the bed of coal and

CRUSHER DATA

Type	Crushing — From	Crushing — To	Capacity per Hour in Tons	Power Required
Roll crusher	3 in.	$\frac{3}{16}$ in.	6 to 60	3 to 25 hp.
Gyratory crusher	3 in.	$\frac{1}{16}$ in.	1 to 12	2 to 20 hp.
Disintegrators	3 in.	65 mesh	3 to 85	2 to 150 hp.

the roof or the bottom. In most cases, however, we must consider impurities, which are more or less disseminated throughout the coal mass, as shown in Fig. 13. In this case a crushing of the impurities cannot be avoided. (2) In every case the degree of crushing—that is, the difference between the size of the material before and after crushing—must be made as small as possible. The crusher giving the greatest yield with the smallest amount of sludge is the one most suitable, because this permits the most perfect separation. Whether, in each separation case, the yield or the amount of sludge should be considered more important depends on the one hand upon the difficulty of water clarification and on the other hand upon the value of the fine coal.

The crushing plant ought to be located between the primary and rewash jigs. This will necessitate the installation of an elevator, because all the jigs should be located upon one platform at the same level.

The crushing of the middle products can be accomplished either with roll crushers, gyratory crushers or disintegrators. Roll crushers can have either smooth or slightly corrugated rolls. Such crushers will permit the free passage of flat pieces of slate, which affords a decided advantage over all other types. For crushing down to $\frac{3}{16}$-in. size, roll crushers are well adapted. If the middle product should be crushed still finer, gyratory crushers or disintegrators are advisable. Gyratory crushers can be used down to $\frac{1}{16}$ in. size, and for still finer crushing disintegrators should be employed.

The process of rewashing does not differ materially from the process used in primary washing. The regulation of the rewash process depends upon the purpose for which the resulting products will be used. If, according to the character of the middle product, only boiler-house coal can be made, close washing is not necessary and the rewashing should be carried on in such a way that the resulting refuse will be as free from good coal as possible. If, however, the middle product is of such a nature that the pure coal contained therein is good enough to be mixed with the primary washed coal, the middle product should be washed very closely. In some cases it would be more economical to rewash for boiler-house coal only, even though the product of the rewash jigs could be made clean enough to be mixed with the primary washed coal, on account of the great loss of good fuel in the refuse, imposed by trying to get a perfectly clean washed product.

(To be continued)

Steam-Operated Coal Conveyor from Tipple to Boiler House

THE most economical method of conveying screenings from tipple to boiler house is a problem that has often been discussed. The most satisfactory solution has never yet been found. Many mines employ various forms of flight and carrier conveyors, driven by steam or electrical power. Others use the old-fashioned method of car and track. A small dump car filled with screenings is pushed to the interior of the boiler plant, where it is dumped before the boilers.

The American Steam Conveyor Corporation has adapted its steam ash conveyor so that it can be used for handling boiler coal. The conveyor thus constructed consists of a line of pipe extending from a point directly under or alongside the screenings hopper in the tipple to a discharge point in the boiler room. The coal is fed into an intake in the pipe and is carried to the discharge point by the action of an air current.

This current is created by the action of a jet of high-velocity steam discharged into the center of the pipe line in the direction of travel of the coal. This steam discharge tends to create a vacuum behind it, which in turn creates a current of air through the air intake in the line.

The coal intake is located conveniently before the tipple hopper, so that a laborer can rake the coal into the intake with small effort. The powerful suction pulls the coal through the system toward the "steam unit fitting," that point where the steam is introduced into the system. Here the force of the steam ejects the coal along the "discharge line" of the system.

When coal is needed in the boiler room a laborer opens a steam valve, allowing the steam to enter the system. The coal is then shoveled or raked into the intake tee, where the air current whisks it to the disposal point in the boiler house.

This disposal point may be a large bin or hopper in the top of the power plant, or it may simply be a target box with long spouts through which the coal is withdrawn to the boiler-room floor below. Since the delivery spouts are movable there is little trouble in placing the coal exactly where it is needed.

The manufacturers of this system claim that it is one of the most economical and efficient yet devised. The steam cost per ton of coal handled is exceedingly small, as the steam is used only when the system is in actual operation. The labor cost is likewise low, as one man can quickly shovel enough coal into the intake tee to supply the boilers for a long time.

Coal Age Is in Receipt of the Following Letter:

Promotion of Friendly Relations with the New Nations of Europe

I AM wondering whether we cannot enlist the assistance of many of our mine managers to inform the foreign-born Americans in their employ that Mr. Hoover, as Director-General of the American Relief Administration, has made it possible for individuals in this country to transmit funds to their relatives in Finland, Poland, Czecho-Slovakia, German-Austria, Jugo-Slavia (including Serbia), Rumania and Turkey.

In securing this exclusive privilege from the Federal Reserve Board, the Government has been chiefly interested in reëstablishing the banking connections between the newly liberated countries and America. It is the first concrete move that has been made to put these people on their feet.

As I look upon the intervention of our Government in Europe, it can be divided into four distinct stages: First, armed intervention; second, suggestion of peace terms which finally led to the signing of the armistice; third, supply of relief to the liberated countries; fourth, reëstablishing of commerce between the liberated nations and the outside world.

Each successive stage represents the natural advance beyond the preceding stage, and all constitute a logical sequence of overlapping steps. For instance, armed intervention against Germany, even if successful from a military point of view, would not of itself have attained our full purposes in entering the war. Having effected the isolation of Germany, we had to endeavor to secure a satisfactory arrangement as to geographical division of territory. With this in the way of accomplishment, we could not abandon the new countries thus established without making some effort to supply them with food.

Having drawn upon our stocks of food in America and placed these supplies at the disposal of the liberated countries in order to meet their requirements until their own harvest becomes available, we shall not have fulfilled our entire obligations unless we make some effort to reestablish commerce.

Commerce is fundamentally dependent upon definite financial relations between countries that hope to do business with each other. The development of the fourth stage of American intervention, therefore, has its beginning in the plan that has been worked out by Mr. Hoover by which the banks in America are offered immediate contact with the banks in the liberated countries, through the medium of the American Relief Administration. Beginning Apr. 22, this new arrangement afforded foreign-born Americans the opportunity to forward individual money gifts or payment of money to firms, persons, institutions or relatives at home. It was expanded in May, so that drafts could be purchased on home banks, and travelers could leave America with the satisfaction of knowing that their dollars here had a definite value in the currency of their own country at home.

It is obvious that it would have been impossible in the early stages after the armistice to set up any such banking relations without the intervention of the Government, and this was made possible by the relief work of the American Relief Administration in Europe. But this is merely a stepping stone to permanent commercial arrangements, and the foreigners in America are asked to support this exchange system now as it represents the definite beginning of financial connections between this country and the liberated nations. While it is chiefly represented at the present moment in the transactions in food, it will gradually be transformed into transactions covering other commodities and lead to definite trade relations. It is prohibited by law to send money by any other medium, and no one of foreign birth can justify using any other means for sending money to his relatives, as the support given by him to the American Relief Administration in this work is indirect support of his own Government as well as that of the United States in its effort to complete the fourth and final step of its intervention in Europe.

THE FOLLOWING RATES are in effect, beginning June 1, until further notice:

Finland	9.65	Finmarks	per	Dollar
Poland	14¼	Polish Marks	per	Dollar
Germany	12.65	Marks	per	Dollar
Austria	24	Kronen	per	Dollar
Czecho-Slovakia	15½	Kronen	per	Dollar
Jugo-Slavia	23	Kronen	per	Dollar
Rumania	9.35	Lei	per	Dollar

EDGAR RICKARD, *Joint Director*
AMERICAN RELIEF ADMINISTRATION
June 5, 1919 42 Broadway, New York

In order to promote this commendable enterprise, *Coal Age* has donated a page advertisement on this subject, which appears in this issue. The advertisement has been put in such a form that coal mine managers may cut it out and post it on their bulletin boards for the general information of their employees, and we urge that this be done. Also, we urge readers associated with companies employing men of foreign birth to cut out this page from their copies of the paper and hand it to the manager so that an ample supply of these notices may be available at each mine and works—EDITOR.

Anthracite Mining Costs

By R. V. Norris
Wilkes-Barre, Pennsylvania

SYNOPSIS—*On account of the greater range of sizes and prices received for anthracite coal, the fixing of a fair price for this fuel was somewhat more complicated than was the establishment of a reasonable price for bituminous. Decreased margins of profits during the war period were absorbed by the coal producers themselves.*

IT WAS stated in a former article[1] that an intensive study of anthracite costs was being made by the engineers of the United States Fuel Administration. The results of this study are now available and are offered as a supplement to the former paper. Anthracite costs as reported for the six-months' period, December, 1917, to May, 1918, inclusive, as compiled by the Federal Trade Commission, were used as a base, and charts similar to those described in the former article were made for the standard white-ash anthracite and for red ash and Lykens Valley coals. The adjustments of cost from a reported to a price-fixing basis, as described for the bituminous methods, were applied but showed only minor adjustments as necessary.

The great spread in anthracite prices on the varying sizes, which for the six-months' period under review ranged in average from $5.244 for nut to $2.074 for barley coal, makes the question of the percentage of sizes produced at the different collieries a vital one. The realization with the same prices for each size must be within wide limits, when it is considered that the percentage of prepared coal reported from different collieries varied from over 80 per cent. to below 30 per cent. for fresh-mined coal. Hence, as the spread in prices for the various sizes must be predicated on some percentage, it is essential to find some method of adjustment to allow for this variation. The logical method of adjustment is to calculate actual costs to costs as of the standard percentage of sizes, so that the margin between the adjusted costs and the average realization shall be the actual margin for each colliery between its actual costs and actual realization due to its particular percentage of sizes. As a base for realization the actual percentage of sizes for fresh-mined coal for the six-months' period was adopted. This percentage is given in Table I.

TABLE I—PERCENTAGE OF SIZES OF FRESH-MINED COAL

Size of Coal	Mesh, in Inches: Through Round	Mesh, in Inches: Over Round	Percentage of Sizes: Fresh Mined	Washery	Fresh Mined and Washery
Broken	...	4½	6.8	0.4	6.2
Egg	3⅜	3¼	14.6	1.2	13.5
Stove	2 5/16	2¼	19.6	2.3	18.2
Nut	1⅜	1¼	24.7	10.1	23.5
Pea	...	¾	9.1	10.0	9.2
Buckwheat	...	½	11.6	21.4	12.4
Rice	5/16	½	3.2	14.9	4.2
Barley	3/16	5/32	4.9	27.5	6.8
Boiler	5/16	¼	3.9	8.8	4.3
Screenings	3/32	1/16	1.6	3.4	1.7

[1] *Coal Age*, Oct. 10, 1918.

For adjustment as a base for fixing a spread of prices the percentages used were, taken at even figures, prepared 65 per cent., pea 9 per cent., buckwheat 12 per cent. and smaller 14 per cent.

The adjustment finally arrived at after long study was tested on actual reports from collieries having percentages that varied from over 80 per cent. to under 30 per cent. of prepared coal and was found to be correct within a maximum variation of less than 1½ per cent. It was as follows:

For Each 1 per Cent. Variation	Above Standard, Per Cent. Deduction	Below Standard, Per Cent. Addition
Prepared	1.20	1.20
Pea	0.85	0.85
Buckwheat	0.75	0.75
Smaller	0.50	0.50

As examples of the working of this adjustment with prices assumed at about the average for the six months and taking mines well away from average percentage of sizes.

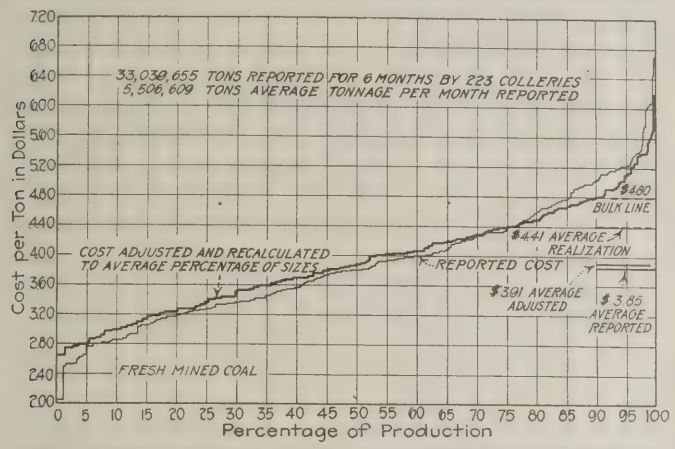
Size	Base per Cent. Sizes	Base Price	Realization	Mine A, per Cent. Sizes	Correction, per Cent.	Actual Realization	Mine B, per Cent. Sizes	Correction, per Cent.	Realization
Prepared	65	$5.10	$3.315	73.1	—9.72	$3.730	55.1	+11.880	$2.810
Pea	9	3.70	.333	6.4	+2.21	.237	15.3	— 5.355	.566
Buckwheat	12	3.20	.384	10.4	+1.20	.333	13.7	— 1.275	.438
Smaller	14	2.20	.308	10.1	+1.95	.222	15.9	— 0.950	.350
Totals	100	.....	$4.340	100.0	—4.36	$4.522	100.0	+ 4.30	$4.164
Assumed cost for each mine					$4.000				$4.000
Actual margin					$0.522				$0.164
Standard realization					$4.340				$4.340
Calculated cost as of standard per cent. sizes	$4.00 × 0.9564% =				$3.826	$4.00 × 104.30% =			$4.172
Calculated margin					$0.514				$0.168

The correction for Mine A is then —4.36 per cent. and the adjusted cost $3.826, showing 51.4c. margin on the $4.34 standard realization against 52.2c. actual margin. Similarly for Mine B, the correction is +4.30 per cent., giving an adjusted cost of $4.172 and a margin of 16.8c. as compared with the actual margin of 16.4c. Thus the adjusted costs on the chart bear a true relation to the realization received from a scale of prices for the various sizes based on the standard or average percentage of sizes adopted as a base, regardless of the actual percentage of sizes produced by each operation, and prices can be fixed from the chart line of adjusted costs which will result in giving each mine its intended margin. The correction, of course, is an allocation based on realization from the different sizes and could be made more accurately by taking into account each size produced, but at the cost of more time than was available for the work. With a material variation in price, different factors of correction should be calculated.

A large percentage of the anthracite coal is owned in fee by operators, who also lease tracts contiguous to their fee holdings. As all report royalties on the basis of tonnage produced, the general average 15.5c.

per ton reported is misleading. The actual average royalty reported by operators mining generally from leased lands was 33.25c., and by those generally mining from fee lands, 5.5c. As relatively few operators mine exclusively from either class of lands, no data are available to show the actual average royalties paid, but it is believed that the present average would be approximately 40c. per ton.

A few leases, notably those made by the trustees of the Girard Estate, owned by the City of Philadelphia, base the royalty payments on a percentage of the sale price of the coal at the mines instead of requiring fixed royalties; this percentage varies from 15 per cent. to as high as 28 per cent. of the price. As the labor war bonuses materially add to the sale price, these have



COST OF PRODUCTION OF ANTHRACITE FROM DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

resulted in excessive royalties and serious embarrassment to the operators, who were not allowed to increase the price of coal sufficiently to even fully absorb this additional labor cost and by whom the extra royalties must be paid out of already narrow margins. Many of the lessors have patriotically foregone the extra royalties due under these sliding scales, and as it is certainly improper that the public should be asked to pay these additional royalties, not contemplated in the original contract though enforceable at law, the United States Fuel Administrator has expressed himself as unwilling to consider such excess payments in any fixing of anthracite prices.

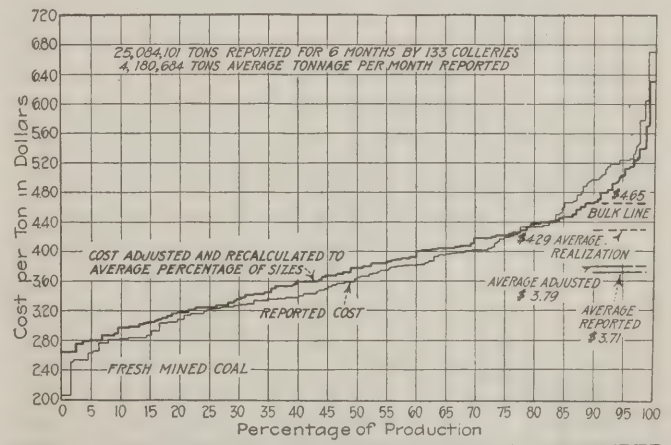
Cost charts were made from averages of the six months, showing both the reported and the adjusted costs for standard fresh-mined white-ash anthracite, both by collieries and by operating companies. As, in the prices fixed by the President, Aug. 23, 1917, a differential of 75c. per ton on pea size and above, equivalent to 52.95c. per ton on all sizes, was established for the independent operators over certain companies with railroad affiliation, generally known as the "companies." Charts were made by collieries for both the independent operators and the companies, as well as a combined chart of the entire output. Similar charts were also made for the entire output of fresh-mined coal and for the total output including washery coal by operating companies, all collieries operated by a single company being consolidated. Similar charts were made for red ash and for Lykens Valley coal. These charts were interesting principally in that they showed that the higher prices charged for these specialties were justified by their higher costs of production. The charts given are believed to fairly show the general costs of production. These charts show the averages and bulk line costs for standard white-ash coal given in Table II. The average prices received are given in Table III.

The prices received by the companies and independents have not been separately averaged, but calculating on the differential and assuming the percentages the same for companies and independents, which is only approximately the case, the selling price of fresh-mined coal would average for companies, $4.287 and for independents, $4.817. Margins over reported costs of companies would be 58c. and for independents 45c. with a general average margin for all fresh-mined coal of 56c. and for all coal including washery of 71c. per ton, and under "bulk line" costs fresh-mined companies, 36c.; independents, 15c.; total, 39c.; including washeries consolidated sheets total of 7.5c.

These margins include all expenditures for Federal income and excess profit taxes, selling expenses, interest charges, expenditures for improvements and developments to increase output, excess of capital expenditures over normal cost, and all profit on the investment of about $8 per ton of annual output.

Effective Dec. 1, 1917, a labor war bonus, ranging from 60c. to $1.10 per day for labor and 25 per cent. for contract miners was granted over and above the wage scales effective by agreement Apr. 1, 1916, expiring Apr. 1, 1920, and the prices fixed Aug. 23, 1917, and modified Oct. 1, 1917, by reducing pea coal 60c. per ton, were increased by 35c. per ton to compensate for this labor increase. The actual reported increase in labor cost due to this advance was figured by the Federal Trade Commission from the operators' reports to be 60.3c. From the actual payroll figures later obtained by the United States Fuel Administration, this increase was found to be 76.3c. per ton.

Effective Nov. 1, 1918, a second labor war bonus



COST OF PRODUCTION OF "COMPANY" COAL, DECEMBER 1917, TO MAY, 1918, INCLUSIVE

was granted. The calculated increase in cost due to this is shown in one of the charts, on which the increases for each operator are found by figuring from the payrolls, for the six months, the actual increase in pay which would have been given applying the Nov. 1, 1918, increases, and dividing by the six-months' tonnage of the colliery. This line, adjusted to per cent. of sizes, plotted on the chart and compared with the adjusted cost, shows an increase in cost of 74.1c. As this was

necessarily applied to the prepared and pea sizes 70.6c. of the total increase on these sizes was $1.05 per ton, which increase was allowed to balance the increased cost of labor.

Price Fixing

Except for the two increases to compensate for labor increases just noted and the reduction, Oct. 1, 1917, of the pea coal price, the anthracite prices are as fixed by the President on Aug. 23, 1917. The present realization, all companies and all sizes, including washery coal and both the labor increases, is calculated to average $5.13 per ton, while the bulk line of the chart shown, plus the November, 1918, labor increase would be $5.32.

The capital invested per ton output in the larger

TABLE II. AVERAGE AND BULK LINE COSTS OF WHITE-ASH COAL

Chart Number	Description	Costs, Averages Returned	Costs, Adjusted	Cost, 90 per Cent. Bulk Line
	Excluding Washery Coal:			
81	All operations, each colliery separate	$3.85	$3.91	$4.80
82	All company operations, each colliery separate	3.71	3.79	4.65
83	All independent operations, each colliery separate	4.37	4.36	4.97
86	All operations, each company operating two or more collieries consolidated	3.85	3.91	4.38
91	Including Washery Coal: All operations, each company operating two or more collieries consolidated	3.57	3.77	4.36

and better-equipped collieries ranges from $5 to $11, with an average investment of from $7.50 to $8.

The prices fixed by the President Aug. 23, 1917, are given in Table IV. No price was fixed on sizes smaller than pea, which was decreased 60c. per ton Oct. 1, 1917. There was a general increase of 35c. per ton. Dec. 1, 1917, and one of $1.05 per ton Nov. 1, 1918. Sizes smaller than pea were limited to a maximum of 50c. per ton below pea coal by order of Nov. 15, 1918.

The present fixed prices, Dec. 31, 1918, per ton of 2240 lb., f.o.b. mines, are given in Table V. Smaller than pea is not to be sold within 50c. of maximum pea-coal price. Thus the selling price of anthracite has been increased but 30.5 per cent. over the pre-war price,

TABLE III. AVERAGE PRICES RECEIVED FOR WHITE-ASH COAL

Size	Fresh Mined Coal: Per Cent.	Fresh Mined Coal: Average Price	Bank Coal: Per Cent.	Bank Coal: Average Price	Total Including Banks: Per Cent.	Total Including Banks: Average Price
Broken	6.8	$4.889	0.4	$4.416	6.2	$4.886
Egg	14.6	5.028	1.2	4.815	13.5	5.027
Stove	19.6	5.161	2.3	5.060	18.2	5.160
Nut	24.7	5.244	10.1	5.246	23.5	5.244
Pea	9.1	3.687	10.0	3.696	9.2	3.698
Total and weighted average prepared and pea	74.8	$4.959	24.0	$4.544	70.6	$4.947
Buckwheat	11.6	$3.342	21.4	$3.213	12.4	$3.324
Rice	3.2	2.482	14.9	2.452	4.2	2.473
Barley	4.9	2.231	27.5	1.767	6.8	2.074
Boiler	3.9	2.341	8.8	2.123	4.3	2.304
Screenings	1.6	2.202	3.4	1.555	1.7	2.162
Total and weighted average small sizes	25.2	$2.795	76.0	$2.339	29.4	$2.697
Grand total	100.0	$4.414	100.0	$2.868	100.0	$4.285

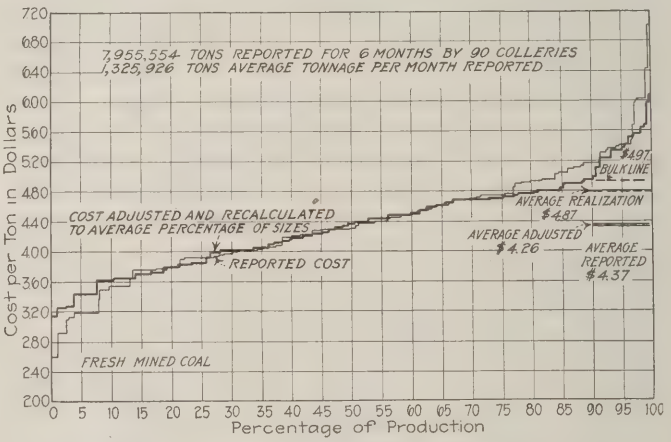
while the cost of production has gone up 52 per cent., the difference having been absorbed by the operators.

The average cost as reported for the six months, December, 1917, to May, 1918, inclusive, prior to the increase of Nov. 1, 1918, but including that of Dec. 1, 1917, is given in Table VI.

Depletion of Lands—The proper charge for depletion is admittedly a difficult question. Under the present (1917) income-tax law lands purchased since Mar. 1, 1913, may be depleted to return the cost price on exhaustion and lands purchased before that date may be depleted on their value as of Mar. 1, 1913. The second class may be divided into those operated on royalty by others than the owners, where the depletion accrues to the owners, and those lands directly operated by the fee owners.

In the case of royalty lands the value as of Mar. 1, 1913, is clearly the present value as a varying annuity of the annual amount of the royalties for the term of the life of the property and as this sum is not dependent upon the vicissitudes of mining the discount is properly at the going value of money in most cases not exceeding 6 per cent.

In the case of lands operated by the fee owners the value as of Mar. 1, 1913, should properly be calculated as the present value of the profits year by year to exhaustion. Unfortunately it is essentially impracticable to determine such a value as the profits are a widely varying quantity and impossible to forecast



COST OF PRODUCTION OF "INDIVIDUAL" COAL, DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

far into the future. We would suggest substituting for the profits the present normal royalty value of the property, as indicated by recent leases of similar lands, and determining the present value on the same basis as royalty coal. In this case the question of profits is minimized and it would seem that the discount rate might properly be taken at 6 per cent., leaving excess earnings to take care of the mining risk. As in the case of a sale which would fix the depletion charge, the purchaser would expect to be able to earn more than 6 per cent. on any investment involving a mining hazard, and a 6 per cent. discount based on royalty values would probably fairly represent a fair sale value.

In determining the probable life of a property consideration should be given to its past history as to output, its state of development, probable future output with normal conditions, and to the quantity of coal available on the property or property tributary to its development. As the present value of an annuity for 50 years is within 5 per cent. of the present value of a perpetual annuity, it is probably wise to limit the present value of a property to the present value of the probable out-

TABLE IV. PRICES FIXED BY THE PRESIDENT, AUG. 23, 1917

	White Ash		Red Ash		Lykens Valley	
	Company	Independent	Company	Independent	Company	Independent
Broken	$4 55	$5 30	$4 75	$5 50	$5 00	$5.75
Egg	4 45	5 20	4.65	5 40	4 90	5.65
Stove	4 70	5 45	4 90	5 65	5 30	6 05
Chestnut	4 80	5 55	4 90	5 65	5 30	6 05
Pea	4 00	4 75	4 10	4 85	4 35	5 10

put of say 50 years, regardless of the total tonnage or life of the property.

Acreage which is not estimated to be mined within the 50-year period should be carried in an investment account not subject to depletion and, when opened, treated as a new property.

The present value of property with less than the maximum life above indicated should be based on its probable life resulting, of course, in a higher depletion charge for short-lived properties.

As an example, the present value per ton assuming regular output to exhaustion would be for 10 years' life 74 per cent. of the royalty rate, for 25 years 51 per cent., and for 50 years, 31½ per cent., the suggested limit.

Then, assuming 50 years' reserves and 25c. per ton royalty rate, the present value would be 7.9c. per ton, and with a 10c. royalty rate but 3.15c., while with a rate of 40c., a fair present average anthracite

TABLE V. FIXED PRICES, DEC. 31, 1918

	White Ash		Red Ash		Lykens Valley	
	Company	Independent	Company	Independent	Company	Independent
Broken	$5.95	$6.70	$6.15	$6.90	$6.40	$7.15
Egg	5.85	6.60	6.05	6.80	6.30	7.05
Stove	6.10	6.85	6.30	7.05	6.70	7.45
Chestnut	6.20	6.95	6.30	7.05	6.70	7.45
Pea	4.80	5.55	4.90	5.75	5.15	5.90

royalty rate, the present value per ton would be 12.6c. per ton for a fair average for depletion where reserves are at least equal to 50 years' probable mining and increasing to 20.4c. for 25 years' reserves.

Depletion and Capital Charges—In general, it is our opinion that all plant and all opening and development charges less the value of coal produced during this period up to the time when the mine is sufficiently opened and developed to be able to maintain a normal

TABLE VI. AVERAGE COST, DECEMBER, 1917, TO MAY, 1918

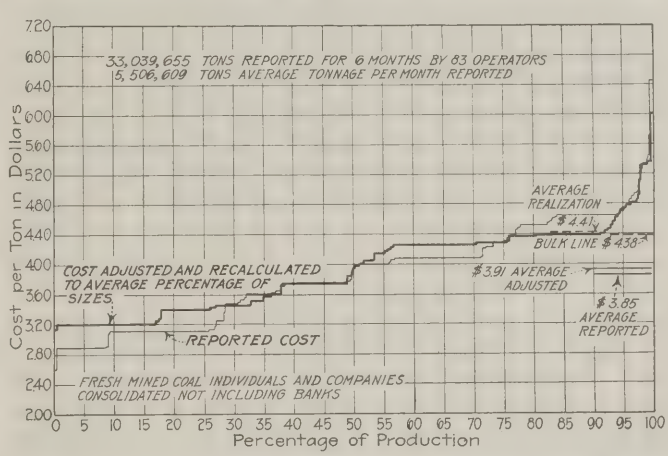
	Fresh Mined Coal, 35,256,550 Tons Cost per Ton	Washery Operations, 3,431,916 Tons Cost per Ton	Total Including Washeries, 38,688,466 Tons Cost per Ton
Labor	$2.593	$0.687	$2.423
Supplies	.616	.260	.584
Transportation, mine to breaker	.004	.007	.004
Royalty, current	.153	.102	.148
Royalty, advance	.002		.002
Depletion	.099	.077	.097
Amortization of cost of leasehold	.014	.024	.016
Depreciation	.091	.086	.090
Pro rata suspended cost of stripping	.023		.021
Contract stripping and loading	.009		.009
Taxes, local	.054	.034	.052
Insurance, current	.016	.014	.016
Insurance, liability	.058	.018	.055
Officers' salaries and expenses	.030	.019	.029
Office salaries and expenses	.048	.024	.045
Legal expenses	.005	.003	.005
Miscellaneous	.026	.023	.026
Total	$3.841	$1.378	$3.622
Increase over May to November, 1917	$0.764	$0.365	$0.719

production should be charged to capital and be subject to depreciation, and all charges for extensions including plant and development work necessary to maintain capacity should be charged to operating expense.

In the case of new development or plant designed to increase capacity or to materially reduce operating expense, a new development account should be opened and the cost of providing such increased output be charged to capital account.

The depreciation account should be so arranged as to extinguish the capital charge against any item of plant or development when such item is either worn out or ceases to be useful to the operation, and it might be well to classify into groups the various divisions of capital charges assigning to each group its probable average life and proper depreciation charge.

Repairs and renewals of parts should be charged to operation, but the life of plant should be figured considering such repairs and minor replacements. For instance, repairs and renewals in a breaker either to machinery or structure should be charged to operating expenses, but on its extension or replacement by a new structure the excess value considering depreciation of the new structure over the old which it replaces should



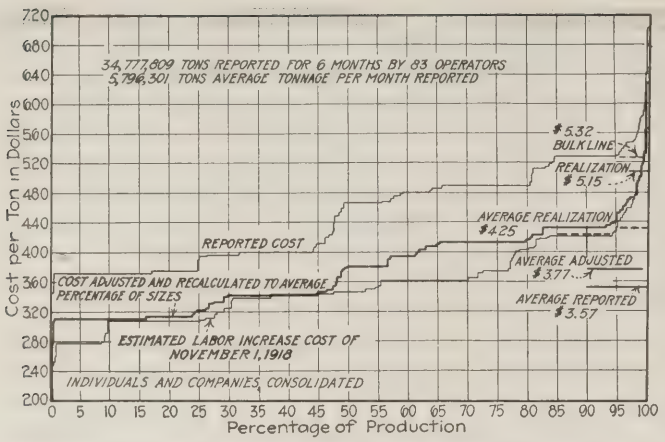
COST OF PRODUCTION OF BOTH "COMPANY" AND INDIVIDUAL COAL, DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

be capitalized. Similarly, the retimbering of a shaft or main tunnel should be charged to operating cost.

The original capital charge against any improvement should be depreciated so as to be wiped off the books on its abandonment whether due to age and deterioration, to lack of further usefulness due to the exhaustion or abandonment of the mine, the expiration of the leasehold, or to other causes.

Extraordinary Expense Account—Large items of expense properly belonging in operating cost but which would so affect monthly costs as to invalidate comparisons may be put into an extraordinary expense account and this distributed annually into the operating expenses.

Insurance and Taxes—Fire insurance and workmen's compensation should be pro-rated with the monthly costs as should local taxes. An insurance fund should also be maintained to provide against mining accidents such as fires, explosions, irruptions of large bodies of water with resulting flooding, extensive squeezes and such like accidents which cannot properly be absorbed into operating expense.



PRODUCTION OF ANTHRACITE, INCLUDING BANK COAL, FROM DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

Income and excess profits taxes are chargeable against profits and are not proper items of operating expense.

Stripping Costs—The cost of stripping overburden should be kept in a suspense account and charged against the coal as produced. This requires a reasonably accurate estimate of the coal to be produced by stripping made from proper borings or in the case of worked-over areas, from mine data, and as such an estimate is an essential preliminary to any properly conducted stripping operation, there should be no difficulties in properly handling this account.

General—It should be understood that the foregoing accounting suggestions are the personal opinions of the author and have not been approved by any Government department.

Conclusion—The anthracite cost investigation supplements the bituminous price fixing previously described and shows, probably for the first time, the actual range of anthracite costs. The entire work is based on the costs reported to the Federal Trade Commission by the anthracite operators. The analysis and study was made by the Engineers Committee of the United States Fuel Administration, Cyrus Garnsey, Jr., J. H. Allport and myself, with the able assistance of Capt. R. H. Vorfelt, U. S. A., detailed temporarily to the Fuel Administration as Director of Investigation.

Cause of Flare-Up Undiscovered

Chief of Department of Mines and His Assistants Trying to Ascertain What Was Responsible for Recent Catastrophe in Baltimore Tunnel

As usual with accidents in the mines it is extremely hard to find the actual cause of the Baltimore tunnel disaster. Seward E. Button, the chief of the department of mines, with six state mine inspectors, two members of the United States Bureau of Mines and several company officers are trying to ascertain exactly what ignited the powder—a current of electricity or a miner's lamp or whatever else. The number of men killed now stands at 95. The inquiry has been delayed because of the condition of certain of the witnesses who were unable to attend the inquiry and give testimony.

The chief of the department of mines gives four possible causes of the disaster. (1) That a bar carried by one of the men in the car where the flare-up first occurred touched the feed wire. (2) That a keg of powder touched the wire. (3) That as pipes were found in the cars, and lighted tobacco, and as the men had lighted lamps, the powder may have been ignited by some such sort of flame. (4) That as an electric feed wire fell on the rail 2500 ft. inside the mouth of the tunnel, the current may have come back through the cars and ignited the powder. Mr. Button states that for the first three conclusions there is a lack of evidence, but, of course, a lack of evidence does not prevent a thing from being true. The chief seemed, at least at one time, to favor the hypothesis that the flare-up was consequent on the fall of the electric feed wire.



ENTRANCE TO MINE WHERE FLARE-UP OCCURRED
Accident was 150 ft. inside of entrance

The inspector arranged to drop the wire at the point at which it fell in the accident of June 5. It was allowed to drop on two rails though it fell on but one when the fatal ignition occurred. A 13-car trip was put in the same position as on the morning of the accident. A keg of powder was placed in the fourth car from the rear and the current was turned on. No explosion or ignition occurred, nor did anything happen when the keg was placed in contact with iron bolts or even rested on the drawbar of the car. The failure to explode or ignite the powder in the keg made the inspector doubtful of the fallen-wire theory.

He Wanted to Be There

Some years ago a foreman's word was law. This petty official ruled with an iron hand, and there was no "comeback." An inside driver once asked his boss if he could get off on the first of the month, which was then about two weeks away.

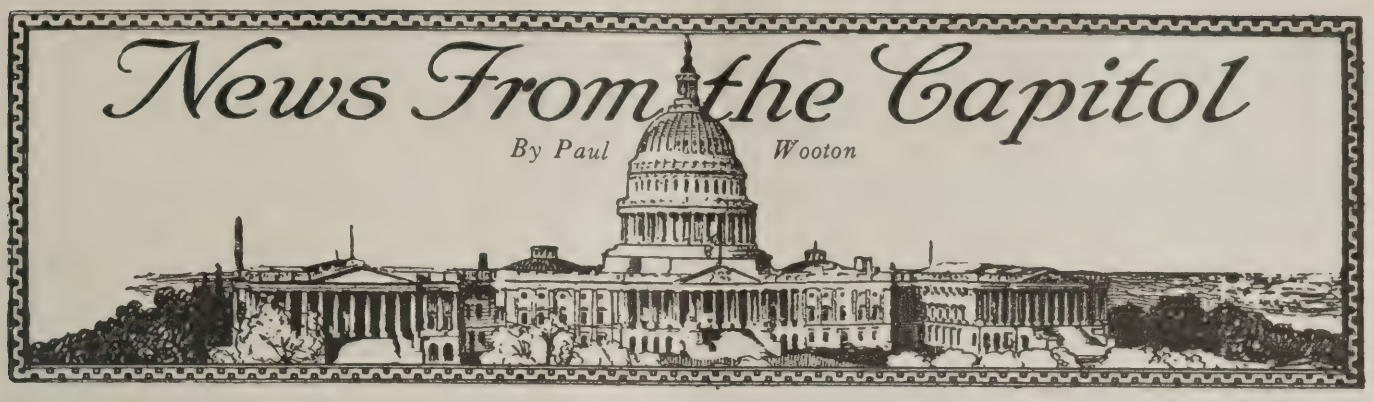
The answer was a short, "No!"

The driver made no comment, but in another week again asked the boss if he could be off on the first of the month.

This time the answer was the same as before, only a little louder. The driver walked away and the boss, being a curious man, called after him and wanted to know what the h—l he wanted to be off for.

"Well," answered the driver, "you see, I'm going to get married then, and I just sort of wanted to be there."

In a section of West Virginia it is said the mine cars were so large that they were often run over the Norfolk & Western R.R. The coal company got to making them so big that the railroad company protested, alleging that they couldn't get them through the tunnels. All of which sounds like the sarcastic remark of an operator in a field where owing to the thin coal and poor roof a large car cannot be used.



Senator Smoot Advocates That Government Own Coal and Oil Lands

"We must have either leasing or ownership," said Senator Smoot in introducing his oil and coal land leasing bill. "My bill provides only for the leasing of these lands from the Government." Senator Smoot long has been an advocate of permanent Government ownership of Government coal and oil lands. He was an important factor in defeating the last leasing bill when it was about to become a law on account of the fact that it allowed the sale of coal lands. Under the provisions of Senator Smoot's bill, 50 per cent. of all money received under the measure is to be paid to the state in which the land is located. The money must be used, however, for the construction and maintenance of roads and for schools.

Proposes a Government Coal-Inspection System Through Bureau of Mines

Legislation providing for Government fuel inspection will be introduced in both the Senate and House in the near future. The bill will direct the Secretary of the Interior to establish through the Bureau of Mines a fuel inspection system and will carry an appropriation of $600,000 for that purpose. The action is being taken by a group of legislators because demands have been made on them for some form of coal inspection that will at once assure to the consumer a grade of coal which he pays for, protect the interests of those preparing clean coal, and without discouraging the mining of poorer grades of coal, will exert an influence toward good coal preparation, especially in time of coal shortage.

The proposed coal-inspection system contemplates as a salient feature public advice as to the quality of coal as shipped. The force depended upon to produce results is a public statement of the facts. For this purpose the machinery for accurate sampling of full carload lots is necessary. The Government now possesses facilities for analyses and publication.

It is proposed that each mining company set its own standard of quality, consistent with the particular seam, preparation and market which the business affords, and that the Government shall publish such standard and certify as to whether such standard is being maintained by the mining companies. Such work would not replace inspection by the mining companies. It would not certify as to the quality of each and every shipment, but it would inspect and sample at irregular intervals a sufficient number of cars of coal as shipped to indicate whether the declared standard of the mining company was being maintained.

Mines entering the system would be privileged to advertise that their product was from a mine whose standard of preparation was certified to by the Government. In case coal shipments were sub-standard the mine would be advised of the fact. If the condition continued, the facts would be given publicity and the mine, to retain a place as a certified mine, would be required to declare a new and different standard and one which its product could meet.

Mines entering this system would agree to allow shipments to be sampled enroute at sampling stations and stand any added expense of transportation and handling incident thereto. All analyses would be published from time to time giving accurate information about American coals. Mines need not come into this system, but there would be manifest advantages in being on a Government approved list which would gradually increase the number using the service.

Important Results of Cleveland Coal Convention Summarized

George H. Cushing, the managing director of the American Wholesale Coal Association, sums up the more important results of the Cleveland convention as follows: "The determination of the association to limit its membership to those who are willing to maintain the highest moral standard in their business dealing. The adoption of a platform. The determination to fight for the reinstatement of civil laws relative to reconsignment and demurrage. The determined stand against government ownership or detailed supervision of coal. The stand for the return of the railroads to private ownership, stripped of coal connections. The adoption of local self-government of the Wholesale Coal Association by having each district nominate and elect its own directors."

The employees of the Bureau of Statistics of the Fuel Administration have presented C. E. Lesher, the chief of the Bureau, and Taylor Thom, Jr., the chief of the planning section, with watches as tribute of their appreciation and esteem.

Joint rail and water rates on coal from Birmingham to tidewater by way of the Government barge line on the Warrior River, have been announced. Equipment for regular service has been provided, and coal already is moving from the Alabama fields to Mobile and New Orleans by the water route.

EDITORIALS

Impermanence of Bench Marks

ENGINEERS like to shut their eyes to the impermanence of bench marks, but it is a fact nevertheless that these monuments are not to be relied on for any great length of time. Especially are those below ground subject to change. When the coal sinks, as it does, into the clay, and the clay is heaved between pillars, there is no certainty in the levels of points in the floor or in the ribs.

When the point is in the roof conditions are but little better, for settling coal involves a sinking roof. Then, again, the drawslate in which the plug too often has to be driven is apt to sag and change the level or—a small error—the plug expands and either pushes itself downward with a purchase on the point or is wedged downward in its attempt to relieve pressure on the sides. Where the plug is not driven so hard as to fathom the bottom of hole the swelling plug is not likely to be forced out by its increase in length. However, a plug thus imperfectly driven is likely to be hammered further in by some zealous trapper-boy or miner. Moreover, when the hole is not tapered the plug is not likely to work out by a diametral expansion. As a rule, as holes are drilled and not cut with a pick so there is no taper and the plug remains in place.

As stated, the worst trouble underground with level plugs driven in the roof arises from a general subsidence. Suppose a point inside the mine is found on leveling to be of the same elevation as a point at the entrance to the mine. Grant then that the latter point descends 6 in. before the next extension of levels occurs, and in the extension that the levelman finds another point in the mine at the same level as the point just mentioned. The level of this second mine point would be recorded as the same as the point at the mine entrance, though it would really be 6 in. lower. Similarly, every extension would increase the recorded elevation of points within the mine. A truly level mine would thus be recorded as having a general gradient downward toward the entrance. After several levelings the mistake would be not only measurable, but even important.

Taking points in the floor the leveler would represent the mine as lower, instead of higher, than it really is; and as movements of the floor are more rapid the error would be greater. Extension of levels from bench marks set in the floor is hopelessly inaccurate, so it should not be considered. The floor will often heave without any roof pressure whatever. Certain constituents in the clay of the mine will expand and arch upward long before the clay will begin to squeeze from under the pillars. This lifting will occur before extension of levels takes place and will consequently vitiate results.

Only roof-points are fitted as bench marks for extensions in levels. The roof-points in entries, if not driven in a drawslate, do not materially change level till the acreage around them is partly mined out. If the extension is made before that time it is likely to be fairly accurate. The levels should always be extended from plugs in such headings as are being driven in the solid away from the larger earth movements.

Points on the surface are subject to subsidence and, if badly chosen, may be wholly inaccurate. These errors will occur whether the bench mark is on a stake or cut in the stump of a tree. In fact, engineers have all too much faith in a stump bench mark which may be affected by mine subsidence, earth movements, frost, growth and wind. The effect of growth has, we believe, never been carefully investigated. An inquiry into that matter might be of value to the industry.

We are rarely entitled to demand an immutable bench mark. Most of us record to hundredths when our base for level extensions is incorrect by tenths and even by whole feet. We are justified, however, for the comparative levels of nearby points are important even when we do not know the true sea level or the relative levels of two points remote from each other. A jump of 25 ft. in a railroad survey in central Pennsylvania would have made transportation on that line impossible, yet the levels of all points in that part of the state thirty years ago were being calculated on a basis of 25 ft. in error.

Standardization of Mining Equipment

THE great economies to be effected through using only standardized equipment around a mine are perhaps not fully appreciated, though there has been a marked tendency in this direction during the past decade. This uniformity should extend beyond the mere procedure of purchasing the same kind of mining machine, pump or other apparatus; it should be an interlocking arrangement so that the weight of the mine locomotive, mine cars and other equipment shall be in correct proportion to the size of the mine rails, frogs and switches.

The necessity for carrying duplicate parts for a number of machines or pieces of apparatus will be a serious factor where there are many different varieties of machines used. Thus, for instance, in a mine using a number of pumps, a certain lot of spare parts that are subject to considerable wear, such as water and steam valves and piston rings, must be kept on hand; and where these pumps are of different types, it will be necessary to multiply this number of spare parts by the number of different makes used; and, in order to reduce the number of parts to the minimum, it is probable that the supply department would not order some parts that it might otherwise do if it was not necessary to obtain such a large number of them. Were these pumps all of the same size and type, a good plan would be to order spare parts sufficient to make one complete pump with the possible exception of some of the major portions, such as the base castings.

It is especially necessary to carry heavy supplies at the more remote mines, where deliveries are liable to be slow. It is obviously poor business judgment to risk a complete shutdown of mine operations because of the lack of $10 or $15 worth of spare parts for some machine.

The stocks on hand in a supply room of big producing companies will vary from $25,000 to $60,000 and sometimes be even larger. The interest on an investment of even $60,000 is sufficient to pay the salary of a high-grade man who might be capable of systematizing and standardizing equipment to such an extent that this could be reduced by fully one-half.

On the other hand, care must be exercised not to carry the duplication of spare parts to extremes, especially on permanent equipment such as large hoisting engines. Developments in mechanical lines in recent years have been rapid, and spare parts on apparatus of this kind may quite possibly become obsolete before put into use.

Measuring Coal by Gold

EVERY man is prone to regard the particular industry in which he is engaged as being basic, fundamental and essential to the well-being of mankind. Thus the farmer asserts that the world is dependent upon him for food. The iron producers in like manner are positive that civilization would come to an abrupt standstill were it not for the steady production of ferrous metals and alloys. And so on *ad infinitum*.

Most nations of the world are on a gold monetary standard. Ever since commercial transactions passed beyond the art of barter, the yellow metal has been the yardstick by which the value of commodities has been measured. Its production has been an attractive calling ever since man emerged from the Stone Age, or possibly even before.

It is but natural then, in comparing one industry with another, to make the gold production a standard of comparison. It is interesting to thus place the coal output beside that of gold production and see how the one measures up with the other.

During the year 1918, the gold production of the world has been estimated as amounting to $377,300,000; that of the United States was taken by the same authority as being $68,493,500.

Reports of actual coal production and the value thereof in the United States during 1918 are not yet available, and estimates must therefore be employed. It is reasonably certain, however, that these estimates are fairly correct; and it is not believed that actual figures of production when available will vary from them by more than a few per cent.

The estimated bituminous-coal production of the United States during 1918 amounted to roughly 590 million tons. Now, assuming that this was sold at the mine mouth at the average price of $2.30 per ton, which is probably conservative, its value amounted to $1,357,000,000. Adding to this the value of the 99½ million tons more or less of anthracite, or $317,522,181, we have, neglecting the last three figures, $1,674,522,000. Now, dividing this figure by $377,300,000 we get 4.4. Again dividing it by $68,493,500, or the value of the gold production of the United States (including Alaska), we get 24.4.

Thus it is seen that the value of the coal production of the United States is roughly 25 times that of its gold production, or that the coal production of this country is worth on the open market roughly 4½ times as much as all the gold produced from all the mines of all the world. This is a fact that the general public only dimly visualizes because it is so often bitter in buying gold stock and so seldom puts its money into coal securities.

A Bottle with Two Necks

AT NO part of the mine does the air travel so fast as in the mine entrance and main return, whether that entrance or return be a drift mouth, slope or shaft. It is these two points, therefore, that quite largely influence the resistance of the mine to the ventilating current. Further underground the air is split into a multitude of more slowly moving currents, and the friction is accordingly reduced.

The amount of air to be delivered is not allowed in many cases to determine, as it should, the size of the intake and return. This is largely fixed by a consideration of the use of these passages for transit. We seem to imagine that the air will force its way through these orifices if only a fair way is provided beyond.

In the passageways leading to the fan especially, there are often sharp angles. Where the flows from well separated districts return into a common current no attempt is made to prevent a conflict at the mouth of the single and narrow airway which, vastly too small for the service, must carry the air to the fan.

We overlook the fact that the air is provided with such narrow quarters it must be traveling fast and should be guided gently to its destination by well-shaped airways. We can give the air all kinds of harrowing experiences where the speed of travel is relatively slow, but where the air is moving rapidly the stream lines should be straight and undisturbed.

Unfortunately as we approach the surface the roof gets bad, and the exigencies of continued maintenance demand a more carefully protected roadway. Hence we tend to make the roadways narrow and fortify them with timber. The air eddies around in these narrow passages, and the friction is much greater than it would be in passages of the same size and carrying the same current if only the eddying were eliminated. Concreting such roadways by forms or with the cement gun is therefore a good means of increasing the ventilating capacity of the airway and hence of the whole mine; and it serves to prevent the airway, not to speak of the roadway, being blocked by ice in the winter.

It is perhaps unfortunate that we cannot see the air and so realize visually what a waste of energy there is when a ventilating current is churned up by a line of timber-set riffles. But what we do not see and know may hurt us most severely, and it is necessary for us to realize that we will not get efficient ventilation if we trip our air as it enters the mine by a lot of crossbars, legs and laggings and trap it as it leaves the workings by a series of similar resistances. A concreted shaft is not only safe and durable, it is a money saver in ventilation. No piping or cabling which goes lengthwise of the tunnel or shaft resists the air like the transverse timbering by which these airways are quite usually kept open.

Drunken and disgruntled men rail at the capitalistic class. Fortunately, they rail also at other people, including those in their own families. They are therefore by no means popular, and their own selfish actions frequently are the best antidote for the doctrines they espouse. Do the wife, children and neighbors of an inebriate, or even a shiftless doctrinaire, believe that all the evil in society rests with the men who provide that inebriate or doctrinaire with what little work he is willing to do and what little pay he is industrious enough to earn? For our part, we think not.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Up to the end of March of this year, according to the reports of the Immigration Service, no great exodus of foreigners had taken place. In the month of the armistice, 4530 more aliens came to the United States than departed, but during the month of February the alien departures outnumbered the alien arrivals by 424. In March the difference had risen to 2014, the number of those returning, by this figure, exceeding the number of those arriving.

In brief, the number of aliens arriving from the beginning of the month of the armistice to the end of the month of March exceeded the number of those returning by 7655. But the arrivals are mostly of the commercial classes and the exodus is of laboring men and is evidently gaining in strength as the months pass. It would be much larger if there were more accommodation. According to the *Nautical Gazette*, the bulk of these aliens seeking traveling accommodation are Southern Europeans — Portuguese, Spaniards, Italians and Greeks, with some Poles and Bohemians.

HOWE SAYS ABOUT FOUR MILLION WILL RETURN

Frederick C. Howe, U. S. Commissioner of Immigration at the port of New York, says: "The middle European peoples, especially the Poles, are going back for nationalistic reasons; the Bohemians the same. The Russians and Hungarians think that land is going to be very cheap over there. They have heard that the land in Russia and Hungary has been nationalized, and it is expected that it will be nationalized in Germany and Austria, too.

"I estimate—it is just an estimate—that a minimum of 4,000,000 people will probably go back to Europe just as soon as they can get transportation. Sometimes I am inclined to think that the number will be greater. Many Austrians, Hungarians and Russians, and to some extent Scandinavians, are going back because they feel they are not wanted here. They feel that America is hostile to them. I have heard that deportation clubs have been organized among these people, but I don't know whether it is true."

In the five months, November and December, 1913, and January, February and March, 1914, the United States received 261,595 more aliens than it lost. The same five months in 1918 and 1919, as stated, showed an increase of 7655. The difference shows how we have failed for a long time to obtain our former supplies of man power.

EMIGRANTS CAN'T GET BEYOND NEW YORK CITY

The working men are moving toward the ports but they find it difficult to secure transportation, and it is this fact that is delaying their exit. With an easing in transportation facilities the movement will be more rapid and laboring men will become more scarce. Thus when exporting becomes possible, the men to make the material to be exported become lacking. But after all, as far as coal is concerned, the problem of exports will be, not so much lack of men and hence of coal, though both may be grievously short, but lack of a sufficiently low schedule of shipping rates to make coal shipments feasible.

The mine workers of the West End Coal Co., Nanticoke, Penn., are on strike because the company refuses to adjust certain grievances of the men. The way to rectify matters of the kind is through the conciliation board of the region, after the local representatives of the mine workers and operators have failed to agree, but the 1500 men at this colliery will not have it that way; they have said what they want and will have it whether in accord with their agreement or not.

On June 2 the mine workers at the Creighton coal mine in Allegheny County, Pennsylvania, went on strike to compel a recognition of the union. Another mine in the same district has gone on strike and for the same reason. There are about 500 men idle in consequence. Five men were riding an electric locomotive on a trestle that spanned a deep ravine at the plant of the Creighton Coal Co. (which trestle joined two mine openings) when a shot from a man in ambush killed Andy Loobek of Tarentum. Another shot passed through the hat of a second man. Three other shots were fired, but the underbrush was so thick that the assassin could not be seen. It is thought that he is a negro, for one was seen recently with a rifle near the mine.

The Canadian royal commission on industrial relations held its Sydney, N. S., session on June 6, taking testimony from 13 persons. F. W. Way said the men were extremely discontented with what he termed the low wages, long hours, high prices, opposition to collective bargaining and inadequate housing which the mine workers of the province have to face. He stated that the lowest wage paid was $3 for a 12-hour day and that wages were from 25 to 30 per cent. lower than in Western Canada.

The lowest wage in the mine he declared was $2.90 per day. He added that men are now employed 11 to 13 hours daily and that every second week they work a 24-hour shift with the result that they break down physically and morally. Sixty per cent. of the men work on a 12-hour shift and the shortest workday is 10½ hours. He declared that the families of the men employed by the Nova Scotia Steel and Coal Co. were living in houses of from three to five rooms for which they were paying $5 to $6 per month. They were willing to pay more money, even double the rent, for better accommodation.

DOMINION COMPANY'S LOWEST PAY, 30C. AN HOUR

General Superintendent Rice of the Dominion Steel Corporation said the lowest price paid was 30c. per hour. The company was unable to put on three shifts of 8 hours, because it would add 30 to 50 per cent. to the cost of production. Rents have not been increased for several years except in the better class of houses. Of the houses of the Dominion company 120 are renting for $4 per month.

A. J. Tonge said that the minimum wage is $3.11 for an 8-hour day and that the average daily wage is $4, although contract men get as much as $50 per week. Coal at the bankhead cost more than double what it did in 1914.

In France a strike of the Federation of Miners took place on June 16. It seems to involve all the mine workers of that country. The general secretary of the federation said that the proposals made by M. Colliard, Minister of Labor, and M. Loucheur, Minister of Reconstruction, were unsatisfactory. The men want an eight-hour day to include the time when they are being lowered into the mine and hoisted to the surface—two periods of about 20 min. each—and also a meal time averaging 30 min. The time of actual service would be reduced to 6 hours and 50 min. The Government supported the demand in general but would not accept the specific statement of June 10 which read "Eight hours, including meal time, to be counted from the time the first man goes down till the time the last man comes up."

The Governmental authorities apparently thought the men would come out as they went in the mine and the loss of time in reaching their work would be only 20 min. They demurred when they found out that the men would start work together and quit work together and have to wait at the shaft mouth, morning and night, making the loss of time 40 min. for hoisting and 30 min. for lunch or three hours and 30 min. per day of three shifts. The mine workers voted at their Marseilles convention 373 to 120 to demand the execution of the contract as presented.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Remarkable Pressure Chart

Letter No. 1—That is certainly a remarkable chart shown in *Coal Age*, Apr. 17, p. 728, and it is no wonder that W. F. Harry is asking for the opinions of others regarding it. As stated in the editorial reply, the chart is not a true representation, there being at least three inconsistencies, as I view the matter.

In the first place, it is only reasonable to assume that the load carried by this power station was a fairly uniform one, from the indications of the pressure line during the day. But, even with a uniformly constant load, there would appear to be no reason why the chart should show the straight line indicated for the nightshift, from the statements of the nightman.

In reply to this inquiry, the editor suggests that the chart was spiked. That may be the case or the night fireman, if so disposed, could turn the chart around at the beginning of his shift, or when it showed a good pressure in the boiler, and having done this remove the chart from the gage and replace it again at the close of the shift.

If this was done, as I have described, the nightman could bank his fires and allow the steam to go down, by that means saving the 30 per cent. of coal during his shift. The saving of this amount of coal is the second inconsistency to which I have referred. Such a saving is incredible. Unless the nightman is an exceptionally good fireman and the daymen both very extravagant in their methods of firing, it would be impossible to show this difference in the amount of coal burned. Indeed, it is my opinion that such a difference could not exist under normal conditions, in the average run of firemen.

Offer To Increase Plant Efficiency Declined

This reminds me, however, of a little incident in my own experience. Having observed some of the extravagant practices and the losses resulting therefrom in a certain plant where power was being generated, I submitted a proposition to the management to make a few changes in the arrangement and accept as my pay the saving in coal that resulted from the proposed changes. The offer was a good one from my own and from the operator's standpoints, respectively, but it was declined, as many such offers are, through indifference or ignorance, as the case might be.

The third inconsistency, regarding this chart and the claims made, has reference to the statement that the fires were cleaned three times during the nightshift of 10 hours. To clean the fires three times in a single shift is much out of the ordinary, in the usual practice of firing. Furthermore, everyone who has fired a boiler knows that more coal is needed when a fire must be cleaned, as some of the unburned coal will pass through the grate and be lost in the ashpit, while the furnace and boiler will be cooled by the inrush of air through the firedoors.

This claim of cleaning the fire three times makes all the more unreasonable the statement that 30 per cent. of the coal was saved during that shift. Again, the necessity of cleaning fires so frequently would indicate that the load carried was much greater at night than during the day, which does not conform to the showing of the chart for that shift.

In closing, permit me to suggest that Mr. Harry should give the day fireman another job, for a week, and let his efficient nightman take the dayshift. Then lock the gage and attend to replacing the chart himself. Having done this, it would be interesting to learn what results the nightman would be able to show when working on the dayshift. S. D. HAINLEY.

Osceola Mills, Penn.

A Modified Longwall System

Letter No. 3—Referring to the letter of W. H. Luxton, *Coal Age*, Apr. 24, p. 764, permit me to draw attention to two statements in his closing paragraph. First, he suggests that "The depth of cover should not be less than 200 ft. to obtain the best results in longwall working." He follows this with the statement that "The principles involved in this method are those that must ultimately be applied to work such seams."

It would certainly be of interest to know if Mr. Luxton has ever had any practical experience in working longwall under a light cover, which induces him to make the suggestion that the success of this method depends on a depth of cover not less than 200 ft. in thickness. In the article that started this discussion, Apr. 27, p. 395, F. A. Pocock states that the cover of the seam, in the method he has proposed, is only 80 ft. in thickness. Now, from Mr. Luxton's point of view, the longwall method of mining could not be successfully applied in that case.

It would seem only fair to Mr. Pocock to ask that others who have had experience in working the longwall system under a light cover should favor us with their opinions in regard to applying this method of mining to shallow seams. It is for the purpose of inviting the expression of opinion on this matter that I have asked the privilege of sending a second letter on this subject, which is one that has always been of interest to me.

Longwall Possible Under Shallow Cover

Personally, I have no hesitation in stating that there is, to my mind, no reason why the longwall method of mining cannot be successfully applied under the 80-ft. of cover mentioned in Mr. Pocock's article, provided only that the strata overlying the coal is such as will make a good roof for the purpose. I could cite instances where hundreds of acres of 3-ft. coal have been worked successfully on the longwall system, and the cover, in some places, did not exceed 60 ft. in depth, while the thickness of the coal varied from 20 in. to 5½ ft.

Allow me to cite just one important illustration, regarding the applicability of the longwall method of mining to a far more difficult problem than that presented by Mr. Pocock. It has reference to the working

of the Pittsburgh seam, with which most *Coal Age* readers are thoroughly familiar, but which they are prone to regard as not being adapted to longwall work. Let me say, here, that I have demonstrated the falsity of this conclusion and can only attribute it to their lack of experience in longwall methods, which is sure to result in failure. Success in longwall requires a thorough experience and training in that work.

My reference to the working of the Pittsburgh seam by longwall relates to an instance where the thickness of the seam varies from 3 ft. 6 in. to 5 ft., the coal being overlaid with 1 ft. of slate, above which was 3 ft. 6 in. of "rooster coal." The seam was worked successfully on the advancing system of longwall.

Allow me to add that the work was carried forward in a proper and systematic manner. Mr. Pocock's proposition appeals to me as one that can only be worked successfully by the longwall method that he has proposed and which promises to produce a quick output and has due regard for the future life of the mine.

McKeesport, Penn. ANDREW ORR BAIN.

Safe Handling of Explosives

Letter No. 1—The reading of the "Safety Letter" of the Consolidation Coal Co. sent to its safety committee and which appeared in *Coal Age*, May 8, p. 874, reminded me of a sad incident that befell a miner by reason of which he is now bowed down in grief and sorrow, as the result of his own negligence in the use of explosives.

Returning home one morning after working an all-night shift in the mine, the man brought with him a quantity of gelatin dynamite that had become frozen. Placing the explosive in the oven of the stove in the kitchen of his home, for the purpose of thawing out the frozen dynamite, the miner went outside to do a few chores, which was his regular custom. He stayed a little longer than he had expected and when about to return was started by the loud report of an explosion in the house, one side of which he beheld blown to atoms.

The explosion killed his wife and three-year old daughter who were both in the kitchen at the time. The title of the safety letter to which I referred is "Leave Your Explosives Outside." Had this man obeyed that injunction and not taken the explosive into his house, he would not now be suffering from the sad recollections that fill his mind, today.

Estimating Charges Fired Per Lives Lost

When one thinks of the tremendous quantity of explosives that are being used today, in the mining of coal, it is astonishing that the number of accidents from this source are so few. In the anthracite region, where the coal is blasted off the solid, it is nothing unusual for a miner to use 25 lb. of powder, in the performance of a single day's work. Assuming the average charge of powder placed in a hole is from 2 to 3 lb., it would appear that an anthracite miner would fire from eight to nine shots, in a single shift.

Now, if there are 50,000 men employed in the anthracite mines, cutting and blasting coal, and each man prepares an average of eight shots, the total number of charges prepared in a single day would be $8 \times 50{,}000 = 400{,}000$; or in a single year of 260 working days there would be a grand total of $260 \times 400{,}000 = 104{,}000{,}000$ charges prepared for blasting.

But, it is estimated that out of the 550 fatal accidents occurring yearly in our anthracite mines, 14 per cent. of these are due to the use and handling of explosives. This makes the total number of fatal accidents due to explosives $0.14 \times 550 = 77$ lives. It is thus perceived that the number of charges fired, per life lost, is $104{,}000{,}000 \div 77 = 1{,}350{,}650$ charges, nearly.

It is true, as has been stated before in *Coal Age*, that it is not the inexperienced but the experienced miner who is the most frequently hurt. The experienced miner has, through long years of practice, grown careless in the handling of explosives. The more often one performs a dangerous task and the more he handles explosives, the more careless he becomes. Not long ago I overheard the remark of an artillery instructor who said that he could always depend more on a green recruit than on an old soldier, in the handling of explosives or moving them from one place to another.

Common Causes of Mine Accidents

Allow me, to give the following common causes of accidents that occur in the use and handling of explosives:

1. A miner bites off the end of a squib, or dips the match in oil, or cuts too short a length of fuse to quicken the explosion of the charge that he has prepared, and the shot goes off before the miner reaches a place of safety.
2. A miner returns to his place too quickly, on the failure of a shot to explode in the usual time, and is caught and killed by the delayed blast, which was a hangfire.
3. A miner attempts to withdraw a charge that has failed to explode and an explosion follows and kills him.
4. A miner prepares a charge, with his lamp in his cap on his head, and the result is that a spark falls from the lamp into his powder can and the fellow is badly burned or killed.
5. Carrying explosives unprotected on one's person or leaving it in niches in the rib or on the timbers supporting the roof.
6. Tamping a shot with a steel or iron bar.
7. Crimping a detonating cap with the teeth, instead of using pliers designed for that purpose.
8. Not properly adjusting the cap or detonator in a cartridge.
9. Using an inferior quality of explosive or mixing different explosives in the same charge.
10. Attempting to thaw explosives when frozen.

The right and wrong methods of inserting a cap in a primer were explained in the discussion "Priming a Cartridge," *Coal Age*, Vol. 14, p. 327 and I will not repeat the operation here. In spite of the state mine law prohibiting many dangerous practices in the use and handling of explosives, miners still persist in taking chances and violating the law. An instance of this was the fatal accident that occurred in the Baltimore No. 2 tunnel of the Hudson Coal Co., at Wilkes-Barre, Penn., a few days ago (June 5), in which nearly a hundred men lost their lives.

It is reported that about 150 men were being hauled into the mine on a special trip of cars and, in violation of what should be the law in every mining state in the Union, the men took seven kegs of powder into the cars with them. The explosion that took place, whether caused by the breaking of the trolley wire or a miner's lamp or otherwise, filled the entry with flame, burning and killing the men.

Obey the Laws and Avoid Many Accidents

To avoid these fatal accidents, the miners must cease to violate the laws made for their protection. Many miners seem to think that these laws are made in the interests of their employers and they are often indifferent to them. It is up to the mine officials and mine inspectors to teach them that this is not the case. Every violation of the law whether resulting fatally or otherwise should be suitably punished. There is no industry where care and constant vigilance is more needed than in coal mining.

Seldom does a miner feel his own responsibility for the safety of himself and his fellow-workers. If the fireboss reports his place safe in the morning when he goes to work, the miner takes it for granted that it is safe throughout the day and gives little heed to any danger that may develop. Every practical miner should know that the condition of his place, in respect to safety, may be greatly changed after the first shot is fired, and care is needed to avoid danger.

Before closing, kindly allow me to give the following brief don'ts, which every miner should keep in mind:

1. Don't go to a powder house with a naked light or a lighted pipe or cigarette.
2. Don't carry powder on your shoulder when stepping on the cage to go down the shaft or when traveling an entry where trolley wires are hung.
3. Don't ride in cars carrying explosives.
4. Don't carry explosives about your person or send a laborer to bring them but go yourself.
5. Don't open your box to start to make up a charge of powder until you have first placed your lamp at a safe distance away from the box in the direction in which the air is passing, and don't smoke a pipe or cigarette when preparing a charge or handling an explosive.
6. Don't shorten the match of a squib, or dip it in oil, or cut too short a length of fuse in blasting.
7. Don't crimp a cap with your teeth, in order to make it fast on the fuse, but use the pliers for that purpose.
8. Don't tamp a hole with a steel or an iron bar, but use a wooden tamping rod, which can be gotten at the powder house.
9. Don't fail to keep your box in a safe place away from the track and don't sit on the box with your lamp when smoking.
10. Don't return to a shot that has failed to explode, or proceed to examine a blast until the smoke has cleared away after the explosion, and don't use two kinds of powder in the same hole, or attempt to withdraw a misfire.

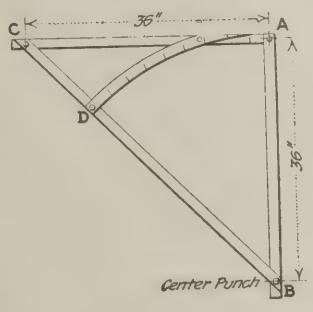
These and many other don'ts that might be mentioned, if obeyed, will save many lives.

West Pittston, Penn. RICHARD BOWEN.

Turning Rooms Without Sights

Letter No. 3—I have been interested in the several references and suggestions made recently, in regard to turning an angle where no instrument is available, as when a room is to be turned off an entry and there is no sight given to determine its direction. One suggestion is that given by Ostel Bullock, *Coal Age*, Feb. 13, p. 306, which was followed by another, by a gas inspector of Worley, Ky., in the issue, Apr. 24, p. 742.

Kindly allow me to describe a triangle that I have found useful for this purpose and which can be readily made by almost any handy mine blacksmith, with a little assistance from an engineer. The scheme is shown in the accompanying diagram and consists of a right triangle made of bar or strap iron. As shown in the figure, there is riveted to this triangle the arc of a circle graduated every 5 deg. from 0 to 45 degrees.



The device is readily constructed by taking a flat, iron bar $\frac{3}{8}$ by $1\frac{1}{2}$ in., in section, and 6 ft. 4 in. long, cutting it in the center and welding the two ends together to form a right angle, and drawing out the corner until it is a perfect square as shown at *A*. To complete the triangle the cross-brace *BC* is riveted at *C* and secured at *B* by a $\frac{3}{8}$ x 1-in. capscrew, with a center punch made in the head to form a sight.

An engineer should then mark off the arc of a circle, on a radius of 36 in. A few nails set firmly in a board will enable the blacksmith to bend a piece of strap iron sufficiently close to the arc to serve the purpose intended. The arc is then riveted to the triangle, as shown in the figure, and when this has been done a notch is filed in the end of the arc $\frac{3}{4}$ in. from the side of the triangle, so as to correspond to the sight point at *B*. Similar notches are filed in the arc for each five degrees, but this should be done by the engineer, who divides the arc, from *A* to *D*, into nine equal spaces of five degrees each.

The use of this device will need no further explanation than to say the side *BA* is first made to conform with the center line of the entry, and the side *AC* will then indicate the direction of a room driven at right angles to the entry. The graduated arc can be used to deflect any desired angle. IVOR LIVINGSTONE.

Paint Cliff, Ky.

Perils in Reconstruction

Letter No. 9—Reading the several letters that have been written, regarding the work of reconstruction following the war, impresses one with the thought that there is a general feeling of worriment prevailing at the present time and that practical men are devoting much thought and time to the study of the situation.

As everyone knows well, we were not expecting peace any more than we were looking for war at the time it was forced upon us through the encroachments made upon our rights as a nation. During the critical period that followed, it was our patriotism and determination to win that led us to sacrifice everything.

When one considers the spirit of sacrifice and cooperation that was manifest by the people throughout the country at that time, there is a feeling that the same patriotic spirit will continue to triumph over the difficulties presented in the problems that confront us in getting back to normal conditions.

FAIR AND JUST TREATMENT OF LABOR

Of all the problems that have arisen probably the most important is the readjustment of wages in the industrial world. It is natural to feel that some trouble may arise from this source, but the solution is to be found in the honest and fair dealing on the part of both employer and employed.

The war has given a great impetus to the labor movement. The higher wages that have, for a time, been within their reach has given to the large majority of laboring men a desire for better living conditions. This desire that has taken possession of so large a proportion of industrial workers is one that employers must consider. These, indeed, have a new lesson to learn in regard to the treatment of the men they employ.

If perils in reconstruction are to be avoided, labor and capital must each develop a spirit of patriotism and coöperation. A fair day's work must be given for a fair wage that will provide good living conditions for all. Much will depend on mine officials avoiding the treatment of their men as inferiors and slaves, using rough language and discharging them for small offenses.

No one will deny the right of a foreman to discharge a man when such action is necessary to maintain the discipline of the mine. But, when a man is discharged for a trivial offense, it has a tendency to create a feeling of unrest among his fellow workers. It is this restlessness that makes the workers easy marks for the I. W. W. or agitators for Bolshevism.

At present, one thing that creates a feeling of uncertainty in regard to the future is the common belief that

wages will be lowered. The situation is one in which little material is being purchased owing to the fear that prices will come down in a short time. Needed repairs are being held up for the same reason.

When the question of wages and prices of material is definitely settled, all business will reach a more normal basis. What would greatly assist in restoring confidence would be the opening up, by the government, of the long-planned building projects which would give ample employment for our returning soldiers.

———, Ky. PATRIOT.

Quality of Mine Timber

Letter No. 2—Some time ago, I read with much interest a letter that appeared in *Coal Age*, drawing attention to the need of using a good quality of mine timber (Feb. 13, p. 333). This is a subject that mine superintendents and foremen should consider worthy of more attention than it has commonly received at their hands. In this respect, not only the quality of the timber but its size and kind should be regarded.

Too often it happens that a mine is located in a section where timber is plentiful and little thought is given to its proper use until the supply is nearly exhausted. Then the higher officials generally awake to the fact that the company's timber has been wasted and the foreman is quite generally blamed for its misuse.

Where a poor quality of wood is used for timbering mine airways, it will last but a short time and the expense of renewal cuts a big figure in the cost-sheet of the mine. It often happens that this gives rise to bad feeling between the management and the superintendent, foreman or purchasing agent who is responsible for the quality of the timber sent into the mine.

Care Needed in the Purchase of Timber

In order that a mine shall be safely and efficiently timbered, not only must good timbermen be employed, but the one who does the buying must be a practical man fully acquainted with mining conditions and familiar with the qualities of timber. Moreover, he must be furnished with data in respect to the size of the timbers required for different purposes. Contracting for mine timber must include full specifications giving the size, kind and the time of cutting the wood, which should always be done in the winter months when the sap has left the timber and the latter is more readily seasoned for use.

An incident that illustrates the waste of timber that may result from lack of care in the specification of what is needed in the mine, occurred at a place where I was employed not many years ago. It became necessary to timber a particularly weak portion of the haulage road in that mine, and the foreman gave an order for sawed timber to be used for the collar bars. By some mischance the bars when delivered were found to be too short and had to be thrown aside. As the superintendent refused to place another order for sawed timber, it became necessary to cut such timber as could be found on the company's land, which, however, furnished nothing of a suitable quality for mine use.

After many delays and misunderstandings, I received 20 sets of timbers, and was told to place them 4 ft. apart, center to center, which I did. Hardly had I finished placing these 20 sets when it was necessary to start putting in other timbers between them, because it was clear that the timbers already set would not support the roof. There was poplar, beech, elm, birch, and some hickory. Some of it was fairly good, but, owing to the way in which it had been cut, it could not be used efficiently, and the whole job was a failure. Had the timbers been able to support the weight, however, much of it would soon have been covered with fungus growth, in the mine, and would have rotted in a short time.

It is gratifying to know that many of the larger companies operating in this state are now giving the timber question considerable thought. Some of these companies have started to replenish their diminishing timber supplies by setting out new trees. In one or two instances, several hundred acres of land have thus been retimbered in a year. One company has several hundred acres of walnut trees that will be large enough for use as mine props, in a very short time. While the company could sell this timber they realize that the quality of the timber is more important than the profits of its sale.

Observations on Wet and Dry Conditions

My own observation leads me to believe that white-oak timber when cut in the winter months will outlast any hardwood timber if it is used either in a dry place or in a wet place, alone. But if it is subjected alternately to wet and dry conditions it will rot quicker than some other timbers under the same treatment. Elm, I believe, will last longer when it is wet part of the time and then dried, or where the air is moist part of the year and then much drier.

Frequently, much of the annoyance of broken timbers can be avoided by the mine foreman using good judgment in placing timbers of different kinds in parts of the mine where they are best adapted to the conditions. Also, when drawing timbers from worked out areas, much of the broken timber can be used again, for lagging or for short legs set in hitches cut in the coal, and still smaller pieces can be split up for caps.

In drawing pillars in mines, it is necessary to have props of good quality that are able to perform the duty required of them. When soft props are used for this kind of work, they should be tapered somewhat at the bottom so that they will mushroom at the point, instead of being broken by the descending weight. This will permit of their being used again. A proper regard for these precautions will make coal mining not only safer but more economical, by enabling the recovery of a larger amount of pillar coal. I hope we shall hear from others who have had experience in the use of different kinds of timber under different conditions and where the quality of timber has been made a study.

Cleaton, Ky. OSTEL BULLOCK.

Efficiency of Mine Workers

Letter No. 3—Kindly permit me to refer to the question of a six-hour day and a five-day week mentioned in the general labor review that appeared in *Coal Age* a short time since (Apr. 3, p. 629). I wish to draw a brief comparison between conditions in the mine in Great Britain and those in this country, from the standpoint of a miner.

Having worked in the mines in the North of England over 20 years before coming to this country, I should say that the work of mining coal there is far more arduous, owing to the greater depth of the seam and the decreasing height of the coal. Moreover, the mines

in Great Britain are seldom as well ventilated as the coal mines in this country, although I will not say but that the ventilation here could often be much improved.

My opinion is that the work of mining is not as healthy in British mines as here in America and, for that reason, the British miners are more justified in demanding shorter hours than are the miners in this country. I believe, however, that our miners, here, would be satisfied with something less than a 30-hr. week. Nevertheless, it is possible that the proposition would provide a suitable remedy for the present injustice done to a large proportion of mine workers, owing to the closing down of many of the smaller mines, while other mines are working practically full time and, in a few instances, are hardly able then to fill their orders for coal.

Anyone familiar with the situation will agree that coal mining is somewhat of a seasonable occupation, and this is true to a greater extent in this country than in Great Britain. Considered from this angle, the question of a 30-hr. week has another significance quite different from what would apply to the mines in Great Britain. It is unnecessary to argue that equal fairness and justice should be shared by all coal miners in this country. To secure this equality of conditions, the lesser demand for coal in the summer season should be met by a reduction of the number of working hours, rather than by the closing down of those mines that may be less fortunate in the matter of securing orders for their output. The arrangements necessary to effect this distribution of work and accord to every mining district equal fairness and justice may require some provision that would rightly regulate the industry.

The Allotment Law in England

In England, there prevails what is known as the "allotment law." By this law, the town council or the county council, on the receipt of a petition asking for the allotment of certain lands and signed by a sufficient number of voters in the district, grants the said allotment at a certain reasonable rate of compensation or rent, which they are authorized to fix. I believe the scheme has been found fairly satisfactory both to those desiring the allotment and also to the farmers and land owners concerned.

This is only a suggestion of what is done to relieve the distress that may arise in certain districts, during the summer months. The arrangement is far better than compelling operators to pay their miners for a full week when they work but half-time, which would be an injustice to operators. I do not wish to be misunderstood, however, and will say if our miners are to be granted a 30-hr. week during the summer months, let them be paid for the 30 hours of work performed, which would be reasonable and just; only let the distribution of the summer demand for coal be such as to give to every mining district and mine the same opportunity for work.

During the winter, it is my opinion that a working day of 8 hours, counting from the time the miner enters the mine until he again reaches the surface, ought to be considered a reasonable day's work. To make the 30-hr. week apply to the winter as well as the summer would not enable the mines to meet the demand for winter coal, unless a larger number of miners were to be employed during that season, which would mean an overplus of labor in the summer months.

———, Ind. EQUALITY.

Prime Producer in a Coal Mine

Letter No. 2—The question of who is the prime producer in a coal mine, suggested by the inquiry that appeared in *Coal Age*, Apr. 3, p. 637, seems to me should not be restricted to the workers underground, but should be taken to include all who contribute their share in the work of production. My idea is that the coal is not actually produced until it has been placed where it can be utilized; or, in other words, put on the market.

Now, I notice that both the inquirer and the editor replying to this question regard the miner who digs the coal as the actual producer. While there is no question but that a good class of industrious, thrifty and steady miners are a great asset in a coal mine and go far toward insuring a steady production, it must be remembered that when the coal is loaded into the mine cars, or even after it has reached the tipple and is dumped over the screens, it has not been placed where it can be used by the consumer.

The Individual Workers in an Organization Likened to the Spokes in a Wheel

In answering this question, the editor has very properly likened the entire force, engaged in the operation of producing coal, to a wheel having many spokes. He states that one spoke may be missing and the wheel will still perform service. The illustration is an apt one and sets me to thinking as to which of all the workers concerned in producing coal on the market is of the most importance.

Now regarding the question from this point of view, it appears to me that there can be no production, unless the mine is operated continuously; and I want to ask, Who of all the mine workers is the one most largely responsible for keeping things moving in the mine? My answer is, The mine boss or foreman. It is my belief that he is the most important spoke in the wheel.

Not only does the mine foreman perform his own particular duties, in the direction of the work; but it is up to him to determine the relative efficiency of each worker in the mine and, by correlating their work, strengthen every spoke in the wheel. Where he discovers one that is weak he studies how to improve and strengthen the defect, or to replace the weak spoke by a stronger one. Should the foreman become inactive, or allow these defects to escape his attention, the development of the mine and its production will certainly suffer.

The importance of a good foreman is readily observed when one goes into a mine and finds the miners idle for lack of cars to load. There may be some trouble on the haulage road, or in the shaft, which delays the turn that should come regularly to each miner. Everything must stand still until the foreman or one of his assistants finds and removes the trouble and again puts the wheel in motion.

A wise management can easily determine the condition of affairs underground, by a close scrutiny of the development shown on the blueprints of the mine map, and by the amount paid for yardage each month. Under normal conditions of working, this amount should be in proportion to the tonnage produced. For this regular development, which is the index of production, I hold that the mine foreman is most largely responsible and is therefore the "prime producer."

Linton, Ind. W. H. LUXTON.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Outlook in Coal Mining

The fact that many helpful suggestions have appeared in *Coal Age*, from time to time, in the discussion of numerous difficult problems that arise in the operation of coal mines leads me to draw attention to a situation into which it would appear the coal-mining industry is helplessly drifting today, and to ask if there is anything that can be done to avoid the disaster that threatens many mines.

It is well known that, for the past three and four years the extraordinary demand for coal, by reason of the war, has resulted in the opening of a large number of mines throughout the country, many of which are in isolated positions in respect to the transportation of their products to market. Again, in the haste to produce a large output of coal, other mines more favorably located are by no means equipped in a manner to compete with longer established operations in their district and supplying the same market.

The question is, What can be done to insure the future of mines that are thus handicapped at the present time? Now that the war is over, there is not the same demand for coal that there was and which was responsible for bringing to life these new operations. It is not strange, representing as they do capital invested largely in a patriotic spirit at the time of the nation's need, that much uneasiness will continue to prevail, unless a way out of their difficulties can be found that will insure to them a future based on an increase in the industrial life of the country? It would seem that there would be a constantly increasing demand for the exportation of coal from this country owing to the devastation in Europe and the needed work of reconstruction, which is now already under way.

Allow me to ask *Coal Age* and its practical readers who are so largely interested in the welfare of the coal-mining industry, what suggestions they have to offer that will render the present outlook more hopeful. What measures can be adopted generally, in the coal industry of this country, that will afford an intelligent solution to the situation that confronts a large number of our mines?

Observation convinces me that this situation is not exceptional, as affecting but a few isolated operations, but there are a large number of producing mines that have not become sufficiently established in the markets and who are otherwise handicapped by reason of their limited experience in the undertaking in which they embarked at a time when the nation needed their help. Now, that times have changed, these young operations need what support and assistance can be given them by government regulations and the intelligent advice of coal operators longer in the game. OPERATOR.

————————, Ill.

Coal Age is glad to submit this inquiry to the helpful consideration of its readers. The letter is but a sample of others that betray the uneasiness that naturally exists in the minds of a number of coal operators owing to the indefiniteness respecting the future of the coal industry.

It is true that all industries are experiencing a crisis at present. How long this crisis must be endured and what the future has in prospect is necessarily quite uncertain, but there is more reason to be hopeful than to be castdown regarding the outlook. There is every reason to anticipate a great revival of business throughout the industrial world, and coal mining is the chief dependency of that industrial life. These are words of cheer, but none the less true.

The present problem, however, is to bridge the chasm of readjustment that divides the abnormal conditions of the war period and the normal conditions to follow when the wheels of industry are again set in motion, and labor and capital are working in harmonious and satisfied coöperation. In the meantime, let our help be extended to preserve the life of every operation, however simple, believing there will soon be need and a ready market for all production.

Without prejudicing the many good suggestions that will undoubtedly come from our practical readers, in response to this appeal, we would suggest that there is great need at this time that every operation should look well to the efficiency of its organization. Particularly is this true in respect to new undertakings. There is far more to be learned, in regard to the efficient and successful operation of a coal mine than many operators of long and varied experience are willing to believe.

The result of recent investigations of power-plant efficiency, in large corporations, has proved that the stopping of unsuspected leaks in all industries can only be intelligently accomplished by those who have an intimate acquaintance with the science and practice involved in an operation and which must go hand in hand in order to secure the highest efficiency. This fact has been demonstrated in the industrial life and success of many large coal corporations.

The present low rate of production in the bituminous mines of the country, and the fact that consumers are getting rid of the reserve stocks accumulated during the war period, presages a scarcity of fuel this winter that will be every bit as serious as that experienced last year. This will be particularly so if the winter is severe.

Under these circumstances, it is a foregone conclusion that the output of every operating mine will be needed if industry resumes the activity it manifested before the signing of the armistice. The demand for coal will then tax the operating facilities of the mines to the uttermost, and the small operations that proved of such utility in the time of need will again justify their reason for existence. Only those plants, however, that have kept equipment and apparatus in first-class working condition will be in position to reap the harvest.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

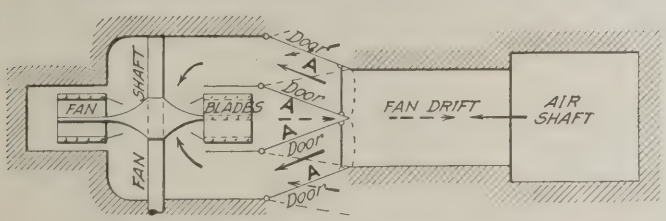
British Columbia Examination First Class, Nov. 20, 1918

(Selected Questions)

Ques.—(a) Explain the difference between a force fan and an exhaust fan. (b) In case of a fire, if it becomes necessary to change an exhaust fan into a force fan, how would you do so? Give an intelligent sketch showing the arrangement necessary to effect the change required.

Ans.—(a) As far as the fan is concerned, the action is the same whether it is exhausting or forcing the air. Air is drawn into the central opening and thrown out toward the circumference of the fan where it is discharged. The difference between these two types of fans consists solely in their connection with the mine. When the fan is forcing or blowing air into the mine, the intake orifice is open to the atmosphere and the discharge is connected with the fan drift leading to the mine. On the other hand, if the fan is exhausting, the intake opening is connected with the fan drift and the air drawn from the mine is discharged into an expanding chimney that opens into the atmosphere.

(b) Referring to the accompanying figure, which is the plan of a fan arranged to exhaust air from a mine,



PLAN OF A REVERSIBLE CENTRIFUGAL FAN

in order to alter this fan to a blower, it is necessary to swing the four doors marked *A* to the positions indicated by the dotted lines. At the same time, it is necessary to cut off the discharge into the chimney and direct the air into the fan drift by swinging another door upward, which is not shown in the plan.

Ques.—Does a change in the barometer affect the volume of air passing through a mine? If 20,000 cu.ft. was passing, with a barometer of 30.5 in., what would be the result if the barometer dropped to 27 in.?

Ans.—A change in barometric pressure produces no appreciable effect in the volume of air passing through a mine ventilated by a centrifugal fan. A fall of barometer from 30.5 in. to 27 in. causes a corresponding decrease in the density of the air, which very slightly affects the efficiency of the ventilator but not to an extent to be appreciable. It has sometimes been assumed that an increase or decrease in the density of the air affects the friction of the air flowing through the mine, but the difference, if any, cannot be measured in the quantity of air passing.

Ques.—State what precautions you would use to prevent accidents and fires arising from defective installation of electricity in the mines, for power purposes.

Ans.—All installations of electricity for power purposes in mines should be in the charge of a competent electrician who is thoroughly familiar with mining conditions. As far as the mine officials are concerned, after the installation has been properly made and approved, every precaution must be taken to see that all rules and regulations are strictly obeyed. Any violations of the rules or tampering with electric wires or electrical installations should be suitably punished. Extra precautions must be used to prevent accidents from falling roof on entries and in passageways where power lines are installed. To avoid accidents from any defect in the installation, all power lines should be periodically and carefully inspected by an electrician, as he is the only one who can detect where an installation is defective.

Ques.—Describe what you consider a really efficient practical and economical system of watering dry and dusty mines.

Ans.—A watering system to be thoroughly effective, in a dry and dusty mine, should be installed by carrying a pipe line through the several airways and, particularly, on the haulage roads. The pipe should be arranged with perforations at suitable intervals, so as to furnish a good spray of water at these points, sufficient to keep the roads and entries in fair condition. It must be remembered, however, that no spraying system of this kind is wholly reliable as a preventive against the dangers of dust, and it is necessary, therefore, to clean all roadways regularly and thoroughly, so as to remove what dust is practicable from the roads and timbers. Branch pipe lines should be conducted to the face of each room or chamber, for the purpose of watering the working faces and the roads in the rooms. Sprinkling at the working face is more important even than the spraying of the haulage roads.

Ques.—Find the size of single pump required to pump 250 imperial gallons per minute from a depth of 500 ft. Effective steam pressure 60 lb. and piston speed 80 ft. per minute.

Ans.— Since the imperial gallon is 277.274 cu.in., 250 imperial gallons is $250 \times 277.274 = 69{,}318.5$ cu.in. Then, assuming the efficiency of the water-end of the pump as 80 per cent., the required plunger displacement is $69{,}318.5 \div 0.80 = 86.648$ cu.in. Then, the piston speed of the pump being 80 ft. per min., the sectional area of the plunger is $86{,}648 \div (12 \times 80) = 90.26$ sq.in. The diameter of the plunger is, therefore, $\sqrt{90.26 \div 0.7854} =$ say $10\frac{3}{4}$ in. But, making due allowance for slippage, we assume a 12-in. plunger. For a head of 500 ft. and allowing 20 ft. additional for friction head, the pressure on the water-end is $520 \times 0.434 = 225$ lb. per sq.in. An available steam pressure of 60 lb. per sq.in. will require a steam cylinder of $225 \div 60 =$ say 4 times the area or twice the diameter of the plunger.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Coal-Mining Situation in France and Belgium

The problem of supplying coal and coke for France and Italy is the most serious economic question of the day, states George S. Rice, in a report made to Van H. Manning, director of the U. S. Bureau of Mines. Mr. Rice is abroad as a member of a commission sent to observe reconstruction conditions and methods in foreign countries.

Before the war France consumed annually about 62,000,000 metric tons of coal. Production, on the other hand, amounted only to 41,000,000 metric tons, which meant that France imported annually about 21,000,000 metric tons of fuel in order to round out her requirements.

The principal coal basin of France is the Nord-Pas de Calais. Three-fourths of this area was occupied by the Germans in 1914 and nearly the whole of the rest of the basin was brought under artillery fire. The coal production was reduced to about 8,000,000 tons, normal production being nearly 30,000,000 tons. It will take from two to five years to increase this amount materially, and perhaps ten years to get back to the normal prewar production.

Belgium before the war consumed 27,000,000 metric tons of coal per year, while the output from her mines amounted to 23,000,000 metric tons annually. Belgium both imported and exported fuel in the prewar period, her imports totalling 9,000,000 metric tons and her exports 5,000,000 metric tons.

The coal mines of Belgium were not destroyed by the Germans, as the latter intended to retain possession of the country. The production has dropped from 23,000,000 metric tons in 1913 to 14,000,000 in 1918, which is a reduction of 40 per cent. The number of workers has been reduced from 145,000 in 1913 to 110,000 in 1918, or a reduction of 24 per cent. The coal mines of Belgium are expensive to operate, and the industry has been greatly disorganized by German occupation. The Belgium coal production will be slow in reviving.

Annual deficits are to be faced in France and Belgium for several years, as can be seen from the following tabulation:

	Metric Tons
Destruction of French output	20,000,000
Reduction of Belgium output	9,000,000
Normal French import over export	21,000,000
Normal Belgium import over export	4,000,000
	54,000,000
Normal output Saar Valley	16,500,000
Now reduced by labor troubles to	12,000,000
Total shortage (considering supply from Saar Valley)	42,000,000

The destruction of metallurgical plants in Belgium and France will lessen the immediate need for fuel by about 12,000,000 metric tons. Pending the rebuilding of plants and the rebuilding of the industry during the next five years or more, there will be a total deficit of about 30,000,000 metric tons of coal per year in France and Belgium.

Great Britain exported before the war 15,000,000 metric tons of coal to France and Belgium, and 9,000,000 metric tons to Germany, making a total of 24,000,000 metric tons exported. Coal production in England has been reduced on account of a shortage of labor.

The Saar Basin politically has three divisions with normal outputs as follows:

	Metric Tons
Prussia	12,000,000
Bavaria	1,500,000
Lorraine Annex	3,000,000

Lorraine Annex will be returned to France. There are some possibilities of further extensions in this part of the Basin. The Bavarian portion is a small corner without much possibility of further development. The Prussian area is the property of the state, thus making it easier to shift ownership or control to France. At the present time all the mines of the Saar Valley are supervised by the French military authorities. Wages have doubled and trebled since the war began.

In the foregoing consideration, Luxemburg has not been counted nor have the needs of Lorraine Annex. Westphalia should be called on to supply these districts and also Holland, which country normally imports 2,000,000 metric tons from Great Britain and over 7,000,000 metric tons from Germany.

English Coal Markets

The outstanding feature of the week's principal coal markets, says the *Iron and Coal Trades Review* of May 9, has been a continual scarcity of fuel supplies. Prices remain fixed for home consumers, but the cost of export coal advances.

In the Tyneside markets the coal situation shows little alteration, though a number of collieries report things as more satisfactory. The inquiry for fuel is heavy from most quarters, and the area of demand is extending.

Throughout Yorkshire and the Midlands, with production better maintained, supplies generally are easier. There is a strong belief that the ban on exports from these districts will be lifted shortly. There is practically little fuel offering in the open market, and prices remain unaffected.

In the South Wales area pressure for all classes of coal continues; and with supplies so limited and Allies receiving preference, it is next to impossible to secure any quantities for export to neutrals.

Conditions in the Scottish coal markets are moving along from day to day without much variation. Outputs are being disposed of without much difficulty, as the demands for home purposes are still fairly good. Surplus tonnages not required for local consumers is readily taken up for export.

Slow in Getting Coal Export Program Under Way

Considerable dissatisfaction is in evidence as to the progress made in getting the export coal trade under way. The methods thus far devised are not regarded as promising. There is complaint arising from the rates which the Shipping Board will charge. It is feared that American exporters will be unable to compete with the English rates, which are said to be much lower.

There is no question, however, that considerable business is to be done with northern Europe and Mediterranean ports. There is little hope, however, of establishing permanent markets. By taking advantage of the present situation and rushing coal to those markets in the largest possible quantities, it is believed that very respectable profits can be made in the near future. This business is being handled with the same idea as had distant dealers in building materials when they rushed large stocks into Baltimore and into San Francisco after the disasters in those two cities. They made large profits for the time being, but had no hope of holding the business permanently. In addition to the financial profit, there will be the important benefit of the experience.

So far as a permanent export market for coal is concerned, the really fertile field is limited to Latin America and to Canada. All are agreed that it is an economic necessity for the country to do an export coal business, but confronted by the Shipping Board's high rates and a decided timidity on the part of the Government to assist, the way that it is going to be accomplished is not clear. Some are of the opinion that coal men at least "cannot hunt business in gangs." When attention is called to the fact that Germany was very successful "in hunting business in gangs," the answer given is that Germany had a government which was not afraid to offend other governments. Nevertheless, there is intense effort being put forth in Washington to reduce the formidableness of the obstacles which confront coal exportation, and it is practically certain that a workable plan will be hit upon finally.

Possibilities for Swedish Coal Imports from America

Sweden is almost entirely dependent on England for its coal supply. Lately coal has been coming into Sweden in quantities approximately but one-third of normal which, of course, is seriously affecting Swedish industry, primarily the iron and steel industry, reports Trade Commissioner Norman L. Anderson, Stockholm. This serious coal shortage has brought forth a great deal of comment relative to the possibilities of obtaining coal from America. Mr. Anderson has been approached by a number of Swedish business men who desire to import coal from the United States, the chief obstacle being, of course, the tonnage situation. Below is given a translation of an article bearing on the subject, which appeared in *Svensk Handelstidning* for Mar. 16, 1919:

Otto Wallenius, a wholesale dealer in Goteborg, has made some rather pessimistic statements concerning the possibilities of importing American coals to Sweden. He points out that an offer, made a month ago, for importation of considerable quantities of coal has been dropped, partly because the price offered, 103.50 crowns ($27.7 per ton is considered too low with the present high freights, especially inasmuch as return cargoes are lacking.

Mr. Fürst, chief of the Swedish Handelskommission (Trade Commission), on the contrary, has pointed out to *Svensk Handelstidning* that the import of American coals does not seem to be impossible. The Handelskommission as well as some private importers are for the present negotiating about it.

According to information the import as regards the Handelskommission would comprise 50,000 tons. As matters stand at present it is, however, very difficult to express any opinion as to the quantity that may be obtained. The whole question depends on the freighting possibilities. The prospects of getting Swedish tonnage are very small, partly because there has lately been a great lack of tonnage, not least because the vessels have been detained for months in English coal ports, and partly because of lack of return cargoes to America. The Handelskommission counts exclusively on American tonnage, of which there seems to be an ample supply. It is not considered impossible, either, to arrange home freight for American vessels from England or perhaps other countries.

Before the war only a small quantity of American coal was imported to Sweden. Therefore it may now be difficult to sell American coal to Swedish coal consumers. Before deciding on any larger coal importation from America, Mr. Fürst further pointed out that it is necessary to ascertain whether there will be a large Swedish market for American coal. If this proves so, which Mr. Fürst for his part does not doubt, one need not give up all hope of importation, especially as there is every reason to expect that the tonnage problem will not be so difficult to solve after the war, as was first feared. Besides, coal import from America has already begun. As is known, the Swedish state railroads have bought 30,000 tons, the first cargoes of which are expected to arrive in Swedish port by the end of this month.

In a conversation that *Svensk Handelstidning* has had with coal import firms in Stockholm, it is pointed out that American coal suppliers have offered coal to several Swedish importers at a price varying between 105, 115 and 117 crowns per ton, and even more, c. i. f. Goteborg. The Stockholm importers, however, do not wish any reloading in Goteborg, as that would make the coal still dearer. Besides, they can hardly bear any reloading and therefore the importers wish the coal delivered directly to Stockholm.

COAL AND COKE NEWS

What Happened in May

[The bracketed figures in the text refer to the number and the page of the volume in which references to the matter noted may be found and should the reader desire further information he can obtain it in the place indicated.]

May 2—The United States Circuit Court of Appeals hands down a conditional affirmation of the judgment rendered by the District Court in the case of the Coronado County Mining Co., of Sebastian County, Ark. vs. the United Mine Workers of America [XV, 873]—The large breaker of the Delaware & Hudson Co., at Jermyn, is closed for an indefinite period. Coal from the Jermyn mines will be sent to the Powderly breaker [XV, 929]—Charles D. Neill hands down a decision under which 200 contract miners of the Lehigh & Wilkes-Barre Coal Co. will receive back pay for work done since 1917. The point at issue was payment for the removal of rock in the robbing of pillars. [XV, 916].

May 3—A disastrous accident occurs at the mine of Old Ben Coal Corporation, at Buckner, Ill. As several men are being hoisted out of the mine on a cage, one is killed and three others are injured. [XV, 930]—As the result of a mine fire on No. 12 east gangway, Nottingham Mine, of the Lehigh & Wilkes-Barre Coal Co., 50 men nearly lose their lives. They are brought to the surface in a serious condition, being overcome by blackdamp [XV, 885]—The Victory Loan drive ends at 12 o'clock, midnight—The coal-export committee of the American Mining Congress meets at a luncheon in the rooms of the Machinery Club, 50 Church St., New York City. The meeting votes to appoint a committee to prepare a report and recommendation for coöperative effort to be submitted to a general conference [XV, 867]—The Western Coal Operators' Association of Canada meets and discusses the position of the coal industry in regard to the labor question [XV, 1093].

May 5—Charles P. Neill rules that contract miners who are taken off their regular work for an emergency job shall be paid the rate called for in their scale if the pay for the other job is less [XV, 916]—A cage containing ten miners drops 1100 ft. at the Maple Hill shaft of the Philadelphia & Reading Coal and Iron Co., resulting in the death of one miner and the serious injury of the nine other men, two of whom may die [XV, 885].

May 7—A new workmen's compensation bill is introduced at the Pennsylvania legislature by Senator Smith [XV, 929]—The peace treaty and the constitution of the league of nations (one document) framed by the peace conference at Paris, is handed to the German plenipotentiaries—The Mt. Jessup Coal Co.'s employees, to the number of 400, go on strike, leaving only the company men at work. The men claim that their wages are being reduced [XV, 916]—The Racket Brook Coal Co.'s 300 employees declare a strike because the company refuses to reinstate a motorman and brakeman who had been discharged [XV, 916].

May 8—An open market for steel products is created when representatives of the Railroad Administration and members of the general committee of the American Iron and Steel Institute fail to agree on minimum stabilization prices—Charles P. Neill rules that mine workers cannot be expected to be reinstated in their jobs if the operators can show that they were discharged for incompetency, in dismissing the complaint of H. C. Singley against the Evans Colliery Co., of Beaver Meadow, Penn.

May 9—The resignation of the Industrial Board, George N. Peek, chairman, is accepted by Secretary Redfield. Upon retiring the board releases all industries from its findings—State mine inspector Frank Rossbottom, of Illinois, announces that the conference between miners' representatives, operators and school authorities to be held in Duquoin, Ill., today, is postponed until June 6. Vocational training is to be discussed [XV, 929].

May 10—Attorney General A. Mitchell Palmer makes public an opinion to the effect that the Redfield plan for stabilizing prices in industry violates the anti-trust laws; he declares price fixing illegal. Any modification of statutes upholding a non-competitive policy must come from Congress.

May 15—All rules, regulations or orders issued by the U. S. Fuel Administrator, H. A. Garfield, relative to oil and gas, are set aside. The annual meeting of the Central Pennsylvania Coal Producers' Association is held at Altoona, Penn. Addresses are made and officers elected [XV, 1017].

May 16—The Northeast Kentucky Coal Association holds a special meeting at Ashland, Ky. Income tax statements and freight rates are discussed [XXV, 1018]—The Central Pennsylvania Coal Producers' Association holds its annual meeting at Altoona. Officers are elected [XV, 1017]—A special meeting of the operators of northeast Kentucky is held at Ashland, Ky. [XV, 1018].

May 20—Compensation amendments proposed by the Pennsylvania state administration bill are given a hearing before the Senate judiciary general committee at Harrisburg, Penn. [XV, 1016]—Amendments to the Mangan bill are proposed in the Pennsylvania Senate judiciary general committee [XV, 1916]—Congress opens at Washington, D. C., and President Wilson's message is read to the two houses.

May 22-24—The National Coal Association holds its annual meeting at Chicago in the Congress Hotel. The convention elects officers for the ensuing year [XV, 1000].

May 26—The Caldwell Bill, proposing a loan of the Government's surplus machine tools to various technical institutions in the U. S., is introduced in the U. S. House of Representatives [XV, 1090].

May 27—Men at one of the mines of the New River Co., in Raleigh Co., W. Va., return to work. Miners at another nearby mine of this company remain on strike—a question of electrification of an incline [XV, 1052].

May 27—The Ohio Valley Coal Operators' Association secures an order from the Interstate Commerce Commission directing the railroads to make marked reductions in rates on coal from western Kentucky [XV, 1063]—John P. Reese, vice president and general manager of the Chicago & Northwestern coal properties, dies at his home in St. Louis, Mo. [XV, 1065].

May 28—The administration compensation bill is reported to the Pennsylvania state Senate judiciary special committee [XV, 1063]—A committee of senators of the Pennsylvania Legislature confer with anthracite coal operators in regard to the mine cave question [XV, 1063].

May 29—It is recorded that all mine workers are out in District No. 18 (eastern British Columbia and Alberta) as a result of a disagreement about wages [XV, 1052]—The Shipping Board holds a meeting of representatives of producers, exporters and brokers at which the export situation is discussed [XV, 1060].

May 29-30—The first meeting of the Coal Mining Electricians' and Mechanics' Institute is held at Charleston, W. Va. [XV, 1076].

Harrisburg, Penn.

Efforts of representatives of employers to amend the workmen's compensation bill, in the face of the opposition of Governor Sproul and Attorney General Schaeffer, failed in the Senate on June 11. As a result the bill, which increases the scale of compensation, remains on the calender.

B. M. Clark, representing the bituminous coal interests, states that the basis on which compensation was computed in the bill as it stands amounts to more than the 60 per cent. which the bill is supposed to allow and is "Unreasonable, unjust and unfair." In some cases the compensation to be paid to beneficiaries of the bill would amount to as high as 125 and 150 per cent.

Charles F. Huber, president of the Lehigh & Wilkes-Barre Coal Co. also objected to a provision of the bill which does not deduct amounts for materials, supplies, tools and other things furnished to miners in computing wages received. He suggests that "materials, supplies and tools and other things" be included in the deduction.

The bill provides that in computing a man's wages with regard to continuous employment the wages shall be taken to be five and one-half times his average earnings at the rate for a working day fixed before an accident occurs and using, as a basis of calculation, his earnings during so much of the preceding six months as he worked for the same employer.

The amendment which it was sought by Mr. Clark to insert in the Senate bill provided that a man's average weekly earnings are to be ascertained by dividing his total earnings for so much of the preceding twelve months as he was in the employ of the employer, by the number of calendar weeks in such period; deducting, however, from such divisor and full weeks or fractional parts thereof during which he was prevented from working by reason of his own sickness, as evidenced by affidavit of attending physician.

Workmen in the mining regions of the state will be interested in an opinion given by Deputy Attorney General Hargest to state Chief of Mines Seward E. Button, to the effect that a man coming to this country with his parents, while still under twenty-one years of age, becomes a citizen without naturalization and that he is eligible for a certificate as fireboss in a mine.

Uniontown, Penn.

Official announcement has been made of the sale of all of the former holdings of J. V. Thompson, at the time of his failure the largest single holder of coal lands in the world, to the Piedmont Coal Co., a Pennsylvania corporation, for a sum approximating $18,000,000. Of this sum $5,500,000 is to be paid in cash and is for the unsecured creditors of Mr. Thompson, returning approximately 43c. on the dollar of unsecured claims. The secured indebtedness assumed by the purchasers totals between $12,000,000 and $13,000,000.

The actual identity of the Piedmont Coal Co. is withheld, but in financial circles which have been watching the negotiations there is a general impression that the company is a subsidiary or is affiliated with the United States Steel Corporation, and that the Hope Natural Gas Co. may be interested in the deal which involves the West Virginia holdings. Samuel McClay, an attorney, of Pittsburgh, is president of the Piedmont Coal Co., and William T. Irwin, of Pittsburgh, treasurer of the Union Trust Co. of that city, is also treasurer of the Piedmont Coal Company.

During the past two years the trustees have sold, under approval of the court, coal lands totaling in sales $6,500,000, bringing the total returns from the properties to around $25,000,000. The appraisement made by the receivers in 1915 estimated the value of the properties at $65,000,000. This appraisement included all of the properties turned over to the receivers, and showed the principal holdings of Mr. Thompson in 1915 to be as follows: Greene

County Holdings—Acreage 58,403.79, valued at $32,047,900.50. Washington County Holdings—Acreage 10,172.29, valued at $3,150,186.60. West Virginia Holdings—Acreage 72,103.03, valued at $18,868,841.55. Fayette County Holdings—Acreage in coal, 735, acreage in surface, 7,877.40, all valued at $2,646,500. Plant and factory sites in Allegheny, Armstrong and Beaver counties, Pennsylvania, valued at $1,557,500.

Charleston, W. Va.

Coal production in central-southern West Virginia was retarded during the first ten days of June by a car shortage confined to no one railroad system although at the end of the period mentioned the car situation had shown some improvement but was still hampering production to an appreciable extent. The continued reduction in no-market losses was more than offset by the increase in car shortage losses. The car shortage was attributed to congestion at Lake ports where the pooling of coal has been discontinued.

During the first ten days of June export shipments were increasing in volume insofar as was possible under transportation conditions existing during the period referred to, the demand being in fact insistent for coal from this particular producing section. Production from the Kanawha River south was reduced at least one-third, generally speaking, by the scarcity of cars, inadequate man power also being a factor in holding down production. The demand for coal on the Lakes was strong. Gas coal also showed considerable activity.

There would have been a much heavier tonnage out of the Kanawha district during the first ten days of the month but for lack of cars in a part of the district.

Strange to say while some parts of the field felt the need of cars others had a plentiful supply. Cabin Creek operations found it almost impossible to secure cars. The mines of the district were unable to produce more than 60 per cent. of the normal output, the general demand being such as would have justified a much larger production. Consequently some mines were limited to only about half a week's operation, although increased demand for all grades would have, under ordinary circumstances, stimulated production. The demand for Kanawha gas coal was becoming more insistant.

Up until June 10 the Chesapeake & Ohio was unable to furnish cars in sufficient quantity to meet the requirements of the mines. As is generally known, New River smokeless is in strong demand just now, not only in domestic areas but in the export trade. Much coal has been going to the Lakes as well as to New England and the supply for these markets was cut off to some extent by the shortage of cars. A scarcity of miners was also a factor in restricting the output.

The report was in circulation on June 10 in the New River field that an embargo had been placed for the time being on shipments to the Lakes owing to congested conditions. The demand for prepared sizes of smokeless is such that this particular grade is now quoted at $4. a ton, run-of-mine ranging from $2.75 to $3 and over. There is in evidence a much better demand for slack.

A 20 per cent. loss in production amounting to 71,000 tons was sustained in the Logan mining district, through car shortage alone. This was almost half of the entire production loss of 47 per cent. and the total production loss was 164,000 tons. The bulk of the remaining loss arose from no market—75,000 tons. Other sources of loss were almost negligible, but the increase in the car shortage loss which was almost double, was more than sufficient to offset the no market gain. As there were 182,000 tons produced it will be seen that but for lack of equipment mines of the district might have exceeded production for the same period of 1918 which was only 194,000 tons. The report covering May production shows 795,000 tons mined as against 1,023,000 for May of last year. May production averaged 54 per cent. of capacity which was 1,472,000, there being therefore during May a production loss of 676,000 tons. Logan coal is in much stronger demand both on the Lakes and in eastern markets. This is particularly true of gas coal.

Fairmont, W. Va.

Conditions in northern West Virginia coal producing fields during the first seven days of June were altogether different from those prevailing elsewhere in the state, at least insofar as transportation facilities were concerned. The cars furnished were ample for all requirements even though the outgoing tonnage was slightly augmented because of additional orders. Figures already compiled show that May was the best month of the year from the standpoint of production, the total shipments from the mines around Fairmont amounting to 876,000 tons. In April shipments totaled 695,000 tons.

Railroad fuel shipments were heavy throughout May, the railroads taking more than a third of the coal mined, 2123 cars went to the Lakes. It was evident during the first third of June that slight gains were being made in Lake shipments as well as to tidewater and more mines were engaged in getting out coal for export. Railroad fuel was averaging much more than a third of the total shipments. A further expansion of export shipments is looked for after July 1 when more boats will be available.

That inroads are being made on the producers of the Fairmont and other northern West Virginia regions by Ohio and Illinois operators insofar as the Lake trade is concerned is the feeling of some coal men in this section. Illinois producers as well as those in eastern Ohio have succeeded in getting a large slice of Lake business during the present year.

Birmingham, Ala.

Extensive developments in the Birmingham mining district, inaugurated by the Woodward Iron Co. two years ago, are about completed; the greater part of the new plants are ready for operation and are expected to start up during this month. The new coal mine on the company's railroad between Dolomite and Mulga is nearly completed. This is one of the large slopes of the country. The mine is equipped with every modern device, and the slope is double-tracked its entire length. Approximately 2000 men will be given employment in and around the new mines.

In addition to proving adjacent properties by drilling, three new tipples have been completed at the Dolomite openings. Each of these tipples have two dumps. With the blowing in of the third furnace at Woodward recently, it is understood that the night shifts at the mines will be resumed.

Coal fields heretofore undeveloped and without means of transportation at present will be opened up, if approximately 60 miles of navigable water are added to the Warrior River; construction of an additional dam and lock on that river may be recommended to Congress by a surveying party of United States engineers who are said to be investigating the situation. Development of the proposed project would afford an outlet for coal lands in Walker and Jefferson counties.

This investigation is authorized under an act of Congress of July 27, 1916, directing a preliminary examination and survey of Mulberry Fork of the Warrior, above Sanders Shoals. Completion of the proposed improvement, it is stated by Col. R. S. Thomas, engineer in charge, would provide 60 additional miles of navigable water to mine operators using the Black Warrior, affording outlet to coal lands noted.

Nanaimo, B. C.

A largely attended meeting was held recently at Nanaimo, B. C., to protest against the action of the lieutenant-governor in withholding his assent to the legislation passed by the Provincial Legislature in 1918 giving settlers within the Esquimalt & Nanaimo Railway belt an opportunity to claim the coal rights on their property. Addresses were delivered by Hon. Wm. Sloan, Minister of Mines; J. H. Hawthornthwaite, Member of Provincial Parliament, and Harvey Murphy, the latter being president of the Nanaimo Board of Trade. The former went fully into the history of the settlers' struggle for the coal on their property and argued that they were asking no more than justice, which should be accorded. Messrs. Hawthornthwaite and Murphy encouraged the claimants to persevere, assuring them that, with right on their side, they would be successful. The following resolution was enthusiastically carried:

"That this meeting emphatically protests against the action of the lieutenant-governor in refusing his assent to the settlers' rights bill and demands that consideration of assent be given forthwith. And be it further resolved, that this meeting protest against any invasion of recognized provincial rights."

PENNSYLVANIA

Anthracite

Scranton—For a number of years I. W. W. agitators have harassed the Jermyn Coal Co. in the operation of its colliery near Scranton, and this, together with the high cost of operation, has caused the company to close down.

Harrisburg—The Pennsylvania Department of Mines announces that no examination of mine inspectors will be held this year. Furthermore, it is stated that the report of this department is still in the hands of the state printer.

Hazleton — Local companies report an increase in New England orders, which were cut off by official rulings during the war.

Wood-pulp pipe in standard sizes has been introduced in this field and will be given a test where acid mine water causes pipe-line trouble.

Dunbar — Damage aggregating $20,000 was caused by fire at the Freeport No. 2 mine of the American Manganese Co. at Dunbar when the tipple, 15 cars loaded with coal, fan house, blacksmith shop, office, repair shop and motor shed were destroyed. It is expected that it will require two months to complete repairs. The origin of the fire has not been ascertained.

Bituminous

Confluence—The Laurel Coal Mining Co., of this place, whose mines are located on the Western Maryland R.R., started about nine months ago to modernize its plant. The improvements are completed and include: An electric plant and Sullivan coal-mining machines and an Ironton storage-battery locomotive. The company expects to materially increase its production. J. H. C. Barr is general manager and W. R. Jones is mine superintendent.

Clearfield—M. D. Kelly, of the Kelly Bros. Coal Co., at Snow Shoe, which has mines at Snow Shoe, Karthaus, Houtzdale, Cherry Run and Kate Glen, a few days ago sold 5500 acres of coal land situated in the lower end of Clearfield County to Pittsburgh capitalists for $225,000. The company intends to make improvements costing $150,000. It is expected the new operations will have an output of two or three thousand tons a day by the first of the year.

Uniontown—Within the past few days it is stated that contracts aggregating 210,000 tons of coal have been placed for railroad fuel, resulting in increased operations at a number of Fayette County mines. There is also a well authenticated rumor in coke circles that four cargoes of export coke have been shipped from this section within the past four weeks.

The Republic Iron and Steel Co. made largely increased coal shipments from its Republic and Martin mines during the first part of this month, though the company is not firing any additional ovens. The Century Coke Co., near Brownsville, fired 50 ovens recently, making the half of their ovens now in blast. The H. C. Frick Coke Co. is also making additional coal shipments. The W. J. Rainey Co. is firing additional ovens at its Allison and Royal plants.

WEST VIRGINIA

Bluefield—Colonel William Leckie, of Welch, recently purchased an office building here with the intention of making it the headquarters and offices of the ten coal companies in which he is interested. It is stated that an annual business of $1,500,000 will be brought to Bluefield by this deal. Colonel Leckie expects to move from Welch and make his home in this place.

Fayetteville—Five hundred and forty acres of coal land in Fayette County have been leased by the Bee Lick Knob Coal Co. from the Sewellmont Coal Co. on a royalty basis, the lease to run for a period of 40 years. Under the terms of the lease, the lessor is to receive a royalty on not less than 20,000 tons for the first year, 40,000 for the second year, and 80,000 for each year thereafter. Royalty is to be at the rate of 15 cents a ton on coal and 22 cents a ton (short) on coke.

Fairmont—C. H. Tarleton, manager of the West Virginia division of the Consolidation Coal Co., announced the following changes in mine superintendents which were effective June 1: Robert Heann, in charge of mine No. 55 is transferred to mine No. 24, as superintendent. Vice W. J. Davis, who is transferred to mine No. 43 as foreman, J. H. Nuzzum is to act as superintendent of mine No. 55 until other arrangements are made.

Charleston—A lease on 302 acres of coal land on Lens Creek in Kanawha County has been made to John Steptoe by the Lens Creek Coal Co. for a period of 25 years, the lease including buildings and mining equipment and the consideration being $5000 in cash and $13,000 in promissory notes, a royalty of 30c. a ton to be paid during the life of the notes and 10c. a ton after they are paid. The lessee is required to pay royalty on a minimum production of 24,000 tons.

Page—Beard's Fork is now the center of mining activities for the Loup Creek Collieries. Here the company has two mines developing about 2000 acres of No. 2 Kanawha coal. One tipple is used for both mines, a retarding conveyor having a capacity of 300 tons per hour being used between mines and tipple. Inside equipment consists of Jeffrey and Westinghouse locomotives and Jeffrey short-wall mining machines. There are eight pairs of openings at the north and six pairs at the south mine. The company has also finished construction work on 125 miners' cottages equipped with electricity.

OHIO

Glouster—Chief Deputy Jerome Watson, of the state Department of Mines, and Deputy Inspector Andrew Ginnan are making an inspection of coal mines in this section and in the Hocking Valley. They are especially interested in mines which connect with the workings of adjoining plants. When the inspection is completed these officials will have information to assist them in making recommendations to further safeguard employees in these mines.

ILLINOIS

De Soto—The Peacock Coal Mining Co. is now sinking its main shaft down to the No. 5 seam, which is about 50 ft. below the No. 6 seam. The coal taken from the drill holes shows up so exceptionally well that it is planned to work both of these beds at the same time, which is something that no other mine in southern Illinois is doing.

Duquoin—The J. R. Crowe Coal and Mining Co., of Kansas City, has leased approximately 3500 acres of coal lands located two miles southwest of here. The Crowe company is one of the largest operators in the southwestern district of Kansas, and is also identified with coal interests in Missouri. Engineers are on the ground making a survey to determine the best location for a new mine. The plant will be modernly equipped and will be connected with the Illinois Central R.R. This is the first venture in the Illinois fields for the Crowe company.

Niantic—Early on the morning of June 10 fire destroyed nearly all of the upper works of the Niantic Carbon Coal Co.'s plant, near here, causing a loss of $40,000 or more. The origin of the fire is unknown; it was discovered by the mine engineer. Five mules down in the mine were suffocated, but fortunately no men were in the workings at the time. The fire started in the screen house and spread to the other buildings; two carloads of coal also were consumed. Considerable smoke entered the mine but the flames did not penetrate the workings. The mine has been in operation about 30 years and employs 100 miners. The owners of the mine are J. M. Dorcine, David Beggs, Daniel Macknet, Frank Shields, Chester Russell, and B. T. Wagoner. The property was partly insured and will be rebuilt without delay.

Benton—The Chicago, Wilmington & Franklin Coal Co. has purchased from Mr. and Mrs. Robert Williams, of Flint, Mich., the mine here which has been operated by the Benton Coal Co. The consideration is understood to have been about $1,500,000. This gives the company three mines in this section; it recently acquired the Hart-Williams mine and has operated the big colliery at Orient for about six years. The purchase of the two former mines, with mineral rights, links up the properties of the companies from Benton to Orient, some seven miles. The Benton Coal Co.'s mine was sunk about 17 years ago. In the past year improvements costing about $250,000 have been made at this plant, including the installation of a new rescreening plant. In 1918 The Benton company produced 437,364 tons of coal.

Personals

William Littlejohn has been appointed general superintendent of the Utah company, with headquarters at Castle Gate, Utah, in the place of J. S. Thompson, deceased.

E. A. Hitchcock has recently become connected with the Bailey Meter Co., of Cleveland, Ohio, as vice president. He will supervise the training of technical graduates for the company's service and sales departments.

Charles F. O'Hagan, formerly chief engineer of William B. Scaife & Sons, of Pittsburgh, Penn., will be resident engineer and manager of this company's Chicago office when it opens on July 1, as a sales and engineering department.

Mark R. Lamb is at Duquoin, Ill., where he is examining the underground coal loading equipment of the Union Colliery Co., in connection with similar equipment for coal mines in France. At this mine coal is hoisted in skips which permits of large tonnage with moderate rope speed.

M. H. Jones, who has been connected with the Westinghouse Electric and Mfg. Co. for the past 15 years, as assistant to manager of the Philadelphia district, has resigned his position with that company to become sales manager of the Standard Electric and Elevator Co., of Baltimore, Md.

Major Donald Markle, of Hazleton, who served with the Fourth Division in France, resigned, on June 8, from the Cranberry Creek Coal Co. and the Harwood Coal Co., to become general manager of the Blair-Cambria Coal Co. (a bituminous operation), and of the Altoona Northern Railroad, a fourteen-mile line connecting the coal mines with Altoona.

F. R. Lyon has been made a vice president of the Consolidation Coal Co., having been general manager of this concern since 1913. He entered the services of the company as manager of the Maryland division. **A. Brooks Fleming**, who started as a mine superintendent of the company, has been selected as assistant to the president. Mr. Fleming was production manager in northern West Virgina during the war.

Coming Meetings

The Missouri State Retail Coal Merchants' Association will hold its second annual meeting in St. Louis, Mo., on Monday and Tuesday, June 23 and 24, at the Planters' Hotel. Secretary, E. J. Wallace, St. Louis, Mo.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

American Institute of Electrical Engineers will hold its annual convention at the Lake Placid Club, Adirondacks, N. Y., June 24 to 27. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Northeast Kentucky Welfare and First Aid Association will hold a first-aid contest July 4 at Pikeville, Ky. Secretary, E. H. Sowards, Pikeville, Ky.

The Rocky Mountain Coal Mining Institute will meet in Salt Lake City the first week in July, 1919. Secretary, F. W. Whiteside, Denver, Colo.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind. Secretary, J. W. Paul, Pittsburgh, Penn.

The National Commissary Managers' Association will hold its annual meeting August 5-7 at the Sinton Hotel, Cincinnati, Ohio. Secretary, D. J. Eichoff, Manhattan Building, Chicago, Ill.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting July 23 and 24 at Reading, Penn. Secretary, W. M. Bertolet, Reading, Penn.

National Exposition of Chemical Industries will hold its fifth annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

Industrial News

Moundsville, W. Va.—The Dunkard Valley Coal Co. has purchased 7½ acres of land and coal from Davis Powers—consideration $3750.

Baltimore, Md.—The Standard Electric and Elevator, Inc., has opened a New York office at 280 Broadway, in charge of C. A. Yarrington, formerly sales manager of the company.

Cleveland, Ohio—The Lincoln Bonding Co. has opened up a Chicago office at 504 Fisher Bldg. This new branch of the company is under the supervision of W. C. Burdick, sales manager.

Uniontown, Penn.—Negotiations have been completed by the Callahan Coal and Coke Co. for the purchase of a total of 435 acres of coal located in Lower Turkeyfoot Township, Somerset County, formerly held by Harry N. Mitchell.

Senecaville, Ohio—The Akron Coal Co. has awarded the contract to the J. W. Williamson Co., Columbus, for construction of a tipple at the Rigby mine which it will open here. A shaft 175 ft. deep will be necessary.

Thacker, W. Va.—The Thacker Coal and Coke Co.'s plants at this place have resumed operation, after being closed down since Feb. 1. These mines are large producers, employing over 600 men. The company is controlled by the Houston interest.

Ebensburg, Penn.—The Commercial Coal Mining Co. is understood to be arranging for the development of one of its lower seams of coal by a slope opening on its holdings in the vicinity of Red Mills, Blacklick Township, to provide for increased operations.

Pittsburgh, Penn.—The Pittsburgh Coal Co. has recently completed negotiations for the purchase of a tract of coal located at Amwell Township, comprising about 15½ acres, and a site in Canton Township approximating 108 acres. It is said that the company is planning for development.

Sergent, Ky.—It is announced that Jouett, Biglow & Brooks, of Cincinnati, have taken over the Cumberland-Hazard Coal Mining Co.'s property near here. The name of the corporation is to be changed to the Florence Mining Co. and a number of improvements in the plant are contemplated.

New York, N. Y.—The Macomber & Whyte Rope Co., of Kenosha, Wis., announces the opening of a branch office at this place at 30 Church St., under the management of E. E. Robirds. Mr. Robirds has been with this company for 10 years, having been successively manager of the Pittsburgh and Chicago offices.

Portsmouth, O.—The Welston-Hill Coal Co. has recently completed negotiations for the acquirement of the holdings of the Coalton Fuel Co., Washington Township, comprising a total of about 440 acres. It is understood that the new owner will continue operations on an increased scale. Homer Goddard is president and Earl Littler, secretary.

Coal Run, Ky.—C. E. Steele, owner of the Coal Run Coal Co. at this place, and manager also of the Funk Coal Co., at Sutton, Ky., has sold his interest in the Coal Run company to H. H. Funk. Pending the resumption of operations at the Funk company's plant, many repairs have been undertaken and much construction work is in progress so as to fit the mines for increased output when operations are resumed.

New York, N. Y.—The New York Testing Laboratories which have been organized by L. R. Seidell, G. B. Jack, Jr., and H. H. Geist, formerly chief metallurgist, assistant chief metallurgist and chief chemist, respectively, of the Wright-Martin Aircraft Corporation, have in addition to their well equipped laboratories at 354 Mulberry St., Newark, N. J., opened up their New York Offices at 74-80 Washington St. In addition to chemical and physical testing and microphotography, this organization is specializing in the source inspection of materials, and as consultants in smelting, foundry, drop forging and heat treating practices and metallurgical investigation of shop troubles. They are also making chemical investigation of various ore and mineral deposits, their application to industrial purposes and possibilities of marketing same.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Buying Improves and Domestic Grades of Soft Coal Strengthen in Price—Labor Problem Promises to Be Difficult of Solution—Mines Working 50 Per Cent. of Capacity —Anthracite Domestic Sizes in Urgent Request

REPORTS coming from the important soft-coal consuming sections indicate that buying is somewhat more pronounced and that there is a tendency toward a strengthening in prices of the high-grade domestic bituminous coals. The matter of disposing of the steam sizes still remains a problem, however, though both the producing and marketing interests maintain their feeling of confidence that there will be a decided betterment shortly.

Stocks of soft coal in the hands of consumers are not exhausted. Probably only one-third of the reserves held in storage at the beginning of the year still remains yet users are unwilling to contract for their future requirements at the prices quoted by the operators.

The labor question grows more serious with the exodus of miners and the unwillingness of many of them to work full time. By next fall and winter the operations will be unable to work to more than 75 per cent. of full-time capacity, owing to the inadequate labor supply. In addition, it is doubtful if the railroads will be in a position to handle the full movement of coal and other freight this winter, for reasons that are obvious.

Operations are now running at about 50 per cent. or so, on an average, though some mines are working more than others. During the week ended June 7 nearly 9,000,000 net tons of soft coal were produced. The estimated production of bituminous coal for the calendar year to June 7 is 186,278,000 net tons compared to 247,196,000 net tons for the same period of 1918.

Complaint is general of the shortage of the domestic sizes of anthracite. Stove and egg, in the order named, are the sizes in greatest request, with chestnut running a close third. It is likely that by the end of the year consumers who are now so insistent on receiving these coals will have to resort to the use of different sizes, as it seems to be a foregone conclusion that production of the domestic grades of hard coal will not be able to catch up with the demand this year.

Steam coals move more slowly, and not much improvement is looked for until the winter sets in. Many operators are commencing to store these small coals at the mines against the time when consumers will be in the market for them.

The output of hard coal in the week ended June 7 totals 1,695,000 net tons. For the calendar year to June 7 the production of anthracite is estimated at 33,349,500 net tons, compared with 42,858,000 for the corresponding period of last year.

WEEKLY COAL PRODUCTION

The production of bituminous coal in the week ended June 7 is established at nearly 9,000,000 net tons, an increase over the week ended May 31, in which Memorial Day was observed as a holiday in some of the districts, of about 1,000,000 tons, and an increase over the week ended May 24 of 200,000 tons or 2.5 per cent. The production in the week ended June 7, 1919, was 3,635,000 tons or 29 per cent. less than in the corresponding week of 1918.

The average daily production per working day for the week ended June 7 was 1,488,000 tons compared with 1,456,000 tons in the week ended May 24. Reports of working time received from the operators for the week ended May 31 indicate that on the average over the country about one-half day in that week is to be considered as having been a holiday and that the average daily output in the week ended May 31 should be calculated on the basis of 5.5 working days. The estimated production of bituminous coal for the calendar year to June 7 is 186,278,000 tons compared with 247,196,000 tons for the same period of last year.

The production of anthracite in the week ended June 6 is estimated at 1,695,000 net tons compared with 1,285,000 net tons in the week ended May 31, and 1,656,000 in the week ended May 24. The production in the first week of June, 1918, was estimated at 2,034,000 net tons. The production for the calendar year to date is 33,349,500 net tons compared with 42,858,000 for the corresponding period of last year.

The production of beehive coke in the United States is estimated at 269,000 net tons for the week ended June 7, an increase compared with 264,500 tons in the week ended May 31, but below the output of 660,000 tons in the week ended June 8, 1918. Production of beehive coke this year to date is estimated at 8,750,000 tons compared with 13,207,000 tons in the same period of last year. All of the eastern districts report increases in the week ended June 7 compared with the last week in May, and the districts west of the Mississippi report decreases.

Bituminous coal dumped at lower lake ports in the week ended May 31, 1,004,753 net tons, was the record week for this year and the first week in which the million-ton mark was passed. The dumpings in the last week of May this year exceed the record for the last week of May, 1918, by more than 300,000 tons. The total coal forwarded from lower lake ports to the end of May is more than 5,000,000 tons and exceeds the movement of cargo coal last year by nearly three quarter million tons.

Atlantic Seaboard

BOSTON

No distinct change but undertone continues favorable. Reports of labor shortage are a factor in current situation. Postponement of navy's decision restricts volume of high-grade coals for open market. Other grades continue druggy. Dull market via New York and Philadelphia piers. Strike of trimmers at Norfolk interrupts shipments. Railroad purchases continue talk of the trade. Anthracite shipments disappointing.

Bituminous—The week has disclosed no significant change in market conditions. In most cases operators are still soliciting orders for June and July, although there are distinctly fewer contract offerings than a fortnight ago. Trade is light in practically every direction, but there is now a pronounced undertone that seems to forecast higher prices in the fall. Shippers have been arguing this for so long a period that not many buyers are impressed, but undeniably there has already begun a new spurt in buying for future needs. Large steam-users who have been marking time and trying coals have now come into the market for more or less comprehensive tonnages. The movement all-rail has not yet begun to show a material increase, but figures on July 1 should prove that there has been additional buying since June came in. The larger share of this increase in receipts will be for the high grades from Central Pennsylvania. Certain of these coals are now practically out of the market, and although medium and low grades are still to be had at prices well down to $2, it is expected that the generally improved state of the market will react on these as well before many weeks have elapsed.

Already there are reports of labor shortage in the region. At some operations where there has been a consistent effort for months to dispose of current output these efforts have now been relaxed because there are more spot orders on file than can conveniently be shipped. There are several instances where agencies in this territory have been obliged to cease selling for prompt shipment to permit the mines to catch up on production. When this happens in June it is a good sign and there are few in the trade who do not now predict freely that something like a "broad" market will prevail in October, if not before.

The Navy Department has not yet reached a decision, apparently, on the coals to be taken at New York under the proposals opened on May 29, and in consequence there are several shippers "in the air" as to the volume of commercial coal they will have available. As a matter of fact the delay, together with labor uncertainty, enables operators to withhold sales until a time when spot coal will almost certainly sell at a considerably higher level. Obviously, from now on, the quality grades from Central Pennsylvania will have sufficient demand for what coal can be mined. The Government is sure to get its quota, and coals on the accepted list will not go begging very much longer.

On the other hand, there are many producers of medium and poor grades who continue with difficulty to run their mines but two or three days a week. This territory is still being combed over for spot orders, and price inducements are being made as freely as at any time since January. Fairmont grades can be bought at $1.85@2 per net ton f.o.b. mines, and there is no dearth of Clearfield coal at $2.15 upward. The trend of buying here is toward the best coals for the money and there is bound to be only a narrow market for high-volatile or high-ash coals until the better grades cease to be offered. Meanwhile, the demand is certain to be inactive.

At the New York piers the demand is also dull and lifeless. Aside from bunker-

ing the tonnage dumped is light and relatively only a small volume is moving either on Long Island Sound or to Boston and the points eastward. At Philadelphia the movement is practically confined to locomotive fuel for such roads as the Maine Central, the Bangor & Aroostook, Canadian Pacific and others. Eastern dealers are not sparing any space from anthracite, under present conditions, and no shippers dare send coal to the Philadelphia piers without orders and marine transportation in hand. The result is that for the most part coal is coming down from the mines only on special order. From Philadelphia it is now practically impossible to secure Reading barges for commercial bituminous, so large a proportion of the fleet having been allocated to the railroads for engine fuel.

The trimmers' strike at Norfolk has been the outstanding fact in Pocahontas and New River distribution the past week. This has meant practically a cessation of loading for several days and in other times would have meant serious interruption in the flow of coal. The agencies have done what they could to shift steamers to other piers and they have also discontinued chartering steamers and barges on a trip-to-trip basis. There has been practically no effect on the situation here, for the southern coals this year are cutting only a very light figure in the New England market.

The more that is learned about railroad purchases in this territory the greater is the amazement that regular channels of supply over long periods have been utterly discarded. Instead, contracts have been placed with a large number of shippers, many of them jobbers in New York and Philadelphia, who are little known in this market and have their experience mostly ahead of them. The remote districts were canvassed in the effort to get bids low enough to suit the controlling authority and it remains to be seen whether the outcome will really cost less than had the coal been purchased of customary sources.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.75@3.35
F.o.b. Philadelphia, gross tons	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.35

Georges Creek is quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $5.04@5.24 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $7.24@7.44, and on cars Boston and Providence at from $7.50@7.90 per gross ton, the latter being the contract price f.o.b. cars for deliveries to April 1.

Anthracite—The first half of June has proved most disappointing to New England dealers. Instead of shipments being increased they have seemed regularly to diminish, especially on egg and stove, the sizes in greatest demand. There has also been increasing anxiety over the very heavy proportion of barges being used to carry bituminous. Shippers who have regularly supplied the market are turning the coal in other directions and chartering their barges wherever an order can be had. The Reading fleet, upon which a large number of retailers have always relied, is bringing forward less anthracite than ever, and as the season advances they are beginning to see the full force of the decree that these barges must carry a heavy tonnage of railroad fuel. The same functionaries who experimented with the movement of these barges from Port Reading instead of from Port Richmond are responsible for this further interference with one of New England's most dependable avenues of supply.

NEW YORK

Dealers complain of lack of domestic coals. Egg, stove and chestnut becoming scarcer and the trade looks for greater shortage as season advances. Shipments to this market continue on even basis. All sections of the country receiving anthracite. Steam coals drug the market and prices are easy. Bituminous tidewater market soft but the trade retains its confidence that business will improve. Line trade picking up and some coals are quoted higher than last week.

Anthracite—Everywhere is heard the complaint of the lack of domestic coals, and there is no reason to expect that they will diminish as the season advances. There has been no improvement in the situation although the shipments of anthracite for May show a substantial increase over those for April, and this in spite of the fact that the mines were idle on several holidays.

Shipments to this market continue on about the same basis as for the past several weeks. This is due, no doubt, to the desire of the trade to take care of the outlying districts. It must also be remembered that the sections of the country that did not receive anthracite during the war period by order of the Fuel Administration are now taking their usual prewar tonnage. Considerable coal is being sent into Canada as well as westward. It is reported that some Canadian dealers have offered premiums for quick shipments.

The call for stove, egg and chestnut, in the order named, keeps up. There is a decided shortage of the two first-named sizes and dealers are urging their customers to substitute some of the other sizes. While there has not been much willingness displayed in agreeing to the suggestion, it is likely to be generally accepted this fall unless production picks up considerably between now and the time to start furnace fires. During the war there was considerable substitution of sizes and the consumer learned much about burning the various sizes of coal.

This market obtained a few hundred cars of anthracite more last week than the previous week, according to the report of dumpings at the local railroad docks. During the week ended June 13 there were dumped 5691 cars as compared with 5380 cars the previous week, an increase of 311 cars. On June 13 there were on hand 3112 cars of anthracite as against 3007 cars on June 6, an increase of 105 cars.

Disposal of the so-called Independent product is an easy matter these days. It is not a question of salesmanship as the orders come into the offices. Considerable of these coals are bringing premiums ranging all the way to 50c. per ton, according to current reports, but some orders taken early in the year are being filled at the prices current at that time.

The steam coals are becoming a drug on the market. They are extremely weak, with small opportunity of the market showing much improvement until cold weather. There is a belief that those operators who have not already started will soon commence the storing of these coals at the mines. The larger companies with storage places have already stored considerable.

Current quotations, white ash, per gross ton at the mines, f.o.b. tidewater, at the lower ports, are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	6.05	7.90
Stove	6.30	8.15
Chestnut	6.40	8.25
Pea	5 00	6.75
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The market is soft, yet the trade maintains its confidence that there will be a decided improvement shortly. Evidences of this change for the better come from salesmen who have visited the inland dealers. They report buying better and a strengthening of prices. So far as this tidewater market goes, there is a decided dullness, with quotations on the various pools far from normal. Movement is slow, many idle boats lying in the harbor.

There were not so many loaded cars at the various railroad docks on June 13 as on the corresponding day of the previous week, the reports showing 4394 cars on hand as against 4664 cars on June 6, a decrease of 270 cars, while for the same period there was a falling off of cars dumped, the reports showing 5748 cars dumped as compared with 6511 cars the previous week, a decrease of 763 cars.

Shippers of coal from certain districts are refusing quotations, asking the prospective buyer for offers. This tends to show that the miners of these coals are not over-supplied with free coals of the better quality and it may also show their hopes in the future.

Handlers of bunker coals are complaining of the loss of business through the absence of ample pier facilities. In the last days of last week there were nearly 50 vessels lying in the harbor waiting for piers at which they could tie up. This lack of piers, it is claimed, has caused many owners of vessels to send their boats to Baltimore and other shipping ports along the coast. Because of this the coal trade here has lost considerable bunker business, some of which will never return to this market.

Quotations for Fairmont and Westmoreland coals are stronger than for the past few weeks and shippers report many more inquiries.

Reports from the mining regions show that labor is in better shape and that because of the increase of orders along the line the mines are working about 65 per cent.

With conditions showing a gradual improvement, Central Pennsylvania miners look for a change in that section.

Quotations on the various coals are about as follows:

	Spot	Contract
South Forks	$2.90@$3.25	$2.95@$3.50
Cambria County (good)	2.75@ 2.95	2.95@ 3.25
Clearfield County (good)	2.50@ 2.75	2.80@ 2.95
Reynoldsville	2.50@ 2.75	2.75@ 2.95
Quemahoning	2.65@ 2.85	2.95@ 3.10
Somerset County (best)	2.65@ 2.85	2.95@ 3.10
Somerset County (poor)	2.00@ 2.35	2.50@ 2.75
Western Maryland	2.25@ 2.50	2.50@ 2.75
Fairmont	2.00@ 2.25	2.35@ 2.60
Latrobe	2.10@ 2.25	2.25@ 2.40
Greensburg	2.25@ 2.35	2.35@ 2.60
Westmoreland ¾-in.	2.60@ 2.75	2.75@ 3.00
Westmoreland run-of-mine	2.35@ 2.60	2.60@ 2.85

PHILADELPHIA

Anthracite demand gains in volume. Orders unfilled. Demand for family sizes expected to run all summer. Individual prices advanced. Increases cause concern. Consumer demand dwindles. Stove hard to get, egg scarce, chestnut in moderate supply, and pea well cared for. Buckwheat shows strength. Rice and barley unimproved. Bituminous unchanged. Good grades strong. Prices well maintained. Little contracting. Fair spot trade.

Anthracite—Real summer weather fails to hold back the anthracite trade. This is particularly noticeable from the producing end, where all companies have more orders on their books than they can fill for weeks. While not at all serious at this time, there can be no doubt nevertheless that all mines could use more inside men. For outside work there is little difficulty in procuring men. Yet despite the efforts of the operators they are unable to get production up to the point that the present situation justifies, and even now forecasts are being made as to what will happen next fall if the operating department is unable to get out the tonnage somewhat near the maximum established during the war.

As to the present situation on family sizes, all producers are extremely confident that the demand for the larger sizes will continue indefinitely. The calls upon them continue from all markets and shippers point out that at the present rate of production it will be impossible to satisfy them during the coming summer.

The fact that some operators are charging premiums of from 15c. to 30c. per ton above company circular tells a tale. As a matter of fact, several of the independents have come out with announcements to their regular trade of an advance of 10c. per ton above circular, and in some cases even 20c. The impression seems to prevail now that the individual operators will all be at least 75c. a ton above company prices by the time frost arrives, if not sooner. In this connection we have in mind one large operation whose production is sold through a middle house, and the coal is netting the producers 15c. above the recognized circular. In other years this coal was often sold in block tonnages in April or May with the prices of those months protected up to September or October, and the agents' commissions were paid out of those rates. For occasional blocks of coal we know that some houses are refusing offers of 50c. per ton advance over current circular, and that more conservative operators are criticizing those who are inclined to accept business at fancy figures.

Locally the market continues short, but the dealers report a rapid falling off in new business. Some retailers when asked to make an estimate stated they do not believe that more than 70 per cent. of the consumers accustomed to buy at this time of the year have as yet placed their orders. One of the very largest retailers placed his estimate as low as 60 per cent. Dealers generally report lack of interest on the part of the householders, particularly the small buyers, and express their determination to continue all summer their efforts to

fill their bins before fall, by which time it is expected the scramble for coal will be renewed. The one great drawback to this plan is that most of the small consumers, being house renters, are not at all certain as to where they are going to live by the time coal-burning weather arrives again. Certainly the outlook for the future is not at all hopeful, and most representative dealers express the belief that only a mild winter will prevent great inconvenience and higher prices.

Egg continues extremely short and really cannot become plentiful, because the New England market and the South in the vicinity of Baltimore and Washington are calling for enormous tonnages. Stove appears positively hopeless, with most dealers entirely out of it; certainly few have what could be called a stock, and the dealers here are tormenting the shippers for it. All shipping offices say the demand from every market is equally great. Chestnut is very far from weak, but is in greater supply than either stove or egg. Shippers say that it is not likely that the demand from western markets can be filled all summer. We have even heard of first-class washery nut bringing full price. Pea remains in very fair shape and shippers report orders in hand for several weeks in advance. We know of one individual house that has actually refused to take on any new business for this size. Of course, the pea that the dealers take in is not being delivered, but is being stored away for winter delivery, as has been their custom for years, most dealers having given up hopes of filling this storage space with chestnut.

The buckwheat market has strengthened during the past week. The poorer grades are being offered from $2.65 to $2.85, while $3.25 to $3.40 is being asked for first-class coals. The big companies are considering no bulk business at less than $3.40, and we are inclined to the opinion that no first-class buckwheat is being sold at reduced prices for shipment beyond sixty or ninety days. Rice shows little strength and orders are accepted around $2.50 for spot shipment. Heavy tonnages are going into the big storage yards while the smaller operators are piling it up at the mines. The same practically holds good for barley, which has been offered at $1.35 recently. However, shippers are taking a cheerful attitude on the situation, and one of the very largest houses advised us they look for greatly improved conditions in all junior sizes within sixty or ninety days, particularly as the outlook for increased steel production is so promising.

Bituminous—The soft-coal situation is almost colorless, if we except the tendency of the high-grade coals to grow scarcer, with the consequent well-held prices for such grades. Cheap coals continue plentiful, and we have heard of quotations on occasional lots as low as $1.80.

Consumers generally seem to be stirring themselves and endeavoring to place themselves in position to buy at the most favorable prices. Many of them want to barter for fuel somewhat on the basis of railroad fuel prices, which are published and are known by all interested in fuel. Of course, it is beyond all reason to sell commercial coal at anything near such prices, especially fine grades of coal.

Contracting seems to have reached almost the minimum for the season, with the bulk of transactions being on a spot basis recently.

BALTIMORE

Export trade shows material increase. Domestic trade inactive. Rumors of large combine.

Although domestic business has been light during the week, the export situation has gone ahead remarkably fast and to such an extent that the indications are that June will be a record month for coal exporting. During the first week of June 40,169 tons cargo and 4505 tons bunker left this port, and within the next two weeks allocation of steamers from this port show that 42 vessels will carry coal to foreign ports. The 42 vessels are the share of 56 steamers that have been allocated for foreign business from this port by the United States Shipping Board. But one steamer will go to South America, the others will be distributed as follows: Gothenberg, 17; Rotterdam, 16; Stockholm, 5; and Genoa, 3. The 56 vessels will carry 280,000 tons from this port and it is estimated that the share of the vessels carrying coal will approximate 200,000. The allocation of coal is expected to be increased materially before the month is past, which makes it appear to observers that this will be a real month's business for the export coal men here.

Despite this heavy shipment of coals there is still little foreign contracting, although the air is full of nibbling with no real bites. The only contracting reported here is that of the 3,000,000 tons for Italy, which was made about two weeks ago.

Failure of any real demand for coals keeps the domestic market inactive. At many points where formerly large tonnages of bituminous coal were used, oil is now being purchased as fuel. Dealers estimate that at least a quarter of a million of tons of coal less will be required in industries here because of the installing of oil-burning boilers. Bethlehem Steel Co. use coal only in the coke ovens, while the Standard Oil Co., United States Industrial Alcohol Co. and other plants all use oil in place of coal.

The best grade of coals at spot brought $2.75 and down to $2.50, while the medium grade fuels sold around $2.30, with no one desiring the low-grade fuels, which went as low as $1.90. Baltimore City has 8000 tons of bituminous, which was bought during the war, but which various departments are objecting to and declining to use. There is some talk of the city selling it on the open market.

The anthracite dealers are still worrying along with low receipts. Large dealers are worse off than the small ones because the equipment of the big firms is idle a great part of the time. Householders will have at least a 25c. increase tacked on July 1, and this may go higher. The belief is general that the independent operators will attempt to force up the price, and during the week one dealer was approached by an independent operator, who offered to furnish all the coal the dealer wanted at a 65c. premium per ton. There is a rumor that there will be a combination of a half dozen firms into one large corporation. The plans provide for a center office downtown with distributing points in all sections of the city. This is the second time within less than half a dozen years that this report has been made. It fell through previously because of inflated values placed by some of the firms on their business. This year the belief is strong that it is likely to be consummated.

Lake Markets

PITTSBURGH

Consumers still unwilling to contract. Labor shortage threatens, also railroad difficulty, next fall and winter. Market prices unchanged.

Line consumers do not show any greater disposition to take hold in the matter of contracting for coal. While operators are talking strongly of higher prices late in the year, there is reason to suspect they would prefer consumers to place contract at prices determined by operators. Stocks in the hands of consumers are not yet exhausted, though probably at least two-thirds of the stocks held at the beginning of the year are gone. Operators contend that consumers should carry not only the stocks now held but even large stocks on the ground that it is very improbable that there can be capacity operation of the coal mines of the district next winter, and such an operation would be required to supply the industries if they have full activity as they seem to expect.

The labor situation grows more serious with the exodus of miners and the unwillingness to work full time. Some operators express doubts whether, with all other conditions favorable, the labor supply would permit of more than a 75 per cent. operation by next fall and winter. Apart from this is the railroad situation, it being doubtful whether the railroads in their present condition could handle a full movement of coal and other freight even if the winter were milder than usual. Operations are now running at 50 per cent. or a trifle more, on an average, but some mines are running much better than others.

For prompt and early deliveries prices are as formerly quoted: Best grades gas coal: Slack, $1.65@1.85; mine-run, $2.35; prepared sizes, $2.60@2.70; Steam: Slack, $1.50@1.70; mine-run, $1.90@2.35, per net ton at mine, Pittsburgh district. Steam mine-run on contract to the end of the coal year is very firm at $2.35 as minimum, and with higher prices predicted.

BUFFALO

Slight improvement in bituminous. Not much stir looked for right away. Industries do not move. Anthracite mining still slow. Demand heavy. Lake shipments keep up fairly well, though not as great as desired.

Bituminous—The demand may be said to increase slightly, but there is nothing looking like a stir in sight. The volume of manufacturing is not large, and it is so disturbed by labor troubles that even an intended amount of output is often not reached. This affects the coal trade directly and postpones the day of recovery. That it is not far off is agreed. In fact the operator especially, and the jobber to a certain extent, is optimistic and will have it no other way than that we are on the eve of a rapid movement of bituminous coal.

The Buffalo jobber is not enthusiastic. Too many complications keep coming up for business to return to the normal just yet. Traveling salesmen go out much as formerly and good ones make sales, but it would be useless for a new man to try the road now. He would make no profits. The consumer is still looking for lower prices.

The mines have already made more concessions than they should, and all that they have accomplished is to cut down their narrow margin of profit. They have not increased the general volume of business and it is doubtful if in the long run they have increased their own. Quotations remain at $4.55 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump; $4.30 for three-quarter; $4.05 for mine-run and $3.65 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The trade is still short of coal. No improvement is in sight, unless it be that the local demand is lighter. More coal has been bought so far by consumers than usual, and that would seem to account for the continual report of shortage but for the mine report, as shown by the Government bulletins, that mining is less now than it has been in six years. If the consumer has learned to economize and use substitutes enough to make up for this shortage, he may get through the winter safely; but it is to be feared that he has not, in which case the dependence must be on another mild winter.

The June prices of anthracite are as follows:

	F.o.b. Cars, Gross Tons	At Curb Net Tons
Grate	$8 55	$10 20
Egg	8 65	10 40
Stove	8 90	10 60
Chestnut	9 90	10 70
Pea	7 20	9 15
Buckwheat	5 70	7.75

Lake shipments keep up only fairly well. The demand is too general and too heavy for shippers to get as much coal for the lakes as they would like. The amount loaded for the week was 86,900 net tons, of which 38,600 tons cleared for Chicago, 6000 tons for Green Bay, 3800 tons for Racine, 18,200 tons for Duluth and Superior, 12,000 tons for Fort William, 8300 tons for Hubbell.

Freight rates remain quiet at 80c. to Racine, 50c. for Chicago and Green Bay, 42½c. for Duluth, Fort William and Hubbell.

CLEVELAND

Prices are stiffening, with Pocahontas and anthracite increasingly difficult to obtain. Operators are more inclined to shove up their quotations on slack and mine-run, with slack more easy now to dispose of. Upper lake dock operators are taking all the bituminous coal they can obtain, although coal is not moving so freely off the upper lake docks.

Bituminous—Business appears to be opening up in all directions. The iron and steel industry—the largest single user of coal in northern Ohio—is rapidly getting under way, and much pig iron and all varieties of finished material are being sold in big tonnages. The prediction that Aug. 1 will see the industry at 100 per cent. operations still holds, and each succeeding week sees its coal and coke consumption increasing. Purchasing agents of the larger mills now are waking up to the situation and suggestions that they had better cover for the remainder of the year are having effect. Some operators believe that within two weeks many of the larger steam-coal consumers will have placed their contracts.

Slack is much firmer in price, and while some still can be had at $1.90, it is believed $2 more nearly represents the market. Not much will be sold at that figure, is the prediction. Some operators look for slack to go to at least $2.50 in the early part of the winter. Mine-run and prepared sizes are also reflecting improved conditions, and mine-run is now bringing $2.10 and up at the mines, with most of it averaging between $2 and $2.10. With each succeeding week showing production far behind last year, coal interests can see nothing but enormous demand coming out in the last half year, with a runaway market the obvious result. The labor situation at southern and eastern Ohio mines continues bad, and most operations can do no better than 55 to 60 per cent. of capacity with their present forces. This situation is one that will grow much worse before it becomes better, it is feared.

While retail dealers have been able to obtain an adequate supply of domestic bituminous, they are complaining of the difficulty in meeting the demand for anthracite and Pocahontas. The coarser grades of Pocahontas seem especially scarce. Domestic demand keeps far ahead of the normal summer business. Some dealers, it develops, have not yet increased their anthracite prices, but on July 1 they plan a 30c. advance in order to catch up with the procession.

Lake Trade—Lake Erie car dumpers continue to handle about 900,000 tons of bituminous coal weekly, making the monthly totals under 4,000,000 tons. In May, the lake carriers took 3,821,295 tons of bituminous for the head of the lakes. This week the docks are dumping from 3000 to 3200 cars daily. Coal is reported not moving so freely off upper lake docks as might be hoped. Demand for lake coal has not abated, and operators are finding a ready market for every car they dispatch to Lake Erie ports.

Price of coal per net ton delivered in Cleveland, is:

Anthracite:	
Egg	$10.85@11.05
Chestnut	11.15@11.35
Grate	11.05
Stove	11.05@11.25
Pocahontas:	
Forked	9.00
Lump	8.25
Mine-run	7.20
Domestic Bituminous:	
West Virginia splint	7.75@ 8.00
No. 8 Pittsburgh	6.10@ 6.35
Massillon lump	7.30@ 7.40
Steam Coal:	
No. 6 slack	4.20@ 4.40
No. 8 slack	4.70@ 4.95
Youghiogheny slack	4.85@ 5.15
No. 8 ¾-in.	5.40@ 5.55
No. 6 mine-run	4.40@ 4.50
No. 8 mine-run	4.80@ 4.95

DETROIT

Steam-coal buyers are still maintaining a waiting attitude, though a fair demand for domestic stock is reported.

Bituminous—Realization of the advantages of buying their coal supply at present apparently has not yet become general among the Detroit consumers of steam coal. Jobbers and wholesalers say there is only a small volume of business being transacted and that buyers are continuing the attitude of aloofness that has been characteristic of the local situation for some weeks.

It is a theory among some of the jobbers that the users of steam coal are waiting in the expectation of cheaper coal coming into the market. Jobbers insist such a development is highly improbable and explain that the delay in releasing orders will mean an accumulation of business later that will tend to produce an advance in prices, when the buying movement sets in, due to the lack of mine reserves and limitations on output imposed by shortage of labor.

Though there is apparently some increase in amount of free coal on tracks, shipments are said to consist largely of slack and fine coal for which there seems little demand, the result being a weakening of prices. While quotations on Ohio slack are reported as $1.50 and on the West Virginia product at $1.85 to $2 a net ton at the mines, jobbers say there are rumors of sales having been made around $1.25 and even lower, in the effort to escape the heavy demurrage accruals.

Mine-run is quoted at $2 for Ohio stock and $2.10 to $2.25 for West Virginia coal, while smokeless holds around $2.75 to $3. Hocking domestic lump is reported selling at about $2.50, with West Virginia gas and splint lump at $2.75 and three-quarter lump at $2.50.

Anthracite—Extremely hot weather during the last few days has somewhat reduced the inquiry for anthracite. Retailers are making an active campaign to encourage early distribution among household consumers.

Lake Trade—Shipments over the lake routes are holding considerable volume and for the week ending June 7 a record for the season was attained, with the loading of 1,122,322 tons of cargo and 46 007 tons of fuel coal, a total of 1,168,329 tons. Toledo, Ashtabula and Lorain, in the order named, were the heaviest shippers.

COLUMBUS

There is increasing evidence of activity in the Ohio coal trade. Inquiries for steam grades are more numerous, indicating a disposition on the part of big users to buy. Domestic grades are stronger and the lake trade is progressing satisfactorily. Prices are still uncertain.

The best feature of the Ohio coal trade during the past week is the increase in the domestic demand. Retailers are gradually increasing their stocks in order to take care of the expected rush in business when the stocking-up season opens. Retail stocks are not large in any section, and consequently there is a general movement to buy. The large part of the orders booked are for the fancy grades, such as Pocahontas and West Virginia splints. Kentucky grades are also in better demand for stocking purposes. As Hocking is not stocked a great deal at this time, there is no important buying movement. Prices for the better grades of lump range higher and all recent advances are well maintained. Pocahontas lump is selling between $4.50 and $5 at the mines, and is scarce at that.

The steam trade is also showing signs of awakening. As industrial conditions slowly improve there is a better demand for steam sizes. This has been noticeable during the past week and the result has been to diminish the over-supply of screenings which has been a drug on the market. But Screenings are still cheap and some extremely low quotations are heard. Iron and steel plants are slowly resuming and are buying a large tonnage for fuel purposes. Rubber factories have about used up their reserve stocks and will soon be in the market.

Production is better in practically all of the Ohio fields. This is most noticeable in the eastern Ohio field, where the output is now estimated at 80 per cent. of normal. In the Hocking Valley and Pomeroy Bend fields the output is between 65 and 70 per cent. and gradually increasing. Other fields are showing up fairly well with prospects of an increase within the coming six months.

The Lake trade is showing considerable activity. Loadings at the lower lake docks are good, and it is claimed that the movement from Ohio ports to date is ahead of last year's shipments. Vessels are plentiful and chartering is going on fairly well. Owing to unsettled prices, contracting for Lake tonnage is not being done on a large scale.

Retail prices delivered in Columbus are:

Hocking lump	$5.50 to $5.75
Pomeroy Bend lump	5.95
Island Creek	6.25
White ash	6.25
Splints, lump	6.00 to 6.50
Kentucky Wheeling Creek	6.75
Semi-smokeless	6.75
Pocahontas	7.00 to 7.25

LOUISVILLE

Block coal in good demand, with operators forcing prices upward to check demand. Screenings hard to dispose of, resulting in dumping at mines in many instances.

The demand for block coal has been so keen since domestic consumers started stocking, and retailers began buying heavily, that some mines are forcing prices up on all new business, owing to the fact that in handling additional block business they are unable to dispose of the accumulated screenings, which have to be dumped at the mine. This will mean rehandling, with the result that better prices must be had to take care of the additional costs. A fair volume of block business can be handled, and screenings sold on a spot market, but with increased block the operator is helpless in the matter of forcing out his screenings, as the market cannot absorb the supply.

A number of operators are forcing retailers to take a car or two of screenings with every car of block in order to lessen the burden. The coal is screened for the retailer, relieving him of the difficulty of hand-forking, and it is felt that under existing conditions he should be willing to aid the operator.

Eastern Kentucky operating conditions are fair, as there is a big demand for block, a fair demand from the lake region, and an increasing demand from byproducts, gas and other plants. Little coal is moving south for bunkering, although some coal is going to textile plants. However, steel and iron plants, cement manufacturers, brick plants and many others are buying small tonnages.

Western Kentucky is hard hit the way things are now going. Owing to the fact that freight rates favor eastern Kentucky coals, and due to the higher grades of these coals that are selling at low prices, western Kentucky has not a large or ready market, but operators are unable to cut prices much more because of the high overhead. The result is that mines are operating one to two days a week, with many of them down. This makes it difficult to hold labor, which is shifting to the eastern Kentucky fields, where the supply is not equal to the demand.

The car supply is becoming a little short, and is giving many operators uneasiness. The heavy movement to the Northwest and lakes this year has kept many cars in transit for long intervals, and considering the fact that there are several hundred cars moving out daily, the outlook is not especially promising.

Quotations are: Eastern Kentucky, block, $3.25@3.50; mine-run, $1.90@2.40; nut and slack, $1.50@2. Western Kentucky, lump, $2.25@2.55; mine-run, $1.85@2.10; nut and slack, $1.75@1.85; screenings, $1.45@1.75, according to size.

BIRMINGHAM

Steam market remains inactive, little spot business being booked. Lump coal very strong and hard to get. Supply very much restricted on account of lack of steam orders at the mines.

The past week has shown no improvement in the demand on this district for steam coal. A large number of railroad contracts expire June 30 and will come up for renewal in the next week or so, though no action has thus far been taken by the rail lines to provide for the fuel requirements for the next twelve months as covered by the expiring agreements. Commercial trade will most likely be favorably affected by the closing of contracts for the needs of the railroads.

Domestic dealers are finding it difficult to secure the desired amount of lump coal, and the scarcity of domestic sizes is such that only now and then can a car be picked up in the spot market. With an improvement in the steam trade this condition will be relieved to some extent, but coal men predict that the shortage this winter will be more keenly felt than in any previous years. Consumers are not buying heavily at this time but nevertheless dealers have not been able to accumulate much coal on their yards.

Some increase in production will be shown by the furnace companies due to the placing of several stacks in commission which have been out of blast for some months on account of the dull iron market, which is now showing gradual improvement.

Coke

CONNELLSVILLE

Contract negotiations for furnace coke, with uncertainty as to outcome. Some furnaces may switch to byproduct coke. Prompt coke firmer.

If the coke market follows the views of Connellsville coke operators as to contracts for the second half of the year it is going to be a very strong one, but the matter is not decided yet. What may be considered negotiations on second half furnace coke have been under way, but they have consisted chiefly in operators giving their views to consumers, in a few cases perhaps naming flat prices, but in the majority of cases proposing sliding scale contracts of various forms. The sanguine feeling pervading the ranks of operators is illustrated by the case of one, who is unwilling to sell for the whole half year but hopes to find a customer for the third quarter. Since the expectation is that pig

iron production will increase up to the close of the year, it is the latter portion of the half year that consumers would be particularly interested in covering against, not the third quarter.

Some eastern Pennsylvania furnaces have been heard from with a statement that if they cannot buy Connellsville coke for the half year at about $3.85 they will not buy it at all, but will depend upon byproduct coke made in the East. They are now offered Bethlehem coke on an iron-bound contract as to deliveries, to offset the operating difficulty the Bethlehem company had some time ago, and there is also the Midvale operation, which is expected to be completed next month. Connellsville operators have no thought of selling even at $4 as a flat price for the half year. Ratio contracts of various sorts are proposed, one being on a 6 to 1 basis—that is, if basic pig iron is $25, valley, which is the approximate price now, the coke would be priced at $4.17. There are various details, relating to maximum and minimum prices and other limitations.

The spot furnace coke market is firmer, it being altogether exceptional for any coke to be available at under $4, while foundry coke readily brings $4.50 for very ordinary grades, and $4.75 and $5 for the better grades. There is nothing very definite as to foundry coke contract prices.

We quote spot and prompt coke at $4 for furnace and $4.50@5 for foundry, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville regions in the week ended June 7 at 117,655 tons, an increase of 6320 tons.

Buffalo—The trade does not improve much. Iron ore comes in slowly by lake and the furnaces are running on slow time. Reports of improvement are not confirmed. Prices remain at $7.25 to $7.50 for 72-hour Connellsville foundry, $6.60 for 48-hour furnace and $6.10 for off grades. Some bituminous shippers are selling crushed sizes for fuel at about foundry prices. They report no sale for breeze coke.

Middle Western

GENERAL REVIEW

All branches of Middle West coal industry not so optimistic. Screenings piling up. Intimation that Government control of coal may again be inaugurated. Large consolidation in Franklin county field.

Operators and jobbers alike report a decrease in business for the weekly period just ended. This lessening of the current demand appears to be general, as practically all of our producing fields are affected, and steam sizes, rather than domestic and railroad egg and lump. The market on screenings is especially weak, and a number of operators have found it well nigh impossible to move their surplus on this size. It is said that one producing field alone has piled in storage over 125,000 tons, as the operators in that district prefer to store their coal rather than sacrifice it on the open market.

One of the reasons for surplus screenings is that considerable lump and egg is moving on railroad orders, and as the operators having railroad shipments must forward coal regularly, it means an accumulation of screenings, which must be moved from day to day. Another reason why the screenings market is weak is because one of the biggest users of steam coal in this territory—public utility people—are still engaged in burning coal they have had in storage. As a result of the conditions mentioned, the screenings market has had a bad week, Southern Illinois 2 in. screenings selling as low as $1.75 mines, and good Indiana screenings as low as $1.50 or perhaps in some cases even less.

The market on prepared sizes—for instance, either lump, egg or nut—continues strong; in fact many producers are behind on their orders. This scarcity on prepared coal is because of recent railroad purchases, as well as a strong demand on the part of the retailers for domestic coal.

Dr. Garfield, in a speech on the Pacific Coast, advised the public that the coal industry would soon be back under Federal control. This came rather as a surprise to the operators, and we believe an unwelcome one, as a whole. The operators feel that the Government restricted them perhaps too closely when there was an opportunity to show a profit, and then, when a chance came for the Government to help the industry, in the railroad matter, for instance, the operators were left high and dry, to shift for themselves.

The coal trade was not surprised to learn that another big consolidation had taken place in the Franklin County, Ill., field. It seems that the Chicago, Wilmington and Franklin Coal Co. has taken over both the Hart Williams mine and the Pyrolite mine, each located in the vicinity of Benton. There is a tendency, especially in Southern Illinois, to merge interests, and place most of the coal properties in strong hands. These developments are perfectly logical, and meet with general approval, as it means a saving to the public. Take for example selling costs. Formerly, each mine in the Franklin County district maintained at least two sales offices, say one in Chicago and another in St. Louis or Minneapolis. As the situation is now, the whole field is represented by three or four large companies, and instead of over a dozen sales offices there are but a third of that number.

The feeling expressed by operators this week is not quite as optimistic as heretofore. The general idea is that screenings and steam coals, with the exception of railroad coal, will continue dull and a problem for at least the next 90 days. Industrial activities have not developed as was predicted, although there are those who predict during the fall and winter months a demand that will prove greater than the supply.

CHICAGO

Better demand for coal and dealers are stocking Eastern coals. Premiums offered for anthracite shipments.

The "Buy your coal early" campaign started by local papers and local coal men a few weeks ago is already beginning to show results. Operators and jobbers from all of the producing fields report a strong domestic demand from Chicago. The steam market continues to lag with small hope of any immediate betterment.

Strange to say, some of our local retailers appear to have profited by the distressing conditions they have been forced to undergo during the past two years. We are glad to say that a few of the more up-to-date and aggressive dealers are now stocking coal. Of course, they are stocking Eastern coal—anthracite, Pocahontas and eastern Kentucky at this time—but they soon will begin laying in a reserve supply of high-grade domestic coal from our own fields in Illinois and Indiana.

The householder is also showing signs of interest, and local retailers report a decided betterment in current orders. Anthracite is in such demand that dealers are offering independent operators 25c. per ton or more premium on prompt shipments.

MILWAUKEE

Coal rules quiet and steady, and dealers report increasing deliveries. Receipts by lake continue liberal.

Coal dealers in Milwaukee report a quiet market, with slightly increasing business. The June advance of 10c. per ton on all grades of anthracite except buckwheat is being publicly protested, and the Milwaukee Association of Commerce, an organization representing every business interest in the city, announces that it will vigorously oppose any further increase in the price of coal, on the ground that it is sufficiently high now and that Milwaukee, with excellent water transportation facilities, should not be compelled to pay exorbitant rates for this class of fuel.

Large users of Illinois and Indiana coal during the war period are gradually getting back to the eastern product. The Central Coal Co., which handled Illinois coal exclusively for the past three years, has put in nearly 75,000 tons of eastern bituminous thus far this season.

Coal is arriving freely by lake, the volume received thus far since the opening of navigation being considerably in excess of last year's record. Up to date 186,153 tons of anthracite and 892,506 tons of bituminous coal have been handled over the docks, as against 124,061 tons of the former and 531,480 tons of the latter during the same period last year.

The City of Milwaukee is advertising for bids on 60,000 tons of coal for public institutions during the coming winter.

ST. LOUIS

Situation remains quiet and the expected call for coal the middle of June has not as yet materialized. Coal in the Standard district still going below cost and no demand for either steam or domestic. In the high-grade field domestic is moving fairly well, while steam sizes are blocking the mine.

The situation is not what it was expected it would be by this time, though conditions are somewhat better. The public still seems to expect a reduction in the price of coal despite reports that the country is behind in its tonnage.

Locally there is a little anthracite and smokeless domestic moving. On the other kinds of fuel there is nothing coming in to speak of, except a little coal from the Standard and Mt. Olive fields. Coke is a drug on the market, except that which is being put in storage by the dealers. There is some threshing coal moving, but not the tonnage that was expected.

Steam locally is at a standstill, and the same condition prevails in the country districts. There is nothing at all to warrant any improvement unless something out of the ordinary happens in connection with the domestic business.

In the Standard district some little coal is moving into St. Louis for steam. Most of the tonnage is going to railroads and some to Chicago. The Chicago tonnage is extremely light and the condition in this field is deplorable at this time, with coal selling below cost and no market for it.

In the Mt. Olive field conditions are considerably better. Some railroad coal moves here and the bulk of the tonnage moves to Chicago and the Northwest.

In the Carterville field of Williamson and Franklin County, as well as in the Du Quoin field in Perry County, the situation is not all that it could be. Steam sizes are long and in some instances the mines are shut down on account of screenings and the smaller sizes of steam coal. Many mines still continue to pile screenings and steam sizes on the ground. Some of the mines are not working at all, and others are only on half time. The car supply is good and transportation is standing up well.

Coal and Coke Securities

New York Stock Exchange Closing Quotations June 16, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	46	...
Burns Brothers, Com	(BB)	46	148
Burns Brothers, Pfd	(BB)	99¾	100
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	...
Colorado Fuel & Iron, Com	(CF)	44⅝	45
Colorado Fuel & Iron, Pfd	(CF)	103	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com	(EH)	32	34
Elk Horn Coal, Pfd	(EH)	...	47
Island Creek Coal, Com	(ICR)	39	...
Island Creek Coal, Pfd	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	...
New Central Coal of West Va	(NCC)	5	...
Pittsburgh Coal, Com	(PC)	60½	61
Pittsburgh Coal, Pfd	(PC)	92¾	93½
Pond Creek Coal	(PD)	17	19
Virginia Iron, Coal & Coke	(VK)	66	70

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	...
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	78	80
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	95
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99½	100¼
—ehigh Valley Coal, Gtd. Int. Red. to 4%, 1913	79⅞	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F., 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	84	85
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	86	47½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	81
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	93	94
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85⅛	88¾

COAL AGE

Volume 15 New York, June 26, 1919 Number 26

New Tools Require New Training

By R. Dawson Hall

UNFORTUNATELY, the early history of coal-mining is exercising undue influence on the elementary technical education of present-day mining men. Early mining operations were quite crude, and there was little of a scientific nature to learn about the subject except what was taught under the heads, Chemistry of Gases and Principles of Ventilation. With little or no machinery, no fans, no mining machines or locomotives, and simple pumps, there was need for little information other than about the mine atmosphere and the safety lamp.

With such a simplicity of operation, technical studies commenced, and as a knowledge of the theory of mining as then practiced was quite necessary, men were rightly required to show their efficiency in such studies before becoming mine foremen. The state examinations are still based on the conditions of that early time. We do not today educate men for their duties as foremen in a modern mine, so much as we school them so that they can pass the prescribed examinations; for these no longer determine whether a man is acquainted with the full range of the many duties that are likely to fall to him. When once the state examinations are passed we show little or no interest in his further development.

We have evolved a sort of classical education in mining. In earlier times men acquired Greek and Latin and did not hold it important to consider whether these studies really had any bearing on the problems actually to be solved in the workaday world. They continued to master them because such learning had attained predominance at a time when there was little else to study, and when the purposes of education were wholly different from those of more modern times.

The mining world branching right and left in its mechanical development, which is slowly but surely turning the mines into machine shops, now needs men of greater technical powers to handle its mine problems. It needs also many more than one man of technical knowledge in each mine to handle the multitude of new tools. It does not have any more a body of men who from childhood have been made acquainted with the implements by which the work is to be performed.

Many years back when the hand pick was not the symbol merely, but the mainstay of the industry, we had men who had learned from their fathers the fine art of handling that implement and who had been coached into the dangers of mining, the means of avoiding them and the tricks of operation. But the men of today have no such background of training in handling the modern tools of our constantly developing industry.

The operation of the new mechanisms may be more readily learned than the running of the more simple tools of the past, for the handling of a machine is often more simple than the deft manipulation of a less powerful and more primitive tool. But the art, hard or easy, must be learned, and there are few teachers on the mining force, whereas in our earlier operations there were as many teachers available as there were men employed, for every man knew mining, as then practiced, from "a" to "izzard."

We need, therefore, more and more mining schools in and about mine villages. In fact, at every mine the engineering staff should contain some man who by addresses or by training at the actual work, or both, should create increased efficiency in the handling of the mine mechanisms, the work to be supplemented by addresses given by experts at local centers. We shall only succeed when everybody knows how his work should be done.

The Chemistry and Constitution of Coal*

Much Has Been Done in the Determination of the Chemical Composition, Heating Value and Ash Fusibility of Various Coals. Recently the Microscope Has Been Brought Into Use and Has Proved a Great Aid in Determining Just What Coal Is Composed of and How It Is Built Up. Different Coal Beds Thus Appear to Be Composed of Totally Different Varieties of Plants

BY A. C. FIELDNER†
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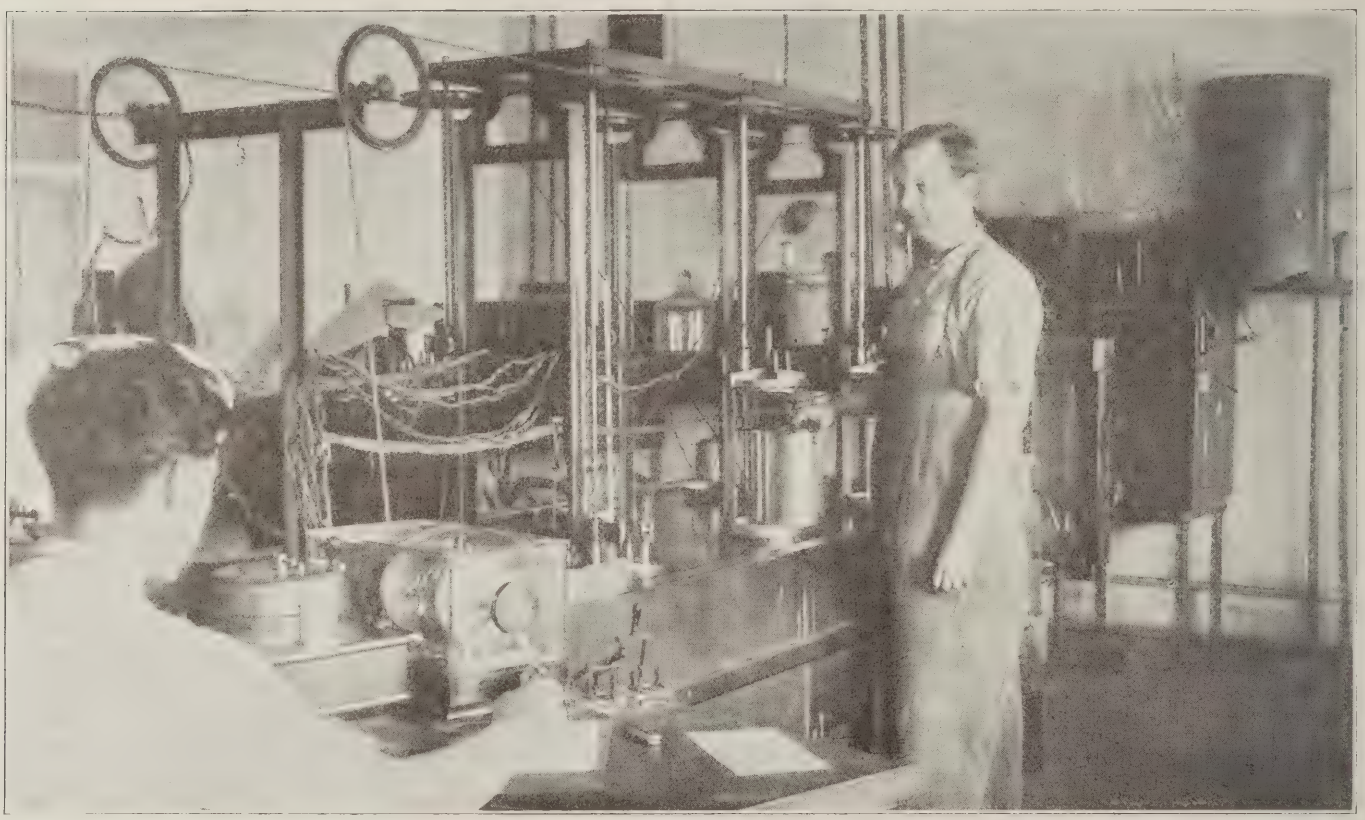


FIG. 1. BUREAU OF MINES' MULTIPLE CALORIMETER INSTALLATION

IN PRESENTING this paper on the chemistry and constitution of coal, I must explain that this all-inclusive title does not mean that it is either lengthy or exhaustive. I wish merely to give a brief review of some of the present-day aspects of the subject, with special reference to investigations that have been carried on in the Bureau of Mines Experiment Station.

Let us first consider the nature of coal. Geologists agree that coal has its origin in vegetable matter that was accumulated and buried in past geological ages. Several different theories have been advanced as to the exact manner of accumulation and the particular kinds of vegetation or vegetable products that were involved. At any rate, this accumulation became more or less altered and concentrated under swampy conditions and finally was buried under a load of sediment, to be subjected to a further change by heat and pressure.

In more or less intimate mixture with these organic remains was deposited silt, sand, clay and other earthy materials. Sometimes layers of sediment were laid down between the periods of plant growth, thus forming partings and veins of shale and slate. It is obvious, then, that the chemical constitution of coal must be extremely complex and must vary greatly from one bed to another. To determine all the real constituents in coal is beyond the power of a mere chemist. This will be appreciated later when the myriads of different substances that the microscope reveals are shown.

With our present-day knowledge we can only resolve this complex mass into its chemical elements, as is done in the ultimate analysis; or we may group the principal constituents into certain classes, as is done in the proximate analysis with which all are familiar.

The proximate analysis divides the coal into four classes of constituents: (1) Water or moisture; (2) mineral impurities that remain in a somewhat altered condition, as ash when the coal is burned; (3) volatile matter consisting of the gases and tars that are driven off on coking the coal; and (4) fixed carbon, which represents the carbonaceous residue or ash-free coke left behind after the gases are driven off.

The moisture and ash represent the incombustible or worthless part of the fuel, while the volatile matter and fixed carbon include the total combustible, which is de-

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FIG. 2. TYPICAL FORMS OF ASH CONES AFTER HEATING IN NO. 3 MELTERS FURNACE

rived for the most part from the plant remains making up the coal substance.

In addition to the proximate analysis chemists have another method of attacking coal, and that is to resolve it into its chemical elements. All vegetable matter, and consequently coal, is composed principally of carbon, hydrogen and oxygen, with smaller quantities of sulphur and nitrogen. By suitable methods in the laboratory it is possible to determine with considerable accuracy the percentages of these elements.

Heating Values May Be Determined

From the ultimate analysis it is possible to calculate roughly the heating value of a coal. However, this method is no longer used, as an actual test in a calorimeter is more accurate and much simpler. The Bureau of Mines has a special multiple calorimeter installation in which six samples can be tested at one time, with an accuracy of 0.1 per cent (See Fig. 1). The results of such calorimeter tests are expressed in British thermal units. A British thermal unit is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit.

In recent years, fuel engineers have demanded a test of the fusing temperature of the ash in order to get some idea of its clinkering tendencies. This test is made by molding some of the finely ground ash with the aid of an organic binder into small triangular pyramids about ¾-in. high and then heating them slowly in a furnace until the ash melts. The temperatures are read during this process and the fusion temperature is taken when the pyramid has melted down into a hemispherical lump, as shown in Fig. 2. The furnace used in the Bureau of Mines' laboratory is shown in Fig. 3. It is a slightly modified form of the No. 3 melters furnace of the American Gas Furnace Co. This furnace is operated with an excess of gas burning at the vent in order to maintain a reducing atmosphere in the combustion chamber. Under these conditions the iron in the ash is reduced to the ferrous state, which condition gives the lowest melting point and, therefore, the lowest temperature at which clinkering may result.

During the last two years the Bureau of Mines has conducted a survey of the fusibility of ash of various American coals. It was found that the average softening temperature of the ash of the different coal beds of the country ranges from 1900 to 3100 deg. F. Certain beds in West Virginia, such as the Island Creek, Coalburg and Winifrede of the Kanawha Group, and the

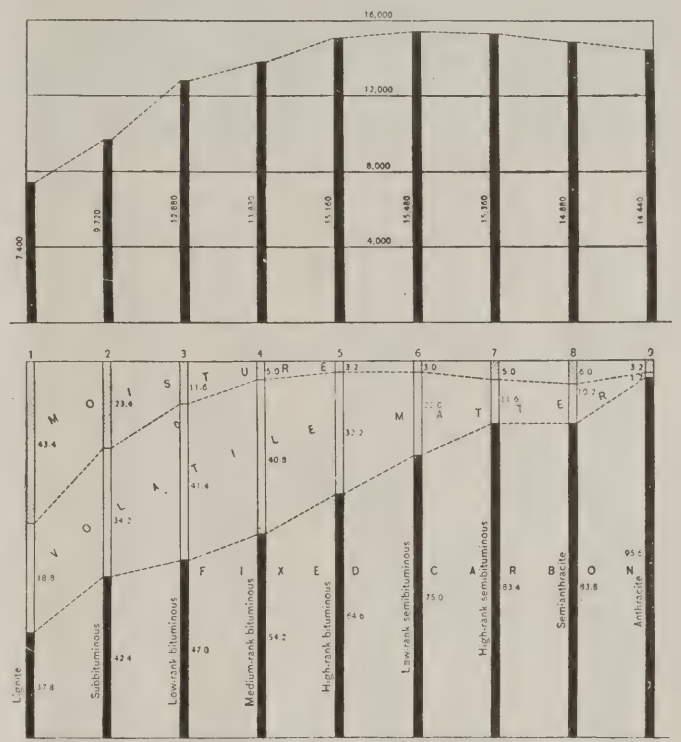


FIG. 1. CHEMICAL COMPOSITION AND HEATING VALUE OF THE SEVERAL RANKS OF COAL

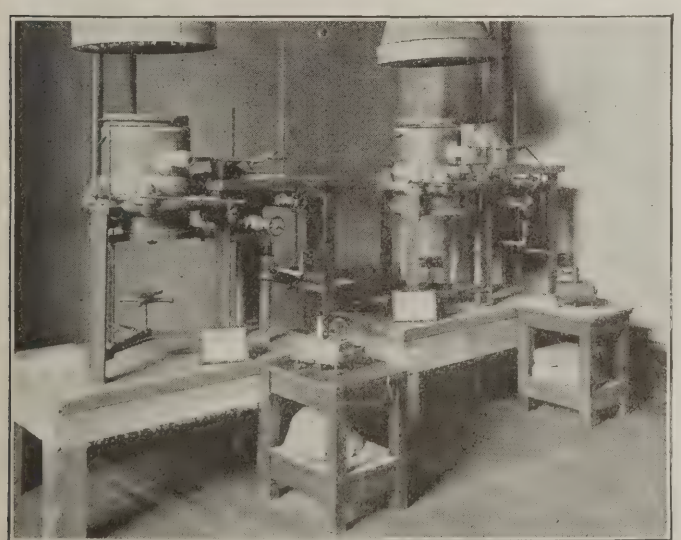


FIG. 3. FURNACES USED IN DETERMINING FUSIBILITY OF COAL ASH

Beckley bed of the New River field, have a highly refractory ash with a softening temperature of 2800 to 3200 deg. F. On the other hand, the coal beds of the Monongahela, Conemaugh and Allegheny series, both in West Virginia and Pennsylvania, are characterized by ash that has medium to low fusibility—i.e., between 2000 and 2400 deg. F. But the most fusible ashes of all come from the coal beds of Illinois, Indiana, western Kentucky and Missouri. The following are the average softening temperatures for western Kentucky beds:

Bed No.	No. of Samples Averaged	Softening Temperature, Deg. F.
6	4	2130
9	75	2030
10	2	1990
11	39	2030
12	17	2150

These low softening temperatures are due to the high percentages of pyrite and lime compounds found in coals from the interior province.

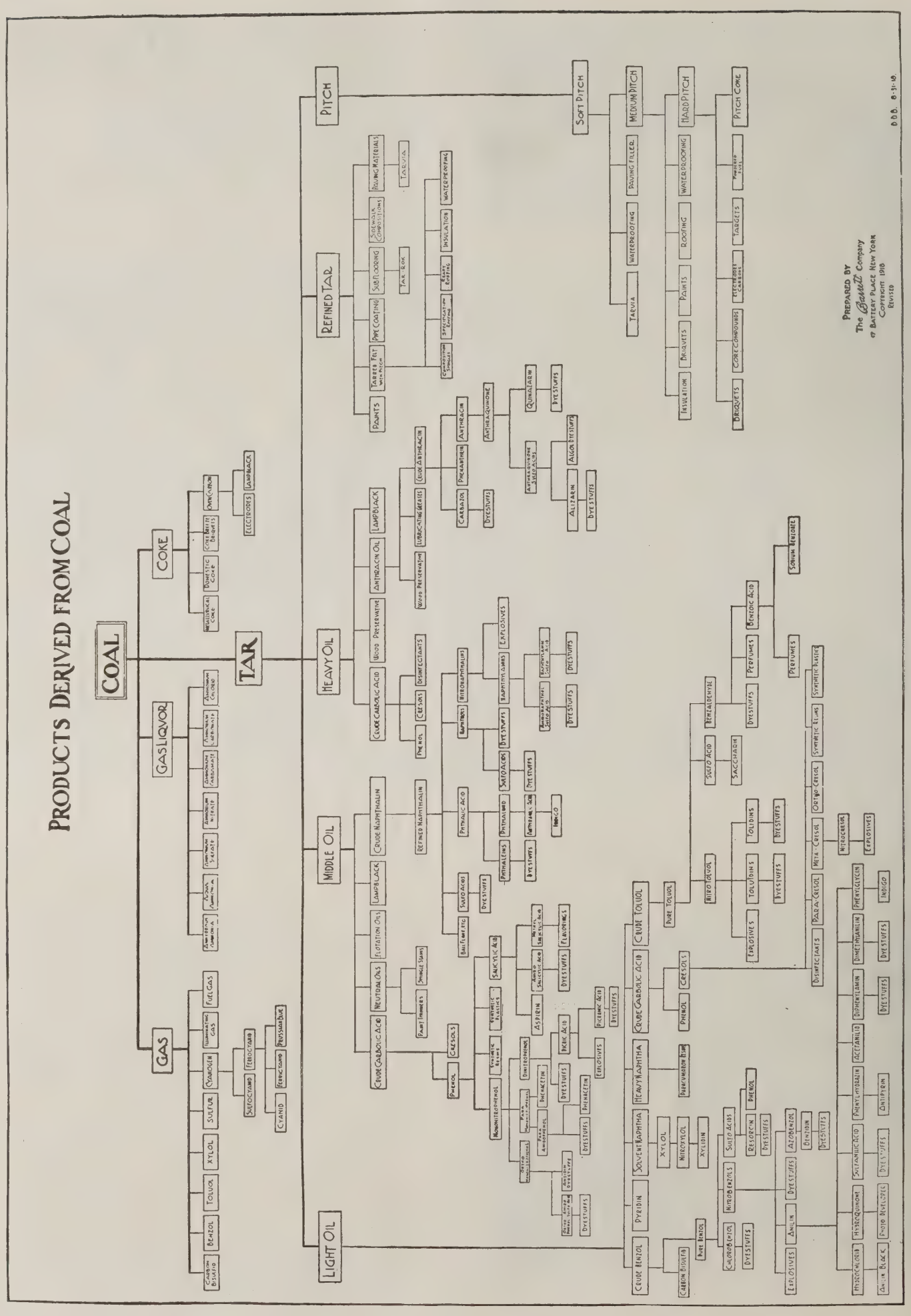
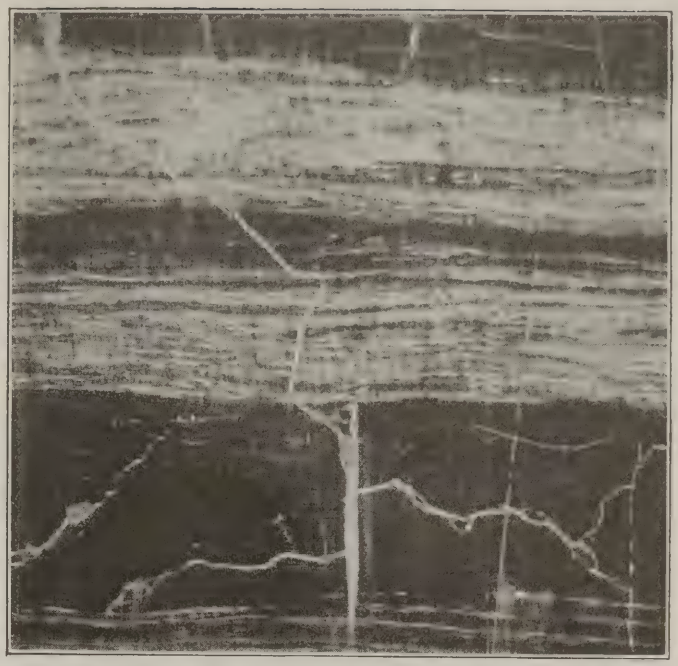


FIG. 5. CHART SHOWING THE LARGE NUMBER AND VARIETY OF PRODUCTS DERIVED FROM COAL





FIGS. 6 AND 7. A BLOCK OF ILLINOIS COAL FROM BED NO. 6, NATURAL SIZE, AND POLISHED SURFACE OF SAME BLOCK MAGNIFIED TEN DIAMETERS

The black bands represent "bright coal" or "anthraxylon"; the grayish bands represent layers of "dull coal"; the lenticular band near the bottom represents a cone of Lepidodendron

Eastern Kentucky coal has a more refractory ash as shown in the table on page 1155.

With the establishment of the United States fuel-testing plant at St. Louis, in 1904, the Federal Government began the analysis of coal from various parts of the country by uniform and standardized methods. This practice has been continued until the present time, first by the U. S. Geological Survey and since 1909 by the Bureau of Mines. Much of this work has been done in coöperation with the state geological surveys, which collected the samples and sent them to the Bureau of Mines laboratory for analysis. This plan has been mutually helpful to both the Federal and state authorities.

The results of all Bureau of Mines coal analyses are published[1] at regular intervals together with a full description of the mines and coal beds from which the samples are taken.

Classification of Coal by Ranks

On the basis of these comprehensive and uniformly made analyses, and also the physical characteristics, the U. S. Geological Survey[2] has worked out a scheme of classifying coal according to its rank, the word "rank" being used to designate those differences in coal that are due to the progressive change from lig-

[1]Bulletins 22, 85 and 123 of U. S. Bureau of Mines.

[2]Campbell, M. R.: "The Coal Fields of the United States." Professional Paper 100-A, 1919, pp. 3-10.

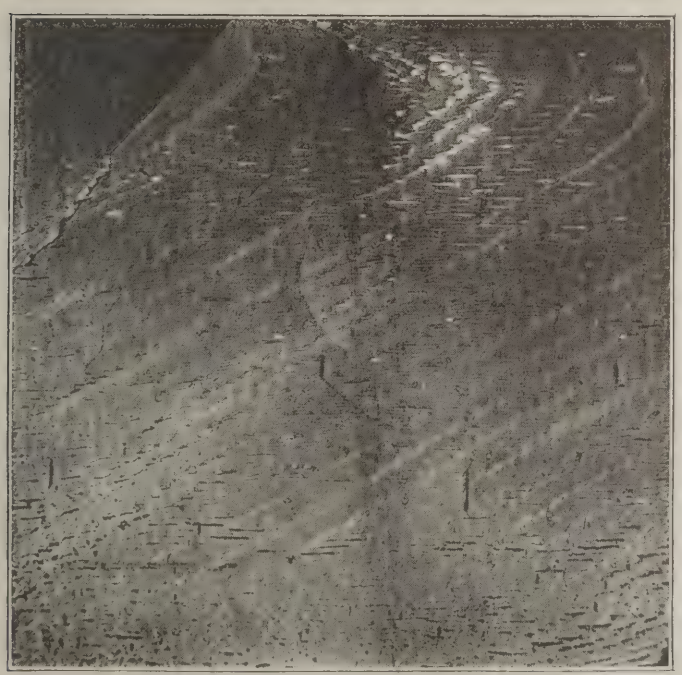


FIG. 8. THIN CROSS-SECTION OF "BRIGHT COAL," SHOWING WELL PRESERVED WOOD STRUCTURE



FIG. 9. THIN VERTICAL SECTION OF COAL AT HIGH MAGNIFICATION



FIG. 10. A HORIZONTAL CLEAVAGE SURFACE OF COMPACT COAL

Showing patches with woody structure or anthraxylon chips, more or less surrounded by structureless areas representing attritus.



FIG. 11. A TYPICAL WISCONSIN PEAT BOG

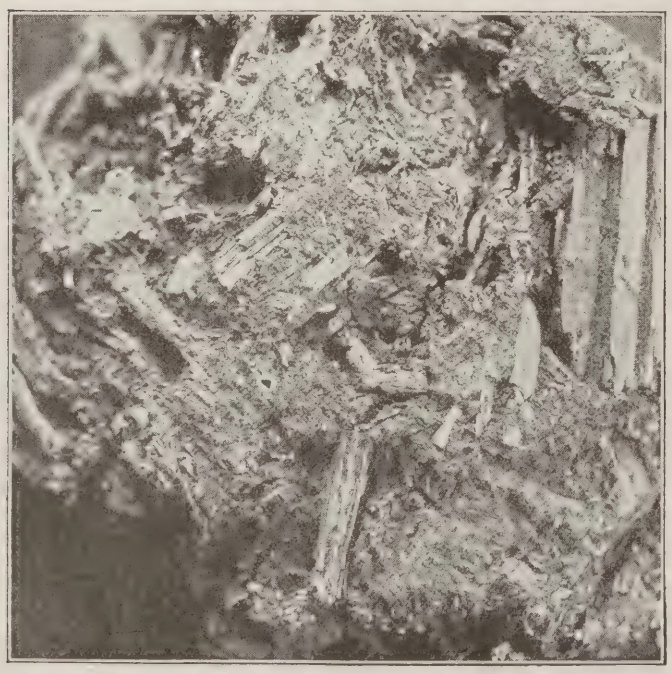


FIG. 12. DRY PEAT FROM BOG SHOWN IN FIG. 11

Showing thin chips of wood corresponding to anthraxylon embedded in the attritus. Compare this with Fig. 10.

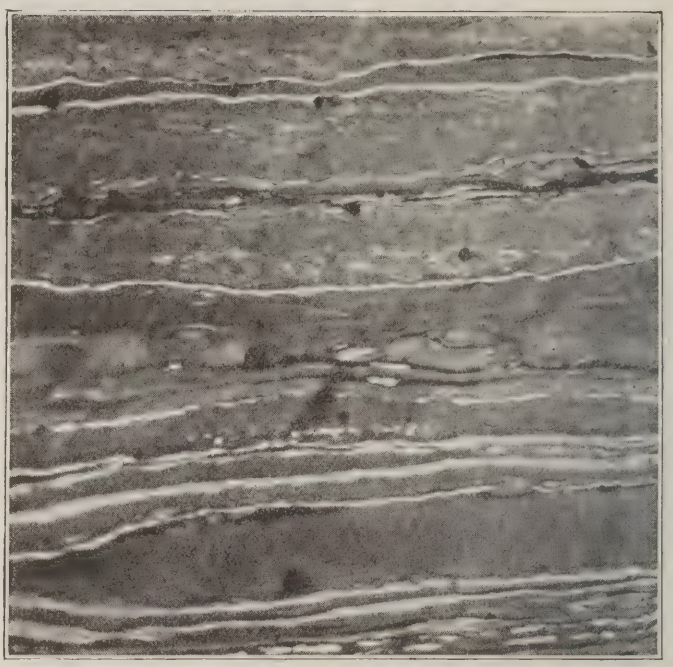


FIG. 13. VERTICAL SECTION OF "DULL COAL"

The white heavy lines running across the photograph represent leaf cuticles embedded in matter largely derived from leaves.

nite to anthracite, a change marked by the loss of moisture, of oxygen, and of volatile matter. The change is generally accompanied by an increase of fixed carbon, of sulphur and probably of ash. When, however, one coal is distinguished from another by the amount of ash or sulphur it contains, this difference is said to be one of grade. Thus "a high-grade coal" means merely one that is relatively pure, whereas "a high-rank coal" means one that is high in the scale of coals—or, in other words, one that has suffered devolatilization and that now contains a smaller percentage of volatile matter, oxygen and moisture than it contained before the change occurred. This progressive change in volatile matter and also heating value with rank of coal is shown in the diagram (Fig. 4), taken from Camp-

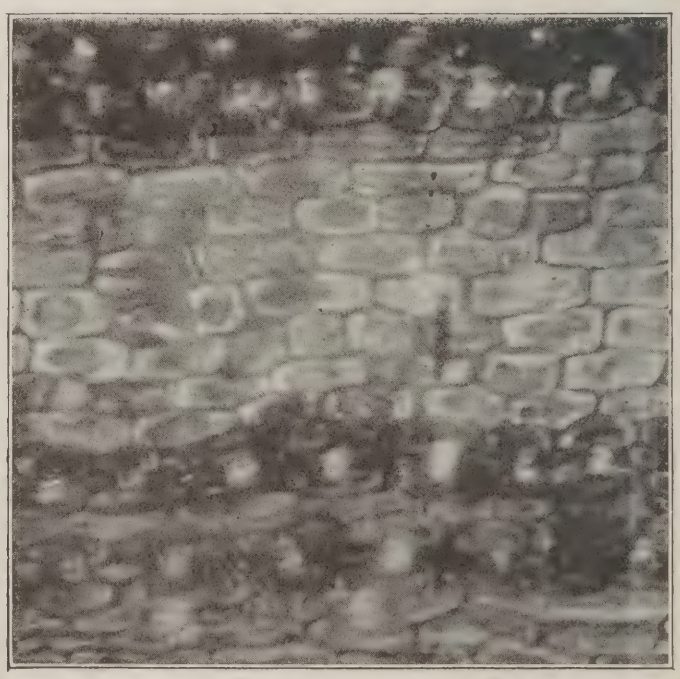


FIG. 14. ONE OF THE LEAF CUTICLES SEPARATED FROM THE COAL SHOWN IN FIG. 13, SEEN FLATWISE

bell's bulletin. It will be noticed that the fixed carbon gradually increases from 38 per cent. in lignite to 95.6 per cent. in anthracite. There is of course no definite boundary line between adjacent ranks; lignites shade into sub-bituminous coal and sub-bituminous into bituminous, so that one is often in doubt in which rank to place a given sample. Physical characteristics are also used to classify the rank of the coal as, for example, lignite is distinctly brown, markedly woody in appearance and slacks to a powder quickly on exposure to air, while sub-bituminous coal, the next higher rank, is black, less distinctly woody and does not slack so rapidly as lignite, although it is readily distinguished from bituminous coal because of this slacking property. Both lignite and sub-bituminous coals contain from 20 to 40 per cent. of moisture when freshly mined. This is readily given off on exposure to air and causes the slacking.

True bituminous coal contains from 3 to 16 per cent. of water, but is only slightly affected by exposure to weather. The fixed carbon varies from 40 to 70 per cent. This rank covers a wide variety of coals, as is well illustrated in the coals of Kentucky. In the western field is found typical low-rank bituminous coal with 8 to 12 per cent. moisture, 40 to 50 per cent. fixed carbon and 11,000 to 13,000 B.t.u. In eastern Kentucky there exist high-rank bituminous coals that are excellent for gas and coke production. These contain from 2 to 6 per cent. moisture, 50 to 60 per cent. fixed carbon and 13,500 to 14,500 B.t.u. There are also certain varieties of bituminous coal called cannel, splint and block coal.

Cannel coal is extremely rich in volatile matter and



FIG. 15. THIN CROSS-SECTION OF COAL FROM SHELBYVILLE, ILL., SHOWING PARTS OF CROSS-SECTIONS ON LEAVES

ASH IN EASTERN KENTUCKY COAL

Name of Bed	No. Samples Averaged	Softening Temperature, Deg. F.	Counties
Alum Bed	1	2940	Pike
Dean, Fire Clay or No. 4 Bed	25	+2790	Bell, Knox, Perry
Elkhorn Bed	18	2490	Letcher
Flag or No. 7 Bed	5	2880	Perry
Harlan Bed	8	+2700	Harlan
Hazard, Haddix or No. 6 Bed	4	2460	Perry
Hickory Bed	4	2340	Bell
Jellico Bed	4	2460	Knox
Kanawha Bed	1	2100	Johnson
Kellioka or C Bed	1	2230	Harlan
Lower Bolling Bed	1	2880	Letcher
Lower Elkhorn Bed	2	2740	Letcher
Lower Lignite Bed	3	2440	Bell
Lower Standiford Bed	1	2260	Letcher
Mason or Creech Bed	11	2320	Bell
Miller Creek or No. 1 Bed	13	2160	Johnson, Laurel
Poplar Lick Bed	4	2670	Bell
Rawl, Gas or No. 2 Bed	2	+2680	Pike, Whitley
Upper Elkhorn Bed	3	2420	Letcher, Pike
Upper Hance Bed	4	2330	Bell
Straight Creek Bed	16	2110	Bell
Thacker Bed	1	2430	Pike

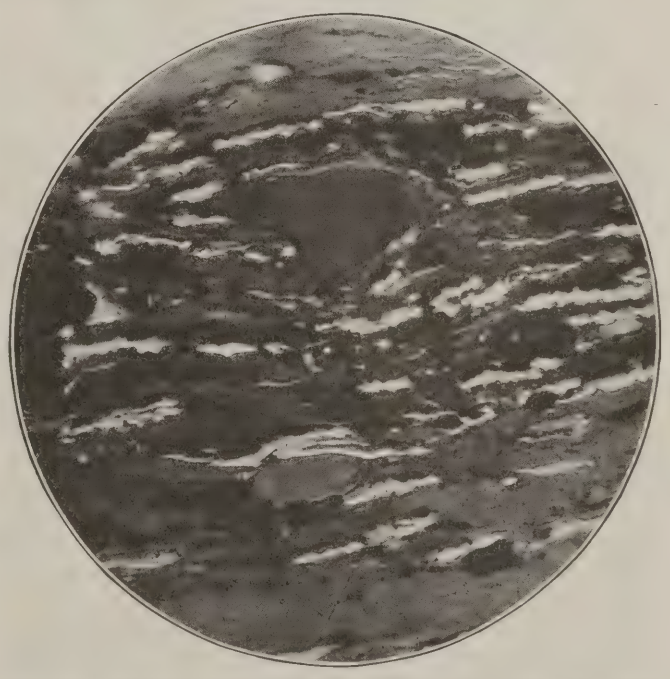


FIG. 16. HIGHLY MAGNIFIED CROSS-SECTION OF COAL FROM PITTSBURGH SEAM

Showing constituents of attritus in detail; spore exines in white; humic matter in gray; resinous particles homogeneous gray; and carbonaceous or mineral matter in black.



FIG. 17. SECTION OF ATTRITUS FROM PITTSBURGH BED, WHICH IS LARGELY COMPOSED OF SPORE MATTER

burns with a long, luminous flame. It is composed largely of spore exines and similar resinous or waxy products of plants, as can be seen from the photomicrographs. Block and splint are names indicating physical characteristics. Semi-bituminous coal and semi-anthracite represent intermediate ranks of coal between bituminous and anthracite. The classification is based almost wholly on the "fuel ratio," that is, the fixed carbon divided by the volatile matter. The limiting ratios for each rank are given in the following table:

Rank of Coal	Fuel Ratio = F.C. / V.M.
Bituminous	3 or less
Semi-bituminous	3 to 7
Semi-anthracite	6 to 10
Anthracite	10 to 60

The conventional chemical analysis and calorimeter tests afford much practical information that is useful in the utilization of coal, especially in evaluating it for fuel purposes. These methods, however, do not give any real information as to the constitution and origin of coal. This problem has engaged the attention of investigators for many years. Three different methods of attack have been followed: (1) Treatment of coal with solvents; (2) the destructive distillation of coal; (3) microscopical examination.

Chemists know that resins, waxes and similar substances will dissolve in certain solvents such as benzene, carbon disulphide, pyridine, ether, etc. Hence coal has been treated with many of these fluids in order to dissolve out its waxy and resinous portions and separate them from the purely cellulosic or plant fiber constituents. These researches showed definitely that coal contained resinous matter and also free hydrocarbons. Pictet, Ramseyer and Kaiser[3] extracted 5½ tons of Saar coal with boiling benzene for four days. In the extract they found and identified several pure hydrocarbons as, for example, C_7H_{10}, C_8H_{12} and $C_{30}H_{60}$ (Melene). The last-named compound was identified as the same as the melene obtainable from Galician petroleum.

The volatile-matter determination that is made in the proximate analysis of coal is a typical destructive distillation. The manufacture of illuminating gas and coke depends upon the same process. It is beyond the scope of this paper to describe the multitude of tars, oils, drugs, dyes and materials for explosives and fertilizers that are derived from the byproducts of the coke and gas industry. Fig. 5 gives the names of the more common coal products.

There is a wonderful field for future development in the production and utilization of these byproducts. We already know how to change the relative yield and quality of coke, gas and byproducts by changing the time and temperature of coking. And, as we learn more of the true constitution of various coal—that is, how the chemical elements are combined—we will be able to convert our bituminous coal into far more valuable products. Indeed the time is not far distant when smokeless coke and gas will be the only form in which coal will be burned in cities, and they will then be much more pleasant and cheaper places to live in.

Microscopical Examination

The various compounds obtained from coal on distillation, although not present as such in the coal itself, throw much light on the nature of the compounds from which they must have been derived, more especially when studied in connection with microscopical examinations of thin sections of coal. After all, the best way to find out how a thing is made is to take it apart and look at it. This is what Dr. Reinhardt Thiessen has been doing in the Bureau of Mines' research laboratory at Pittsburgh. Dr. Thiessen has developed a wonderful technique in cutting and grinding sections of coal to such a thinness that it is possible to examine them under the microscope at high magnifications with transmitted light, thus bringing out to plain view structure in coal that has never been suspected.

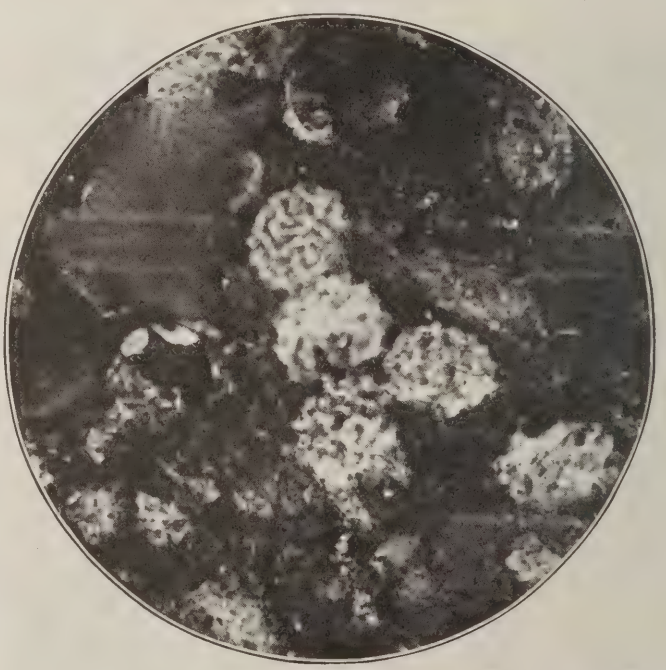


FIG. 18. HORIZONTAL SECTION OF PITTSBURGH BED COAL HIGHLY MAGNIFIED

Showing the convoluted spore that is characteristic of this coal bed and thus far found in no other bed

[3]Pictet, A., Ramseyer, L., and Kaiser, O., Comt. Rend. Acad. Sci., Vol. 163, pp. 358-361, Paris, 1916.



FIG. 19. MEGASPORE EXINES FOUND PREDOMINANTLY IN THE SHELBYVILLE, ILL., COAL AND SPARINGLY IN A FEW OTHER COALS

Dr. Thiessen has recently completed a comprehensive investigation of structure in bituminous coals that contains some wonderfully clear photomicrographs of high-rank bituminous coals. This represents a distinct advance in microscopic study, as these coals have hitherto resisted all efforts to cut or grind them into sufficiently thin sections to allow light to be transmitted through them.

A few typical sections which explain the composition of the bright and dull bands in coal are shown in the accompanying photographs. Fig. 6 is an ordinary photograph of a lump of Illinois coal that illustrates the laminated structure of most bituminous coals. Certain of the layers are of a glossy jet black appearance, others are dull grayish black. The former are usually called "bright" or "glossy" coal and the latter are called "dull coal" or "mat coal." Fig. 7 is a photograph of part of the surface of the block of coal shown in Fig. 6, magnified ten diameters. The "bright coal" is represented by the black bands and the "dull coal" by the lighter striated zones. Close examination of the "dull coal" at this low magnification shows that it in turn is sublaminated into thinner sheets of "bright coal" and "dull coal," the former being largely embedded in the "dull coal."



FIG. 20. GIANT MEGASPORE FOUND PREDOMINANTLY IN THE SHELBYVILLE, ILL., COALS AND SPARINGLY IN OTHER COALS

THE STRUCTURE OF BRIGHT COAL

Now let us examine a thin section of this bright coal under a microscope. Fig. 8 represents such a section magnified 200 diameters. Note the typical cross-grain structure of wood. A great number of bands of bright coal from many different beds were examined in the same way. All of them proved to be derived from woody plant tissue, either of stem, branch or root. The cell structure was well enough preserved so as to leave no doubt that the bright coal represents pieces of wood, large or small, turned into coal.

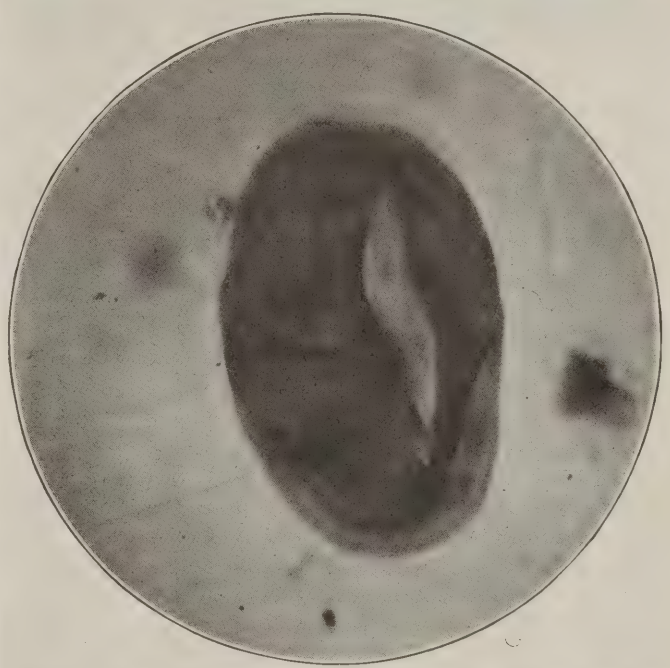


FIG. 21. ONE OF THE LARGER TYPES OF POLLEN GRAINS

Referring again to Fig. 6, it is seen even at low magnification that the dull coal has a sublimated structure of alternating light and dark bands, and on closer examination we find that the dark bands are "bright coal" embedded in a granular-appearing higher-colored material. And these "bright coal" bands in thin section and high magnification again prove to be woody tissue, that is, instead of being coalified trunks and limbs of trees, as were the large strips of bright coal that are visible with the unaided eye, they are small chips and twigs of wood embedded in a ground mass of vegetable débris, bits of macerated tissue, pollen grains, seed coats, resin particles, etc.

Fig. 9 is a photomicrograph of a section at right angles to the bedding plane of the "dull coal" zone. This is a thin section viewed by transmitted light and is magnified 200 diameters. The woody structure of the large fragment in the upper part of the picture

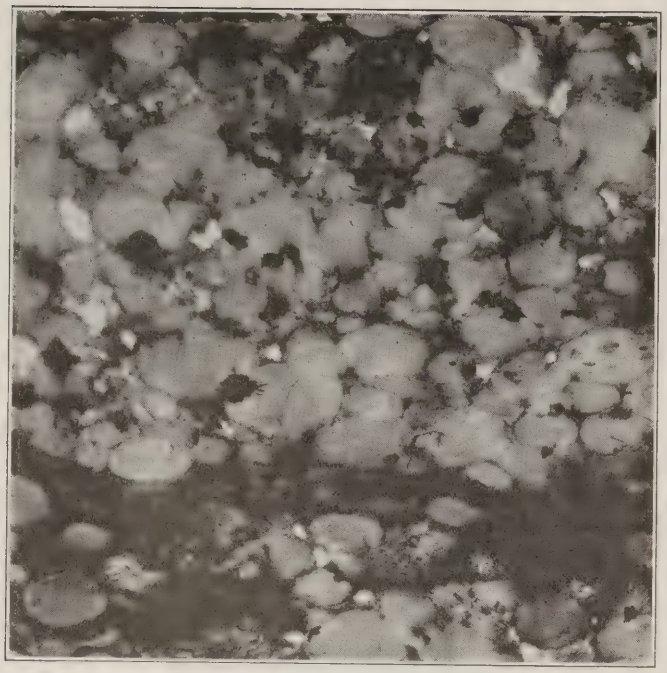


FIG. 22. CROSS-SECTION OF "DULL COAL" FROM THE VANDALIA MINE, TERRE HAUTE, IND., SHOWING A LARGER NUMBER OF RESINOUS PARTICLES

is plainly visible. In fact a large part (and in many bituminous coals the largest part) of the "dull coal" consists of small pieces of woody tissue pressed flat layer upon layer. The surfaces of these chips are readily seen even at low magnification by splitting the coal along the horizontal cleavage plane. Fig. 10 is a photograph of such a horizontal surface. The traces of woody chips are plainly visible.

Origin of the Small Anthraxylon or Woody Components

Dr. Thiessen has named the "bright coal" "anthraxylon," from the Greek *anthrax*, coal, and *xylon*, wood (coal from wood). He explains the presence of such formations in the coal by showing analogous conditions today in a peat swamp containing trees, as shown in Fig. 11. Fig. 12 is a lump of peat from this swamp. It shows a great many thin scaly chips which in the process of coal formation would probably become the thin layers of anthraxylon or "bright coal."

Let us now consider the thin vegetable tissues such as the outermost layers of leaves, green parts, young stems, etc. In many instances these skins, or cuticles, as the botanist calls them, are covered with waxy or resinous matter. They are therefore more resistant to decay and are found in the "dull coal" in the form of very thin layers, as in Fig. 13, which is a section at right angles to the layers. Figs. 14 and 15 also show cuticular tissue readily recognized by the trained botanist.

Between the layers of anthraxylon and cuticular tissues appears at high magnifications a heterogeneous mass of elongated light colored patches, irregular lumps of darker matter, and other débris, as shown in Fig. 16. This material is called attritus. It consists essentially of cellulosic degradation products or humic matter, spore-exines, resinous matter, cuticular matter, and some mineral matter.

Spore-exines are the outer shells or walls of spores of certain plants that contributed to all the coal beds. These spores are found to a greater or less extent in all coal. The attritus of Pittsburgh coal is particularly rich in spores, as shown in Fig. 17. The original spores were spherical in shape. In the coal there remains only the collapsed exine, or shell, which appears in the vertical section as a collapsed ring. In a horizontal section they appear as circular disks, as in Fig. 18. Note the brain-like convolutions of these spores, which is a striking characteristic of the spores of the Pittsburgh coal bed. This particular type of spore has never been found in any other bed.

Figs. 19 and 20 are spores from Shelbyville, Ill., coal and are probably characteristic of this bed, although not enough of the other Illinois coals have yet been examined to be certain that it is limited to this particular coal. Fig. 21 is a large pollen grain from the same coal. Fig. 22 is part of a thin cross-section of anthraxylon coal from the Vandalia Mine, Terre Haute, Ind., showing a large number of oval resinous particles.

The photomicrographs shown in this paper are only a few of many that have been made in the Bureau's laboratory. They represent a vast amount of patient, painstaking work, and have aided greatly in interpreting the results of chemical and geological investigations on the constitution of coal. Much remains to be done. Semi-bituminous coal such as Pocahontas and New River have thus far resisted every effort of the microscopist to produce sections thin enough to permit light to pass through them. Hence we have no direct information on the structure of these coals. The same, of course, applies to anthracite. However, what is impossible today is accomplished tomorrow, and we believe that the story of these coals will be read in the near future just as the structure of the bituminous coal has been revealed today.

Railroad Administrator Orders Change in Demurrage Rates

Of decided bearing to the coal trade is the change in demurrage rates ordered by the Railroad Administration. The statement issued by the Railroad Administration in this connection reads as follows:

Walker D. Hines, Director General of Railroads on June 21 signed Supplement No. 2 to General Order No. 7 referring to demurrage rules, regulations and charges, effective July 20, 1919. The charges at present are $3 per day for each of the first four days, after expiration of free time, $6 per day for each of the next three days, and $10 per day for each succeeding day.

They will be reduced to $2 per day for each of the first four days, after the expiration of the free time, and $5 per day for each day thereafter. The Supplement also provides that the average agreement which at present applies only to cars held for unloading will also be applied to cars held for loading, but the loading and unloading agreement will be separate.

Representatives of the shippers and of the American Railway Association recommended reductions. Mr. Hines pointed out that demurrage charges are not imposed for the purpose of securing revenue but to assist in the punctual unloading and loading of equipment and also that in view of the diminished purchasing power of the dollar and the increasing demand for equipment it was doubtful whether the prompt unloading and loading of equipment could be secured by means of these reduced charges. He referred to the heavy movement of traffic expected within the next few months and announced that if the results were not successful he would feel compelled to increase the demurrage charges.

Some Common Violations of the Mining Laws*

The Chief of the Department of Mines of West Virginia Unburdens Himself of a Few Opinions Regarding Mining Conditions and Safety in Mining, and Enumerates Some of the Reasons for Accidents

RECKLESSNESS and ignorance, according to W. J. Heatherman, who heads the mine inspectors' department of the State of West Virginia, are the chief obstacles to mine safety. The failure to set proper timbers, shooting from the solid, riding on trips, and the lack of adequate facilities for entering and leaving the workings are some more of the causes of mine accidents. Many mine officials, believes Mr. Heatherman, woefully lack a proper conception of their own responsibility and do not attempt to enforce precautionary measures.

TO MAKE the coal mines of West Virginia a safer place in which to work is the main object of the Department of Mines. Recklessness and ignorance are the foes with which we have to contend. They are at the root of every disaster. The mining laws of the state are the safeguards thrown around the men who mine coal. Their enforcement is vested in an inspection force which is continually making inspections of mines, removing hazards and curing defects that appear dangerous to life and limb.

The mine inspector, in reality, is a traffic officer, like the one who stands at the intersection of a busy street and guides the pedestrian on a course of safety. Frequently some reckless individual ignores the warning of the traffic officer and courts disaster by a rash act. The same is true of the warnings of the mine inspector. Familiarity breeds contempt, it is said, and this is most certainly true of the attitude of many miners in the observance of most of the ordinary rules of safety.

The most common violations of the mining laws are the failure of men to set timbers for their own protection, the shooting of coal from the solid, the riding of mine trips and the failure to provide proper methods of ingress and egress to the mines.

The records of the Department of Mines show that 50 per cent. of the accidents in the mines of the state are caused by falls of roof. The majority of these occur between the timber and the face of the coal where the miner has failed to post. It is indeed a common sight to visit a working place and find the miner working from 6 to 16 ft. ahead of the last timbers, while the roof over him is in a dangerous condition.

In reply to an inquiry as to why the miner does not set another prop here and there, you will most frequently receive the same answer—"I will, as soon as I finish loading this car"; or such a query will be met by the assertion that "That's good roof." Pursuing such an inquiry will develop that the miner is without an ax, or if he has one he uses it as though he had never seen that sort of instrument before. The law should require that every miner possess an ax, a good hammer, a slate bar and at least two good wedges, and that he serve as an apprentice or "backhand" for at least six months before he is allowed to work in a place by himself.

Can you imagine a railroad trusting one of its limited trains in the hands of a man who never saw a railroad before? As a matter of fact it is easier to learn to start and stop an engine than it is to be a good judge of roof conditions.

There is not another trade or profession under the sun that does not require an apprenticeship of from one to four years, and often longer. The inexperienced and unskilled miner not only faces unknown dangers, but he endangers the lives of all his fellow workers.

It is essential that every mine should have a well-defined rule as to the location of posts and when the timber should be set. Mine foremen should require strict and uniform observance of this rule.

Frequently, however, mine foremen may be found who do not realize the gravity of their duties. They are content to go from place to place, begging a cigaret here and some carbide there, with an occasional inquiry to the miner as to "When are you going to set that post I told you about yesterday?"

In my opinion, the mine foreman is the most important element in the mining organization. And yet there are some mine foremen who really do not know the way through their own mines. The mine foreman ought to be selected carefully: he is the general in charge; upon him depends the success of the business venture as well as the lives of the men who work for him. He ought to be a clear-headed, intelligent, industrious man possessed of executive ability.

The second offender in the percentage column is mine cars and motors. Next to falls of roof the riding of mine cars and motors by employees in the mines leads to the greatest number of casualties. To lessen the number of accidents from this source no man should be permitted to ride any other than a regularly conducted man-trip. Brakemen should be required to ride on the inside of the empty cars and on the rear of all loaded trips. Couplings should be made only while the trips are standing. Ample clearance should be maintained on the brake side of the car at least, so that a man may pass a moving trip on curves without danger of being caught or rolled against the rib. Another invitation to disaster, which ought to be sufficient cause for suspension, is the practice of standing in the middle of the track and boarding an oncoming trip or train.

The average motorman and brakeman are young fellows, who are often placed in charge of trains without any knowledge of the machinery they handle. They might be called starters and stoppers, or wreckers.

I feel that each motorman should be required to pass

*Paper presented before the West Virginia Coal Mining Institute, Charleston, W. Va., June 4, 1919.

an examination to show that he understands the use and care of brakes, the necessity of good contact, why oil cups are provided, and that he can make just as much speed with his pole trailing as he can "back-poling." I know from experience what means it is necessary to resort to at times (especially on the Monday following the old payday) in order to get all the motors out of the barn. But I believe that such necessity can be overcome to a certain extent by having an occasional meeting with the train crews. You might call it the Knockers' Club, but if you invite them to your office every few weeks and lay before them statistics concerning the number of men they have killed and crippled, the number of cars they have sent to the shop, and what the cost of each locomotive has been, and do it in the proper manner, I believe you will find an appreciative audience and a much-improved set of trainmen. After all, they are only human and a youthful lot, and many of them have not had the advantages of education. These frequent conferences should be advantageous in many ways. No one should be more competent to tell you where to find a piece of bad track or a dangerous roof condition than your train crew. Have your assistant mine foreman present at these meetings and you will be able to discuss and adjust your difficulties, so that when a motor or piece of track is marked for repairs it will be repaired.

The average foreman closes his eyes to boys and men riding huddled between loaded coal cars, and will tell you if you reprove him that he is perfectly willing to go to the next place. Therein lies one great reason for the lack of discipline around the mines today. I would like to suggest that the operators assist in organizing a mine foreman's institute, to be held as often as is necessary to allow each mine foreman in the state to attend and hear qualified men lecture on the duties of a foreman. This would tend to arouse a spirit to overcome the constant and flagrant violations not only of the mining laws, but all laws having for their purpose the elevation of man. The foreman's institute should teach that the same discipline in enforcing the laws should be in effect in every mine in the state.

Solid shooting is one of the most dangerous practices allowed in our mines today. The only remedy I can suggest would be to have the proper section of the mining laws revised so as to require all coal to be undercut, and where it is hand-mined no cuts should be shot down until some official has made an inspection.

It may be contended that solid shooting "bats out of turn," for the reason that so many accidents are traceable to it. I think many slate falls are premature for the reason that the strata are fractured by overcharged holes, and there is little doubt that several of our largest explosions have been the result of blowout shots or were caused by shooting from the solid.

Where solid shooting is permitted the use of black powder should be avoided. In fact I would like to see written on the statute books a law forbidding the use of black powder and fuse inside the mines of West Virginia. Where men are permitted to use permissible explosives and fuse they will invariably resort to the use of short fuse. There are only two ways to eliminate the hazard. One is by legislation, as I have suggested; the other is for the company to refuse to handle fuse. If the miner were made to realize the amount of money he would save by properly placing and tamping his holes, as well as the danger in which he places the lives of his fellow workmen, I really believe he would readily accept the electric firing and submit willingly to the adoption of permissible explosives.

I regret to say that many of our mines pay little attention to their traveling ways. In fact there are dozens of operations at the present time where one must be both an expert swimmer and climber in order to reach the outside, if he leaves the main haulage road. In many instances I have found the main hauls so badly gobbed that one either had to flag the trip or outrun it if he did not care to be crippled.

I venture the assertion that half the foremen in the state do not travel their returns more frequently than every six months. Every foreman should keep such returns in shape for men to traverse at all times, and should insist upon manholes as required by law.

In conclusion, permit me to make the suggestion that foremen pay occasional visits to adjoining mines where the accident rate is lower, or go from county to county to make inspections and see what methods are being employed in other mines to make them safer for life.



THREE VIEWS OF THE TIPPLE OF THE VALIER COAL CO., VALIER, ILLINOIS

From left to right the views are of the main shaft under construction, the air shaft where men and material are handled, and a second view of the main shaft under construction. The mine will be one of the largest and most modernly equipped in the state. Its capacity will be 7000 tons per eight-hour day. It is electrically equipped throughout. The haulage is by means of storage-battery locomotives. Both shafts are arranged for hoisting, the air shaft being provided in the tipple with a rotary dump, which handles a 4-ton mine car. The main shaft is equipped with a 12-ton double skip hoist, with a modern rotary dump at the bottom. Edison storage-battery cap lamps and other safety appliances will be used.

Underground Motor Repair Shop

By Ralph W. Mayer
California, Pennsylvania

A LARGE company that has immense coal mines does its motor repair work underground. The shop used for this purpose is situated over four miles from the tipple. It is 50 x 18 ft. in size. The roof is shot down to give it a height of 15 ft. and the sides and ends of the room are lined with heavy stone walls. The roof is supported by steel rails, over which is placed sheet steel, the space between the roof and the sheets being filled with concrete.

A track runs through the shop. Underneath the track has been taken up and a motor pit having a depth of 6 ft. has been built. Both ends of the pit are provided with steps made of concrete. The sides and bottom of the pit are constructed of the same material as is also the floor of the shop. Eighteen inches from the pit bottom the side walls have an offset of 4 in. Short lengths of plank can be placed upon these offsets, forming a platform to work upon. The side walls of the shop, near the roof, have an offset on which a steel rail is fastened. A Cleveland electric crane travels upon these rails and will reach any part of the shop floor. It is operated by a small motor. The side walls only partially support the roof, as the steel rail roof beams are set into deep hitches at the side.

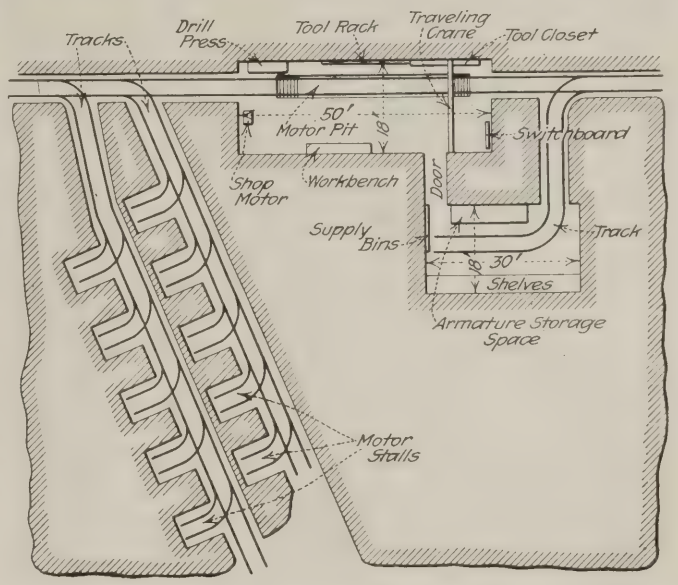
One corner of the shop contains a drill press, an emery wheel and other small machinery. The power for driving these tools is furnished by an electric motor, which is placed overhead at the end of the shop, out of the way. The pit is located at one side of the shop. Racks along the wall on this side hold the wrenches and other necessary tools. A closet on the same side near the end of the shop, provided with doors and locks, furnishes a storage place for the smaller and more valuable tools. The switchboard is placed in the opposite corner. The work bench, equipped with a vise and other appliances, is placed at the side of the room opposite the pit. The entrances to the shop are closed with sliding steel doors, hung on rollers. These are of course provided with locks. The motors are re-wheeled in this shop, and other necessary repair work is also done here.

A storage room adjoins the shop, being separated from it by a pillar of solid coal. A passage way through this pillar, which connects the two rooms, is also closed by a steel door. This storeroom is 30 ft. by 18 ft., but only the height of the coal, or about 7 ft. It has a solid rock roof, while the sides are lined with brick walls. A track also traverses this room, which is also closed by a steel door.

One side of the room is provided with racks for the storage of armatures, field coils, etc. Electric heaters placed underneath this rack keep these spares absolutely dry. Both rooms are entirely free from water. Shelving along the opposite side of the storeroom is filled with spare parts for motors, pumps and other machines. The framework supporting the shelves is made from 1½-in. pipe. Clamped fast to the pipe are pieces of L-shaped iron which support the steel sheets used for the bottom of the shelves. The L-shaped irons are also used to separate the contents of the different compartments. Along the ends of the room also are supply bins. The passageway between the two rooms contains a desk where the records of the repair shop and of the storage are kept. Work is done here on all the haulage, pump and fan motors, as well as the repairs on the pumps. All spare parts have to be kept here, as well as supplies for the mechanics, such as tape, sandpaper, lamp globes, etc.

The locomotive stalls are close to the repair shop. All these machines have numbers painted on their sides with white paint, and each stall has a corresponding number painted at its entrance with an arrow pointing into the stall. At the end of every shift each motor must be placed in the stall having the same number as the motor.

The company has 44 haulage motors in this one mine, all of which are placed in their stalls at the end of the shift. They are then overhauled by the mechanics of the repair shop. Two shifts of mechanics are employed for this service. A split point throw switch is placed at the entrance to each stall. Pillars of



LAYOUT OF AN UNDERGROUND REPAIR SHOP

coal separate the stalls, which are long enough and wide enough so that there will be several feet of clear space around the motor when it is in place. The repair shop also cares for the repair work on the 35 pumps employed in the mine.

These are usually repaired where they are installed in some new location, the mechanic taking the packing or repair parts to the pump. Any haulage motor breaking down during the day is brought to the shop and immediately repaired if the injury is not too severe. Any of the stationary motors giving trouble are reported to the shop, and a mechanic sent at once to locate and repair the difficulty.

Having the repair shop and mechanics right at the center of gravity of the haulage system, so to speak, saves time. Placing the motors in their stalls at the end of the shift and having them inspected and if necessary overhauled by mechanics forestalls breakdowns, and keeps the machines in good shape thus reducing repair expenses. This constant care also lengthens the life of the locomotives.

The British Government is spending $750,000 in a large experimental plant in which near-coke will be manufactured by subjecting coal to low-temperature distillation.

The Plastic-Arc System of Welding*

ELECTRIC welding fooled the officers and men of the interned German ships. They had smashed the cylinders and other parts of their engines until they believed they were beyond repair. However, the engines were repaired in place, and the vessels did good work in the transportation of American troops. Electric welding has its application in coal mining, but for arc-welding purposes a suitable welding metal is as necessary as a proper electrical outfit.

By J. O. Smith
New York City

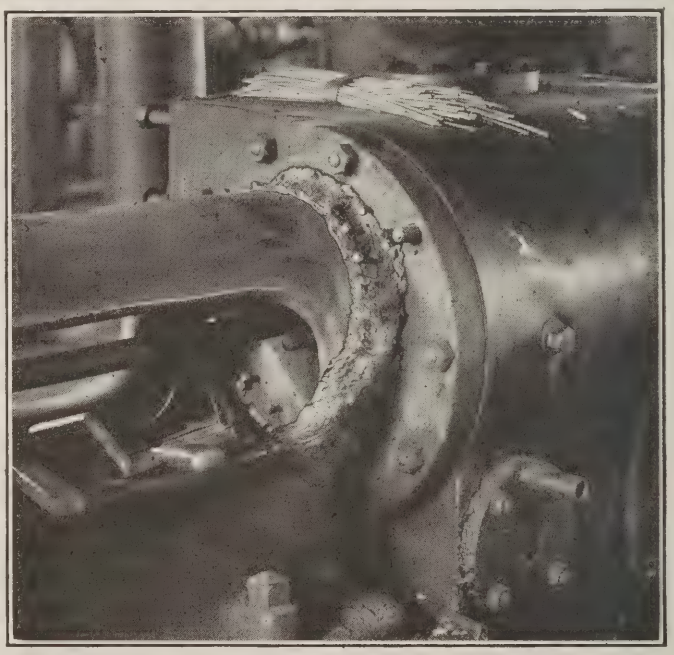
ELECTRICITY as a means for the joining of metals, in repairing cracks or breaks, salvaging defective castings and for metal-cutting purposes, all included under the general head of electric welding, although comparatively simple in theory has been slower in development in the coal-mining field than in any other service in which it has been applied. This slow growth probably arises from two causes—the scarcity of skilled operators and a dearth of reliable apparatus suitable for performing the actual operation.

During the last two years, however, arc welding has made great strides. Undoubtedly one of the means whereby it has attained greater prominence, and the confidence of the engineering world in general, was the successful welding of the damaged parts of the interned German ships at the outbreak of the war in the spring of 1917. The work that was done on the damaged engines of these ships demonstrated to the engineering world in general that electric welding could be depended upon to make permanent repairs, no matter how large or bulky the part to be welded, or what was the character of the metal.

There are four general fundamental types of arc-welding outfits in general use—constant potential, with fixed resistances; variable potential, rising and falling inversely as the current rises and falls; constant current (all of these employ direct current) and the alternating-current type, with reactive control. The constant potential system is the oldest of those employing direct current. It operates on a generator potential of between 35 and 40 volts and uses 18 to 22 volts at the arc for actual welding.

A distinct advantage of low voltage at the arc is that it renders it impossible for the operator to draw out a long arc between the electrode and the work. The deposition of clean, sound metal resulting in a good weld is largely a question of the operator's skill in maintaining a short and even arc, which eliminates oxidization of the molten metal by the air and insures the metal being deposited in the correct place. The voltage across the arc increases as the arc lengthens, and if the voltage is too low to maintain anything but a correct length of arc it follows that the operator has a surer indication (when his arc begins to weaken) that he must shorten the distance between his electrode and the work. With a low-voltage supply the external appearance of a weld is a certain guide to its value, and it can be safely reckoned to be free internally from any dangerous slag or oxide inclusions.

In the variable potential system, the current and voltage balance one another to a certain extent, the current varying principally with the length of the arc and maintaining its greatest stability when the arc is of considerable length. The long arc, however, is not generally advocated, because of diffusion at the surface of the original metal, and because of the tendency of the original metal to become porous and also to oxidize. The constant-current system is used primarily for single-arc outfits, although arcs in series can be used.



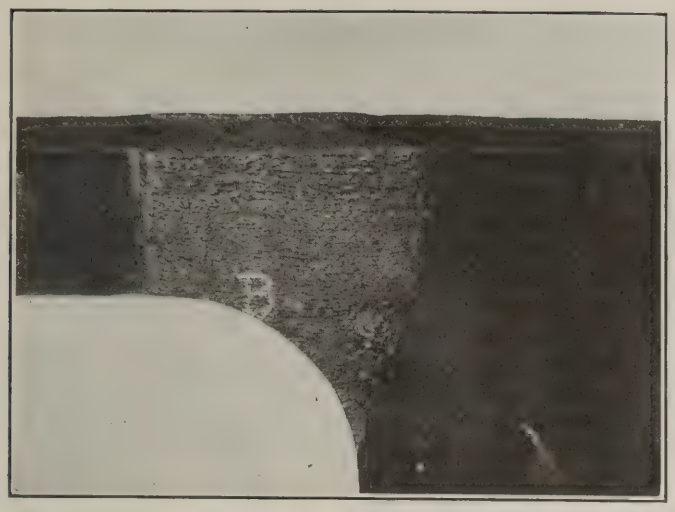
WELDING REPAIR ON STEAM ENGINE

The steam engine at the Public Service plant in Jersey City, N. J., broke practically in two. It was welded and put back in service by the plastic-arc system

Because of the alternations of the current, it is practically impossible to draw a long arc in the alternating-current system, and further, because such an arc is much more sensitive to variations in its length than in direct-current systems a higher voltage is necessary to steady it. Coated electrodes are used with the alternating system.

In the Wilson plastic-arc system, which comes, of course, in the constant potential class, the power lost in the line and in the automatic current regulation is of

*Abstract of a paper presented before the first meeting of the Coal Mining Electricians and Mechanics Institute, Charleston, W. Va., May 30, 1919.



COMPLETED WELDING REPAIR ON A BRAKE

low value compared to the energy actually required for welding. There is consequently a great saving over systems employing higher voltage. The low voltage used (18 to 22 volts at the arc) also insures better penetration of the original metal by the concentrated arc than is true when a longer, diffused arc of higher voltage is employed.

The comprehensive repairs necessary in the case of the damaged engines and other parts of the interned German ships definitely determined that any welding system, to be considered available for such heavy work in cast iron or cast steel, must deliver and maintain a critical degree of heat at the weld, in order to insure proper fusing of the original and the added metal.

This condition is successfully accomplished by means of a standard flat compound 35-volt generator feeding a special constant-current controller. The carbon pile and a solenoid that operate the arc are in series with it, so that the current through the arc is controlled by the automatic variation of the resistance of the carbon pile in response to the pull of the solenoid. The pull of the solenoid is balanced in turn by a spring acting through a leverage system, and the current adjustment is made by changing the leverage. The pilot motor, which is controlled by a switch at the welding-tool handle, regulates the leverage so that the operator can change the current at the arc, if necessary, without leaving his work or extinguishing the arc. This is a desirable feature in ship or general welding repair work.

The subject of the repair of the interned German ships brings up a matter that assumes greater and greater proportions the further consideration of it goes. It must be remembered, first of all, that some of the largest and fastest ocean steamships afloat were included among those deliberately damaged by their crews to prevent their use by the United States as transports, and that these same vessels eventually carried one-quarter of the total American expeditionary force to the battle fields of France, just in time, as we all know, to be where they were badly needed to stop the onrushing Hun. Had the repair of these ships not been effected as promptly as it was, there is no telling how much bearing the belated arrival of our troops on the firing line might have had on the final result. For all we know, the war might still be going on.

Part of the annual report for 1918 of Secretary of the Navy Daniels, which has a distinct bearing on this phase of the matter, is as follows:

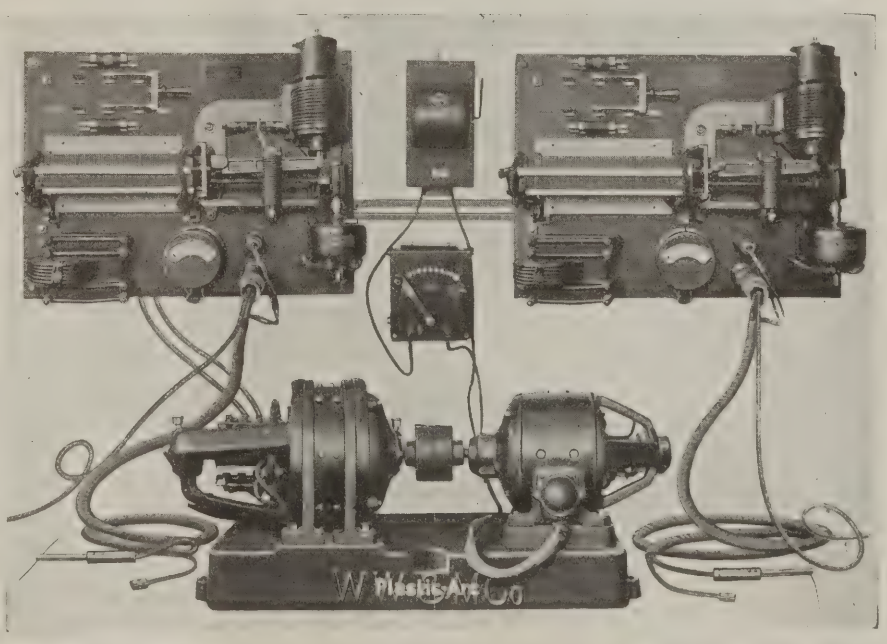
When war was declared with Germany all the German ships lying in our ports, many of them of the highest class of transatlantic passenger steamers, were immediately taken over by our Government. Upon examination it was found that the machinery of all of them had been deliberately damaged by their crews, in many cases seriously, and the character of the injury was such as to denote that the work had been carried out under a central direction and that it had been well planned.

When taken over, these ships, to the number of 103, were put under control of the Shipping Board, which later transferred 34 of them to the Navy for use as troop and freight transports, and subsequently added 20 more to be repaired and returned to the board.

The principal damage was the breaking of cast-iron parts of the main engines, chiefly the cylinders, though in one case rods, connecting-rods and boiler stays were sawed half in two, and in others the boilers were ruined by dry-firing and had to be renewed. There was, in addition, much vandalism of a minor character, but the remedying of this was insignificant in comparison with the gigantic task of repairing the cylinders, some of which were more than 9 ft. in diameter.

It was speedily recognized that the large passenger ships thus taken over would have to be our chief reliance in transporting troops to France, and their quick repair became a matter of great national interest. After a survey by representatives of the Shipping Board, which at the time had custody of them, it was decided to make new cylinders. This decision was in accord with usual practice and also with the rules of the marine underwriters, and but for the number of ships and the large number of cylinders involved would probably have been followed. But the time required was prohibitive, and while the subject was under discussion a few of the ships were transferred to the Navy and sent to the New York Navy Yard for repairs.

As the Navy was not bound either by previous practice or the rules of marine insurance societies, the engineer officer of the yard, Capt. E. P. Jessop, U. S. N., after conference with an electric welding company recommended that the broken cylinders be repaired by welding, and in



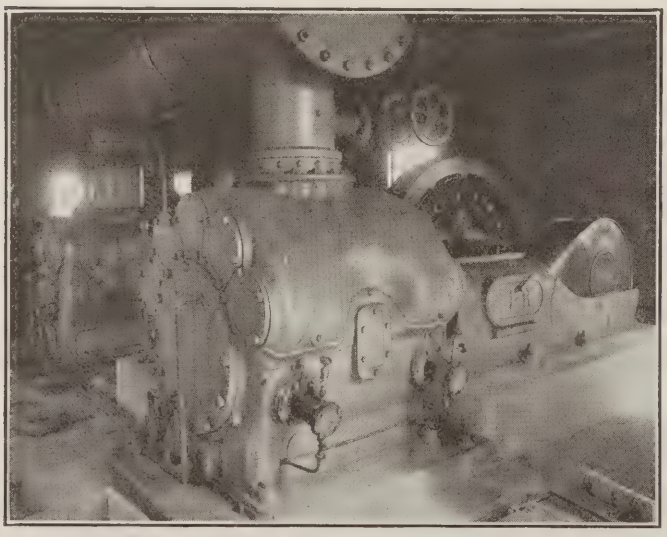
NECESSARY ELECTRICAL OUTFIT FOR WELDING BY PLASTIC-ARC PROCESS

this he was heartily supported by Rear Admiral Burd, the industrial manager of the yard. The matter was referred to the Bureau of Steam Engineering, and Capt. O. W. Koester, assistant to the bureau, was directed to make a thorough examination of all conditions on the ex-German ships. As a result of his investigation, orders were issued to make all repairs where possible by electric welding, and to resort to mechanical patching only where welding was impracticable, and the department supervision of the work was thereafter under the personal direction of Captain Koester.

This decision, so far-reaching in its application and so fraught with danger to the professional reputation of the officers concerned, was made in the face of opposition by engine builders and by marine insurance companies, but with such confidence in the ultimate result as left no room for doubt of its success. Electric welding was well known but its application on such an extensive scale was unprecedented; by its use these damaged cylinders could be saved, the work could be done without removing the cylinders, and all the vessels could be made ready for service probably a year before they could have been if the cylinders were renewed.

Upon completion of repairs, which were carried out uninterruptedly for 24 hours a day, each vessel was sent to sea for a test under full-power conditions for 48 hours, the purpose being to ascertain whether the work of repair had been well done and to determine whether the ships were in condition to be intrusted with the transportation of troops. So well and so successfully were the repairs accomplished that there was not a single instance of a defective weld, nor has one developed during the months of arduous service on which these ships have been engaged.

I have entered upon so full a statement of this case because I think it stands out as one of the greatest engineering achievements of the period. The perpetrators of the sabotage were confident that they had damaged the machinery of these ships beyond repair, which fact is evidenced by a memorandum found on board one of them, in which each case was carefully noted, followed by the significant remark, "Cannot be repaired"; and the speedy rehabilitation of these vessels in the face of such German confidence is a splendid triumph of American ingenuity and an evidence of American engineering accomplishment that is deserving of the highest commendation. The restoration of these magnificent ships to service reflects the greatest credit upon the naval officers concerned and upon the officers and employees of the welding and engineering companies who carried out the work. It is an illustration of the part played in winning the war by men who handled an electric torch or who fashioned and secured mechanical patches to these damaged cylinders. Without these ships we could not have transported our troops to France as rapidly as was done, and the men who made this possible performed a service of as high an order as have the brave boys who were thus enabled to take their place on the fighting line.

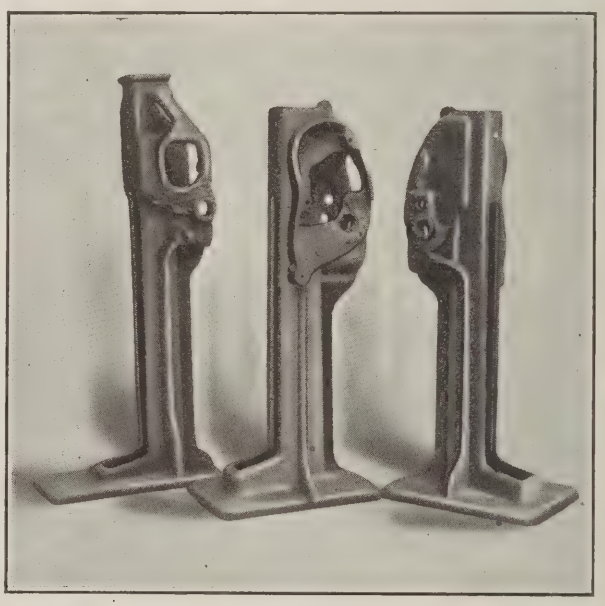


CAST-IRON ELECTRICALLY DRIVEN AIR COMPRESSOR REPAIR

This compressor, at the plant of the New Jersey Zinc Co., at Ogdensburg, N. J., was cracked in several places, due to a fire at the plant. It was repaired in place by the plastic-arc welding method

As a sidelight on this work it has been made the subject of careful estimate and determination that the repair of these ships resulted in a saving of 12 months in time, enabled us to transport at least 500,000 troops to France, and effected an economy which is conservatively estimated at upward of $20,000,000.

It will be recalled that for a few days previous to the declaration of war, the newspapers of the country had printed articles about mysterious doings and noises aboard the German ships then interned in our ports. These articles told of sounds of heavy pounding being heard throughout the days and nights on board these ships, and of splashes during the nights as though heavy pieces or parts of machinery were being thrown overboard.



BROKEN JACK STANDARDS RECLAIMED FROM SCRAP PILE BY WELDING

It was not known then, of course, to what extent we had to deal with *Kultur* and its refinements, and we did not realize the lengths of infamy and destruction the Hun would resort to; but after the vessels were taken over, it was discovered that the pounding was the result of driving tapering wedges into holes previously drilled into cylinders and other parts of the interned ships. The result was, of course, that huge pieces of metal were broken out of all the important parts of the ships, and these pieces were thrown overboard.

Some of the German officers of these ships have declared, since the war, to Americans with whom they came in contact, that when they damaged these ships they thought they had made them impossible of repair. The fact that 9-ft. cast-iron cylinders could be repaired by welding seemed beyond their understanding. They stated that although the Germans had experimented extensively with all sorts of welding, they could not weld cast iron of such bulk.

On the cylinders of the 20 vessels of German origin, exclusive of the turbine-driven "Leviathan," formerly the "Vaterland," there were 118 major breaks which would have entailed the renewal of some 70 cylinders if



REBUILDING THE PINION END OF AN ARMATURE

ordinary practice had been followed, as was the recommendation of the surveying engineers in their original report. However, a group of five electric-welding experts inspected the damage and reported that all the cylinders could be saved by welding. A fact of great importance to the marine engineering world is that all the cylinders were thus saved, the ships were quickly made serviceable and another calculation of our enemy was thereby sadly disarranged.

To any one familiar with conditions at that time in the machine shops and foundries in the vicinity of New York, also in the drafting rooms, the problem of producing 70 cylinders of the size required by these vessels would have seemed almost impossible, and it is fairly well established that some vessels would have had to wait nearly two years for this equipment.

It must be remembered that few drawings of these engines were available, and those in many cases were not discovered until months after the repairs had started. Therefore, it would have been necessary to make drawings from actual cylinders, and competent marine engine draftsmen who were not already flooded with work did not exist at that time.

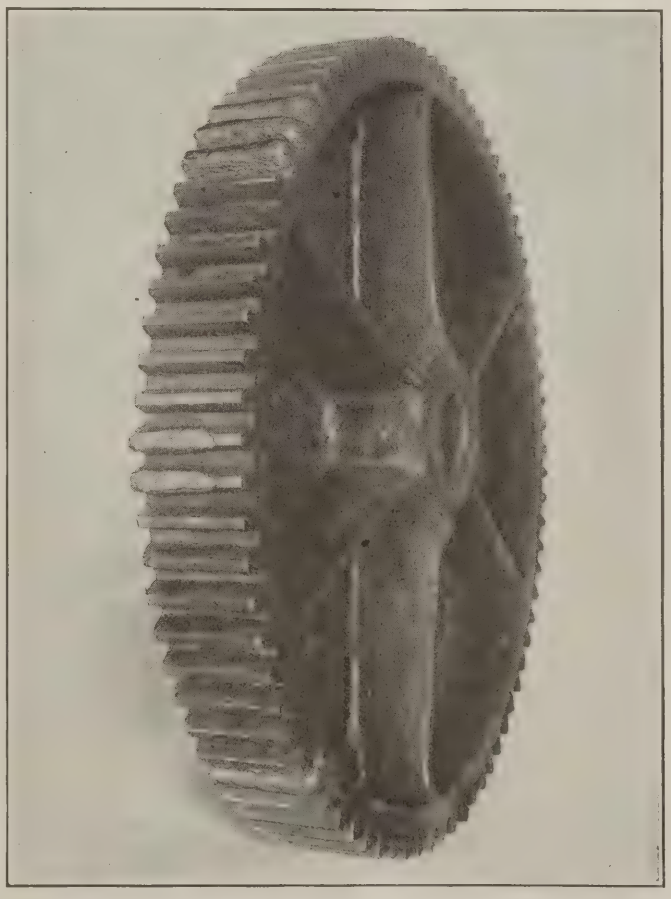
The break in the starboard high-pressure cylinder of the North German Lloyd steamer "George Washington" was typical of the damage done by the Germans. This break was effected by boring a row of holes in the cylinder wall, about an inch apart, and knocking a piece of the wall out with a ram.

To prepare this for welding it was necessary to chisel off the surface roughly, build a pattern of the break, cast a steel piece from the pattern, stud up the surface of the cast iron of the cylinder with a staggered row of steel studs $\frac{5}{8}$ in. in diameter projecting $\frac{1}{2}$ in. from the cylinder, bevel the edge of the cast piece, place the piece in position, and make the weld. A pad of metal was sometimes laid over the rows of studs previously mentioned. Tests have shown conclusively, however, that such welds can be properly made without this pad; that is, if the approximate strength of the original metal is all that is desired. In such a case the studding of the metal is unnecessary. In these particular cases the work was of vital importance, because of the uses to which the vessels were to be put when in service. Furthermore, it was appreciated that this exhibition of a new application of the art of welding required that the demonstration be satisfying, not only to the mind of the engineer, but to the eye, and ear. And when any engineer looked at the band of metal formed by the pad and sounded it with a hammer, he could not fail to be satisfied that the necessary strength was definitely there.

Capt. E. P. Jessop, of the Navy, personally tested many welds in which cast iron was joined to cast steel for tensile strength and noted in but one case a failure to obtain practically the original strength. This one case showed the effect of an inexperienced operator burning the metal. It was easily detected as an inferior weld without the test being applied.

The electric-welding operation consists in connecting the positive leg of the circuit to the part to be repaired, and the negative leg to the holder in the hand of the operator, placing the welding wire in the holder and bringing it sufficiently close to the casting to strike an arc. The welding wire then melts to a plastic state and fuses to the casting, which is also in similar state from the heat of the arc. The metal is laid on in layers in such a manner as to take care of the contraction in cooling. Each successive layer is cleaned with a wire brush before the next layer is applied. In the keeping of the successive layers clean and in laying on the metal so as to take care of contraction the operator's ability is exercised quite as fully as in the handling of the apparatus.

The cylinders of the German engines were not removed, but were repaired in place. Thus the work of fitting was reduced to a negligible quantity, and the refitting of lagging was not interfered with by projections, other than the $\frac{5}{8}$-in. pad, which was laid over the studs for extra strength. It may well be noted that such repairs can be undertaken at any place where a vessel may be lying, either at her loading dock or in the stream, since welding apparatus may be carried on



RENEWING TEETH IN A DAMAGED GEAR WHEEL

barges which can be placed alongside and a wire run to the work.

In the early days of arc welding attention was directed solely to developing the machines employed in the operation and little thought expended on the welding metal itself, or how it should be used to attain the best results. The result was that a large percentage of the attempted welds were failures, principally because of the change in characteristics of the welding metal from the effect of the heat in the arc.

This particular phase of welding has been made the subject of special study by laboratory engineers, with the idea of developing a welding metal that would hold its proper characteristics through the intense heat of the arc. It was determined after long experiment that no one welding metal could be developed that would insure lasting holding qualities in work on a variety of metals.

The result was that a number of special welding metals were developed and these were experimented with, analyzed and further developed, until the special welding metals, known as Plastic-Arc certified welding metals, were finally evolved. These special welding metals, of which there are eight grades, are made up in the form of welding electrodes.

In order to insure proper tensile strength and ductility it is necessary that the welding metal possess the following qualities: (1) The wire must flow evenly with good penetration. (2) The metal added must compare favorably in its composition with the parent metal.

In welding with an ordinary soft iron electrode on a metal part that contains about 20 per cent. (so called) of carbon and 45 per cent. of manganese, the deposited metal is practically pure iron and does not penetrate the weld.

The parent metal is plastic for about $\frac{3}{16}$ in. below the surface and the electrode is added while it, too, is in a plastic state. When a sufficient amount of this incorrect welding metal has been deposited at a certain point, the operator moves the arc along and the metal quickly hardens, leaving a sharp line between the parent and the added metal. The result is a weld devoid of holding qualities or the tensile strength of the parent metal, and failure is certain to occur the first time undue stress is imposed on the welded part.

In order to insure a tensile strength as great as or greater than that of the parent metal, it is absolutely necessary that the welding metal be of such composition as to retain the characteristics of the parent metal after the welding metal has been passed through the intense heat of the arc.

In welding parent metal of about 18 per cent. carbon and 45 per cent. manganese, by the Wilson system, No. 6 welding wire is used. This contains 22 per cent. of carbon and 75 per cent. of manganese, together with a small amount of copper. Part of the manganese, some of the carbon and practically all of the copper are burned away in the arc, leaving the added metal with about 19 per cent. of carbon, 50 per cent. manganese and no copper, which is approximately the same composition as the parent metal.

THE COAL sample of higher moisture content will usually occupy more space for the same number of pounds of (dry) coal than will a sample of lower moisture content. However, the Bureau of Mines states that the increase in volume for the wet coal is not so great proportionately as is the increase in weight per cubic foot.

Tenth Annual Meeting of the Mine Inspectors' Institute

THE tentative program of the tenth annual meeting of the Mine Inspectors' Institute of U. S. A., which is to be held at Indianapolis, Ind., July 8, 9 and 10, 1919, promises to be most interesting and profitable to those who will attend. The headquarters of the Institute will be located at the Claypool Hotel, and meetings will be held at the Legislative Chamber, State Capitol Building, and the hotel proper. The ladies attending have not been forgotten, for they will be given the privileges of the parlors of the Claypool Hotel, and their entertainment will be in charge of a local committee.

As announced, the program is as follows:

TUESDAY, JULY 8, 1919

10:00 A.M., State Capitol—Address by Hon. James P. Goodrich, Governor of Indiana; Hon. Philip Penna, Indian Coal Operators Association, and Hon. William Green, United Mine Workers of America.

Response by members of the Institute.

Business Session—Acceptance of new members, etc.

2:00 P.M., Palm Room, Claypool Hotel—Address by the President, Thomas Graham.

Discussion.

Indiana State Mine Inspection Service, Its Aims and Hopes, by Cairy Littlejohn, Chief Deputy Mine Inspector of Indiana.

Discussion.

Address by Prof. C. J. Norwood, Chief Inspector of Mines for Kentucky.

Question Box and Discussions.

8:00 P.M., Smoker—

Round table conference.

WEDNESDAY, JULY 9, 1919

10:00 A.M.—Palm Room, Claypool Hotel—Compensation Insurance as an Aid to the State Mine Inspector, by J. G. Vaughan, District Mine Inspector of West Virginia.

Coöperation Between State and Insurance Inspectors. by H. M. Wilson, The Associated Companies.

Discussion.

Question Box and Discussion.

2:00 P.M.—A Method of Humidifying Coal Mines to Prevent Coal-Dust Explosions, by J. W. Paul, Mining Engineer, U. S. Bureau of Mines.

Discussion.

History of the Mine Inspectors' Institute of the U. S. A., by Prof. J. T. Beard, Senior Associate Editor, *Coal Age*.

5:00 P.M.—Automobile ride through Indianapolis, leaving from Claypool Hotel.

8:00 P.M.—Business meeting.

THURSDAY, JULY 10, 1919

Visit some Indiana coal mine, place of visit to be announced on July 9.

CARBON IGNITES at about 900 to 1000 deg. F. Therefore, in burning pulverized coke or anthracite in furnaces it is necessary to use special expedients to raise the temperature of the burning fuel above the ignition point. Low-volatile fuels have been burned satisfactorily by this method.

The Importance of Rail Bonding

By E. Steck
Hillsboro, Illinois

SYNOPSIS — *Locomotives often fail through no fault of design and no imperfection in manufacture, but through improper or inadequate electrical supply lines. The chief difficulty appears to be poor track bonding, which cuts down the voltage delivered to the mine motors. The welded terminal type of track bond appears to give better all around results than other common varieties.*

MANY coal operators and superintendents do not realize the importance of proper track bonding. Excessive numbers of and high maintenance cost on locomotives and cutting machines are often traceable to poor bonding. The full importance of this matter is not apparent until this subject is investigated in detail.

If the theory once expounded to me by an electrician in charge of a large mine were true, bonding would not be necessary. His view was that the trolley was the positive side, which carried the current from the positive brushes of the generator out along the line and into the locomotives and cutting machines. After passing these machines it made no difference what happened to the current, and no return was necessary. If by any chance the polarity of the generators was reversed, it would be impossible to operate the locomotives and coal cutters, as the current would have to flow along the rail, which, not being bonded, would make it impossible to reach the machines.

Of course, this theory is not correct. It is just as important to have good bonding if the trolley is the positive side as it is if the trolley is the negative side. In fact, it is generally highly important to bond properly since the voltage drop may thereby be made to be less over the rails than over the trolley. The voltage of any point in the mine circuit is readily calculable, since it depends upon the amount of current, size of trolley and feeder, rail resistance and the voltage of the generator.

$$\textit{Voltage drop} = \frac{10.5 \times \textit{amperes} \times \textit{distance}}{\textit{Circ.mil of conductor}}$$

For example: The generators on top develop 275 volts direct current, and we will assume that there is a 15-volt drop in the cables connecting the trolley and rails to the source of energy. The voltage on the bottom will then be 260. If the voltage at a parting 3000 ft. from the bottom is desired, when 800 amp. is being used on the entry, and there are 35-lb. 30-ft. rails with bonds showing an average of 4 ft. of rail resistance, and a 4/0 trolley with a 500,000-circ.mil feeder, the calculation is as follows:

$$\textit{Drop in trolley} = \frac{10.5 \times 800 \times 3000}{211{,}600 + 500{,}000} = 35 \textit{ volts.}$$

$$\textit{Drop in two rails} = \frac{10.5 \times 800 \times 3400}{371{,}360 \times 2} = 38 \textit{ volts.}$$

The resistance of the rails in the foregoing is assumed as 12 times that of copper, or the cross-section of 35-lb. rail equals 371,360 circ.mil of copper. A 4/0 trolley equals 211,600 circ.mil. In this case the bond has the effect of making a 30-ft. rail equal to 34 ft. on the basis of resistance; therefore, 3000 ft. of rail would be equal to 3400 ft. when bonded. In other words, the 35-lb. rail well bonded is as effective as a 4/0 trolley plus a 500,000-circ.mil feeder. The voltage at the parting will be 260 — 35 — 38 = 187 volts.

Now take the same condition where the bonding is extremely poor; no cross-bonding; switches not bonded; sections of track without bonds, and good bonding at only infrequent intervals. Under such conditions it is not out of the ordinary to find the average—that is, the total rail joint resistance divided by the number of joints—equal to 60 ft. of rail resistance. In this case the overhead drop will be the same, but the rail drop will be

$$\frac{10.5 \times 800 \times [3000 + (100 \times 60)]}{371{,}360 \times 2} = 100 \textit{ volts.}$$

The voltage at the parting will be 260 — (35 + 100) = 125 volts. The effectiveness is reduced to a little more than that of a 4/0 wire. The result is not only a frequent burning out of locomotive and machine armatures, but the slowing down of all electrically operated machinery. The locomotives will not make as many trips as they should, and the machines will not cut enough coal. It can readily be seen that this poor bonding reduces the output of the mine, and that when the bonding is done efficiently the locomotives will haul more coal and the machines will cut more places. Either the tonnage will be increased with the same amount of equipment or, if it is impractical to increase the tonnage, some locomotives and machines can be dispensed with.

We can easily see that a mine with good bonding saves in the number of machines and locomotives required for a given output. The reduction of the number of machines and locomotives reduces the capacity of boilers, engines and generators, decreases the amount of boiler coal necessary and, in fact, lessens the demand upon all power-plant equipment. There will be a saving in the number of motormen and tripriders that frequently amounts to considerable. There will also be an increase in voltage as the amount of current will be decreased, and from the formula it is noted that the voltage drop is directly proportional to the amount of current required. The cost of bonding, including labor and material, when done well is small in comparison with the benefits derived.

The bond resistance depends on the length of the bonds and the type. A 12-lb. high-carbon rail has practically the same resistance per foot as a 2/0 copper wire; a 20-lb. rail is equal to a 4/0, and a 40-lb. rail is equal in resistance to two 4/0 wires. Main haulageways should have both rails bonded with 4/0 wire where haulage motors, gathering motors and cutting machines are in use. This is especially necessary in old mines where the partings are far back from the bottom. In cross entries it is generally found efficient to bond one rail with 2/0 bonds; however, if some of these cross entries are to be used later as main haulageways, they should be bonded with 4/0 bonds on one rail, and later the other rail may be similarly bonded. It is not

possible to give an empirical formula for bonding, but after the length of bonds has been decided upon their size should be such that when the mine is fully developed the drop will not be excessive.

Often a piece of solid wire is laid along the flange of the rail and clamped to it by spikes driven into the ties, so that the head of each spike presses the wire to the rail. Tests made on 20-lb. rail with 2/0 wire show about 6 ft. of rail resistance when the wire and rail are both clean and the bond has just been installed. A test two months later showed 25 ft., and in six months this bond was found absolutely useless. The apparent explanation is that the locomotives loosen the wire, and the rust on the rail and the oxidization of the copper gradually increase the contact resistance.

Channel pin bonds are a development of clamp bonds with all their troubles, only these take longer to develop. Compressed terminal bonds are and remain effective when properly installed, but it is nearly impossible to have them put in as they should be. In many instances the head of the terminal is too short, making it impossible to do a good job. More often the bond hole is not the correct size for the bond, the hole is not cleaned thoroughly, oil, dirt and dampness being present, and the bond compressor is not used properly, or a hammer is employed in place of it.

With poor workmanship the bond resistance quickly increases and the bond becomes ineffective. Tests made at the time some 4/0 compressed terminal bonds were installed on a 25-lb. rail showed an average resistance equal to 4 ft. of rail. In less than a year this had increased to 15 ft. because of poor workmanship.

How the Hole Should Be Reamed

In order to obtain permanently satisfactory results with this type of bond the hole should be reamed with a taper reamer to such an amount that the bond must be lightly tapped to cause it to enter the hole. Both sides of the web of the rail should be surfaced; all dirt, oil and moisture should be thoroughly cleaned off before the bond is inserted, and a bond compressor should be employed. The head of the bond should be of sufficient length so that a button is formed after it is compressed.

Because of the trouble encountered in getting these bonds installed properly, electrically welded bonds are coming into use. The cost of these bonds is practically the same as those of the compressed terminal type, but the cost of installation is decidedly less. Experiments further show that a bond of this type is permanent.

These bonds may be procured with either iron or copper terminals. While the copper has slightly less resistance than the iron terminal, it is more difficult to weld to the rail. Bonds are made for welding to the ball, web or flange of the rail. A short U-shaped bond is used for attachment to the ball. This has the advantage of being cheap and easily inspected, but it car only be used on heavy rails with tight fishplates and where the ties under the rail joints are in good condition. Otherwise such bonds will be cut off.

The same bond can be used underneath the flange, but one serious objection is that it cannot here be inspected readily; also on old track generally the ties must be changed. This makes the cost prohibitive. The most satisfactory method for the average track is to use the straight bond, 10 in. longer than the fishplate, and weld it to the upper side of the flange on the inside of the rail so that it passes just underneath the bolts. This method gives maximum protection in case either cars or locomotive leave the track, and it can here be easily inspected.

The objection to using this type of bond and welding to the rail web is the liability of burning the web and damaging the rail. With a gang of three men, one to do the welding and the other two to prepare for the weld, 15 to 20 bonds may be put in place per day when all hands are absolutely new to this work. With about two months' experience they can easily put in 60 per day. This is on an eight-hour basis and must take into consideration the fact that work is often interrupted to permit the passing of locomotives. The average for putting in concealed compressed terminal bonds under like conditions is about 15 per day for two men. On a test using 35-lb. rail and 28-in. 4/0 bonds of the welded type, the installation gang showed an average of 100 bonds per day. A test made a few months later showed no change in resistance.

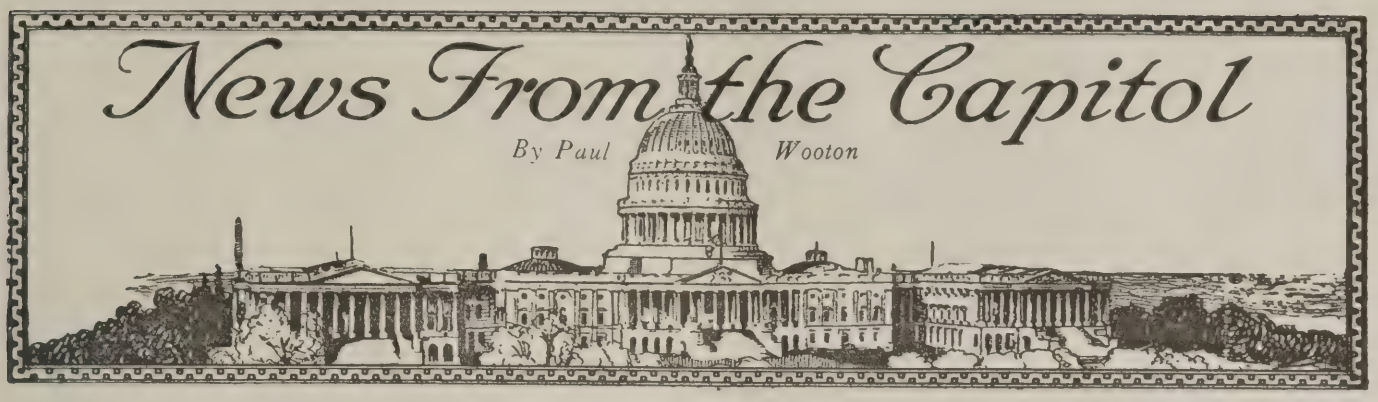
Importance of Bonding Switches

Even when bonds are properly installed it is important that the bonding progress with the track extension and that relayed track be bonded at once. In many instances considerable trouble is taken in bonding a straight track and no attention paid to switches. Special precautions should be exercised in bonding switches, as neglect to do so, especially where there are no cross bonds, is to make the work done on the straight track useless.

The advantage of cross bonding is that should a rail joint have especially high resistance because of a defective bond, the current will take the other rail on the cross bond just before this fault, and again return on the next following cross bond. Consequently, cross bonds should be installed about every 200 ft. They should be about 10 in. longer than the gage of the track and should be buried in the ground close to a tie in order to protect them from injury.

Return feeders frequently are placed along the track and only tied to it at the end of the feeder. The effectiveness of the feeder will be greatly increased if it is tied into the track about every 200 ft. This materially decreases the length of the electrical circuit as the locomotives come into the bottom; or, in other words, it increases the voltage at the locomotive. Care should be taken to solder the feeder and either weld the other end to the track or bond to it by means of compressed terminal bonds; cross bonds cut in half are convenient for this service.

In proving a coal property preliminary to development, often a number of drill holes are put down which serve their usefulness when the desired depth has been reached and a record obtained of the material drilled. Later when mining has opened up territory including these old drill holes, it often happens that they increase the amount of water to be pumped. The old drill holes may have gone through crevices, fissures or seams of watery strata, and it is desirable to stop the flow into the mines. A number of methods have been used to plug such drill holes, operating from the surface. However, a simple method of plugging the hole from the underground workings is as follows: Fill small bags with concrete and push them up into the hole one at a time, the diameter of the hole determining the size of the bag used, as ultimately they must be wedged tightly into the drill hole. When no more concrete can be forced into position the bottom of the hole is plugged with a soft pine stopper, which can be supported temporarily in position until the concrete sets.



Navy Rejects Bids for Steam Coal

The Navy has rejected all bids submitted for steaming coal for the coming fiscal year and is continuing its requisition of coal on a pro rata basis at a price of $3.08 per gross ton. Some question has been raised as to the authority of the Navy to secure coal in this way after the signing of the peace treaty. Some operators are of the opinion that the Navy made a mistake in not accepting the bid, since the operators, under the requisition plan, may sue if they are not satisfied with the price, and it is believed that the Navy will pay a much larger amount for its coal than would have been the case otherwise. In connection with the refusal of the bids, Secretary Daniels issued the following statement:

Failing to secure tenders of enough coal to fuel the troop ships bringing the Army back from abroad, the Navy has found it necessary to provide an adequate supply of satisfactory coal, primarily for use on vessels engaged in the return of troops and other purposes afloat, to continue the issuance of Navy orders, as is being done in the case of current deliveries.

Under a recent issue of proposals soliciting competition for the furnishing of steaming coal after July 1, definite offers were received for only about one-half of the quantity requested, some of the largest operators offering only a meager supply and some having failed to submit a bid.

At Hampton Roads and New York, two of the principal points of supply, the tonnage as offered was less than one-half and one-third respectively of the estimated requirements.

The coal situation, as reflected in the Navy's recent bids, is viewed as rather difficult of explanation in that recent announcements from persons active in the interest of coal supply have indicated that the reluctance of consumers to buy coal was resulting in more or less concern to the operators, as an increase in demand was needed to provide employment for the miners and the desired increase in production.

The Navy orders just issued will cover the period for six months from July 1, and for the most part provide for prices which are in keeping with the lowest bids received for high-grade coal under the schedules recently published.

Hearing Ordered on Coal Rates to Northwestern Ports

The Interstate Commerce Commission has issued the following statement in the matter of rates on coal to northwestern points:

Whereas, the Director General of Railroads, in exercise of powers conferred upon the President by Section 10 of said Federal control act, increased the rates on coal from mines in Ohio and West Virginia via the lakes to points in the States of Minnesota, North Dakota, South Dakota and the northern portion of Wisconsin by 52c. per ton from such mines to the lakes and by various additional amounts from the western lake ports to the points of destination, while the rates on coal from mines in Illinois and Indiana to the same destination territory were increased 55c. per ton, and

Whereas, the Director General of Railroads has received numerous complaints, particularly from dock operators on the lakes alleging that the increases in the rates from Ohio and West Virginia mines disturbs the relationship theretofore existing with the Indiana and Illinois mines and that this change in rate relationship will seriously restrict the shipment of coal via the lakes, and under Section 8 of the Federal control act has requested the advice, assistance and coöperation of this Commission in the premises:

It is ordered, that the Commission enter upon an investigation into and concerning the relationship between the rates on coal to Minnesota, North Dakota, South Dakota and the northern portion of Wisconsin from mines in Ohio and West Virginia, via the lakes, and the rates on coal to the same destination territory from mines in Illinois and Indiana, all-rail, with a view to advising the Director General whether the relationship heretofore existing between the rates from the Indiana and Illinois mines and the rates from the Ohio and West Virginia mines should now be restored; and if so, in what manner the restoration should be accomplished.

It is further ordered, that this proceeding be, and it is hereby, assigned for hearing on June 25, 1919, ten o'clock a.m., at the office of the Interstate Commerce Commission, Washington, D. C., before Commissioner Clark.

Bureau of Mines Specialists Complete Investigation of Lignite

O. P. Hood, who has charge of the lignite investigations being made by the Bureau of Mines, has returned from an inspection trip through the North Dakota lignite fields greatly impressed with the immensity of the beds of brown lignite in that state. War conditions have stimulated the use of North Dakota lignite until it now is being used at the rate of 1,000,000 tons annually, Dr. Hood finds. He also is impressed with the fact that the average citizen in North Dakota is taking a serious interest in lignite and is willing to do all that lies in his power to make use of it for his every day personal needs.

The great problem which confronts the development of lignite in North Dakota is the finding of a market for the gas which is the principal byproduct of lignite preparation.

Dr. Hood and Bureau of Mines specialists now have completed their studies of the two great lignite fields of the country and soon will make a recommendation as to which is better suited for the establishment of the Government's experimental plant.

EDITORIALS

Mine Inspectors—Attention!

JULY 8 is to be the Grand Rally Day of the mine inspection forces of America. After an interim of three years, following their last gathering at Joplin, Mo., in 1916, the Mine Inspectors' Institute will hold its decennial meeting, this year, at Indianapolis, where the first conference of inspectors was held and the Institute organized, in 1908.

It had been expected to hold this decennial meeting at the regular time, July, 1917, but loyal to the country's call for increased output of coal, the executive board voted to postpone further meetings of the Institute to a time when inspectors could be better spared from their duties at the mines.

That time has now arrived and, although there is much labor unrest among mine workers, which demands the intelligent advice and coöperation of the inspectors in all mining districts, no better preparation for these duties is afforded than the coming together of the inspectors from all parts of this country and Canada to discuss such questions of mutual interest and benefit.

Let every mining department or bureau, every inspector and assistant inspector, in the United States and Canada bring this matter to the attention of their governors or other authorities at once and obtain their authorization for attending the Indianapolis meeting, July 8-11, 1919.

Each state and province should see that a good delegation of its inspectors attend the meetings and become members of the Institute. The expenses of inspectors in attendance should be met by their respective states or provinces, as the benefit derived from such gatherings is vast and important.

Attendance at the meetings is always open to all state, district or county mine inspectors, assistant inspectors and Federal commissioned officials engaged in the work of coal and metal mine inspection and investigation, in the United States and Canada. All are invited to become members of the Institute. The membership includes both coal and metal miners. Many ex-inspectors still retain their membership under special provision of the constitution.

Arrangements will always be made for the entertainment of the wives and lady friends of members in attendance at the meeting and it is hoped a large number of ladies will be present this year.

Let every inspector, then, get busy and *boost, boost* and *boost again,* for Indianapolis, in July. It is the old stamping ground where the Institute first saw the light. Rally to the high standard of efficiency in mine inspection.

South and Central America, while largely fuelless, produce bananas, coffee, mahogany, rubber, hides, platinum, nitrates and tin, materials for which we have much need. The coal trade, therefore, with South and Central America is as logical as is our trade with Canada. "See it grow!"

A "Mute and Inglorious" Profession

PERHAPS the engineering profession prides itself, in the words of Grey's "Elegy," on being mute and inglorious. Certainly our engineers are not good speakers. For the most part they do not impress the public in an interview, and they certainly do not distinguish themselves before an audience.

Muteness and ingloriousness quite generally go together. No wonder the lawyers pull down all the big jobs, the managerships, vice-presidencies and presidencies of our institutions. Those learned in the law can stand on their feet unabashed. They can argue their point of view, whereas the engineer—civil, mining, mechanical or electrical—surveys his shoes rather than the world in general and diligently digs into the depths of his pockets for stray coins the feel of which will ease the agony of his mind.

The engineers are looking up and looking over, and the lawyers who have talked expansively about nothing in general and about all things but the body of the fact in particular will have to give way. The big engineers' societies are now planning to give the professional man his proper place.

The years behind affect us more than we know. The engineering profession is one of the most recent of all. The recognized order of precedence has been the army, the church, the law, medicine and engineering. Fermentation in the politic mass is making changes in this long-established order, and the engineer is coming bubbling to the surface.

But all this change will not come about if reticence and silence, obsequiousness and indecision, are to be marks of the engineer in the conduct of his professional life. He has the knowledge which justifies confidence, and he should not leave to those who lack the wherewithal for management full possession of the field.

Some day our colleges will put out engineers who can write and who can speak, who can awaken in others the confidence that the possession of a collegiate education should inspire. The college will not only sharpen the nail but provide the hammer by which it can be driven home. *Coal Age* intends to give space to those who are trying in all engineering fields to put big engineers in the place where they rightly belong.

South America must not be rated by what it is but by what it will be. We must remember that in some respects it is like Seward's Alaska, a country of unknown and untold possibilities.

Further Steam-Shovel Possibilities

THE opportunity to mine coal with the steam shovel is not limited to the regions where the coal in general is under light cover. In the anthracite region the cover is heavy, yet here steam shoveling for coal first had its origin. The work is done only at the crops, and, as the seams are thick, the cover removed is often

of great depth. In fact the material to be transferred is so large in quantity that locomotives and dump cars have to be installed to remove it.

In the bituminous regions of Pennsylvania are miles and miles of coal crops, many exhibiting themselves in the poorest ground, which is often entirely untilled. As the coal enters the hill on a level it is possible to secure a large amount of mineral without much excavation. As nearby there is plenty of room for spoil, there need be no need for double shoveling. The shovel will drop the coal cover over the valueless wash crop and down the slope of the hill.

Many of the earlier mines left all the crop coal underground. The roof was bad. The coal was apt to be discolored, while nearby there was an abundance of bright, hard coal with a good roof. For this reason the crop coal was left. But in many of these regions croppy coal is now being worked, and it would appear that much real Moshannon coal (Lower Freeport or "D" bed) for instance, could in that way be obtained. It would doubtless be a little rusty in places, but in all probability it would be somewhat lower in sulphur than the bed under heavier cover. There are many other sections, some of them mining coal just as good as the Moshannon and almost as badly depleted, where similar work might be done.

The benefits to be derived along the crop are not limited by the extent of the output uncovered by the shovel. In many cases pillars have been left in the workings as they approached the crop and these, being laid bare and being approachable owing to the work of the shovel, can be operated without much expense by underground methods. In fact it will probably be found that where there are revealed a hundred approaches to a mine through solid coal many old and imperfectly operated areas will be again made centers of activity.

It is much simpler to take out a pillar or pillars and thus enter an old mine than it is to clean up the falls in an abandoned heading. Given a free approach to a lot of pillars leading to the surface, there is always a chance of excavating a large area of coal. Without this means of approach one might not be able to profitably recover the coal lost in the mine.

In the anthracite region the old practice in stripping needs a new birth. The dinkey shovels, locomotives and dump cars need replacing with more modern and larger equipment. There are some signs that a change in viewpoint is coming and that excavations so large as to bring up recollections of the Panama Canal will cease to be conducted with such inadequate equipment as these old strip-pits exhibit.

Mules and horses are rapidly finding that their bad manners and low energy output are ousting them from the mines. But they seem to be holding on better on that part of the colliery work which is performed on the surface—why, it is hard to explain. The motor truck is as logical as the mine locomotive, but so far no one has come forward to present its case to the coal operator.

French Miners Strike for Short Hours

WHEN there is a shortage of coal, of provisions, of everything that makes home happy and endurable, the French workingman strikes for a shorter day. His British brother is no better; in fact he is worse, for he did it first and was even more peremptory.

The workingmen of Europe are tangling themselves in a net of their own weaving. They have had a long period of fighting. As far as the national well-being is concerned they would have done better if they had taken a four-year holiday. Perhaps even a ten-year vacation would be better than four years of war. The war was far more exacting than any work, and it was for causes infinitely more worthy than those which impel us to our daily labor; but these considerations are beside the mark, and it is fair to say that the evil effects of the war may be not inaptly compared to the outcome of a holiday of from four to ten years.

After such a vacation we would expect the nations of Europe to buckle to their task. "Here is devastation," we might anticipate them saying: "here are delayed purchases; here is lack of needed material; let us work diligently to obliterate the effects of the dislocation of effort." Instead the workingmen are going back with a resolution to do less than ever, and the bourgeoisie are disposed to lengthen their week ends till they meet in the middle of the week. What can become of such a mental attitude!

One would think that among the beneficent discoveries of the war must have been one for performing work without toil, and really, the government boasts would lead us to believe it was so. But we have no record of any such discovery. The world is little bettered by war inventions and apparently is on its way to be beggered by the war psychology and the dreams that the war had painted. The rich now bleat about shorter hours and better living for the workingman. It is well perhaps that thoughts like these replace that old feeling of the bourgeoisie that the workingman should never vulgarize the pleasures of the middle class by his participation in them. But all the goodwill toward the workman will never result in the amelioration of his lot unless both employer and employee are willing to do their uttermost to produce and again produce.

If the mine worker in France or Great Britain worked eight hours before the war, he should do so now. If there is to be any change, he should work even longer hours, till the need of the European allies for coal is fully satisfied. The great holiday of destruction, death and pain is over, and the time for laborious peace efforts has arrived. The European people will prove their mettle if they keep their "home fires burning" by steady toil.

In the United States there is more excuse for the shorter day, but we do not believe that seriously the workingman will want it when he realizes that it will be accompanied by small output and therefore by less remuneration. Our vacation of blood was shorter. It was only accompanied by waste and not by destruction. Our future and even our present is reasonably assured, but it will be a three-quarter future only if we are going to reduce our hours by one-quarter. If, on the other hand, we seek the "simple life" and resolve to cast off the excrescences of civilization, we can have our leisured ease; but if we would hold the prosperity that we have, let us arrange to spend as much time on its securing as we have in the past.

The American Federation of Labor, at its Atlantic City session, would have the teachers' opinions unhampered by boards of education. Then, with questionable consistency, it advocates that its own "unbiased" view of "industrial history" be taught in the schools.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

No better evidence of the new alignment toward labor can be found than the report issued by the United States Chamber of Commerce in relation to its labor referendum. The report is dated June 22. The members of the Chamber of Commerce approved by a majority of more than two votes to one all the articles but No. 13, which was a proposal to establish a national employment system. The report chronicles the decision of the members that "the public interest requires adjustment of industrial relations by peaceful methods."

The members likewise recognize "the right of workers to organize," "that industrial harmony and prosperity will be most effectually promoted by adequate representation of the parties interested" and that "industrial-relations agreements should be faithfully observed."

The other declarations are that wages should be "reduced only when the possibility of reduction of costs in other directions has been exhausted," "that every man is entitled to an opportunity to earn a living wage" and that "wages shall be adjusted with due regard to their purchasing power." Fixing of a basic day as a "device for increasing compensation" is declared by the members to be a "subterfuge that should be condemned."

British Board Would Have Nation Own Mines

No one, for a moment, expected that the majority report of the Royal Coal Commission in Great Britain, appointed under the Coal Industry Commission Act, would fail to recommend nationalization of that industry in Great Britain. There will be a natural tendency toward a similar attempt here, though it does not necessarily follow that nationalization will be imposed on the industry. The continent of Europe and Australia had previously owned railroads for years, yet Great Britain resisted, as also did we, that costly experience—in fact, both nations took counsel from the unfortunate foreign examples and determined not to follow them.

However, though Great Britain has resisted many tendencies toward national ownership, through its coal commission it now seems to be committed to mine nationalization. It is true there are four reports filed by the commission, representing as many points of view, but the most numerously signed report, dignified with the signature of the chairman, Justice Sir John Sankey (a former judge on the Kings Bench and prior to that a barrister who had a large practice in mining cases) is whole heartedly for the taking over of the industry by the nation. That report recommends immediate legislation for the acquisition of the mines, royalties for the state and compensation for mine owners. The provisions of the report call for the administration of the collieries during a period of three years by local, district and national mining councils. At the close of that time legislation will have been framed for the acquiring of the mines and the owners will have been justly compensated.

Miners Object To Compensation of Land Owners

The miners' representatives in general agree that the report signed by Justice Sankey is satisfactory, but they object to a clause that would require the mine workers to sign a contract to cease work until any question that may be in dispute has been before the appropriate councils. The three representatives of the miners, Robert Smillie, president of the Miners' Federation of Great Britain; Frank Hodges, secretary of the same organization, and Herbert Smith, president of the Yorkshire Miners Union and vice president of the larger federation, declare in their report that no compensation should be given, apart from certain allowances made where small royalty owners are deprived of their livelihood.

The mine owners in their report argue that any form of nationalization would be detrimental to the development of the industry and the economical life of the country. The document declares that no action which so vitally affects the business of the whole nation should be taken without referring the question to the whole community. The report favors, however, the formation of a department of mines to be assisted by a system of councils such as the majority report sets forth. In order that the difficulties arising from royalties may be met, the operators' report proposes that the state acquire ownership of the coal subject to the continuance of existing leases for at least 60 years.

Sir Arthur Duckham, the Director General of Aircraft Production, makes the fourth report, recommending state acquisition of the entire mineral rights and the establishment of a Ministry of Mines with representation of labor on the directorate.

Mine Workers Urge a Reasonable Contract

On June 15 a secret session of past and present chiefs of the United Mine Workers of America was held at Atlantic City, N. J., at which were present John Mitchell and John P. White, former presidents of the organization; William J. Ryan, former international secretary-treasurer, now representing the National Fuel Administration at Kansas City, Mo.; J. L. Lewis, vice president of the United Mine Workers; John Moore, president of the Ohio district; Philip Murray, president of the Pittsburgh district; William Green, national secretary of the United Mine Workers, and a number of others. Little was learned of the business transacted. John L. Lewis said, according to newspaper reports, that "an orderly, sensible policy applied in a practical manner is what we have decided upon."

"I am not in favor of anything at this time that would disrupt reconstruction of industrial matters," said John Mitchell after the conference. "But the employers must remember at this stage of the situation that labor has some rights that should not be forgotten, but be recognized more than in the past."

On June 23, the American Federation of Labor, which met at Atlantic City, declared itself in favor of a universal 44-hour week in industry and pledged support to unions that were planning for a 6-hour day. It also called for double time as a penalizing measure.

Green Still Advocates the Shorter Day

Delegate William Green of the United Mine Workers said that the organization he represented intended to press for a workday of less than 8 hours in order to keep all the unemployed in the industry busy. He said that, with an 8-hour day and 100,000 men less than the industry had under the longer day, the coal mines had produced the greatest output in the history of the industry.

It may be said in this connection, in opposition to what Mr. Green has stated, that the shortage of coal now assures work to every one, and the shorter day should go over to a later time, if it is ever to be put in operation. The shorter day will never guarantee steady work unless there is a restriction in the number of new mines or additional workers. The agreement for a shorter day will be a signal for a large expansion in the industry such as will make it necessary either to work irregularly or to work still shorter hours. If the shorter day is introduced and the public runs short of coal it will know where to place the blame.

In the anthracite region a few troubles have recently occurred. The Hudson Coal Co. disaster stirred up the men, and, for a short while, there was a feeling that the company would try to find a means by which it might avoid

the payment of compensation losses. However, the minds of the men were soon disabused, for the chief counsel of the coal company, H. J. Torrey, of Scranton, lost no time in declaring to H. A. Mackey, of Philadelphia, chairman of the Workmen's Compensation Board, that the casualties were compensable. As fast as each case came up, the company disposed of it in a liberal spirit, as the statement by Mr. Mackey on June 14 clearly shows:

"Reports received from officials assigned to Wilkes-Barre to arrange for immediate compensation for the surviving injured workmen and the families of the deceased victims of the mine disaster in the Baltimore tunnel shows that with a few minor exceptions every claim has been settled within the last week. There were 92 deaths in the catastrophe, and 43 men were injured. The survivors of those killed include 40 widows, 106 children and 10 dependent parents. The agreements for compensation will average $4028.65 per claimant. The cases not settled include a dozen in which the dependents are residents of countries which are at war with the United States. These claims will be placed for the present with the federal custodian of alien property. The immediate settlement of claims, under the provision of the compensation act, has been due chiefly to the broad spirt of the Hudson Coal Co. and the remarkable efficiency of its compensation department. The company did not quibble, but leaned to the other extreme in its efforts to rush compensation along.

"The company established offices upon its own ground for the use of board officials while they were arranging the compensation agreements and even utilized automobiles to bring the dependents to these headquarters. In less than a week's time the entire problem of securing compensation for the victims has been solved, and another valuable demonstration has been made of the prompt action secured under the compensation act as contrasted with the delays and losses that occurred under the old laws."

However, the agitation did not end when full compensation was made. At the mines of the Hudson Coal Co. there has been, for some time, a claim for back pay aggregating $50,000. It has relation to the presence of slate in the coal which slate has to be removed. The miners have claimed consideration for this impurity under the scale as officially interpreted by the conciliation board. The men threatened not to go to work on Monday, June 23, if the questions at issue were not settled satisfactorily by Sunday. Claims for about $14,000 remained unsettled on that day, and the miners agreed to give further time for their consideration.

If the plan of the mine workers had been carried out 28 collieries would have been closed down between Forest City and Plymouth, and 11,000 men would have been laid idle. The difficulties appear to have reference solely to the conditions in the Clinton and Crystal Collieries. The settlement is a matter for congratulation, as the Hudson Coal Co. has shown itself, at least in recent years, quite anxious to advance the interests of its employees and its steady goodwill should by this time have begun to show results. Unfortunately it has, in places, a number of men who are never happy unless they can find excuse for trouble.

Another anthracite strike is that at the mines of the West End Coal Co., where on June 12 1500 mine workers were idle trying to settle by a strike what their agreement declares must go to the conciliation board. The agreement fails of its purpose if it does not end strikes.

Speaking at Wilkes-Barre, at a meeting in memory of the men who died in the Baltimore tunnel disaster, William Green, the secretary-treasurer of the United Mine Workers, denied that the mine workers would strike in sympathy with Thomas Mooney, though they greatly desire to see him freed. The plan of the Industrial Workers of the World was for all workers to strike five days at the beginning of each month, the abstention from work to continue till Thomas Mooney was liberated. The first strike was to commence July 1.

Mr. Green advocated in his speech to the mine workers that 66⅔ per cent. should be the amount of compensation provided and that no worker should be required to wait two weeks before drawing compensation for injuries received at his work.

In western Pennsylvania two strikes have been settled. It will be remembered that there was a suspension at the McFetridge Coal Co.'s mine, at Creighton, involving about 200 men. They quit on June 2 owing to a disagreement with the company. The mine, which has run nonunion for more than 20 years, is now to be a union mine, arrangements having been made to incorporate it into District No. 5, in which it naturally belongs, being in Allegheny County. It was announced June 12 at the headquarters of the United Mine Workers in Pittsburgh that the Bessemer field in which the McFetridge Coal Co. operates is now entirely unionized with the exception of one concern and even there negotiations are pending.

A report under date of June 11 states that Vesta No. 5 of the Jones and Laughlin company, located at Fredricktown, has returned to work after a strike of 8 weeks regarding the allocation of a house to a man who had left the service of the company and moved temporarily elsewhere. The strike caused a movement in sympathy at Vesta No. 4, located at California, Penn., and strange to say this mine was still striking after Vesta No. 5 had composed its troubles.

In West Virginia there are no strikes in the coal mines, as far as the news reveals, but there has been a strike of the employees of the motive-power department of the Norfolk & Western Ry. about the discharge of six men at Wilcoe. This has prevented the operation of many mines.

However, at the call of the first shift on Monday morning, June 16, after a strike of over one week, the striking employees returned to work in consequence of an agreement made between representatives of the American Federation of Labor and officials of the Norfolk and Western Ry. During the life of the strike, which began June 4, time freight was moved only after the greatest delay. The movement of west-bound freight was much curtailed and east-bound business was almost at a standstill. In the block mines of Indiana there has been a strike. Two hundred coal miners employed at the Franklin-Tandy-Low mine, west of Brazil, struck June 16 when the company ceased giving a bonus of 6c. a ton. The miners, who have been receiving 90c. a ton, say the extra 6c. was paid for leaving a strip of coal on the roof of the mine to support the roof and keep it from falling. The company, in rebuttal, says that the extra money was a war bonus. The matter has been taken up by officials of District No. 11.

JOHN MOORE, president of the Ohio miners, delivered himself as follows in a recent statement to the press: "In eastern Ohio, practically adjacent to the Pittsburgh district, a few months ago there was idleness in Belmont, Jefferson, Guernsey, Tuscarawas and Monroe counties. Our men were getting impatient and I might say to the revolutionary stage. Today they are all working and the coal operators are clamoring for more men. From the records kept in our office about 14 per cent of the foreign-born miners in southern Ohio have asked passports to go home with the little wad they have made during war times when things were flush. This means a decrease in man-power. It means also a shortage of the supply of coal during the fall and winter months. This is no time to throw a monkey-wrench into the industrial machinery of the country which is being gradually greased. Let everybody get on the job to have things going good and proper."

Don't Carry Powder on a Man Trip

ON June 5 an explosion in the Baltimore Tunnel, at Wilkes-Barre, Penn., resulted in the death of 92 men, the widowhood of 43 wives, the making of 106 orphans, and the bereavement of 10 dependent parents. Among those who paid the price for negligence and carelessness was the father of the family shown in the photograph. The more we study the picture, the more we realize that the living are more in need of our tears than the dead.



THE father of this family may not have been a careless man—the look of his family suggests that he was a more than usually good citizen—but because there were careless men with him, and because there were men who did not observe the union rules and agreements as to carrying powder with them on the man trip, he died a terrible death, leaving a widow and seven children.

What Precautions Are You Taking to Protect Yourself and Family and the Families of Those Who Ride the Cars With You?

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

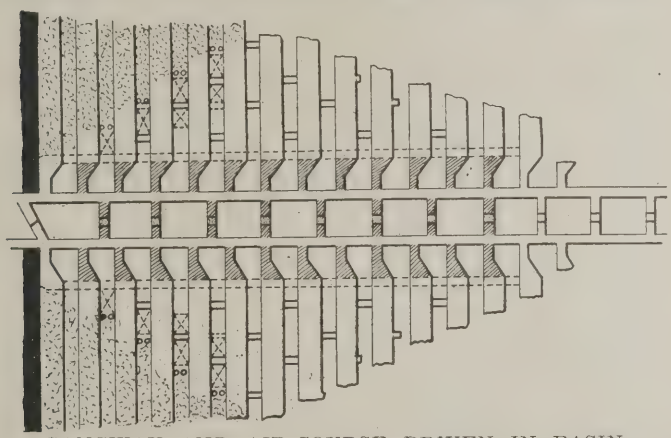
Drawing Pillars on Steep Pitches

Letter No. 1—I have been much interested in reading the inquiry signed "Luzerne," *Coal Age*, May 15, p. 924, because I had a similar experience some time since in taking out the coal in the "Pittston" or "Cooper vein," in this county. If I mistake not, the inquirer whose case is here presented, is operating in the same vein and, if so, the suggestions I have to offer may be of some assistance to him.

First, then, let me say that my friend's trouble may arise from too small a thickness of pillar left between the gangway and the airway, both being driven in the basin, from which the coal pitches on each side from 35 to 45 deg. My experience is that, as a rule, no squeeze will start in the chambers owing to the coal lying on this pitch.

In my case, it was necessary to temporarily abandon the airway in the basin and to start a counter, about 40 ft. above the airway on the pitch. This counter was driven parallel to the airway and, as it crossed each chamber, the mouth of the chamber below was filled solid with rock, from the airway up to the counter.

In the accompanying sketch are shown the gangway and airway driven in the basin and the chambers



GANGWAY AND AIR-COURSE DRIVEN IN BASIN

driven to the pitch on each side of these entries. The counter is indicated by the dotted line and the rock filling the mouth of each chamber is shown by the hatched portion between the counter and the airway. Moreover, as shown in the sketch, each crosscut between the gangway and airway was filled solid with rock, in the same manner as the chambers.

The coal was 14 ft. thick and overlaid with a solid sandrock roof. In each chamber, a line of props was set 8 ft. from the rib, the timbers being 20 ft. apart. Old wooden rails were then spiked to the bottom of each prop. Also, two or three props were stood just behind the pillar being drawn, and old rails or lagging were nailed to the back of these to protect the workmen against loose material falling down the pitch.

This arrangement had the effect to protect the slide or chute at the side of each pillar. When a cave occurred, the loose material was deflected so that it did not obstruct the chute and interfere with the loading of the coal, which ran down to the battery erected near the mouth of each chamber.

In the drawing of the pillars, narrow cross-headings were driven through each pillar at distances of 14 ft. apart, thereby dividing the pillar into separate stumps, which were blown out in one operation by drilling several holes to the center of the stump and charging and firing these holes by an electric battery.

As each two pillars on opposite sides of the main roads were finished, the chamber stump and gangway pillars were taken out. By that time, the rock filling previously mentioned had become so solid that the roof did not cave when taking out these pillars. To this day, one is able to walk through these places where the pillars used to be. It is, of course, not 14 ft. in height, but the headroom is sufficient to take an empty car along the road.

RICHARD BOWEN.

West Pittston, Penn.

Safety in Mine Timbering

Letter No. 2—While there are many good points brought out in the letter of Jesse Hamilton, *Coal Age*, May 15, p. 919, and in the previous article to which he has referred, written by Joseph R. Thomas, Feb. 20, p. 349, I feed that they have failed to mention a method of supporting the roof on haulage roads that, to my notion, is far superior than any form of timbering that can be adopted.

It surprises me that Mr. Hamilton, who formerly had a great deal to do with this method, which was then in use on the main haulage road in a certain mine here and which has since proved to be the best and most practicable means that I have ever seen adopted for that purpose, should have omitted to refer to the method in his letter.

USE OF IRON RAILS TO SUPPORT ROOF

In that mine, it was the practice to use the discarded rails as roof supports set 4 ft. apart and hitched into the rib on either side of the haulage road. The work was well done and certainly looked practical. The use of rails, instead of timber crossbars gave a good, clear headroom on the road.

In speaking of the number of accidents due to falls of roof, it is noticeable that there are far more of such accidents occurring at the working face than on the roadways in the mine. This may be due to several causes. For instance, the men remain a much longer time in their working places than they spend in traveling the roads. Also, a bad piece of top on the road is observed by the many men passing in and out of the mine, while a bad roof in a working place is seen only by the few men who go into that place. But safety on the haulage roads is as important as at the working face.

In the use of iron rails in the manner I have mentioned, the risk of timbers being knocked out by cars

jumping the track is avoided, and this alone is a strong argument in favor of such a method of supporting the roof over a roadway. I have seen accidents happen when a car knocked out a few temporary timbers set for the support of a bad piece of top. In one instance, the timbers were set by the instructions of the foreman, who was responsible for the results that followed.

In mine timbering, "Safety First" should be the watchword. Any person, whatever his position, should report any dangers that he may observe, and the foreman, or one of his assistants, should take prompt measures to remove the danger. Owing to the larger number of accidents occurring at the working face, more attention should be paid to visiting and inspecting the places where the men are at work, than in patroling the haulage roads and travelingways in a mine.

Duty of Miners to Insure Their Own Safety

Every miner's first duty, on entering his place in the morning and before proceeding to work, is to examine his roof carefully and reset any timbers that may have been discharged by a blast the night before. The safety of each miner depends on his taking this precaution. At a mine I visited not long ago, I saw a good sign on the headframe that read as follows: "Sound your roof. Set your posts. Load your coal. Safety first."

Safety in the rooms requires the prompt delivery of timber at the working face. When a miner finds that his timber has not been delivered, as ordered, it is well for him to stay out of his place until he can get the timber he needs. The loss of a dollar or so is as nothing compared with the danger of being hurt or killed by falling roof. I believe in systematic timbering, and a good rule to adopt at the working face is to set all timbers not more than 4 ft. apart or closer, if necessary. Even then, the safety of each miner depends on his keeping a careful watch of the roof in his place throughout the day.

It is well for a miner to remember that no good superintendent or foreman will excuse the driver who neglects to deliver timber promptly where it is needed in the mine. Most coal-producing states have certain provisions, in their mining laws, regulating the supply and the setting of timbers in mines, and these laws should be strictly obeyed. INSPECTOR.

———, Ind.

Longwall Work in Low Seams

Letter No. 2—In reference to the modified longwall system proposed by Charles Martin, *Coal Age*, Mar. 20, p. 520, I beg to submit the following outline bearing on the probable success of the method he has suggested:

In applying the longwall system to work a low seam of coal varying, say from 20 to 24 in., it is practically impossible to mine such coal at a profit, unless it is first undercut by a small longwall machine and loaded out either by means of a scoop or by the Thompson conveyor mentioned by Mr. Bain in his letter, *Coal Age* May 22, p. 965. I am not familiar with that conveyor but, from Mr. Bain's description, I should think that it would work satisfactorily, although it seems to me that the coal would have to be shoveled into the pans and then, of course, transported by means of rope haulage to the car on the main haulage road.

The scoop system, however, appears to be a great improvement on the Thompson conveyor, in that practically no shoveling need be done. It is astonishing how little coal this scoop will push to one side when it is drawn up from the haulage road to the end of the cut. In coming down again, the scoop fills itself and carries the coal to the chute where it is dumped directly into the car. It is also surprising to note with what ease this scoop will operate on a fairly uneven bottom; but, of course, the smoother the bottom the better the operation. The scoop is operated by a main and tail rope winding on a double drum, which is operated either by an electric or an air hoist. A complete description of this operation has been given in a recent issue of *Coal Age*.

In sections where there is locomotive transportation, direct current is available for the operation of the scoop hoist and also for the longwall undercutter. However, a longwall undercutter operated by an alternating-current motor has been perfected and gives excellent results, so that where direct current is not available, the hoist and undercutter can be operated by alternating current.

It is possible, of course, to drill the coal face by means of jackhammers and blow the coal off the solid, but this produces a lot of fine coal and makes an uneven face that cannot well be cleaned up by the scoop. In this system of longwall mining it is best to keep the face straight and at right angles to the main haulage road.

Length and Arrangement of a Longwall Face

I do not regard with favor Mr. Martin's oblique face, as it seems to me that it would cause difficulty in the operation of the mining machines. However, not having seen the operation of this oblique longwall face, I would not care to say that it does not have the advantages claimed.

It is my experience that a face of 300 ft., in bituminous mining, and 200 to 250 ft., in anthracite mining, is the best economic limit. To control a fracture it is necessary to have a man on the job who thoroughly understands the longwall system and will timber systematically, and make his rockpacks correctly.

Where the scraper system is used (and this applies as well to the Thompson conveyor) there is no trouble in moving the mining machine anywhere along the face, as the ropes can be detached from the scoop and attached to the machine, which is then moved by means of the hoist. In this way, it is possible to operate a longwall system on the fairly heavy pitches found in some of the anthracite mines.

There are many conditions that affect the operation of longwall work and which are not mentioned in Mr. Martin's article. For example, he does not say whether the section is dry or wet, or state the thickness of cover, presence of gas, character of the coal, kind of roof immediately overlying the coal and the presence of dirt or rock seams in the coal. Some of these would absolutely prohibit longwall work in this thin seam.

In answer to Mr. Martin, I can only make the general notes given above, but will say that where the coal is thin and conditions are favorable for any type of longwall mining, the combination of undercutting and scoop loading will produce coal as cheaply as any other method that I know.

In very many of the thin seams of the anthracite field, there is about a foot of rock above the coal and that comes down or is easily broken down after the coal is taken out. This makes an extremely favorable condi-

tion for building rockpacks. Moreover, the rock has a cubic fracture, which makes the building of uniform packs very easy.

All timber and cogs should be drawn so that the roof will come down and exert a uniform pressure on the coal face. Where the loading is done by scoop the cutting should, of course, be done on the nightshift, so that there will be no delay on the day shift when the coal is loaded out. It is unnecessary to add that the work should progress uniformly, as the success of all longwall work depends on this one fact.

Scranton, Penn. SUPERINTENDENT.

Available Oxygen

Letter No. 1—Reading the interesting reply to the question of a student who asked for the reason why a safety lamp will burn in the air but is extinguished in carbon dioxide, *Coal Age*, May 8, p. 880, tempts me to offer a few comments on the nature of blackdamp, which has been so fully investigated by the eminent chemist, Dr. J. S. Haldane, as well as by our own chemists of the Federal Bureau of Mines. In Miner's Circular No. 14, p. 13, it is stated that "average blackdamp contains 10 to 15 per cent. carbon dioxide and 85 to 90 per cent. nitrogen; the proportion of carbon dioxide is seldom more than 20 per cent. or less than 5 per cent."

The analyses made of mine air, of which the Bureau of Mines have made a large number, reveal the truth of the fact as claimed by Doctor Haldane that the dimming and final extinction of the lamp in blackdamp, in the mine, is chiefly the result of the depletion of the oxygen of the mine air, or in other words, the lack of available oxygen in the blackdamp, rather than to the presence of carbon dioxide. As stated in the reply to the inquiry on page 880, the burning of the lamp depends on the amount of available oxygen present, and where this is insufficient to support the combustion of the carbonaceous matter, the flame is extinguished.

Toxic Effect of Carbon Dioxide

While the experiments of the Bureau of Mines have established the fact quite conclusively that the extinction of the lamp in a mine atmosphere is not ordinarily due to the presence of carbon dioxide in the air but rather to the lack of oxygen necessary to support the combustion of the lamp, it is nevertheless believed that the presence of the carbon dioxide in such an atmosphere is the probable cause of the discomfort and distress felt by men compelled to breathe the air.

The experiments of Professor Clowes, in England, as well as those of the Federal Bureau of Mines, have shown that a mine atmosphere in which the oxygen has been depleted to about 17 per cent., by the addition of carbon dioxide generated in the mine, extinguishes the flame of a lamp burning sperm, cottonseed or lard oil *(Mine Gases and Explosions—Beard, p. 140)*.

The gradual depletion of the oxygen of pure air from 20.9 per cent. is accompanied with an increasing dimness of the lamp, until its final extinction at about 17 per cent. The acetylene or carbide lamp, however, continues to burn, according to the statement of the Bureau of Mines, until the depletion of the oxygen has reached 13 or 12 per cent. It is for this reason that objection has been made, at different times, to the use of the carbide lamp, which thus continues to burn in an atmosphere fatal to life. However, it seems to me that the labored breathing of a man in an atmosphere that is increasingly dangerous should be sufficient warning for him to withdraw to better air.

Again quoting from Miner's Circular No. 14, pp. 14, 15, in reference to the effect of breathing mine air low in oxygen, the following statement appears:

"Many authors have stated that mine air containing less oxygen and more carbon dioxide than ordinary outside air is in itself without effect on man. As regards oxygen, this is proved by the fact that in one pound of the air at a place 5000 ft. above sea level, like Denver, there is the same weight of oxygen as in one pound of air at sea level containing by volume 17.5 per cent. oxygen.[1]" This is followed by a quotation from Haldane that appeared to support the contention of such authors; but the Bureau of Mines draws attention to the fact that the statement of Doctor Haldane refers only to fresh air and has no reference to air containing carbon dioxide.

I thought these references would be of interest in connection with the question of available oxygen in the atmosphere. CHEMIST.

Scranton, Penn.

Certification and Safety

Letter No. 7—The question of the certification of mine officials, in its relation to the safety of mines and the men employed therein, I consider a very important and vital one not only to mine workers but to the coal operators who employ them and to mining men in general.

The matter of certification, indeed, involves not only the safety of the mine but the economy of its operation. In a brief manner, allow me to outline different types of men who, as candidates for mine foremanship, possess quite different degrees of ability in respect to safety and efficiency in the operation of a mine.

First, there is the man who is versed in mathematics, geology, ventilation, etc.; in other words, he has a good knowledge of the theory of mining. I will assume, however, this man has little practical experience that would enable him to produce a good tonnage of coal at a moderate cost of operation. His ability to handle men in a productive capacity is naturally quite limited; and, owing to his lack of mining experience, he is unable to put into practice his knowledge of the theory of ventilation, hauling, timbering, pumping and draining, methods of working and other things that the successful mine foreman must understand in a practical way.

Every cause has its effect and the capabilities of a mine foreman are the causes that must produce their effects on the daily production of a mine and the monthly cost-sheet, on which most largely depends the dividends that the owner of the mine or the stockholders have a right to expect.

Second, there is the practical mining man who has had a long experience in producing coal and handling men. Here, again, I will assume that this man lacks the knowledge of the theory of mining, which is his great

[1]This statement is wrong. The meaning intended to be conveyed is that, volume for volume, pure fresh air at Denver, containing 20.9 per cent. oxygen, holds the same weight of oxygen as air at sea level, in which the oxygen has been depleted to 17.5 per cent. In other words, breathing into the lungs the same volume of Denver fresh air (20.9% O.) and air at sea level lower in oxygen (17.5% O.) supplies to the lungs the same weight of oxygen each breath taken. However, breathing the rarefied air of Denver results in more rapid but not as deep inhalations as at sea level.

setback and the one cause that produces a most notable effect both on the regular daily production of the mine and the monthly cost-sheet. It is frequently necessary for this man to explain to the management why a day's tonnage has fallen short of the average, or why the cost-sheet for any month is unusually large.

Typewritten reports coming from the office inform our practical friend of the high cost of production; but these are matters that he cannot follow out in detail. The reports show that there are leaks somewhere but do not tell him where to find them, and he is at a loss to figure it out for himself. The superintendent to whom he goes in his dilemma is helpless to assist him, owing to a lack of practical experience. The results obtained by this foreman can be readily imagined.

Third, there is a candidate for foremanship who has both the technical knowledge and the practical experience required to make a successful man to place in charge of a mine. This man's failure, however, consists in his temperament. He is quick and impulsive and makes many mistakes on that account. For the same reason, he does not succeed well in the handling of his men. These are some of the causes that have their effect in lowering the tonnage and increasing the cost of production of coal.

Type of Foreman Mine Operators Desire

Fourth and finally, there is the really successful candidate for the position of mine foreman who possesses not only a full knowledge of the theory of mining, backed by a long practical experience in the operation of mines and the handling of men, but he has an even temper, good judgment and a manner that invites cooperation and gains the confidence of his men. They learn to trust him for a fair deal. He is a good judge of human nature and his knowledge of work enables him to tell what each man can do to the best advantage. The result of these characteristics in a foreman are far-reaching in securing a good daily tonnage and reducing the cost of production in the mine. He is the type of man that operators, generally, are seeking today.

Now, having before me these several types of men applying for mine foremanship, it is my conviction that coal mining is made safer and a higher efficiency will be attained by requiring the examination and certification of all candidates for the position of mine foreman, assistant foreman and fireboss. Indeed I would not stop here, but would advocate the examination of candidates for the position of mine superintendent and would suggest that a higher percentage of efficiency should be required for that position than for any of the others previously mentioned. Considering the matter from its face value, there appears to be no reason why a candidate for the superintendency of a mine should not be required to pass an examination that would determine his competency to hold that position.

A mine superintendent should naturally possess a full knowledge of all mining work, to enable him to counsel, advise and instruct the under-officials in his charge. Every year the work of coal mining is developing a greater need of technical knowledge in all mine officials, in order to produce a larger tonnage at a reduced cost of operation. We are, as it were, in a reconstructive era following the war. Let us look at our industrial problem from that viewpoint.

Allow me to say in closing that examining boards should be comprised of men of integrity and ability, who are fully acquainted with the theory and practice of coal mining and able, themselves, to answer the questions they submit to candidates. Not only that, but examiners must be able to judge, in a competent way, the answers submitted by men taking the examination.

JOHN E. AMBROSE.

Fairmont, W. Va.

Firebosses as State Officials

Letter No. 5—After reading the several letters written on this subject, I feel with Edward H. Coxe, that the employment of firebosses by the state would not work well. In his letter, *Coal Age*, May 8, p. 876, Mr. Coxe expresses the idea that state mine inspectors are employed to see that the mines are kept in a safe and healthy condition, and I would add that the mine foreman and his assistants are charged with the duties of looking after the safety and welfare of all the men employed underground.

The mining law of Pennsylvania and those of other states specify the duties of the foreman and his assistants, as well as those of the fireboss, who must examine the mine and report any dangers that he may find. It is my idea that the work of the fireboss is such that he should be subject to the mine foreman, who is in direct charge of the mines and responsible for its safe condition. These officials should work in harmony. If there is any reason why the fireboss should be employed by the state, there is all the more reason that the state should also employ the mine foreman and his assistants.

It has been suggested that state mine inspectors have too much to look after to make the necessary frequent visits to a mine to insure its safety. If that is the case, let me say that the state should employ more inspectors and give to each inspector a smaller district, or else deputy mine inspectors should be appointed to assist the district inspectors.

Disadvantage of Employing State Firebosses

In my opinion, the fireboss is the most useful person employed in a mine. His work is of such a nature that he is fully acquainted with every place in his district and knows each man that works there. For that reason, he can always supply much needed information to the foreman and, in many other ways, help to make a good day's run. How different would this be if firebosses were employed by the state?

Suppose, for instance, that a state fireboss, on duty in a remote section of a mine, finds that a wreck has just occurred on the haulage road and no coal can be hauled from that section until the track is cleared. Now, if this fireboss was employed by the company he would naturally feel an interest in the work of clearing away the wreck and getting out the coal. The foreman being away in another portion of the mine, he would throw off his coat and assist to clear the track. But on the other hand, a state-employed fireboss would naturally feel that the wreck was none of his affair and lend no assistance to get things again in shape. In other words, he would "pass by on the other side," with a lofty and disinterested air.

Other instances could be mentioned in which a fireboss employed by the state would prove a hindrance to the work of getting out the coal, instead of a help. Neither would the safety of the mine be made any more certain by state employment than where a con-

scientious fireboss is employed by the company operating the mine.

If it is true, as has been stated, that a mine foreman is disposed to underestimate the work of the fireboss and, as we say attempt to "put something over on him," the matter should be reported promptly to the superintendent, who ought to be broad-minded enough to straighten out the difficulty promptly, and do justice to a fireboss who performs his duties faithfully.

Where a fireboss receives just treatment, I do not think he would desire to be employed by the state. Moreover, every mine foreman should have qualified for his position, by serving a certain length of time as a fireboss and such a foreman will not generally be disposed to ill treat his firebosses, realizing as he will from his own experience the difficulties of that position.

McIntyre, Penn. THOMAS HOGARTH.

Letter No. 6—I want to endorse what Edward H. Coxe has said in his letter, *Coal Age*, May 8, p. 876. In his argument against the employment of firebosses by the state, it seems to me that Mr. Coxe has covered the ground so completely that there is little room for further comment on that side of the question. However, a few thoughts have come to me that I wish to present.

In the first place, whenever a mine is generating firedamp it is of the utmost importance to employ a thoroughly competent and reliable fireboss whose judgment in regard to conditions that are safe or unsafe will always be respected by both the mine officials and the men who work in the mine. Such a man will perform his duty equally well regardless of whether he is is employed by a company or the state.

DANGEROUS SITUATION CAUSED BY AN INCOMPETENT FIREBOSS EMPLOYED BY THE STATE

When a fireboss employed by the state proves to be incompetent or negligent in the performance of his duties, and the lives of men working in the mine are endangered by reason of that fact, neither the superintendent nor the foreman would have any authority to remove him from the mine. An application for the removal of a state fireboss would have to be made to the state appointing power, and that would require time. Before any action could be secured or relief obtained, a serious accident might result from that official's incompetence or negligence and the state would be responsible for the consequences.

Again, although this should not be, it must be admitted that there is always more or less of politics influencing state appointments, and I take it that the state employment of firebosses would not be immune in this respect. Nine times out of ten, the applicant with the "strongest pull" would secure the appointment, regardless of his relative competency and efficiency. No one will deny that this would seriously lower the standard of firebosses in our mines.

In discussing the efficiency of firebosses, a short time ago, Fred Turner stated that he knew of "firebosses who would do anything they are told, without regard to whether their acts are lawful or dangerous to the men working in the mine." In my opinion, such a fireboss would prove no safer in the employment of the state than if employed by a company, and his certificate should be revoked at once and the man sent back to the pick. Mention has been made of the awkwardness of a fireboss who is compelled to work under an inefficient foreman; but it appears to me that it would be a far more awkward situation for a company to be compelled to operate its mines under dangerous conditions, with an inefficient fireboss employed by the state and over whom they have no control.

In this state the mining law declares that the mine foreman and the gasboss, in the discharge of their duties, act as the representatives or agents of the operators or owners of the mine in which they are employed. The duties and responsibilities of both of these officials are the same as far as the safety of the employees is concerned. Although employed by the company, both of these officials act under the state law and are held responsible by it for negligence on their part. Now, it appears to me that if firebosses are to be made more efficient in the employment of the state, the same rule would apply to mine foremen and superintendents. It is my belief, however, that no greater efficiency will be secured and our mines would not be made safer by the state employment of mine officials; but there would result, instead, much confusion and delay in the important work of firebossing. JOHN ROSE.

Dayton, Tenn. Former District Mine Inspector.

Exhaust from Steam Pump

Letter No. 10—Referring to the letter of R. J. Pickett, *Coal Age*, May 22, p. 964, and the editorial note that follows the letter, I would like to ask the reason for assuming that Mr. Pickett's plan has for "its chief object the cooling of the water in the sump." The scheme is not clear to me although a sketch showing the exact arrangement would have made it a little easier to understand.

Mr. Pickett clearly states that exhausting the steam into the sump made the water very hot. What I fail to understand is that if it was possible to pump the hot water out of the sump, why should he attempt to devise a plan for cooling the water in the sump?

Now, according to the best information I have, a pump will not lift hot water, because of the vapor formed in the suction pipe destroying the vacuum required to raise the water to the pump. In the present case, the sump is said to be just below the pump and the lift was not therefore great.

It occurs to me that if this pump could be placed below the level of the water in the sump, so that the water would gravitate to the pump, such an arrangement would overcome the difficulty of handling the hot water and avoid the necessity of providing a means to cool the water in the sump. GEORGE J. KEARNEY.

Kincaid, Ill.

[It is true that a pump will not work with the same efficiency when the water in the sump becomes heated by the exhaust steam turned into the sump. However, this correspondent misjudges the case by suggesting that it is possible to continue pumping the water, which is growing hotter all the time. The plan devised by Mr. Pickett has for its purpose the cooling of the sump water, from time to time, by allowing water from the main to flow back into the sump. By this means, the temperature of the sump water is kept low enough not to seriously interfere with the pumping, the suction lift being very small.

This letter will close the discussion of "Exhaust from Steam Pump."—EDITOR.]

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

World's Production Record

In the issue of *Coal Age*, May 1, p. 799, there appeared an article showing the effect of equipping a mine with self-dumping cages to increase its capacity, and mention is there made of a record hoist. This has since been referred to as a .'world record" by a correspondent, June 5, p. 1053.

In the first article, it is stated that the Orient mine, of the Chicago, Wilmington & Franklin Co., Mar. 6, 1919, hoisted 6777 tons of coal from a depth of 600 ft., which I agree must be a new world's record for a shaft mine hoisting one car of coal at a time.

It would be interesting to know two items regarding this hoist that are not mentioned in the article; namely, the number of hoists that were required to produce this tonnage and the number of hours in which the work of hoisting was performed. If *Coal Age* can supply this information, it will prove interesting to very many of its readers. G. E. HUTTLE.

Scottdale, Penn.

In response to our letter of inquiry, T. F. Holmes, general superintendent of the Chicago, Wilmington & Franklin Coal Co., at Orient, Ill., writes as follows:

"Regarding the record hoist made at the Orient mine in Franklin County and in compliance with your request, I am pleased to give you the desired data as taken from our reports: The Orient mine is 520 ft. deep. To this depth must be added 80 ft., the height of the dump circles above the surface of the ground at the lower landing, which makes the total height of hoist 600 ft.

"On Mar. 5, 1919, this mine produced 6422 tons of coal, making 1401 dumps in an 8-hour shift, notwithstanding there was a loss of 25 min. in the last hour, owing to valve-stem trouble on the hoisting engine. This accident prevented a record run being made on that day.

"On the following day, Mar. 6, the mine produced 6776.75 tons of coal, making 1502 dumps in an 8-hour shift in which only 8 min. were lost, 4 min. on re-dumps and shaker delays and 4 min. waiting on coal on the bottom.

"The average steam pressure on each of these days was 120 lb. gage. It may be of interest to add the following, which is the record of the number of hoists made in each consecutive hour throughout the day:

1st hour	195 hoists	5th hour	192 hoists
2d hour	190 hoists	6th hour	170 hoists
3d hour	188 hoists	7th hour	185 hoists
4th hour	192 hoists	8th hour	190 hoists

This is certainly a good record, even for a self dumping equipment in the shaft, and *Coal Age* will be pleased to learn of any record that will equal or surpass the one given. Such records show, not only the efficiency of the equipment, but indicate an equal efficiency in the mining and handling of the coal underground, including the work of gathering the cars at the working face, and hauling them to the shaft bottom.

The vast improvement made in the past ten and twenty years, in the management and operation of coal mines in Illinois, has established a record of which the state may well be proud and one that other coal-producing states could do well to follow. It is the result of the uptodate equipment of all the larger mines.

Errors in Surveying Practice

Kindly state, in the columns of *Coal Age*, what are some of the more common errors made by beginners in the work of surveying. I have been told that few engineers can measure off a distance of 1000 ft. and be sure of reaching the same point twice in succession. While this seems to me to be an exaggerated statement, I have found my own measurements to vary as much as 2 in. in that distance, although exercising my usual care in the performing work. SURVEYOR.

Des Moines, Iowa.

It is true that the measurements made by different engineers pulling a chain or tape over the same course will often vary surprisingly. There are a number of reasons for this: In the first place, all engineers do not exercise the same care in taking their measurements. Again, many engineers but more commonly surveyors do not realize the changes that occur in the length of a chain or a steel tape used in making the measurements and which may be caused either by the temperature of the steel or the pulling or tension exerted by the chainmen.

Of course, it is absolutely necessary to use a good steel tape when taking accurate measurements. Such a tape is usually graduated for a pull, of 10 lb. and care should be taken to approximate this pull when measuring. Again, when a steel tape is first run out, its temperature may be about 60 deg. F. In a hot sun, it requires but a short time for the temperature of a tape lying on the hot ground to increase a possible hundred degrees. I have known the tape to become so hot that it could not be held with comfort in the hand.

Now, taking the coefficient of linear expansion of steel as 0.000625, per 100 deg. F., a rise in temperature of 100 deg. would lengthen a 100-ft. tape $12(100 \times 0.000625) = \frac{3}{4}$ in. The lengthening of the tape this amount in 100 ft. would make the distance measured between two points 1000 ft. apart only 999 ft. $4\frac{1}{2}$ in., showing an error or difference in the two measurements of $7\frac{1}{2}$ in. This is one of the most common sources of error appearing when taking measurements over the same ground, in the summer and the winter seasons.

Another common source of error is caused by pulling too hard or not hard enough. A pull of 10 lb. on a 100-ft. steel tape, $\frac{1}{8}$ in. wide and $\frac{1}{50}$ in. thick, commonly used in surveying, will stretch the tape $\frac{1}{8}$ in. This is an interesting subject and there are many other errors to which we hope attention will be called by our readers who are interested in surveying.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

Bituminous (Penn.) Firebosses' Examination, Apr. 11, 1919

(*Selected Questions*)

Ques.—Give the legal qualifications and state what other qualifications one should possess to properly perform the duties of fireboss.

Ans.—The Bituminous Mine Law of Pennsylvania (1911) requires a person seeking the position of fireboss, to hold a fireboss' certificate granted him by the examining board of the state, after he has successfully passed the examination given by the board. The law also requires that an applicant for a fireboss certificate must be a citizen of the United States, at least 23 years of age, of good moral character and known temperate habits. He must have had at least five years' practical experience after 16 years of age, as a miner or performing general work in the mine. He must also have had experience in mines generating explosive gas in Pennsylvania. Each applicant for a certificate must be able to read and write the English language intelligently and must furnish the board with a certificate testifying to his character and temperate habits and showing the length of his service in different mines. The law further requires the candidate to satisfy the board of examiners that he is able to perform the duties of a fireboss in gaseous mines. Besides receiving an average of at least 65 per cent. in the written examination, the candidate must undergo an oral examination in the presence of explosive gas.

In addition to the legal requirements just mentioned, a candidate for a fireboss certificate should have no physical ailment that will hinder him in the performance of his duties in the mine. He must be strong, have good hearing and eyesight, be conscientious and faithful in the performance of his work, honest in all his dealings with the company and with the men employed in the mine and possess the skill and courage required of a fireboss in the mine. He must also have a thorough acquaintance with and knowledge of the construction and use of the safety lamp.

Ques.—Name the various kinds of sign boards and danger signals authorized for use around the mine. State their special uses.

Ans.—There are danger signals and signs or warning boards to prevent men from entering places where danger exists, without due warning of its presence. There are also signs indicating the direction to be taken to reach the shaft bottom or mine entrance. Danger signals would seem to refer to any agreed signal transmitted into the mine and warning the men of impending danger. Such signals may be transmitted by telephone, signal bells or gongs, or by whistles blown at the surface by the hoisting engineer in charge at the time.

Danger signs or warning boards are of various kinds. They may be painted in bright red or the word "Danger" may appear in plain letters that can be easily read. In any case, such a sign warns men of their proximity to danger and is a reminder that they must not violate the mine regulations and rules. Firebosses frequently use a board or rail laid across the track, at the entrance of a room or near the face of a heading, as a warning to men to proceed no further toward the face. Such a board or rail may be marked with chalk to indicate danger. Chalk is also used by the fireboss, foreman, or assistant foreman to indicate a loose piece of top that is to be taken down and men are thus warned not to go under roof so marked. Signs indicating the direction to be taken in going out of the mine usually have the form of an arrow or are marked with an arrow pointing in the direction to be taken.

Ques.—Name at least four approved safety lamps and state what is meant by an approved safety lamp.

Ans.—One of the first lamps approved by the Federal Bureau of Mines was the Koehler lamp, both the steel and the aluminum type, then manufactured at Marlboro, Mass., and equipped with a "Macbeth, No. 2100, high-speed" glass and a pyro internal igniter, 1915 model. The Bureau of Mines next approved the Ackroyd and Best lamp, equipped with "ACK Best, A-1" glass and the Ackroyd and Best underground electric relighter. The Department of Mines at Harrisburg, Penn., has approved for use in that state, besides the two lamps just mentioned, the ordinary Clanny, the Davis deputy lamp, Wolf lamp, and a few others.

The term "approved safety lamp" refers to any lamp that has been examined, tested and approved, for use in mines, by a state or the Federal Government. Lamps approved by a state Government are approved for use in that state only, and the authorization does not apply to any other state. Authorization by the Federal Government is simply a gratuitous act on the part of the Government through the Federal Bureau of Mines, with a view to increasing the safety of mining operations. Such approval by the Federal Government does not prevent the use of other lamps in any coal-mining district or state. The matter of restricting the use of lamps in mines, in any state, can only be authorized through a properly constituted state board or mine official of that state.

Ques.—What observations would you make relative to the timbering of working places?

Ans.—Observe, first, that no coal is being loaded when one or more props have been knocked out by a blast and not been reset; and, second, see that sufficient timber of the right size is on hand in each place, and that all posts are stood properly according to the regulations of the mine, and the coal properly spragged.

Correction

Attention has been called to an error that occurred in the answer to the second question on page 970 of the issue, May 22, which should read $150 \div 0.9965 = 150{,}526$ cu.ft. This makes the gas generated in 24 hr., $24 \times 60\ (150{,}526 - 150{,}000) = 757{,}440$ cu.ft.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Diminishing Demand for Import Coal in Venezuela

Importations of coal to Venezuela have never been of very great importance. The figures for 1916 were: From the United States, 8507 tons; from Curacao (coal of American origin), 2031 tons; and from Great Britain 10,114 tons; total imports from all sources being 19,600 tons. In 1917 a total of 16,000 tons were imported, of which 8129 tons were from Curacao, 2039 tons from the United States and 6075 tons from Great Britain.

The importations of coal from England consist of Cardiff Crown briquets. These are ground coal compressed with some binding material into cubes of about 10 in. They can be stacked and counted and for this reason meet a demand that ordinary loose coal or small briquets can not fill, no matter how good in quality. In Caracas they have sold as high as $55 per ton. Formerly the railroads used them exclusively because they could be stacked upon the running boards of locomotives, thus avoiding the necessity of pulling a tender.

But the demand for these as well as for other sorts of imported coal is diminishing. The railways and the coastwise steamers are now using oil fuel, and some concerns having been forced to use Venezuelan coal, have found it better than they had thought. No bunkering is done in Venezuelan ports, that business in these waters being monopolized by the neighboring islands of Curacao and Trinidad, where labor is cheaper. The Venezuelan government operates coal mines near Barcelona and near Coro. Production appears to be stationary at about 20,000 tons per annum. A large deposit of coal near Maracaibo is being developed by an American company, and there is a prospect that Venezuela may be a large exporter of coal within a few years.

German Coal Trade

The subjoined information has been extracted from recent issues of the German newspapers by the *Iron and Coal Trades Review:*

The Minister for Economy, who refused to sanction the large price increases which the Westphalian Coal Syndicate decided to introduce Apr. 1, and who subsequently fixed maximum prices in the sense that the quotations which prevailed down to Mar. 31 were to be regarded as the maximum rates, has now been convinced by the Syndicate of the necessity for the particular increases which were proposed, and has sanctioned them with retroactive force as from May 1, subject to one condition. As now approved, the increase for coal is 20 marks per ton, including the coal and turnover taxes, with the exception of nut coals which are raised by 22 marks, while coke is increased by 30 marks and broken coke by 36 marks. The condition is that one-half (10 marks) of the coal price advance is to be placed to an equalization fund, which will be allotted to the pits which are working under the most unfavorable conditions. This arrangement is the same as that which was recently reached in regard to the collieries in Upper Silesia, and is now also being introduced in Saxony.

One of the articles of the peace treaty stipulates that Germany has to deliver coal to France for ten years to the amount of the difference between the production of the mines in the Nord and Pas de Calais before the war and the annual output in the ten years in question. In addition, Germany grants the right to France to receive 7,000,000 tons of coal per annum for ten years, to Belgium to obtain 8,000,000 tons of coal in 1919-20, and rising to 8,500,000 tons in 1923-24, at prices which are fixed in the treaty. It is permissible for coke to be supplied in place of coal in the proportion of three tons of coke to four tons of coal. Provision is also made for the delivery of benzol, coal tar and sulphate of ammonia to France for three years. The commission is empowered to postpone or cancel these deliveries should they be inconsistent with the industrial requirements of Germany.

It is reported that the government is engaged upon plans for prohibiting strikes by the introduction of a system of compulsory arbitration, as in Australia and New Zealand.

Coal Output in Scotland in 1918

The coal output in Scotland last year was 36,121,424 tons, a decrease of 2,355,526 tons, compared with 1917. The number of persons employed was 124,477. Of this number, 96,558 were employed under ground, and 27,919 above ground. In 1917 the number employed in coal-mining operations was 130,027.

Carrying Coals to Newcastle

If newspaper reports emanating from London convey the truth, then American coal operators who find business dull on this side of the ocean have been sending emissaries to Wales to find a market for their surplus product. The rumor hath it that some American salesmen, taking advantage of the state of the Welsh coal market and the need of the Welsh operator, are offering to fill orders for producers who are not in position to execute contracts on time owing to the shortage of raw materials and labor.

These agents are offering the prospective British customer coal placed on board at Newport News at $6.10 a ton, which is about half the price Welsh mines can deliver coal f.o.b. at any of the Welsh ports. In addition they are guaranteeing to deliver this coal at certain dates, which the Welsh collieries are unable to do.

In the Swansea manufacturing region, which is the center of Welsh industry, merchants and other coal consumers are being approached by the representatives of American coal shippers with a proposition to take care of British orders that cannot be supplied through the usual channels. The suggestion is made that any orders that cannot be executed will be filled by America to mutual advantage.

British Coal Output

Sir Auckland Geddes recently announced in the House of Commons that the output of coal per person employed in or about the mines continues to show a decrease. In the face of this England will either have to reduce the supply of coal to industry and for domestic use, or to limit even more strictly than at present the amount permitted to be exported. According to figures published in *The Times* (London), the output for the first three months of the present year is as follows:

Four Weeks Ended	Number of Persons Employed	Output, Gross Tons	Output per Person, Gross Tons
Feb. 1.....	1,064,828	18,321,100	17.2
Mar. 1.....	1,097,541	19,472,200	17.7
Mar. 29....	1,106,299	18,676,200	16.2

On the basis of the figures the total production for 1919 would be about 224 million tons, as compared with 227,714,579 tons in 1918.

Discussing the question of Great Britain's coal supplies, the London *Times* remarks that it is extremely doubtful whether the great mass of the British people realize how serious is the position, even in the great industrial districts in the north. Manufacturers may expect to receive the same supplies as allotted to them up to the end of June, but after that a reduction of 12½ per cent is likely.

Holland in 1918 imported 1,259,144 metric tons only of coal and briquets, as against 2,661,390 tons in 1917 and 5,679,906 tons in 1916. On the other hand, she exported 113,757 tons of coal and briquets in 1918, as against 58,037 tons in 1917 and 82,158 tons in 1916.

Exports of Coal and Coke During April, 1919

Districts:	Anthracite Tons	Bituminous Tons	Coke Tons
Maine and New Hampshire	.....	.....	22
Vermont	1,833	1,356	48
St. Lawrence	73,195	90,419	4,132
Rochester	34,661	3,203	.....
Buffalo	158,220	160,361	10,277
New York	1,695	1,001	468
Philadelphia	1,856	7,807	.....
Maryland	90	76,408	5,886
Virginia	.....	211,313	.....
South Carolina	.....	3,181	.....
Georgia	.....	1,400	.....
Florida	.....	3,955	.....
Mobile	.....	47	.....
New Orleans	.....	941	3
Sabine	1	.....	.....
San Antonio	369	1,256	4,511
El Paso	176	1,385	3,317
Arizona	47	420	5,343
Southern California	.....	21	.....
San Francisco	.....	53	19
Washington	80	191	148
Dakota	336	1,944	183
Duluth and Superior	68	784	98
Michigan	.....	101,171	10,393
Ohio	12,563	142,511	35
Total	285,190	811,128	44,883
Countries:			
France	.....	.....	395
Italy	.....	32,309	.....
Netherlands	.....	31,106	.....
Sweden	.....	16,892	.....
Bermuda	.....	381	.....
British Honduras	.....	47	.....
Canada	282,217	501,940	25,336
Costa Rica	.....	.....	8
Guatemala	.....	103	3
Honduras	.....	665	.....
Nicaragua	.....	226	.....
Panama	.....	19,088	.....
Salvador	.....	.....	23
Mexico	593	6,200	13,171
Newfoundland and Labrador	404	.....	.....
Barbados	.....	16,514	.....
Jamaica	.....	5,251	.....
Trinidad and Tobago	.....	3,519	.....
Other British West Indies	342	.....	.....
Cuba	1,544	58,173	.....
French West Indies	.....	5,348	8
Dominican Republic	.....	670	.....
Argentina	.....	14,914	.....
Brazil	.....	70,333	.....
Chile	90	4,847	4,382
Colombia	.....	15	18
Peru	.....	4,968	1,537
Venezuela	.....	.....	2
New Zealand	.....	17,303	.....
Portuguese Africa	.....	316	.....
Total	285,190	811,128	44,883

BUNKER COAL

Districts:	Tons
Maryland	30,926
New York	259,671
Philadelphia	47,521
Virginia	140,741

Foreign Trade Summer Courses

Columbia University, New York City, has announced that it will give summer courses to those interested in foreign trade, as also will New York University. The course at Columbia University will be in charge of Prof. Guy Edward Snider and will consist of (1) Marketing Methods in Foreign Trade and (2) Economic Geography of International Trade. The course at New York University will cover (1) Foreign Trade Geography, (2) Methods in Foreign Trade, (3) Export Technique and (4) Foreign Exchange and Foreign Credits.

The Swedish State Railways and various gas works in Stockholm have bought 100,000 tons of American coal at prices somewhat lower than those at which English coal was offered.

Coal and Coke News

Harrisburg, Penn.

The bill requiring the delivery of explosives to miners (in the anthracite region) at points below the surface has been reported from committee, but with several amendments. The bill provides that on and after the first day of July, 1919, explosives to be used by the miners in the anthracite coal field shall be delivered to them by the operator of such mine or by his representative at a point below the surface most convenient to their place of work.

One of the amendments says that, "If any controversy shall arise between any miner, operator or foreman as to the points at which explosives are to be delivered, such controversy shall be referred to the proper mine inspector, whose decision thereon, taking into consideration practicability and safety, shall be final.

"Explosives shall be taken into the mines for the use of the miners and shall be there transported and stored under such rules and regulations as may be prescribed by the chief of the Department of Mines, and no greater quantity of explosives shall be taken into or held in any mine at any time than that necessary for delivery to the miners of such mine for one day's work."

Section two of the bill states that the quantity of explosives supplied each miner shall be in accordance with an order left by such miner at the mine foreman's office the day previous, the quantity not to exceed the amount provided by law.

The bill states further that any operator who shall fail, or neglect, or refuse to furnish explosives to miners as in this act provided, has committed a misdemeanor. An amendment has been added to this section which reads, "or who shall fail, or neglect, or refuse to furnish explosives to any miner as required by any decision of the mine inspector or who shall violate any of the rules and regulations adopted by the chief of the department under the authority of this act," shall upon conviction be sentenced to pay a fine of ten dollars for each such failure or neglect.

Lacking three votes of the necessary constitutional majority, the Flynn anti-sedition bill was defeated in the House on June 17. The vote was 101 to 84. Governor Sproul backed the measure and it was prepared by Attorney General Schaeffer. Though beaten in endeavoring to put the bill through, the proponents of anti-sedition legislation are jubilant at the showing made in the face of the stiffest possible opposition. There is hardly a doubt that the bill will go back on the calendar and enough votes be mustered to pass it by a substantial majority. Representative David Fowler, a national organizer for the United Mine Workers and floor leader for organized labor, led the battle against the measure, which he claimed was aimed directly at organized labor. Fowler's fight at times bordered on the sensational.

Nine men who were on the ill-fated trip of cars on the morning of the Baltimore No. 5 tunnel disaster, recovered from their injuries and recently discharged from the hospitals, were given a hearing on June 17 by the committee of investigation (six state mine inspectors) but no new light was thrown on the exact cause of the accident. All the men told of seeing the flash, followed by the fire, but were unable to say how the powder was ignited. The evidence shows that the causes have dwindled to smoking and electricity, but no definite testimony was received to prove that either of these caused the ignition of the powder. The pipe that was in the fatal car on the morning of the accident is the mute evidence that shows that some one was smoking.

Uniontown, Penn.

There have been three outstanding features in the industrial situation in the Fayette County or Connellsville coke region during the past week: (1) Demand for coke contracts from furnace interests. (2) Tightening up of the byproduct coal market. (3) Growing indications of an early labor shortage. Operators are giving quite serious attention to the labor situation which is expected to assume vital importance during the ensuing two months. A large number of workers, particularly Italians, have recently left for their native land and their absence will be felt materially with the return of normal conditions in the region. So far there has been no marked exodus of peoples of the Slav nations and in fact there is a strong movement on foot throughout the region to prevent these peoples from returning for some time, at least, in order to give the new republics, especially Czecho-Slovakia, an opportunity to get established firmly. It is pointed out that the difficulties there are such as to require the undivided efforts of the government with the population already there without being called upon to provide for the hundreds additional from the United States who are anxious to return and greet members of their families and relatives whom they have not seen or heard from since before the war.

While the inquiries for byproduct coal have been quite numerous during the week, no large contracts have been reported. The steam-coal situation is practically unchanged, plants which are in operation now working on a month to month basis. Expiration of June orders, however, probably will lead to a flurry during the last week of the month in placing orders for July business.

Demands for coke contracts are coming rapidly from furnace operations which are about to resume work. The favored plan just now is the placing of contracts on a sliding price range, with monthly revision, and upon a basis for coke of 5¼ or 6 to 1 as to pig iron. A few short-term contract deliveries are being made at around $3.50 to $3.90 while spot coke, quite scarce, is selling at around $4.00. During the week approximately 450 more ovens were placed in operation.

Charleston, W. Va.

If little or no headway is being made in increasing production in the various fields in the Charleston section, it is due not so much to general market conditions as to the inability of operations to secure enough cars. Such conditions have prevailed for about a month. For instance during the second week of June, mines were still unable to operate to capacity owing to car shortage but lately the supply has been somewhat better but still entirely inadequate to meet the demand. Added to the car scarcity is a shortage of miners tending to further curtail production; so that production in several fields of West Virginia was not over 75 per cent. and in some instances not that large, when in the face of a constantly increasing demand much more coal could and would have been mined. Conditions in the southern part of West Virginia reflect an even stronger market. There being, however, no sweeping advances, some kinds of coal even lagging behind in the procession. That was specially true as to ordinary steam coal, though the demand for it was better than had been true in earlier weeks. Mine-run is enjoying a better market while prepared sizes both in the smokeless fields and elsewhere are at a premium, in fact the output of a great many operations is sold as to prepared sizes. Pressure for coal from export sources is partly responsible for the increased demand, the movement of coal to tidewater during the week ended June 14 being especially heavy. An embargo in effect for a few days held down the lake tonnage, but with the rescinding of the embargo order coal again moved in large quantities to Lake ports. There appeared to be a much stronger demand for mine-run in western markets and that had its effect on slack coal which had been rather sluggish.

Under favorable transportation conditions the New River field would have been able to produce up to the capacity of its mines during the second week of June because market conditions for smokeless coal were conducive to a large output. However, the mines produced not more than 75 per cent. of the normal output. Export shipments were still growing in volume, though lack of vessels tended to hold down such shipments. Prepared sizes continue to advance and now approximate $5.00 a ton, it is stated, while mine-run is quoted at about $3.00 a ton and slack at from $2.35 to $2.75.

Production was greatly retarded in the Kanawha district, labor was scarce and it was not found possible to produce more than 60 per cent. of capacity. Much Kanawha coal was being shipped to tidewater. Prepared sizes were in prime demand and it was expected that a stronger market for mine-run would increase slack sales. The maximum price for prepared sizes was said to be $3.25, running from that down to $2.50 while the general average for mine-run, contract, was $2.25.

Fairmont, W. Va.

As an index to conditions in the Fairmont and other fields in the northern part of the state, on Saturday, June 14, shipments of coal from the Monongah division of the Baltimore & Ohio were larger (with one exception) than at any time during the present calendar year. The increase in shipments was most marked as to eastbound tonnage, more especially as to tidewater shipments and that means a steadily mounting export business. Much of the export business is being handled by the big companies who have the larger selling organizations, but some of the smaller companies are also participating. Only about 900 cars were loaded for Curtis Bay in four days, while the total loads of coal from Monongah division mines for the entire second week in June for all points reached a total of over 4800, it is estimated. Western shipments decreased in volume, the tonnage moving to Lake ports being below that of previous weeks. So far operators in northern West Virginia have not been troubled by a scarcity of cars or labor; fewer unconsigned loads were on hand. There was also a decrease in the number of idle mines and mines being operated were on a full-time basis. Run-of-mine (spot) was averaging over $2.00 while $2.50 and $2.60 per ton was an average price for prepared sizes. The price of slack ranged anywhere from $1.50 to $2.10, the average price being $1.75.

Huntington, W. Va.

There was an excellent attendance at the annual meeting of the West Virginia Coal Association held here on June 10. Aside from the election of officers for another year, the most absorbing question before the association was as to whether or not West Virginia operators favored a continuance of government supervision of the coal industry.

There was almost unanimous opposition to resuming the submission of monthly cost reports to the Federal Trade Commission, as such reports were not to be treated as confidential and, furthermore, it was considered that the submission of such reports was a phase of government control.

The executive committee at a meeting held after the adjournment of the annual meeting re-elected J. G. Bradley, of Dundon, as president; E. Drennen, of Elkins, as vice-president; Walter H. Cunningham, of Huntington, as secretary; A. H. Land, of Huntington, as treasurer. Mr. Drennen was the only new officer elected, succeeding G. H. Caperton.

After brief discussion the eastern car pool matter was left in the hands of the association's executive committee.

Terre Haute, Ind.

The production of coal in the mines of Indiana during May amounted to 1,307,325 tons, a small increase over April, which was 1,245,921 tons. The increase, while relatively small, is held by many operators in the coal field to indicate at least a start of a revival of the demand for fuel, inasmuch as the market ordinarily takes less coal during May, June and July than in any other months. The tonnage reported for May was produced at 197 mines, as compared with 189 during April. Several mines in the state are still closed; practically all are working only part time. A loss in production resulting from car shortage was apparent for the first time in several months, the loss from this source amounting to 84,587 tons. It was estimated that the full time capacity of Indiana mines during May would have been 2,887,372 tons, but it is not probable that this maximum production will be attained any month this year. Distribution of railroad contracts among many mines, instead of their concentration in a few has had the effect of more evenly distributing the working time of the various properties and, consequently, has improved, in a measure, the general working conditions.

Ottawa, Ont.

The final report of C. A. Magrath, Canadian Fuel Controller, was presented to the House of Commons on June 2. It emphasizes the necessity of devising every possible economic method of developing Canadian fuel resources. It would greatly help to maintain a favorable balance of trade if every effort were made to conserve and utilize to its full value all fuel brought in, and at the same time to develop the coal-export business in the maritime provinces, British Columbia and the West. The attention of builders, municipalities and others is drawn to the greater efficiency and saving in the cost of fuel obtained by the use of central heating plants in closely-settled parts of cities in the United States. The recommendation is made that the government should discourage the use of electrical energy for heating houses as being wasteful, considering that where used as power it has ten times the efficiency. Other recommendations are that classes for furnacemen should be held in each municipality to teach the conserving of fuel; that furnace manufacturers should be canvassed to see if they can be induced to make furnaces suitable for burning soft coal; to secure better building inspection of air spaces between walls to obtain protection against cold; that mines should be inspected to see that there is no waste in the extraction of coal; also provision should be made so that the cost of coal is not increased by over-capitalization, and that the report should be submitted to the consideration of the Advisory Council for Scientific and Industrial Research.

The Hon. A. K. Maclean, Acting Minister of Trade and Commerce, has issued a statement on the Canadian coal situation. He draws the attention of the public to the fact that owing to lack of orders many mines were forced to close down in the early spring, with the result that some seven million tons of coal, or one-twelfth of the yearly output was lost to the trade; there is, in consequence, a shortage of just that amount of coal with which to enter next winter. Under these conditions there is only one sound policy for the Canadian consumer to follow, both in respect to imported and also as to domestic coal. That is to keep pressing for supplies and to leave nothing undone until each consumer has at least a substantial portion of his next winter's supply in his cellar. The public need not look at present for a reduction in coal prices, as if there is to be any change every indication points rather to an increase.

Montreal, Que.

The first meeting of the special committees appointed by the Dominion Steel Corporation and the Nova Scotia Steel and Coal Co., to consider the possibility of reaching an agreement for the redistribution of the submarine coal areas leased by the two companies, were held here recently. It is stated that the following represented the Dominion company: J. H. Plummer, formerly president of the Dominion Steel Corporation; Hector McInnis, a director of the company, and William MacMaster, of Montreal. The Nova Scotia Steel and Coal Co. were represented by the following: D. H. McDougall, president; Colonel Cantley, chairman of the board, and W. D. Ross, vice president. It is of interest, says the Wall Street Journal, that Mr. Plummer heads the Dominion company committee, for when he was president of this company he recognized the ultimate necessity of some rearrangement of the various properties operated by the two companies. Mr. McInnis had charge of the entire undertaking before the Legislature of the Province.

If the companies in question fail to reach an agreement, then the Provincial Legislature will intervene and settle the matter in a manner which it may consider to the interest of the province. Many believe that the present negotiations may lead up to a possible merger between the two companies involved.

Victoria, B. C.

Joseph Hudson, of the Explosives Branch, Department of Mines, Ottawa, is making a tour of Canada on business of considerable importance to the mining industry. At present he is in British Columbia and has interviewed Hon. William Sloan, Minister of Mines, and other officials in the Department of Mines. He announces that it is the intention of the Ottawa authorities to provide the finances necessary for the installation at the Canadian capital of a powder-testing plant modelled after that of Cumberland, England, and Pittsburgh, Penn. At the present time there is no provision in Canada for the official testing of explosives used in the mines of the country.

The Provincial Government had been authorizing the use of those explosives passed by the United States Government authorities or recognized and approved by the British Government. If necessity arose for the testing of a certain grade of powder, and the coal dust of the mines in which it was proposed to be used, then it was necessary to send samples either to Cumberland or to Pittsburgh. With a plant at Ottawa, not only would a uniform list of authorized explosives be adopted in Canada, but it would be possible for all such testing and experiments to be carried out within the Dominion.

If the proposed plans are carried out it is understood that manufacturers of explosives will be required to submit their output to test in the official laboratory; also plans of new plants will have to be submitted to the proper authorities for approval.

Another innovation suggested is that regulations regarding the sale of explosives shall be uniform throughout the Dominion. This will be a marked improvement over the present somewhat haphazard method. Mr. Hudson's mission, therefore, is to lay these various proposals before the heads of the Mines Departments in the different provinces, explain them in detail, obtain suggestions and generally come to a clear understanding of the objects aimed at; then when Dominion legislation is finally drafted, it should meet conditions in all parts of the Dominion and be unanimously approved.

PENNSYLVANIA

Anthracite

Lansford—The Lehigh Coal and Navigation Co. will build a number of new tenament houses during the summer. The G. B. Markle Co., of Hazleton is also improving and rebuilding all its mine villages, putting the houses in first-class condition.

Shenandoah—The Continental washery, which has been idle since Feb. 8, resumed operations recently. The washery is owned by the Lehigh Valley Coal Co., and is one of the many washeries that were erected during the war to relieve the coal shortage. It has a daily output of 1250 tons.

Ebervale—Anthracite miners continue to be in demand. The G. B. Markle Co. announced on June 9 that it was still short of practical hands and is scouring the entire region for men holding certificates to mine coal. Efforts are being made to induce former residents of the Lehigh section now working in other parts of the state to return to their old occupations.

Shamokin—To prevent a tying up of its collieries between here and Mount Carmel, the Susquehanna Collieries Co. has inaugurated an auto bus service to convey the miners to and from their work. Practically all big trucks in Shamokin and Mount Carmel have been hired to make morning and afternoon runs to the collieries, during the strike of the trolley men.

Philadelphia—The Monash line of pressure reducing valves and pump governors, formerly manufactured and sold by the Monash-Younker Co., of New York and Chicago, has been acquired by the Harrison Safety Boiler Works, of Philadelphia. The Harrison Safety Boiler Works will manufacture and market the valves under the trade name "Cochrane-Monash," and will supply repair parts for valves now in use.

Inkerman—The electric storm on June 15 created havoc at the Red Ash shaft of No. 14 colliery of the Pennsylvania Coal Co., doing considerable damage, and it is likely that the Empire tower, which stands about forty feet high will have to be dismantled and rebuilt. The shaft has been abandoned for several months. It is equipped with modern machinery and after being sunk to the Red Ash seam, a distance of about 550 feet, it was decided by the officials to postpone underground development for an indefinite period.

Hazleton—It is stated that traces of a mine fire that existed in the Honey Brook No. 3 workings over a score of years ago have been discovered in the strippings at this plant several miles south of this place. The Lehigh & Wilkes-Barre Coal Co. operates the property.

Coöperating with the Government authorities, the coal companies are canvassing their men in an effort to ascertain their ideas regarding citizenship in this country. The information is also used in the collection of income taxes. A surprisingly large number of aliens seem to have no desire to take out citizenship papers.

Bituminous

Waynesburg—Paul B. Dick of Connellsville, has purchased several hundred acres of coal in Wayne Township, Greene County, from various owners.

Brownsville—William F. Ellwood, Susan Ellwood Mounts and Agnes Ellwood Brownlee, all of Washington, and E. E. Morris, of Waynesburg, have sold to the Pittsburgh Coal Co. two tracts of coal, one tract in Amwell Township containing 15.8 acres and the other in Canton Township, containing 108 acres. The price paid per acre was $300.

Scottdale—Organized play is to be an innovation this summer at the Phillips plant of the H. C. Frick Coke Co. For years past every Frick plant has had a playground with a band but the equipment at Phillips is to make provision for worth-while games which will appeal to the workers and their wives as well as the children.

Pittsburgh—The Hecla Coal and Coke Co. has been granted a permit by the United States Government to construct a steel tipple with a concrete pier and trestle supports on the right bank of the Monongahela River, 3.5 miles above Lock No. 6 at Rice's Landing and 72 miles above the mouth of the river. This plant is at the Isabella mine and is to replace the river tipple carried away by the ice winter before last.

Meyersdale—H. M. Habeeb and S. Silomon, both of Windber, have purchased 375 acres of coal land at this place from Aaron Cober and Joseph Lint. The land is near Keystone Junction and is underlaid not only with good coal but with several strata of sandstone. The new owners contemplate the development of a modern mining plant and the erection of a crusher to manufacture sand for commercial purposes.

Brier Hill—Officials of the Brier Hill Coke Co. made a trip to Fayette County, from Youngstown, Ohio, in a special train for the annual election of officers and inspection of the Fayette County operations of the company. All officers were re-elected as follows: President, Thomas McCaffrey; vice president, W. H. Warren; secretary, W. B. Phelan; treasurer, N. B. Folsom; directors, Colonel J. G. Butler, Jr., Thomas McCaffrey, W. H. Warren, G. L. Alderduce, John N. Allen and W. B. Phelan.

Pittsburgh—A dinner was given on May 27, by Dr. A. A. Hamerschlag, president of Carnegie Institute of Technology, at which a number of prominent coal operators were present. Announcement of a new Carnegie mining engineering department of the Institute was made at this time. Coöperation between all interests involved is promised. The operators were highly in favor of this plan and resolved that the gathering give its moral and material support to the form of education proposed by which students may receive combined technical, practical and business training necessary to fit them for service in coal mining.

Scholarships are offered; each operator whose production averages 1000 tons a day is to give one scholarship each year to young miners or sons of miners who cannot otherwise obtain such schooling. This school is expected to start next fall and an advisory board has been selected on which are prominent coal men.

WEST VIRGINIA

Clarksburg—Though yeggs succeeded in demolishing the general store of the Elkhorn Fuel Co. at its Ocean mines near here on June 4, through using too much explosives on the safe they succeeded in carrying off only a small amount of loot.

New River—The Buffalo Coal Co., recently incorporated with a capital of $75,000 has leased about 1000 acres of coal in this section, and plans the commencement of development work at an early date. It is said that the daily capacity of the plant will be about 800 tons. A. B. Day, John F. Shea, and M. T. Devault, all of Knoxville, are the incorporators.

Beckley—The Winding Gulf Operators' Association at its meeting at White Sulphur Springs, W. Va., went on record in a series of resolutions as favoring any movement for the advancement of the physical and moral welfare of the miners, the strict enforcement of the prohibition laws, better educational facilities, better schools and higher salaries, also the establishment of mining schools at various operations.

Huntington—A syndicate of this place, composed of C. W. Jones, W. E. Minter, J. B. Purcell, A. J. King, C. P. Donovan, E. J. Payne, John Clapperton and S. J. Hyman, recently closed a deal with the Hutchinson Lumber Co. involving the transfer of 2500 acres of coal land in Fayette County. Two mines are now in operation on the tract and a third is being opened up by the Greenbrier Collieries Co., in which the Hutchinson company held a fourth interest.

Charleston—The Turkey Knob Coal Co. is seeking an injunction to restrain the state tax commissioner from collecting additional amounts which he claims are due from all corporations in the way of an excise tax owing to the increase by the legislature of the rate by one fourth of one per cent. The effort of the Turkey Knob company to secure the injunction is in effect a notice of an appeal from the decision of the State Board of Public Works which sustained the Tax Commissioner in his ruling that the increase applied to the state's fiscal year beginning July 1, 1918, and ending June 30, 1919. The Turkey Knob company applied to Judge Rummell, of the Kanawha Circuit Court for the injunction but he refused it and it is now the understanding here that the company both on its own behalf and on behalf of others will apply to the Supreme Court of the state for an injunction. In fact a chancery suit has already been filed in the Kanawha Circuit Court as to just what period of the year the increase applies. A quarter of a year's additional excise tax is due according to the Tax Commissioner.

KENTUCKY

Louisville—The W. E. Caldwell Co., of this place, tank manufacturers, will build a 30,000 to 35,000 cut band saw mill in St. Landry Parish, La., where the company owns large tracts of cypress, ash, oak and gum timber. J. B. Crawford, an experienced saw mill man is connected with the enterprise.

Lexington—The Kentucky Mining Institute recently elected officers as follows: H. M. Ernst, Sturgis, president; C. W. Strickland, Ashland, secretary-treasurer; vice presidents, Alex Frost, Wilton; J. P. Gorham, Lexington; J. H. Hall, Whitesburg; H. H. Small, Chicago; A. G. Spillman, Earlington; R. C. Thomas, Paintsville; H. H. Townsend, Athens, O.; Louis Frances, Crofton.

OHIO

Columbus—A new bill of lading which goes into effect on all railroads, Aug. 8, does not limit the liability of carriers to the cost of the coal at lading and also does not place responsibility for coal cargoes on the owner, when held by railroads as warehousemen. In other words where the coal is on track in storage which is paid for, the railroad company must assume all losses.

Martins Ferry—The Fred R. Jones Construction Co. of Chicago, which is constructing the sidetrack for the Pennsylvania railroad from the W. & L. E. to the new Youghiogheny & Ohio mines on Little Short Creek, Jefferson County, has taken the contract for loading the 30,000 tons of coal piled near the Bud mine. The company has been piling coal beside its Bud opening since the first of the year at the rate of 200 tons a day, as it was impossible to load on the railroad until the branch line was put in. The Jones company will use steam shovels to load the coal.

The construction company is expected to be at work all summer in completing the contract of laying the branch railroad on up the creek to the new Dorothy mine.

ILLINOIS

Hallidayboro—The Jackson Coal Co. is now installing a new 150 k.w. electric generator at its mine to take the place of the one formerly used, which was too small to supply the demand. New storage battery motors were recently put into use at this mine. The new generator will be driven by a corliss engine.

Chicago—A warning that America faces a possible coal shortage more serious than that of eighteen months ago was sounded recently by a special committee of the National Coal Association, whose membership produces approximately 75 per cent. of the country's bituminous coal.

The committee, headed by F. C. Peabody, of Chicago, pointed to the production decrease of 50,000,000 tons from January 1 to May 10, as compared with a year ago, declared there are grave dangers of a labor shortage, and urged that consumers place their orders now, and thus set the idle mines in full swing again.

Sesser—Final plans are now being completed for the sinking of a new mine near here on the Chicago, Burlington & Quincy R.R. The company which will prosecute the work was recently formed with a capital of $5,000,000. The members include several prominent business men of Sesser and also Jesse Diamond of Chicago, D. M. Parkhill of Benton and Thomas Horn of St. Louis, all of whom are interested in the Modern Coal Co. The Modern Coal Co. recently completed a new mine at Sesser which ranks among the most modern in southern Illinois. The mine which this new concern is now planning will also be large and well equipped.

Springfield—Coal mines in the Springfield district are working as follows: The Peabody No. 6, one of the large mines of Central Illinois, employing more than 500 men, is working steadily. The Girard and the Capitol mines are down, the Athens mine is working four and five days and the Spring Creek mine averages about five days a week. Other mines which are putting in good time are the New Citizens, with an average of four days a week, the Klondike, working an average of three or four days, the Woodside working four and five days, the Panther Creek, about two days and the Divernon and Auburn mines about four days a week. The Tuxhorn mine, which has been down, will open July 1.

Zeigler—This place promises to be one of the largest mining towns of southern Illinois. Another new mine has just been sunk near the old plant of Bell & Zoller. These mines are the only ones in the southern part of the state which are said to be working full time. Ample facilities, such as water, light and power are supplied by the large mines which are located close to the town. A new and modern hospital is maintained and the city is to have, in the near future, one of the best labor temples of this section. The local union of miners at Zeigler recently held a labor picnic and celebration at which there were about 5000 persons present. The speakers were: Frank Farrington, president of the United Mine Workers of America, Mother Jones and Edward Carbine, of the Illinois State Federation of Labor. A part of the celebration was in the form of a big parade; dinner was served at the city park.

ALABAMA

Birmingham—The Alabama Fuel and Iron Co. of this place has completed negotiations for the purchase of a tract of about 1640 acres of coal and is said to be planning for development. The new property is located in Harlan County, Ky. Charles F. De Bardeleben is vice president and general manager.

Alabama produced 19,521,840 net tons of coal and 4,344,726 tons of coke during 1918, according to figures compiled by Chief Mine Inspector C. H. Nesbitt for incorporation in his annual report. Compared with the record production for 1917 of both coal and coke, there was a decrease of 891,971 tons of coal and a shortage of 523,872 tons of coke. Jefferson County, producing over half the coal tonnage for the state in 1917 and 1918, fell below the 1917 record by 980,109 net tons.

MISSOURI

St. Louis—Shipments of coal into this city last year were 1,052,283 tons in excess of the preceding year and 4,933,700 in excess of 1915, according to the annual report of the Merchants' Exchange. The receipts of coal here were as follows: In 1918, 12,905,755 tons; in 1917, 11,853,472 tons; in 1916, 9,683,806 tons; in 1915, 7,972,055 tons. The receipts of anthracite, included in the report, were 64,515 tons in 1918, against 163,789 tons in 1917. The receipts of coke were 168,205 tons last year, against 217,236 tons in 1917. Of the receipts of anthracite, 48,436 tons were local and 16,079 through. The Illinois Central carried the greatest tonnage, 1,787,691; the Southern was next with 1,400,248; the Louisville & Nashville was third with 1,247,660 tons.

Personals

Arthur King Wood, formerly president of the Franklin Trust Co., has been elected vice president and treasurer of Westinghouse Church Kerr and Co., of 37 Wall St., New York City.

Herman T. Garrison has resigned his position with the Madison Coal Corporation at Carterville, Ill., to accept one with the Hartwell people who operate a new mine at Hartwell, Ill.

C. F. Bashore, formerly manager of the New England Fuel and Transportation Co., Grant Town, W. Va., has accepted a position as manager of an operation of the Randall Coal Co. along Scott's Run.

John Chisnell, mine foreman at No. 5 colliery of the G. B. Markle Co., was seriously injured by a runaway car recently. His assistant, Charles Tyson, also sustained a fractured leg in the same accident.

Harold M. Stagg, formerly New York sales manager for Weston Dodson & Co., Inc., has been appointed general manager of sales of the Pennsylvania Collieries, Inc., with offices at 500 Fifth Ave., New York City.

Charles Gottschalk has resigned his position as chief engineer for the Union Colliery Company, at Dowell, Ill., and has been succeeded by W. T. Detweiler, of St. Louis. Raymond J. Dowd, also of St. Louis, will be assistant engineer.

Robert H. Kann has been appointed superintendent of Mine No. 24 of the Consolidation Coal Co., having been superintendent at the No. 55 mine of the company. For the time being J. H. Nuzum will act as superintendent at Mine No. 55.

Col. William Leckie, head of a number of coal companies operating in the Pocahontas region has purchased the Kelley & Mayer Building in Bluefield, W. Va., and will use it as the headquarters of 10 different companies in which he is interested.

C. S. Coler, especially fitted by education and experience, was recently appointed manager of the educational department of the Westinghouse Electric and Manufacturing Co. He is also president of the Casino Technical Night School and chairman of the technical sections of the Westinghouse Club.

Samuel F. Joor, a consulting engineer of Chicago, has joined the American Steam Conveyor Corporation, Chicago, in the capacity of sales engineer. Mr. Joor has had wide experience in the conveyor field, at one time being western manager and sales engineer of the Jeffrey Manufacturing Co. and previous to that, with the Link-Belt Company.

High appreciation of the work of **Lieutenant-Colonel C. W. Watson**, president of the Consolidation Coal Co., as an ordnance officer in France, has been expressed by General John J. Pershing, head of the American Expeditionary force. In a letter addressed to Colonel Watson, General Pershing says, "I wish to express my appreciation of the valuable services which you rendered the American Army as Base Ordnance Officer of Base Section No. 6. You performed tasks of magnitude, constantly surmounting unexpected difficulties and solving perplexing problems with sound judgment and initiative. At all times you were devoted to your important duties and untiring in the energy with which you unfailingly acted. I regret that I was unable to thank you personally before you returned to the United States."

Obituary

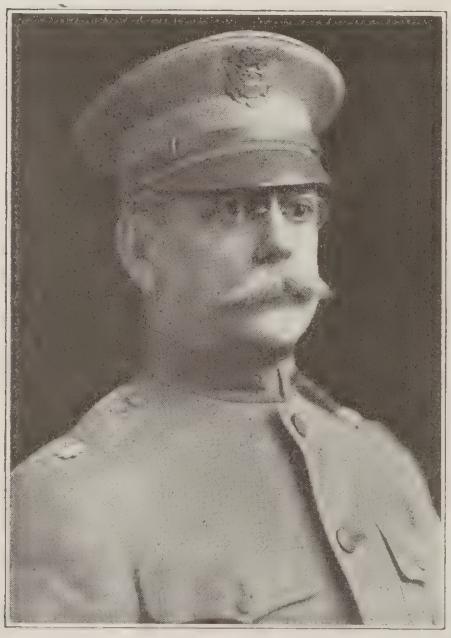
Charles Binkley, age 53, a coal operator of southern Illinois, recently died from heart failure at his home in Marion, Ill. He had been suffering with pneumonia for several weeks.

Burr E. Cartwright died on June 17 at his home in Buffalo, N. Y., in which city he was born in 1850. He was interested in the Shawmut Mining Co., whose property he developed.

John J. Broderick died on June 7 at St. Louis, Mo. Mr. Broderick was president of the Broderick & Bascom Rope Co., whose product is used in and around the coal mines throughout the country.

Philip M. Hucke, age 49, died at his home in St. Louis, on June 19. He was general manager of the Kolb Coal Co., St. Louis, and also manager of the St. Genevieve Lime Co. Mr. Hucke was a member of the St. Louis Chamber of Commerce and prominent in the masonic fraternity.

Major Granger Farwell, chairman of the board of directors of the Monarch Coal Mining Co., of Monarch, Wyo., died suddenly in Chicago, May 15. He is survived by a widow and five daughters. Major Farwell entered the army when this country declared war and served until Jan. 10, of this year. Besides being connected with the Monarch company, he was a director of the Diamond Match Co., Utah Gas and Coke Co. and other institutions.



MAJOR GRANGER FARWELL

Coming Meetings

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

Northeast Kentucky Welfare and First Aid Association will hold a first-aid contest July 4 at Pikeville, Ky. Secretary, E. H. Sowards, Pikeville, Ky.

The Rocky Mountain Coal Mining Institute will meet in Salt Lake City the second week in July, 1919. Secretary, F. W. Whiteside, Denver, Colo.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind. Secretary, J. W. Paul, Pittsburgh, Penn.

The National Commissary Managers' Association will hold its annual meeting August 5-7 at the Sinton Hotel, Cincinnati, Ohio. Secretary, D. J. Eichoff, Manhattan Building, Chicago, Ill.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting July 23 and 24 at Reading, Penn. Secretary, W. M. Bertolet, Reading, Penn.

National Exposition of Chemical Industries will hold its fifth annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

The National Safety Council will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

Industrial News

Cincinnati, Ohio—The B. A. Vesche Electric Co., of 327 East Sixth St., of this place, announces that the address of its eastern sales agent is 110 West 40th St., New York City.

Cleveland, Ohio—The Sullivan Machinery Co. announces the establishment of a new branch office at Room 810 Park Building, Cleveland, Ohio, under the management of Ralph T. Stone, for several years past sales engineer associated with the New York office of the company.

Huntington, W. Va.—The Link-Belt Co., of Chicago, has opened a new office at this place. George S. Jaxon, one of the company's engineers, who for many years served the West Virginia field, has been made district manager with headquarters in the Robson & Prichard Building.

New York, N. Y.—The Dominion Asbestos and Rubber Corporation, with executive offices at 154 Nassau St., New York City, has recently opened branches in Albany, N. Y.; Atlanta, Ga., and Allentown, Penn. In January, 1919, the capital stock of the company was increased to $100,000.

Petersburg, Ind.—The Gladstone Coal Co., which operates the Gladstone coal mine, three miles north of this city, on the Evansville & Indianapolis R.R., is completing a new tipple and will increase the working force to 100 men within the next few months. Electric power will be used.

Oil City, Penn.—The Oil City Oil and Grease Co., of this place, has been authorized to increase its capital stock from $80,000 to $200,000. D. J. Cavanaugh is treasurer. This expansion means increased business and reflects most favorably on the excellence of the products of this company.

Yorkville, Ohio—The erection of 47 houses was begun at the Dorothy mine of the Youghiogheny & Ohio Coal Co., west of here, recently. This will make a total of 100 houses at the Dorothy and Bud mines. It is said the number will be doubled eventually. A large store building will also be erected.

Pittsburgh, Penn.—The Safety First Supply Co., of this place, has found it necessary to move to larger quarters on account of the continued increased business of the company. The entire building at 107 Third Ave., Pittsburgh, is devoted to the manufacture and distribution of appliances for safety first aid and welfare.

California, Penn.—Extensive additions and enlarged operations at the Vesta mines of the Jones & Laughlin Steel Co. are being planned as a result of the completion of the first battery of byproduct ovens at the big steel plant. Operations have been resumed at Vesta No. 4 after a four months' shut down.

Huntington, W. Va.—C. W. Jones, W. E. Minter and associates have recently completed arrangements for the purchase of coal properties in Fayette County, and are planning for extensive development at an early date. The tract comprises about 2500 acres. It is understood that the plans provide for an annual capacity to exceed 200,000 tons.

Olcott, W. Va.—The General Underwriters, Inc., has acquired the Penn-Virginia Coal and Coke Co. and the Black Band Fuel Co., the latter being a well known company in Kanawha County where the formal transfer was made. The consideration was approximately $100,000. A further development of the Black Band property is insured.

Pruden, Tenn.—The Pruden Coal and Coke Co., of Knoxville, is understood to be planning the development of approximately 2500 acres of coal properties located in the Pruden district. Complete equipment for an up-to-date plant will be installed. It is proposed to have an initial capacity of about 300 tons daily. V. M. Hacker is president.

Cincinnati, Ohio—Goodin, Reid & Co. of Cincinnati, Ohio, has changed its name to Goodin, Reid and Co., of New York, and has removed its main office from Cincinnati to 41 Union Square West, New York City. The company will still maintain its Pittsburgh office at 913 Farmers Bank Building and shipments will continue to be made from Cincinnati.

Washington, D. C.—According to Railway Administration figures the mines and oil wells of the United States furnish 55.75 per cent. of the tonnage hauled by the railways. The material manufactured from ores and minerals produced from American mines and oil wells furnish 25 per cent. of the remaining tonnage. This ratio has existed in a greater or less degree for many years.

Buffalo, Tenn.—The Buffalo Coal Co., of Knoxville, recently incorporated with a capital of $75,000, is arranging for the commencement of work at an early date on the development of approximately 1500 acres of coal properties located in the Buffalo district. It is understood that the company's plans provide for an initial capacity to exceed 500 tons per day. A. B. Day is president; and Milton T. DeVault, secretary.

Taylorville—The shaft of the Springfield Coal Co. has been closed down indefinitely. The mine has been working only one day a week since January 1 and the shutdown will not mean a great loss to the miners, except that they had been holding on with the hope that there would be an abundance of work in the future. It is believed that there will be no more work at this mine until fall. The other mines in the Taylorville vicinity are working full blast, extra men being required at a number of the mines.

Coalwood, W. Va.—Arrangements are being made by the Carter Coal Co. for extensive improvements at its various plants. The plans include the construction of a large new steel tipple and automatic hoist at the Coalwood works, as well as the construction of a number of new miners' houses; improvements at the Seaboard and Coaldon plants, and other work to increase the present capacity. At the present time the company's holdings approximate 40,000 acres of coal properties located in four states. J. W. Carter is vice-president.

Fairmont, W. Va.—The Domestic Coke Corporation is making rapid progress on the installation of its large new local plant, estimated to cost in excess of $3,000,000, and it is expected that construction work will be completed by the first of the coming year. The plant will comprise a battery of 60 Koppers ovens with byproduct recovery apparatus, to have a daily carbonizing capacity to exceed 1000 net tons of coal. The Koppers Co., Pittsburgh, Penn., is the contractor. Charles V. Critchfield, Cleveland, O., is vice-president of the corporation.

Palmer, W. Va.—A million-dollar firm to be known as the Jones By-Products Coal Co., has been organized by well known Delaware and Pennsylvania business men to operate at this place in a comparatively undeveloped region. While the plans of the company have not been made public it is understood that a large byproduct plant will be constructed and operated. The company was organized by Robert H. Jones, of Wilmington, Delaware; H. Chester Johnson, John E. Bassett, and Randall F. Collins of Philadelphia and John M. L. Black of Villa Nova, Penn.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Good Grades of Bituminous Coal Already Contracted For—Present Is Best Time to Purchase Fuel—Anthracite Domestic Sizes in Good Request—Production Inadequate to Meet Demand, Which Is Insistent

THE disinterestedness evinced by many large consumers of bituminous coal at the present time can lead only to one result this winter—a coal shortage. Mines are still losing on an average of two days a week because of lack of orders. The rate of production is at present about 30 per cent. below that of last year, and is only sufficient to take care of current consumption.

Operators still hold fast to the belief that the signing of peace will bring in its wake the long-expected activity for American industries, and that many large consumers will thereupon change their present lackadaisical attitude toward their future coal needs.

Business, however, is picking up, though slowly. It is not at all improbable that the next few weeks will witness the inauguration of a new era in market conditions. No contracts are being signed, and those concerns that have failed to cover themselves for their future requirements will find when they come into the market not only higher prices, but a dearth of the good grades of soft coal, the output of which for the coming year has already been contracted for.

Add to this the by no means remote possibility of labor trouble at the mines, labor shortage, inadequate car supply, higher freight rates and poor transportation conditions—and the reasons why the immediate moment is the psychological time for the purchase of coal become readily apparent. In a short while the complexion of things will have changed.

Medium and low grade coals move slowly. Producers of the better grades are refusing new business. Gas coals are in good request, and the export coal situation is improving. The general average of market prices is on about the same level it has occupied for the past month.

During the week ended June 14 there was produced 8,782,000 net tons of bituminous coal as against 8,917,000 net tons for the preceding week.

Demands for the domestic sizes of anthracite are nothing short of strenuous. The cry for egg and stove coal is most insistent. Chestnut, also, is coming in for a goodly share of the favor shown toward the larger anthracite coals at this time. The mines are working steadily, but the output could be much greater if sufficient labor were available. Many anthracite mines are now producing at only from 60 to 65 per cent. of their maximum output capacity.

Good tonnages of hard coal are moving to Canada, to the West, and to New England points. Efforts are being made to prevent a serious shortage of anthracite in any section of the country next winter As in former years, those sections more remote from the source of supply are being catered to first.

During the week ended June 14, about 1,685,000 net tons of anthracite were mined, bringing the total output for the calendar year to date up to 35,180,000 net tons compared with 44,890,000 net tons in the corresponding period of last year.

WEEKLY COAL PRODUCTION

A slight decrease in the production of bituminous coal was recorded for the week ended June 14 The estimated output is 8,782,000 tons, compared with 8,917,000 tons in the first week in June, and 8,724,000 tons in the week ended May 24.

The best time in the year for laying in stocks of coal for next winter is rapidly passing, with no evidence of general buying for this purpose. The rate of production has not varied greatly since the middle of May, and averaging about 30 per cent. below last year, is apparently just sufficient to meet current consumption.

The production of anthracite in the week ended June 14 is estimated at 1,685,000 net tons, about the same as the preceding week, but nearly 15 per cent. below the estimated output for the corresponding week of 1918. The total production for the calendar year to date is estimated at 35,180,000 tons, compared with 44,890,000 tons in the corresponding period of last year.

Reports from the operators for the week ended June 7 show no general improvement in the market for bituminous coal. The mines lost on the average two days in the week because of lack of orders, which is a slightly smaller loss on this account than in May. With the exception of a few districts the railroads are giving practically full car supply, but in both the smokeless and high volatile fields of southern West Virginia car shortage is already becoming a limiting factor. Several districts, however, reported to exceed 80 per cent. full-time operation; the Pittsburgh, Westmoreland and nearby fields and Somerset reaching that mark for the first time this season.

The production of beehive coke in the week ended June 14 is estimated at 297,500 net tons, compared with 271,400 tons in the week ended June 7, a gain of about 26,000 tons, or more than 9 per cent. Although the production of beehive coke has been slowly but steadily increasing in recent weeks, at the present rate of production it is less than 45 per cent. of that of the first half of June, last year. The increase in production in the week ended June 14 was general. Colorado and New Mexico in particular recorded an output nearly twice that of the first week in June.

The shipments of lake coal continue to exceed the million-ton rate per week. The total dumpings in the week ended June 7 are reported at 1,074,000 tons, nearly 70,000 tons greater than the previous week, and more than 300,000 tons, or 41 per cent. greater than the corresponding week of last year. The total lake coal dumped to June 7, this year, exceeds the total for the corresponding period of last year by nearly 1,200,000 tons, or 25 per cent.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods ran about the same compared with the corresponding week of 1918. More customers were in the market than during the comparative week of last year. Retail business continues excellent. Orders from road salesmen for both immediate and future delivery were much greater in volume than for the corresponding week of 1918. Collections are satisfactory.

The Iron Age—Volume of new business and rate of production in steel has undergone little change in June. The improvement of three weeks ago has been held, without the signs that usually attend a regulation buying movement. The amount of new manufacturing capacity that is projected in metal-working lines in the Middle West, particularly in the Detroit district, and the repair and new construction work laid out by a number of steel companies, are outstanding features.

Dry Goods Economist—The export demand for American textiles continues to grow. The call for certain goods now exceeds the capacity of the mills that produce them and has made it necessary for exporters to seek the aid of jobbers and converters in order to make shipments. One leading printer of cotton fabrics is said to have export orders for 10,000 cases of goods. A heavy demand for raw cotton and for cotton fabrics is anticipated, but for the present there is limited activity among dealers in the staple.

American Wool and Cotton Reporter—On the basis of supply and demand, the wool industry is in a stronger position than in the past, and therefore the profit margins are likely to be more regular and somewhat larger. No great change in the situation is looked for until the buying power declines greatly, or the supply is largely increased, and neither of these changes is anticipated soon. Raw cotton has been particularly weak during the week under review with a decline running up to about $20 per bale. The decline was rather unexpected by many, but is perhaps justified on the basis of the rapid advance which had occurred and because of the uncertainty as to the consumption of cotton in other countries.

Atlantic Seaboard

BOSTON

No distinct price movement as yet. Steady improvement, however, in general situation. The trade notices a disposition to stock coal. Gas slack quoted at low figures. Navy Department arranges for a "pool" at New York. Little demand at New York and Philadelphia piers. Hamp-

ton Roads resumes dumping on settlement of trainmen's strike. Anthracite behind on shipments.

Bituminous—Although there have been scattered instances where select grades have been sold at prices slightly advanced, there has yet developed no pronounced upward movement. The market here seems more than anything else to be "marking time." While this is not unusual in New England for the early weeks of summer, the trade really anticipated a much more active market in June this year. There is still room for a good deal of optimism, however, for the business boom is coming and not for any extended period in the future will 50 per cent. output be enough to run the railroads and turn the wheels of industry. The present state of the market only goes to show that this territory was more heavily overstocked than was supposed, and that even now there are large plants taking current supply from the mines and having still untouched large reserves that were accumulated last season. So long as mining continues on the present basis, without material loss of tonnage, There are no surface indications of shortage the coming season, so far as this territory is concerned. The rub is expected to come when either present output can no longer be maintained, or other sections of the country increase their requirements.

The undertone continues decidedly favorable to a more active market, slow as it may appear in coming. Buyers find that special kinds of coal are not so easy to secure and there is more or less maneuvering to get shippers to agree to contracts. Operators have shown more disinclination the past fortnight to sign up for extended delivery, and even September orders are not sought in the same eager fashion that was characteristic but a few weeks ago. Certain shippers are beginning to say they would rather not take business, at least for the present, and wait for developments later on when higher prices seem assured. There are still steam-users of importance who have not yet bought for fall and winter, but these are exceptional cases. The bulk of the buying hitherto has been to meet only part requirements, leaving it to later in the season to secure the balance needed. It is some of this kind of purchasing that is being done now and on which slightly higher prices have been realized. So far as prices go there is less questioning among buyers; their effort has been directed more to getting suitable fuel, and the gain in this respect is very great. Not in years has there been such discrimination between different grades.

There are a good many smaller buyers, 10,000 tons and less, who are already beginning to stock coal. Many of them were hoping to rely upon steady shipments during the next six or nine months, but there are so many uncertainties that they concluded to take the more prudent course. Certainly it would be hard to figure out how coal is going to cost any less between now and next April. It seems pretty well established that the Government will not increase freight rates, but it is at least equally certain that under private management the railroads will seek to recoup themselves if costs continue to mount.

Slack coal has been freely offered the past week, in part reflecting the better demand for prepared coal in other markets and also indicating the market preference of buyers here for the low volatile coals. The Fairmont gas coal shippers are especially active with spot prices as low as $1.40 per net ton. They are at a disadvantage in tariffs, however, for in a considerable part of this territory they are under an adverse differental of at least 35c., and in other cases 60c., for there are producers of slack in Central Pennsylvania who can ship at the minimum Clearfield rate. In the Pittsburgh region prices on slack are almost as low as in Fairmont, several quotations of $1.50@1.60 having been made.

It is understood that the Navy Department has arranged for more than 20 different coals to be shipped regularly to a Navy "pool" at the New York loading piers. This is recognized as an effort to keep coal in steady supply for all requirements and emergencies. Perhaps no better line could be had on the prospective market for steam coal than the official attitude indicated by this move. It is conceded that several coals have been given classification in Pool 71 (coals on the Navy supplementary list) that in normal times would hardly be requisitioned for Navy purposes, but with the outlook as at present the authorities could not prudently do otherwise.

At the New York and Philadelphia piers there is no improvement in the spot market. The quality grades are held firmly and usually are sent from the mines only on staple business, but on the medium and fair coals there is almost no movement worth mentioning. All-rail delivery has the call in most of New England and almost it seems as if the market for water coal were being increasingly restricted. The higher grades from Pennsylvania costs nearly as much alongside in our harbors as the smokeless coals from Hampton Roads, and where both coals are accessible the latter are likely to have the preference at any moderate differential.

The trimmers' strike at Norfolk was settled and service resumed on the 16th instant. Much inconvenience was caused the several shippers but the market here can hardly be said to suffer for any lack of coal in consequence. Prices are firmer, however, and now that practically all the tonnage has been sold that could readily be placed on the lower figure there is a disposition to adhere to the $5.14 basis f.o.b. vessel. Much is said about the enormous demand expected overseas when peace is signed, and of course there is a steadily increasing tonnage loaded for export; but there has been no distinct trend of prices upward, as yet.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.75@3.35
F.o.b. Philadelphia, gross tons	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.35

Georges Creek is quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $5.04@5.24 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $7.24@7.44, and on cars Boston and Providence at from $7.50@7.90 per gross ton, the latter being the contract price f.o.b. cars for deliveries to April 1.

Anthracite—On domestic sizes the demand continues most insistent. A slight easing up on chestnut has been noticed lately, but on egg and stove the movement is extremely slow whether by rail or by water. There is not this year the strong arm of the Fuel Administration to favor New England on anthracite, and all the shippers are faced with extraordinary pressure to get coal forward to all sections and a much less tonnage for distribution. The larger cities, too, have increased their needs because of large increases in industrial population.

NEW YORK

Heavy demand for domestic sizes of anthracite continues. Canadian dealers offering inducements for coal. Heavy tonnages being sent into the West. All-rail trade heavy. Steam coals long in supply with prices easy. Local bituminous market dull, but line trade picking up. Prospects bright for better business soon. Contracting nearly ended. The better grades of bituminous coal in demand. Exporters report good business.

Anthracite—Conditions in the local market are strenuous. The quantity of egg, stove and chestnut, particularly the first two named, received here is far too small to meet the demands of the trade. The call for these coals remains strong and dealers are booked far ahead.

Production maintains its usual level. The mines are working steadily, but because of the lack of the required labor to mine the coal the output in many mines is only from 60 to 65 per cent. of what it should be. However, the production figures for the past few weeks show a steady increase, but a vast decrease as compared with a year ago. An effort is being made by the selling agents to distribute the supplies equitably in the hope of preventing a serious shortage next winter in any section of the country.

The demand from the West and from Canada continues heavy with no let-up in sight. Heavy tonnages are being sent forward. It is reported that some Canadian dealers are offering inducements for quick shipments. Shippers covering the New England states say there is a big demand there and that a good tonnage is going forward both by rail and by water.

Dealers handling all-rail coal are in the market for heavy supplies of the domestic sizes. They are complaining of slow shipments but are better situated with respect to stocks than the city retail dealer, inasmuch as most of them have facilities for storing coal which the local dealer does not possess.

Selling agents and shippers are top-heavy with orders for the larger sizes, many of them refusing to book new orders unless the old orders have been reduced through deliveries.

The condition of the market regarding domestic coals has resulted in premiums being asked for some of the so-called independent coals. Not all operators are asking premiums, but it is said that some are quoting prices ranging up to 50c. per ton above the regular company circular.

Chestnut coal is not as short as egg and stove, but dealers are glad to get it. Pea coal is in fair demand and is not long, the call for it being about normal.

There has been no reduction in the quantity of the buckwheat coals coming forward. While buckwheat is plentiful most buyers receive no concessions from the regular quotations, particularly when the better grades are wanted. Rice and barley are more noticeable. Quotations for good grades of rice coal range from $2.30 to $2.50 at the mines, and for barley from $1 to $1.25.

The quantity of the anthracite steam coals on hand has again brought to the front the question of a reduction of sizes. Some of the trade believe that with a reduction of sizes there would be a better opportunity to keep up with the demand for the domestic coals and that the buckwheats would not accumulate as easily as they now do.

Dumpings of anthracite at the local railroad piers for the week ended June 21 were 6046 cars as against 5611 cars the previous week, an increase of 435 cars. There were 2812 cars of anthracite at the docks as against 3112 cars on June 13, a decrease of 300 cars.

Current quotations, white ash, per gross ton at the mines, f.o.b. tidewater, at the lower ports, are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	6.05	7.90
Stove	6.30	8.15
Chestnut	6.40	8.25
Pea	5 00	6.75
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The situation at this market is dull. There is no buying and yet operators and shoppers see signs of brightness ahead. Some claim that the situation is brighter than last week. They claim to see business picking up slowly and believe that the next few weeks will see wonderful changes in conditions.

In this harbor there is little coal moving unless it is on contract. Buying is almost at a standstill, but there are some who are anxious at this late day to close contracts. There are practically no new contracts being considered unless they are for the poorer grades. The better grades have all been taken up and for that reason quotations for contract business have been practically removed from the market.

The labor situation is likely to play a prominent part in the coal industry for at least the balance of the winter. With peace near at hand there is a bare possibility that the mine workers may ask for an increase in pay, it being understood that their present agreement with the operators terminates upon the declaration of peace by the President, or it may continue in force until March 31, 1920. Some operators are looking at that phase of the situation in booking future business, while there are others, and they are by no means small in number, who do not anticipate any trouble. Labor is short-handed and operators hold out little hope that the situation will improve.

Shippers expect that buying of the free coals will soon pick up, due to the smallness of storage piles in most manufacturing places. They maintain that these customers, most of whom have failed to make contracts, are not willing to take any further risks for the market and will soon come forward with orders for coal.

The demand for the better grades is strong and orders have been booked for

weeks ahead; in fact, it is said that some operators have their output sold for the next six weeks and are refusing new orders. There is a good demand for gas coal.

The trade here is advising against excessive shipping to this harbor in the expectation of finding a ready market. Fears are entertained of an overstocked market which may result in price-cutting in order to move the coal. Producers are advised to ship only when they have a market, thereby avoiding the danger of being forced to dispose of their product at a loss.

There has been an improvement in the export situation which is encouraging. With the vesels coming into this harbor steadily increasing in number the bunker business is healthy. Some tradesmen say that were it not that many of the bottoms are equipped with oil burners it would be impossible with production as it now is to supply all the coal necessary.

During the week ended June 21 there were 5560 cars of bituminous coal dumped at the local railroad docks, as compared with 5748 cars the previous week, a decrease of 188 cars. On June 21 there were 4196 cars on hand at the docks as compared with 4394 cars on June 13, a decrease of 198 cars.

Quotations on some of the various pool coals f.o.b. this harbor are as follows:

Pool No. 9	$5.30@5.50	Pool No. 11	4.65@4.90
Pool No. 10	4.85@5.00	Pool No. 71	5.30@5.50

Following are quotations on various coals, per net ton at mine:

South Forks (Best)	$2.95@3.25
Cambria (Best)	2.75@2.95
Cambria (Ordinary)	2.35@2.50
Clearfield (Best)	2.75@2.95
Clearfield (Ordinary)	2.35@2.50
Reynoldsville	2.50@2.75
Quemahoning	2.75@2.95
Somerset (Best)	2.75@2.95
Somerset (Poor)	2.15@2.35
Western Maryland	2.25@2.50
Fairmont	1.75@2.00
Latrobe	2.10@2.25
Greensburg	2.25@2.35
Westmoreland ¾ in.	2.60@2.75
Westmoreland run-of-mine	2.35@2.50

PHILADELPHIA

Anthracite activity shows no sign of abatement. Full production absorbed. Dealers endeavoring to accumulate stocks. Moderate premiums asked. Retail demand strong on all sizes, especially egg and stove. Pea moving steadily. Buckwheat gains strength. Rice and barley very weak. Bituminous displays signs of strength. Consumers more interested. Some contracts closed. Bigger business predicted soon. Prices firm.

Anthracite—There is no sign of weakening in the market for prepared sizes. It is true that many of the smaller dealers will have delivered by July 1 practically all their orders, with the possible exception of stove coal. If the retailers who handle heavy tonnages have materially reduced their accumulation of orders it certainly does not show in their buying. A canvass of the numerous yards located here shows, with few exceptions, seriously small stocks. Every day more dealers are coming to the conclusion that there are troublesome times ahead for those in the trade who go into the fall season without full bins. In their advertisements they are freely predicting that the public will face a shortage, with higher prices, next winter.

All shippers consulted show no hesitancy in prophesying an indefinite demand for all family coals. We hear of premium prices being offered from other markets that are surprisingly high, especially on stove, but as usual this market is not paying any unusual prices. We heard of several instances where as much as 70c. premium on stove was asked, but no one is willing to admit that a sale was made at that price. In fact, we doubt if any of the shippers are charging their regular trade more than 30c. above company circular. Needless to say the big companies are adhering to their schedule of prices on all sizes from broken to No. 1 buckwheat inclusive.

Egg is in poor supply and the call for it is far greater than in any normal year. It would probably require no enormous tonnage to satisfy the immediate demand, but because so little of it is coming here most dealers are extremely short of it. The call for stove is so general and persistent that no producer will give any buyer any encouragement as to the ability of satisfying needs in the near future.

As last week, there is a heavier tonnage of chestnut in the yards than either egg or stove, but the retail demand continues quite strong on all sizes. Chestnut is apparently causing the shippers no concern, as they report the orders from the West show no signs of any weakness in that market. To the satisfaction of the shippers the pea-coal demand keeps up beyond their earlier expectations. Several of the larger buyers have recently placed orders for substantial blocks at circular. They now claim they had not been waiting with the hope of lower prices on this size, but that they have been too busy to spare their yard help to unload and store it. We believe that some of the poorer grades of pea coal are being moved by the shippers refusing to accept orders for the larger sizes unless they carry a proportion of pea with it.

Among the dealers the report is common that they are receiving little new business. This is particularly true in the industrial districts, where with the business on a strictly cash basis, many of the buyers are not yet in position to stock coal for the winter. One of the big retail companies in order to meet the argument of many customers that their houses might be sold before they used the coal, have used big space to advertise the fact that in case they have to move the incoming tenant would be more than glad to purchase the coal in the cellar. Of course there will be ordering right along and we are fully of the opinion that the people are even now becoming strongly cognizant of the fact that coal will be difficult to get next fall and winter.

In the steam coals buckwheat continues in its gradual gain in strength. Several independent houses who had been accepting business at considerably less, now report refusing all orders that do not carry the $3.40 price. Rice is slow to respond and continues troublesome. With the heavy tonnage now in storage we expect to see low prices on this size for some time. We hear of $2.50 being quoted, but believe sales are made at considerably less. Barley remains in the discard and one authority states that no reasonable offer would be refused.

Bituminous—We believe it can be said after a careful canvass of the trade that there is a stronger tone to soft coal. Consumers are becoming alive to the fact that they are going to need fuel and are also more keen in their desire to take in supplies. While many of the producing companies have all the contract tonnage they desire, there are some other concerns slow at first to go in for agreements, who are now accepting some tonnage from the best trade. It can also be said that big users of coal are really taking in more tonnage now than they are consuming, not wishing to be caught with short stocks next fall, when crop movement might interfere with the shipment of coal.

Yet with all the light buying so far this spring, one authority consulted is of the opinion that there is still more coal above ground now than there was at this time last year due to the extremely heavy stocks which were accumulated last year. The improvement in the iron trade has shown its reflection in the soft coal trade, and there is at this time a feeling of confidence that big business is not far away; some shippers really predict that within 60 or 90 days the demand is likely to be considerably greater than the supply. It was only during the past week that one operation producing high-grade coal actually reported a car shortage. While this was purely a local condition it is indicative of the fact that it will take only a very few weeks to change the entire aspect of the soft-coal trade.

The prices ruling in this market have been about as follows:

Georges Creek Big Vein	$2.90 @ $3.00
South Fork Miller Vein	2.90 @ 3.00
Clearfield (ordinary)	2.70 @ 2.80
Somerset (ordinary)	2.65 @ 2.75
Fairmont Lump	2.50 @ 2.60
Fairmont mine-run	2.35 @ 2.45
Fairmont slack	1.90 @ 2.00
Fairmont lump (ordinary)	2.25 @ 2.35
Fairmont mine-run (ordinary)	2.00 @ 2.10
Fairmont slack (ordinary)	1.70 @ 1.80

Due to the limited demand the matter of labor shortage has not made itself felt, but certainly will by the time orders begin to accumulate in the shipping offices, requiring full working time. No one believes for an instant that the production of last year can be approached, yet on the other hand the demand is likely to be almost as great when the industrial boom arrives, as all fully believe it will.

Lake Markets

PITTSBURGH

Car shortages threatening. Labor scarcity feared. Slack easier, mine-run steadier.

The Pittsburgh district coal market is somewhat stiffer in general tone, not so much by reason of heavier demand as by reason of prospects increasing that coal will be scarce next fall and winter on account of transportation and labor conditions. There has been little if any increase in buying. The steel industry, one of the largest consumers, is running a shade better, now averaging an operation of about 60 per cent. of capacity, against an average of 54 per cent. in May, the lightest month since about the beginning of 1915. It is questionable whether there will be much further improvement in mill operations in July and August, which are normally very dull months in the steel trade.

Car shortages have begun to appear. While they are of little moment in themselves they are held to bear an important augury. For instance, a developing mine that has an old rating of 4½ cars had been shipping 11 cars daily, getting the cars without going to the trouble to secure a new rating, and it was suddenly notified it would be cut down to its rating of 4½ cars. As a developing mine this mine could secure more cars by formal application.

Some uneasiness is felt by coal operators that there may be labor difficulties before the end of the coal year, through the miners taking advantage of the fact that the present wage arrangement expires by limitation when the peace proclamation is issued. Common labor is far from plentiful, while miners are indisposed to work full time.

The general average of market prices is about the same as for two or three weeks past, but in the past week there has been a slight further softening in steam slack and at the same time a little stiffening in mine-run, whereby we quote steam slack at $1.40 minimum instead of $1.50 and mine-run at $2 minimum instead of $1.90, the general run of prices being as follows: Best grades gas coal: Slack, $1.65 @ 1.85; mine-run, $2.35; screened, $2.60 @ 2.70; Steam: Slack, $1.40 at 1.70; mine-run, $2 @ 2.35; per net ton at mine, Pittsburgh district.

TORONTO

Shortage of stove coal the cause of delayed deliveries. Other sizes available. Dealers advise consumers to substitute egg and nut. Bituminous quiet.

There is no likelihood of dealers overtaking arrears in the delivery of anthracite for some weeks to come, as orders are being received by such dealers as will accept them in greater volume than the supplies coming forward. The principal cause of the delay in filling orders is due to the fact that about 85 per cent. of the domestic demand is for stove coal, while only about 30 per cent. of the shipments received from the mines are of this grade. The dealers are appealing to consumers to substitute egg and nut coal, which can be used to equal advantage in many cases, or mixed with stove coal. They state that the situation would be greatly relieved if this course were followed, as while there is a great shortage of stove coal, they can supply plenty of the other sizes. There is no improvement in the demand for bituminous of which there are ample supplies on hand with a downward tendency in prices.

Quotations for short tons are as follows:

Retail:	
Anthracite, egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	7.50
Slack	6.50
Domestic lump	10.00
Cannel	11.50
Wholesale f.o.b. cars at destination:	
Three-quarter lump	5.75
Slack	4.44

BUFFALO

Some stir in bituminous reported. Anthracite not plentiful enough to meet the demand.

Bituminous—The movement is much as it was. Shippers note an increased uncertainty on the part of consumers as to the chances of getting prompt service when the stir is here. Certain Canadian factory owners are asking jobbers what they may expect in July and August, if the demand stiffens. The reply is that early buying will obviate any difficulty, but that in any case the jobber ought to be advised in time of the change when it comes. Nobody doubts that it will come before long.

Not much coal is moving unsold. It is too risky. None has been reported here on consignment for a long time. In case any comes this way it finds its way to Canada in time to keep that market in a state of depression. The water movement from Ohio ports to the St. Lawrence is dull. A vessel in that trade lately has been unable to get a cargo. The report is that the territory is pretty well filled up. It will take a brisk stir in manufacturing to use up the output.

Slack coal is still weak, both it and mine-run being offered by certain mines at reduced prices. Jobbers for the most part are holding close to old prices and are quoting as follows: Thin-vein Allegheny Valley sizes, $4.65; Pittsburgh and No. 8 five-quarter lump, $4.45; same, three-quarter, $4.30; mine run, $4.05; all slack, $3.65 per net ton, f.o.b. Buffalo.

Anthracite—The supply continues to be less than the demand. All branches of the trade could use more coal. The mines are running sadly behind their previous output, and there is fear of a bad winter shortage if the output is not increased before long. At the same time, the local and rail demand is not so insistent as it was, and the shippers hope to be able to turn in a heavier tonnage to the lake trade soon. All lake ports that take coal by water are short of their usual quota. It is said that the St. Lawrence River and Lake Ontario ports are as deficient as are the upper-lake ports.

Anthracite prices in this market remain as follows:

	F.o.b. Cars, Gross Tons	At Curb Net Tons
Grate	$8.55	$10.20
Egg	8.65	10.40
Stove	8.90	10.60
Chestnut	9.00	10.70
Pea	7.20	9.15
Buckwheat	5.70	7.75

The loading to lake vessels is as brisk as receipts will permit. Shippers would like to turn everything in that direction for a while, till the shortage is made up, for tonnage is plentiful and that may not be the case all the season.

The amount loaded for the week is 117,250 net tons, of which 34,600 tons cleared for Chicago, 30,300 tons for Duluth and Superior, 25,950 tons for Milwaukee, 3000 tons for Marquette, 2600 tons for the Sault and 800 tons for Mackinaw.

Freight rates continue quiet at 60c. to Chicago, 50c. to the Sault and Mackinaw, 47½c. to Milwaukee, 42½c. to Duluth and Marquette.

CLEVELAND

Consumption of coal in northern Ohio continues to gain. Demand is reflecting this condition and prices are firmer. Domestic demand is being maintained surprisingly for this time of the year.

Bituminous—Industrial operations are rapidly approaching normal, with consumption of steam coal keeping full pace. Interest in the coal market is increasing each week. Talk of "good times" appears universal, and it is believed that the middle of next month will see coal consumption back close to the war level.

Slack demand is much better, and the price is much firmer. Around $2 continues the quotation on slack, compared with $1.35 a short time ago. Mine-run is hovering around the $2.10 mark, and it is not believed a great deal could be had for less. Talk of $2.50 slack in the winter is freely heard, and mine-run around $2.60 to $2.75 is another prediction.

Southern and eastern Ohio mines still are on a 55 to 60 per cent. operating basis. A shortage of cars is an every-other-day feature now. The chief restricting factor, however, is lack of labor. Operators fail to see how this can be remedied. Aliens are flowing out as fast as steerage accommodations to Europe can be had.

Anthracite and Pocahontas—The anticipation of a 30-cent increase the first of next month by dealers who have not tacked on the 20-cent advance already authorized, has prompted some buying of anthracite. Demand for Pocahontas is larger than that for anthracite and more difficult to meet. It is believed that Aug. 1 will see a large percentage of next winter's need of anthracite and Pocahontas filled.

Lake Trade—Loading of bituminous coal at Lake Erie ports last week amounted to 1,122,000 tons, and this week will total about 1,050,000 tons. Both cargo space and tonnage seem a trifle decreased this week. May loading probably will be around 4,000,000 tons, exclusive of vessel fuel. Some upper lake dock operators are complaining of the slow movement of bituminous from the docks. In May only 12,067 cars of bituminous left the upper lake docks, compared with 12,913 cars in May 1918, and 16,389 cars in May, 1917. For the five months ended with May 31 the number of cars moved from the docks has been 71,382, compared with 89,800 cars in the corresponding period of 1918, and 114,367 in 1917.

Prices of coal, per net ton, delivered in Cleveland are as follows:

Anthracite:	
Egg	$10.85 to 11.05
Chestnut	11.15 to 11.35
Grate	11.05
Stove	11.05 to 11.25
Pocahontas:	
Forked	9.00
Lump	8.25
Mine-run	7.20
Domestic bituminous:	
West Virginia splint	7.75 to 8.00
No. 8 Pittsburgh	6.10 to 6.35
Massillon lump	7.30 to 7.40
Steam coal:	
No. 6 slack	4.20 to 4.40
No. 8 slack	4.70 to 4.95
Youghiogheny	4.85 to 5.15
No. 8 ¾-in. lump	5.40 to 5.55
No. 6 mine-run	4.40 to 4.50
No. 8 mine-run	4.80 to 4.95

DETROIT

While demand for domestic coal is improving, steam coal is difficult to sell, with prices showing occasional concessions.

Bituminous—Consumers of steam coal in the local market have not yet overcome their apparent reluctance to commence stocking up. Orders coming from them are described as scattering and in small amount, according to jobbers and wholesalers. Reports coming to the jobbers indicate a somewhat unsatisfactory condition as regards car supply in certain West Virginia districts from which part of Detroit's supply is derived. Though the situation is causing no serious trouble yet, it is considered an indication that there is likely to be a less free movement of shipments as the season advances and other uses for cars become more pressing.

With the present movement of coal to Detroit almost unobstructed, the light buying demand for steam coal is curtailing shipments. Considerable coal is finding its way into the market, however, and a large part of the stock is fine coal. Jobbers say there is a moderate amount of coal unsold on tracks, and assert the amount is being magnified in the estimation of some buyers from the circumstance that they are solicited by several brokers offering the same consignment.

Lump of the West Virginia gas and splint type is offered at $2.75, with three-quarter lump at $2.50, mine-run $2.10 to $2.25, and slack $1.85, these quotations being for short ton, with freight and war tax to be added. Hocking domestic lump is quoted at $2.50, mine-run at $2, and slack at $1.50. It is admitted sales of slack have been made at a lower price, transactions having been reported at $1.25.

Smokeless is not reaching the market in very large quantity. There is a small amount of mine-run which is quoted at $2.75 to $3.

Anthracite—High temperatures have curtailed the buying of anthracite for household consumption. Dealers are continuing their campaign of publicity in the effort to encourage early distribution. Shipments are not of large amount, but retailers have a fair amount on hand.

Lake Trade—Shipments over the lake routes are being maintained to fair volume, though carriers are finding it necessary in some instances to shift from one loading dock to another to complete cargoes. Scarcity of downbound cargoes diverts an unusual amount of tonnage to the coal trade.

COLUMBUS

With a better demand for steam sizes and the lake trade going forward actively, the Ohio coal trade is in better shape. Screenings are still a drag on the market. Prices are stronger in most producing fields.

The best feature of the Ohio coal trade is the better demand for steam grades, with the exception of screenings. Mine-run is in better demand and purchasing agents for large plants are in the market for a considerable tonnage. Reserve stocks are being used up to a certain extent, and as a result more activity is displayed in contracting. Operators and distributors believe that the worst of the slump in steam business is now over and that there will be a steadily expanding trade. Iron and steel plants are using a larger amount of coal, and the same is true in certain lines of general manufacturing.

The lake trade is going along nicely with a fair tonnage being moved from Ohio and West Virginia mines to the Northwest. Most of the lake contracts have been made, so there is little opportunity to contract for lake tonnage. Dock interests are busy moving fuel to fill their docks. The movement off the docks to interior points has started.

The domestic trade is still rather slow as consumers are not buying to any great extent. But there is a better feeling in retail circles as householders are making inquiries regarding their fuel supply for the coming winter. The best demand is for the fancy grades, which are higher in price. The short time strike on the Norfolk & Western R.R. caused a flurry in Pocahontas, and some was sold at $6. The regular price for Pocahontas lump is around $5. West Virginia splints are selling well. Hocking and Pomeroy grades are also being bought more liberally, but there is little stocking of those varieties on the part of retailers. Retail stocks are not large.

Production is holding up well, despite the labor shortage which is appearing in some districts. The eastern Ohio field reports about 75 per cent. production and the same figures are reported from Pomeroy Bend. The Hocking Valley, Jackson and Cambridge fields are producing about 65 to 70 per cent. of normal.

CINCINNATI

Demand steady. Not much coal being stored. Prices being maintained.

The demand for all kinds of coal in this market continues steady. Orders are coming in nicely for both immediate and future delivery, with the volume of business being for immediate delivery, however. Dealers in all sections of the city find that there is not the demand for coal for storage this season that there was last year, since many of the coal users in this city have stocks left over. This seems to be especially true of the domestic users, who after stocking up last season for a severe winter encountered mild weather. Consequently their stock of coal was not much depleted. Many householders, however, are laying in quite a stock of smokeless coal, which was unobtainable here last year.

Manufacturers refuse to believe the dealers when they say there is danger of a shortage, and despite all the pressure that can be brought to bear they continue to buy only for their daily requirements. There is quite a good business being transacted by "snowbirds" in this city.

The prices on all grades of coal continue stiff. Some dealers make a specialty of going about 25c. below the market price on coal to stimulate buying at this time, but they are few and far between. The demand for steam coal continues steady, but few orders are being placed for lump coal at this time.

LOUISVILLE

Producers stocked with block orders for June and to about middle of July, many refusing to quote new business. Domestic situation tight, with steam market loose. Prices holding fairly well.

Many of the Kentucky producers are refusing to make quotations on block coal as they have business to run them to about the middle of July and cannot take care of additional business without orders for steam coal, which is still sluggish. It is believed that a better demand for screenings and mine-run will develop about the middle of July, resulting in better prices all around, and enabling the producers to get out a larger volume of block coal without being tied up with the resulting screenings.

The demand for block as a whole has been very good, and mine-run is moving somewhat better; but the nut and slack

situation is about the same as it has been, with industrial consumption not great enough to take care of the output.

Eastern Kentucky is operating around four full days per week, with some mines doing slightly better. It is held that they would all be operating full time if the steam market was right. There is still a considerable labor shortage in some districts, but the car supply is slightly better as a whole.

In western Kentucky things are still slow, with mines doing about two days a week, and scratching hard for business. Block coal is showing some improvement, but steam is very dull.

Such few mines as are quoting prices on eastern Kentucky block are asking $3.35@3.50 per ton for their coal, although such coal would be selling at around $3 if the screenings could be disposed of profitably.

Kentucky mine prices are as follows:

	Eastern Kentucky	Western Kentucky
Block and egg	$3.35@$3.50	$2.30@$2.55
Run-of-mine	2.25@2.40	1.90@2.00
Nut and slack	1.65@1.90	1.60@1.75

BIRMINGHAM

Steam market quiet, some contracts being signed by industrial consumers. Operators await developments in railroad purchases. Domestic market strong, the supply continuing short.

While some few contracts are being signed up by industrial interests for steam-coal requirements for the next twelve months, chief interest is now centered in the course to be pursued by the railroads in regard to renewing contracts for fuel for the ensuing year. The Southern Ry. has rejected all bids from this district, and is reported to have purchased some coal in the Tennessee field, although, on the other hand, operators in that field, it is stated, were unable to furnish the Southern the tonnage of coal normally taken from that district. Nothing definite can be learned as to just what action has been taken by this line. The Seaboard, so it is understood, has contracted for 140,000 tons of Big Seam coal from one of the larger commercial operators, and 40,000 tons of Carbon Hill coal from a combination of small operators in that field. Other lines in the district have taken no action as yet on renewal of contracts. Some coal is now going through the ports of Mobile and New Orleans to Cuban and South American interests, though this tonnage is necessarily limited by lack of bottoms, which condition is expected to be relieved by the allocation of more ships to these ports in the near future.

The domestic market is still strong, and lump coal is difficult to obtain, and this condition will not be relieved until such time as the steam market materially improves. Premium prices can be obtained for any free coal that is made available.

Coke

CONNELLSVILLE

Contracting for second half begins suddenly, terms being practically uniform.

Buyers and sellers suddenly found a basis on which they could get together for the making of contracts for furnace coke for second half delivery, and as a result fully one-half the business that was in prospect has been put through. It seems the way was blazed by the Oliver & Snyder Steel Co., itself a newcomer in the merchant field, and thus not tied down by previous practices while at the same time being able to offer one of the very best cokes in the region. This company's coke has gone exclusively to the Steel Corporation for many years, but the corporation quits with the expiration at the end of this month of the present three-year contract. The company has three plants, in the heart of the old basin, with a total rated capacity of 70,000 tons monthly, but on account of prospective operating and transportation conditions it limited its sales to 50,000 tons, and four contracts have been closed, covering this tonnage. In this and other business done the basis is a ratio of 6¼ to 1, relative to basic pig iron at valley furnaces.

Thus with pig iron at $25.75, nominally at least the present market, coke would be invoiced for the month at $4.12, with four cents rise or fall against each change of 25c. in pig iron. Contracts provide minima ranging from $3.50 down to $2.75, also maxima, but it is altogether unlikely pig iron will change enough between now and the end of the year to call either into play. Somewhat over 100,000 tons monthly has been closed, with about 100,000 tons more business to be done, allowing for some eastern furnaces to switch to eastern by-product coke as they probably will. The spot market is a shade easier, some sales having been made at $3.75 although the regular asking price is $4, with a few operators quoting more.

Foundry coke is in better demand, and while there remains some available for spot shipment at $4.50 the demand runs rather to the higher grades, held at $4.75 and $5. There has been rather free contracting for foundry coke for the second half of the year. Foundries would probably prefer to cover for the twelvemonth, but operators will not quote for the year, except at a stiff advance. The market is quotable as follows: Spot furnace, $3.75@4; second half contracts, 6¼ to 1, against basic pig iron at valley furnaces; spot foundry $4.50@5; second half contracts $5@$5.50 per net tons at oven.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended June 14 at 127,095 tons, an increase of 9446 tons.

Birmingham—The demand for foundry coke in this market is strengthening rapidly and a good aggregate tonnage is being sold. Present quotations on Brookwood are $8, and $9 per net ton ovens is being asked for Yolande foundry. Furnace coke is also experiencing a better demand with the blowing in of several furnaces which have been idle for some time, and is quoted at $6.50 ovens. There is no accumulation of either grade.

Buffalo—The market is a trifle stronger, but no particular activity is yet in sight. Iron ore moves more freely by lake and will probably from this time edge into a full season's activity. If it does not it will soon be impossible to bring down an average supply for the year, and no effort is ever made to supplement the lake cargoes by winter shipments by rail. This would be too expensive. Some new ore is chartering, but no new sales are reported. Coke prices continue at $7.25 to $7.60 for 72-hour Connellsville foundry, $7 for 48-hour furnace and $6.10 for off grades. Finely divided coke is not selling.

Cincinnati—Foundry coke is now in good demand, not alone for immediate requirements, but for shipment over the remainder of the year. Prices seem to be well established, on which basis buyers are showing little hesitancy in covering. It is expected that within the next two weeks virtually all coke contract buyers will have covered for their requirement.

Middle Western

GENERAL REVIEW

Inactivity in market conditions general. Domestic coals expected to increase in price in July. Mines unable to dispose of screenings.

The coal situation in the Middle West does not show the improvement confidently expected of it. The Middle West is perhaps one of the richest manufacturing territories in the United States, and it is discouraging to note that at this late date so many of our industries are in an inactive state. Those operators in our midst who are confirmed and habitual optimists still claim that the market on steam coals will boom as soon as peace is signed, and the various industries receive a chance to figure on what may be expected in the immediate future.

Prepared sizes on practically all grades are firm in price. Lump and egg from the mines producing low quality coal are moving to the railroads, and the same sizes from the high-grade coal fields of Illinois and Indiana are moving to the domestic trade. Prices are firm, and it is generally expected that they will be advanced on prepared sizes July 1.

In southern Illinois this advance will amount to 10c. per ton, bringing the cost of, say, Franklin County domestic coals to $2.95 per ton f.o.b. mines. The demand, however, for high-grade domestic coal is such that the operators could easily advance their prices to $3.15 and $3.25, and still be oversold, but they prefer not to take advantage of the present situation. They are to be commended on their attitude, which is in violent contrast to the New River and Pocahontas operators, who have advanced their prices until their lump and egg sizes are selling at from $4.50 to $5 mines. This contrast in policy is all the more noteworthy because Franklin County coal occupies the same position in the West that Pocahontas et al. occupies in the East. In other words, there are no successful substitutes for either Pocahontas or New River coals in West Virginia, or for Franklin County coal in Illinois.

The situation on screenings is bad, as mines having railroad contracts calling for lump coal are having a serious time in disposing of their fine coals. The steam buyers are not interested, and the only sales made in the past week have been closed on a basis that is below cost to the mines. The situation is serious, and the only hope of immediate salvation is that the signing of peace will bring about an industrial revival that will absorb the screenings now thrown on the market or being put in storage.

Apparently there is a lull in the contract situation, as according to our information practically no coal contract of any size, or importance, outside of railroad business, has been closed during the past week. Operators and jobbers have tried in vain to impress upon the trade the folly of buying coal on the open market, in the very face of conditions as they are at present. Producers and distributors feel that they have done their best, and are now awaiting, with resignation, further developments, which will lead to a coal shortage.

CHICAGO

General dullness in steam trade with demand brisk for prepared sizes.

The local situation differs in no radical extent to conditions experienced by the trade throughout the Middle West. The demand for steam coals is dull in the extreme, and the situation on prepared coals is keen.

The movement of eastern coal into this market continues heavily. It is reported that a number of distributors for the anthracite mines are from three to eight weeks behind on their orders. Some are not taking further business at this time, and others are taking orders only subject to delays.

MILWAUKEE

Coal market experiencing the usual summer quiet. Movement moderate only. Receipts by lake continue ahead of last year.

With the thermometer registering between 80 and 90 deg. daily, the coal market may be said to be in the doldrums. The demand is only moderate, despite a campaign of publicity to induce consumers to stock up early and guard against a shortage of fuel the coming winter. Coke is also moving slowly and the byproduct plants are accumulating large piles in their storage yards. Small sizes of gas coke are being advertised at $9.50, carried in. The Milwaukee Association of Commerce is pursuing an investigation of coal costs from the mines to the Milwaukee consumer in order to determine whether present prices are justified. Coal cargo receipts by lake continue in excess of last year's record. Thus far 205,967 tons of anthracite and 1,026,471 tons of soft coal have been received, a gain over 1918 of 74,456 tons of the former and 376,877 tons of the latter.

ST. LOUIS

Conditions are quiet, with a plentiful supply of all grades of coal and an oversupply of steam, which threatens to become a serious handicap toward getting out a sufficient tonnage of larger sizes. Very little storage coal coming in. Country demand light.

The steam business is demoralized. Throughout the entire Mississippi territory there is an industrial depression that has brought the coal trade face to face with a serious problem, that of taking care of the steam sizes. Many mines are dumping their screenings and smaller sizes on the ground, and some have no more available space in which to do this. Many mines have orders for domestic sizes for three or four weeks ahead and are able to work only one and two days a week on account

Hampton Roads Coal Exports

			Cargo	Bunkers
Lamberts Point				
June 2	Amer. S.S. Achilles	Cristobal, C. Z.	12,113	1,073
June 2	Amer. S.S. Lake Pachuta	San Juan, P. R.	2,820	407
June 3	Amer. S.S. M. J. Scanlon	Rio de Janeiro, Brazil	6,030	0
June 5	Amer. S.S. Masca	Leghorn, Italy	4,385	0
June 5	Am. Sch. Ernest Mills	Buenos Aires, A. R.	916	....
June 6	Nor. S.S. Stavangeren	Curacao, D. W. I.	1,097	262
June 6	Nor. S.S. Pacific	Montevideo, Uruguay	8,200	0
Sewalls Point				
June 2	Amer. S.S. Lithipolis	Havanna, Cuba	2,820	407
June 3	Amer. S.S. Isonomia	Rio de Janeiro, Brazil	4,875	604
June 4	Am. Sch. Albert T. Paul	Rio Grande do Sul, Brazil	1,092	....
June 4	Amer. S.S. Calispell	Havana, Cuba	3,028	142
June 4	It. Bk. Spica	Genoa, Italy	1,944	....
June 5	Amer. S.S. Lake Cayuga	Havana, Cuba	2,358	322
June 5	Ital. S.S. Ansaldo, II	Genoa, Italy	6,454	996
June 6	Amer. S.S. Transportation	Rio de Janeiro, Brazil	5,124	1,558
June 7	Nor. S.S. Harriet	Santiago, Cuba	1,900	200
Newport News				
May 31	Dut. S.S. Slot r.lij's	Rotterdam, Holland	4,109	692
June 2	Amer. S.S. Lake Stirling	Havana, Cuba	2,413	337
June 2	Amer. S.S. Lake Land	Havana, Cuba	3,501	357
June 2	Amer. S.S. Yadkin	Santiago, Cuba	2,125	247
June 3	Amer. S.S. Lake Gormannia	Port of Spain, Trinidad	2,915	541
June 3	Dut. S.S. Kralingen	Rotterdam, Holland	1,861	180
June 6	Am. Sc. Rosalie Hull	Rio Grande do Sul, Brazil	243	....
.....	Am. Sc. Rosalie Hull	Porto Alegro, Brazil	1,000	....

of having no sale for the steam sizes. This is affecting the Carterville field more seriously than anywhere else. There has been a noticeable increase in the demand for domestic coal in this field, but most mines are unable to take care of the business. The labor shortage still continues to bother the operators. The car supply is plentiful and the movement is good. Similar conditions prevail in the Du Quoin field. In both of these districts there is a fairly good movement of railroad fuel.

In the Mt. Olive district railroad fuel still helps to keep this field in a somewhat healthy condition. The domestic and steam sizes are going to Chicago and the Northwest, and in a general way the business in this district is satisfactory, everything considered.

The Standard field presents an unusual condition. There is no screening market and no demand for lump, and it is a question as to how long some operators can hold out with the present prices and the light demand. The cost of selling coal from this district has increased several hundred per cent. in the last few months. The preparation is not all that it should be, and there is much dissatisfaction among the miners. The operators, too, appear disgruntled and dissatisfied because the industrial conditions have not shown some improvement.

The present prevailing prices per ton f.o.b. mines are:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
Association:			
Lump, egg and nut	$2.85	.....	.....
Washed Nos. 1 and 2 nut	2.85	.....	.....
Independent:			
Lump, egg and nut	2.75	$2.55 Egg	Lump $2.00 & up 1.75
Washed Nos. 1 and 2 nut	2.85	.....	.....
Mine-run	2.45	2.20	1.60@1.70
Screenings	2.20	2.05	1.35@1.50
3-in. lump	....	2.30	.....
2-in. lump	....	.....	1.75
2x6 egg	....	.....	1.75 & up

Williamson-Franklin County rate to St. Louis is $1.07½; other rates, $0.92½.

I. C. C. Decisions

No. 10237—Seaboard Byproduct Coke Co. vs. Erie Railroad Co., Director General, et al. Submitted Feb. 4, 1919. Decided Apr. 16, 1919.

Rate on byproduct coke, in carloads, from Seaboard, N. J., to Troy, N. Y., found to have been unreasonable. Reparation awarded.

No. 10315 Clark-Davis Coal Company et al vs. Director General, Delaware, Lackawanna & Western Railroad Co. et al. Submitted May, 19 1919. Decided May 21,1919.

Rates charged for the transportation of anthracite coal, in carloads, from Scranton, Penn., to South Utica, N. Y., for delivery by the West Shore R. R., found to have been unreasonable and unduly prejudicial to the extent that they exceeded the rates contemporaneously in effect from Scranton to Utica, N. Y. Reparation awarded.

No. 9734. Middlesboro Kentucky Coal Operators' Association vs. Louisville & Nashville Railroad Company et al. Submitted Mar. 31, 1919. Decided May 19, 1919.

Upon complaint alleging that the Middlesboro mines are subjected to undue prejudice and disadvantage by reason of refusal of the Louisville & Nashville R.R. to establish and maintain rates therefrom to points in the southeast via its line through Corbin, Held: There appears to be no necessity for establishing a route through Corbin. The record does not disclose the basis upon which cars are at present distributed, and the Director General has not been made a defendant. Complaint dismissed.

General Statistics

PRICES OF COAL AT PANAMA CANAL

Coal is being supplied to steamships, including warships of all nations, in transit through the Panama Canal, delivered and trimmed in bunkers, at $11.50 per ton of 2240 lb. at either Cristobal or Balboa. For ships not in transit through the canal, $11.50 at Cristobal and $13.50 per ton at Balboa. For ships taking less than carload lots from plants or less than 25 tons from lighters, the price is $13 per ton at Cristobal, $15 at Balboa.

ANTHRACITE SHIPMENTS FOR MAY, 1919

The shipments of anthracite for May, as reported to the Anthracite Bureau of Information, amounted to 5,711,915 gross tons, as compared with 5,224,715 tons in April and with 6,887,256 tons in May, 1918. The increase of nearly 500,000 tons over April is gratifying, for it was accomplished in spite of the fact that most of the mines were shut down on Ascension Day and Memorial Day. The decrease as compared with May, 1918, was chiefly in steam sizes as, because of the war demands a year ago, washery tonnage was an important factor, whereas comparatively little washery coal was shipped last month.

The shipments by companies were as follows:

	May, 1919	May, 1918	Coal Year, 1919–1920	Coal Year 1918–1919
P. & R. Ry	1,156,119	1,356,878	2,200,311	2,590,390
L. V. R.R.	1,030,160	1,328,464	1,896,084	2,503,491
C. R.R. of N. J.	498,521	566,974	980,302	1,095,860
D., L. & W. R.R.	914,301	1,037,603	1,799,516	2,045,621
D. & H. Co.	667,227	825,990	1,270,706	1,597,543
Penna. R.R.	401,918	493,380	785,168	941,754
Erie R.R.	621,326	761,436	1,202,779	1,456,622
N. Y., O. & W. Ry.	167,403	177,072	312,259	362,722
L. & N. E. R.R.	254,940	339,459	489,505	661,626
Total	5,711,915	6,887,256	10,936,630	13,255,629

MOVEMENT OF ILLINOIS, INDIANA AND LAKE DOCK COAL

The movement of bituminous coal from Illinois, Indiana and the Upper Lake docks into the northwestern states in 1917, with preliminary estimates for 1918, indicate the effect of the zone system on the movement of coal in 1918. This statement is given below because of the present demand for these statistics, in advance of the publication of the final reports of the Geological Survey for 1917 and 1918, now in process of completion. The tabulation is compiled by C. E. Lesher, of the Geological Survey.

	1917			1918		
From	Illinois	Indiana	Lake Docks	Illinois	Indiana	Lake Docks
Iowa	4,026,000	247,000	271,560	3,597,000	90,000	225,000
Wisconsin	1,936,000	564,000	4,484,768	2,486,000	617,000	4,870,000
Minnesota	1,801,000	199,000	4,151,132	1,968,000	28,000	4,565,000
North Dakota	43,000	3,000	618,131	8,000	200	654,000
South Dakota	231,000	15,000	477,961	228,000	500	610,000

Coal and Coke Securities

New York Stock Exchange Closing Quotations June 23, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Burns Brothers, Com.	(BB)	145	150
Burns Brothers, Pfd.	(BB)	99¾	115
Central Coal & Coke, Com.	(CK)	55	...
Central Coal & Coke, Pfd.	(CK)	63	...
Colorado Fuel & Iron, Com.	(CF)	47½	48
Colorado Fuel & Iron, Pfd.	(CF)	103	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com.	(EH)	37	37¾
Elk Horn Coal, Pfd.	(EH)	...	47
Island Creek Coal, Com.	(ICR)	39	...
Island Creek Coal, Pfd.	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	60	...
New Central Coal of West Va.	(NCC)	5	...
Pittsburgh Coal, Com.	(PC)	62½	63½
Pittsburgh Coal, Pfd.	(PC)	93	95
Pond Creek Coal	(PD)	18½	19
Virginia Iron, Coal & Coke	(VK)	67	68

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	92
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	79	80
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	92⅛
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99½	101
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1913	79½	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F., 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	84	84½
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	86	87½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946.	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	...	81
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	93	94
Utah Fuel, 1st Sinking Fund 5s, 193'	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	86	88½

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by The Matthew Addy Company as per Department of Commerce Committee Schedule.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$30.75	$30.35
Northern Basic	27.55	27.55
Southern Ohio No. 2	28.55	28.55
NEW YORK, Tidewater delivery		
Penna. 2X	31.90	.....
Virginia No. 2	31.15	32.40
Southern No. 2	33.95	34.70
BIRMINGHAM		
No. 2 Foundry	26.75	25.75
PHILADELPHIA		
Eastern Pa. No. 2	30.65	31.90
Virginia No. 2	30.85	33.25
Basic	30.90	29.65
Grey Forge	30.90	29.65
Bessemer	31.85	.....
CHICAGO		
No. 2 Foundry Local	27.25	26.75
No. 2 Foundry Southern	31.75	33.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry	28.15	26.25
Basic	27.15	25.75
Bessemer	29.35	29.35

* F.o.b. furnace. † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2.45	$3.47	$4.19½	$3.39	$3.47
Channels, 3 to 15 in.	2.45	3.47	4.19½	3.39	3.47
Angles, 3 to 6 in., ¼ in. thick	2.45	3.47	4.19½	3.39	3.47
Tees, 3 in. and larger	2.45	3.52	4.19½	3.39	3.47
Plates	2.66	3.67	4.44½	3.39	3.67

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	Cincinnati	St. Louis	Denver	Birmingham
2.75	3.25	3.44	4.30	3.50

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.25	$3.90	$4.90	$3.90	$4.50	$3.90	$4.75
Cut	4.25	6.50	4.61	5.50	....	6.00	....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅜-in. and larger	$3.35	$4.27	$4.44	$5.65	$5.25	$5.05
Track bolts	4.35	5.17	Prem.	6.65	8.00	6.05
Standard section angle bars	3.00	4.22	Prem.	4.60	....	4.45

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List —5%	List —2%	+15%	+20%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.50	$6.50	$7.25	$8.50	$7.35
Assorted	6.40	7.50	6.50–7.00	6.40	8.75	7.60

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$55.70	$60.70	$64.35	$54.80	$48.00	$72.50	$59.00
6 in. and over	52.70	57.70	61.35	51.80	45.00	69.55	56.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$45.00	$55.00	$45.00	$65.00
Standard openhearth rails	47.00	57.00	47.00	67.00
Light rails, 8 to 10 lb.	2.58½*	3.13½*	2.83½*	3.13½*
Light rails, 12 to 14 lb.	2.54*	3.09*	2.79*	3.09*
Light rails, 25 to 45 lb.	2.45*	3.00*	2.70*	3.00*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$18.50	$16.50	$15.50
Stove plate	16.00	16.50	15.50
No. 1 machinery cast	22.00	22.00	19.50
Machine shop turnings	8.00	6.75	7.00
Cast borings	9.50	9.75	7.50
Railroad malleable cast	13.50	16.50	14.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.13	$0.18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	16c.	13c.	15c.
Hollow	24c.	.....	..

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Inches	Steel Black	Steel Galvanized	Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	50½%	24%	¾ to 1¼	39½%	23½%
½	54½%	40%			
¾ to 3	57½%	44%			

LAP WELD

2	50½%	35%	2	32½%	18½%
2½ to 6	53½%	41%	2½ to 4	34½%	21½%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	46½%	29%	¾ to 1¼	39½%	24½%
½	51½%	39%			
¾ to 1¼	55½%	43%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	48½%	37%	2	33½%	20½%
2½ to 4	51½%	40%	2½ to 4	35½%	23½%
4½ to 6	50½%	39%	4½ to 6	34½%	22½%

Stocks discounts in cities named are as follows:

	New York Black	New York Galvanized	Cleveland Black	Cleveland Galvanized	Chicago Black	Chicago Galvanized
¾ to 3 in. steel butt welded	47%	31%	46½%	31%	57½%	44%
3½ to 3 in. steel lap welded	42%	27%	42½%	27½%	53½%	41%

Malleable fittings. Class B and C, from New York stock sell at list + 12½%
Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+12½%
Galvanized cast steel rigging	7½%
Bright plain rigging	35%
Bright cast steel	22½%
Bright iron and iron tiller	5%

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Chicago Current
*No. 28 black	4.35	5.62	6.22	6.45	5.27	5.37
*No. 26 black	4.25	5.52	6.12	6.35	5.17	5.27
*Nos. 22 and 24 black	4.20	5.47	6.07	6.30	5.12	5.22
Nos. 18 and 20 black	4.15	5.42	6.02	6.25	5.07	5.17
No. 16 blue annealed	3.75	4.77	5.37	5.65	4.67	4.77
No. 14 blue annealed	3.65	4.67	5.27	5.55	4.57	4.67
No. 10 blue annealed	3.55	4.57	5.17	5.45	4.47	4.57
*No. 18 galvanized	5.70	7.42	7.57	7.70	6.62	6.72
*No. 26 galvanized	5.40	7.12	7.27	7.40	6.32	6.42
No. 24 galvanized	5.25	6.97	7.12	7.25	6.17	6.27

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 15c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sizes orders, the following amount is deducted from list:

	New York Current	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago	St. Louis Current
Hot pressed square	$1.28	$1.90	$1.40	$2.00	$1.05	$2.25
Hot pressed hexagon	1.08	1.90	1.20	2.00	.85	2.25
Cold punched square	3.25	1.90	.75	1.30	1.00	2.25
Cold punched hexagon	2.70	1.90	.75	1.30	1.00	2.25

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	50—10%	40%
Chicago	50%	50%
Cleveland	60–10–10%	60%
St. Louis	45%	....

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St. Louis
⅜ by 4 in. and smaller	50–10%	50%	50–10%	50–10%
Larger and longer up to 1 in. by 30 in.	40–10%	40%	40–10%	40–10%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York.....$1.25 Cleveland.....$3.50 Chicago.....$2.25

For cast-iron washers the base price per 100 lb. is as follows:
New York.....$6.00 Cleveland.....$3.75 Chicago.....$4.00

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ½ and smaller	65%	60—5%	45%
Tinned	65%	60—5%	40%

Boiler, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York..$4.72 base Cleveland..$4.00 Chicago..$4.87 Pittsburgh...$4.65

Structural, same sizes:
New York..$4.82 Cleveland..$4.10 Chicago..$4.97 Pittsburgh...$4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Raw in barrel	$1.93	$1.55	$2.00	$1.65	$2.10	$1.65
5-gal. cans	2.06	1.65	2.25	1.80	2.30	1.75

WHITE AND RED LEAD—Base price.

	Red Current Dry	Red Current In Oil	Red 1 Year Ago Dry	Red 1 Year Ago In Oil	White Current Dry and In Oil	White 1 Year Ago Dry and In Oil
100-lb. keg	13.00	14.50	12.25	12.50	13.00	12.25
25 and 50-lb. kegs	13.25	14.75	12.50	12.75	13.25	12.50
12½-lb. keg	13.50	15.00	12.75	13.00	13.50	12.75
5-lb. cans	15.00	16.50	14.25	14.00	15.00	14.50
1-lb. cans	16.00	17.50	14.25	14.50	16.00	14.50

500 lb. lots less 10% discount. 2000 lb. lots less 10–2½% discount

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Chicago	12.00	Birmingham	$15.00
St. Louis, salmon	10.00	Denver (hard red)	12.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply C.l.	1-Ply L.c.l.	2-Ply C.l.	2-Ply L.c.l.	3-Ply C.l.	3-Ply L.c.l.
No. 1 grade	$1.35	$1.60	$1.70	$1.95	$2.05	$2.30
No. 2 grade	1.20	1.45	1.50	1.75	1.80	2.05

Asbestos asphalt saturated felt (14 lb. per square) costs $5.00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.80 per roll in carload lots and $2.05 for smaller quantities.

Shingles, red and green slate finish cost $5.00 per square in carloads, $5.25 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots N. Y.	Carload Lots Chicago	Less Than Carload Lots N. Y.	Less Than Carload Lots Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$50.00	$50.00	$51.00	$51.50
Tar pitch (in 400-lb. bbl.)	19.00	16.00	20.00	17.00
Asphalt pitch (in barrels)	30.00	30.00	35.50	35.50
Asphalt felt	65.00	65.00	69.50	69.50

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0.056	$0.11	$0.162
St. Louis	.08	.15	.....
Seattle	.09	.175	.30
Los Angeles*	.082	.154	.236
New Orleans	.165	.22	.325
Pittsburgh	.065	.115	.....
Chicago	.08	.144	.....
Denver	.125	.18	.....

*F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price of pine per M in carload lots:

	1-In. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$30@51	$35.00	$33.00
Birmingham	39.00	33.00	31.00
Denver	43.25	35.90	43.00
Cincinnati	43.00	42.00	37.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	.....	$0.27½	$0.30	.....	$2.40
Boston	$0.22¼	.24½	.26½	$0.31	2.40
Kansas City	.19	.23¾	.26¼	.30	2.45
New Orleans	.22½ (50%)	.23¾	.24¾	.....	.....
Seattle	.14½	.18½	.21	.....	.....
Chicago	.18¾	.21¼	.23½	.....	.....
St. Paul	.19	.22½	.26¼	.....	2.45
St. Louis	.19	.21½	.23½	.30	2.25
Denver	.17¾	.22	.24½	.28¾	2.60
Dallas	.189	.22⁵	.288	.342	.....
Los Angeles	.196	.237	251	.....	2.75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7	8½	14½
Fiber or sponge	8	13	8½	18
Transmission	7	13	8½	17
Axle	4½	4¾	4½	5¼
Gear	4½	7½	8½	8
Car journal	22 (gal.)	4.9	8½	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Best grade	87.00	90.00	79.00	100.00	75.00	100.00
Commercial	42.00	50.00	18.50	22.00	15.00	22.00

HOSE—Following are prices of various classes of hose:

	Fire 50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	30%

	Air First Grade	Air Second Grade	Air Third Grade
¾-in. per ft.	$0.55	$0.40	$0.30

Steam—Discounts from list
First grade..... 25% Second grade.... 35% Third grade..... 40%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	50%
Denver	35–5%	30%
Birmingham	30%	35%
Chicago	45%	35%
Cincinnati	30–5–2½%	40–2½%

RAWHIDE LACING—20% for cut: 45c. per sq.ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.60
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.80
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra: while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft., ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.25	Atlanta	$0.30
New York	.27	Denver	.29½
St. Louis	.26½	Kansas City	.28½
Chicago	.26½	New Orleans	.27½
St. Paul	.28	Seattle	.27
San Francisco	.26	Los Angeles	.26

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING Pipe Size	Standard List Per Lin.Ft.	BLOCKS AND SHEETS Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1-in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2 -in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05
85% magnesia high pressure			List
For low-pressure heating and return lines			4-ply.... 58% off 3-ply.... 60% off 2-ply.... 62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ⅙ lb. rolls	48c. per lb.
Rubber tape, ⅓-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver Single Braid	Denver Double Braid	Denver Duplex	St. Louis Single Braid	St. Louis Double Braid	St. Louis Duplex	Birmingham Single Braid	Birmingham Double Braid	Birmingham Duplex
14	$15.00	$16.00	$34.00	$11.00	$20.00	$31.50	$12.67	$15.25	$27.75
10	17.65	24.25	48.00	25.40	29.00	59.00	20.25	24.25	46.90
8	24.50	31.75	70.00	35.45	35.00	72.50	27.60	32.60	.....
6	39.00	42.25	.....	.....	61.00	120.00	48.25	54.75	.....
4	56.00	58.95	.....	.....	86.00	.....	66.40	73.75	.....
2	85.00	86.15	.....	.....	130.00	.....	96.00	104.50	.....
1	110.00	113.10	.....	.....	176.00	.....	127.00	136.50	.....
0	165.00	158.00	.....	.....	222.00	.....	169.00	179.00	.....
00	.....	183.60	.....	.....	270.00	.....	203.50	214.00	.....
000	.....	222.80	.....	.....	330.00	.....	246.50	257.50	.....
0000	.....	269.70	.....	.....	400.00	.....	295.50	308.00	.....

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains etc., the following freight rates per 1000 lb. are effective:

Boston	$0.30	New Orleans	$0.38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	.49*
Denver	.99	Pacific Coast (all rail)	1.25*
Kansas City	.59		

Note—Add 3% transportation tax. Minimum carload, 80,000 lb.

COAL AGE

With Which is Consolidated The Colliery Engineer

McGraw-Hill Co., Inc. 15c. per copy New York, June 26, 1919

a
WEBSTER
Loading Boom



has turned many a small profit Tipple into the big paying class. It ensures a better grade of coal and lower handling costs.

For the kind of Coal Tipple Machinery that produces, consult

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(273)

Where Reliability Counts

— The "Lungs" of the Mine —



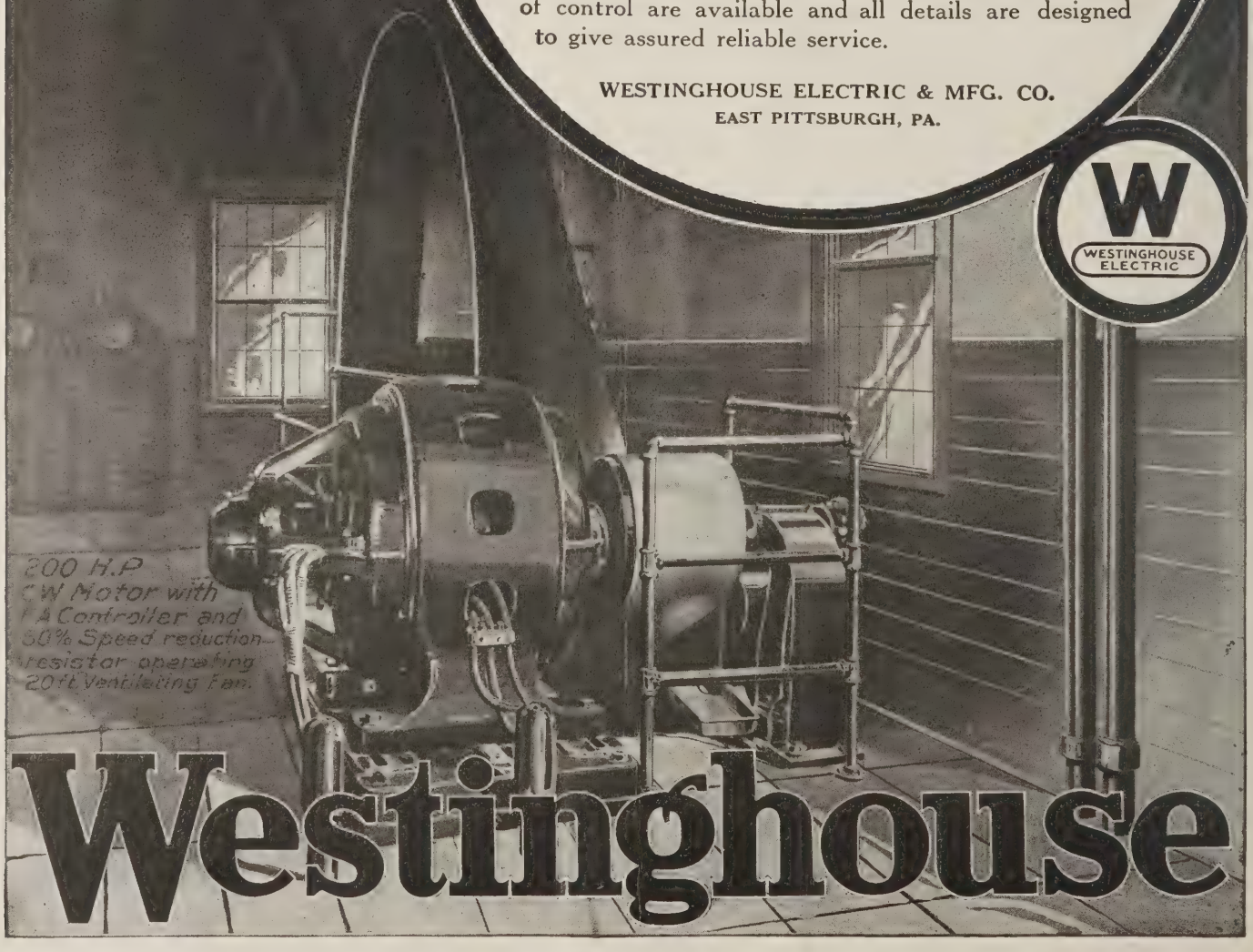
Making a mine "breathe" properly is a prime requisite for uninterrupted production. Breakdowns in ventilating equipment that endanger life and hold up operations are too costly and obstructive; and for this duty—*where reliability counts*—Westinghouse Mine Fan Motors are the safest and soundest investment.

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Volume 15 June 26, 1919 *Number* 26

COAL AGE

WITH WHICH IS CONSOLIDATED THE
COLLIERY ENGINEER

R. DAWSON HALL, *Managing Editor*

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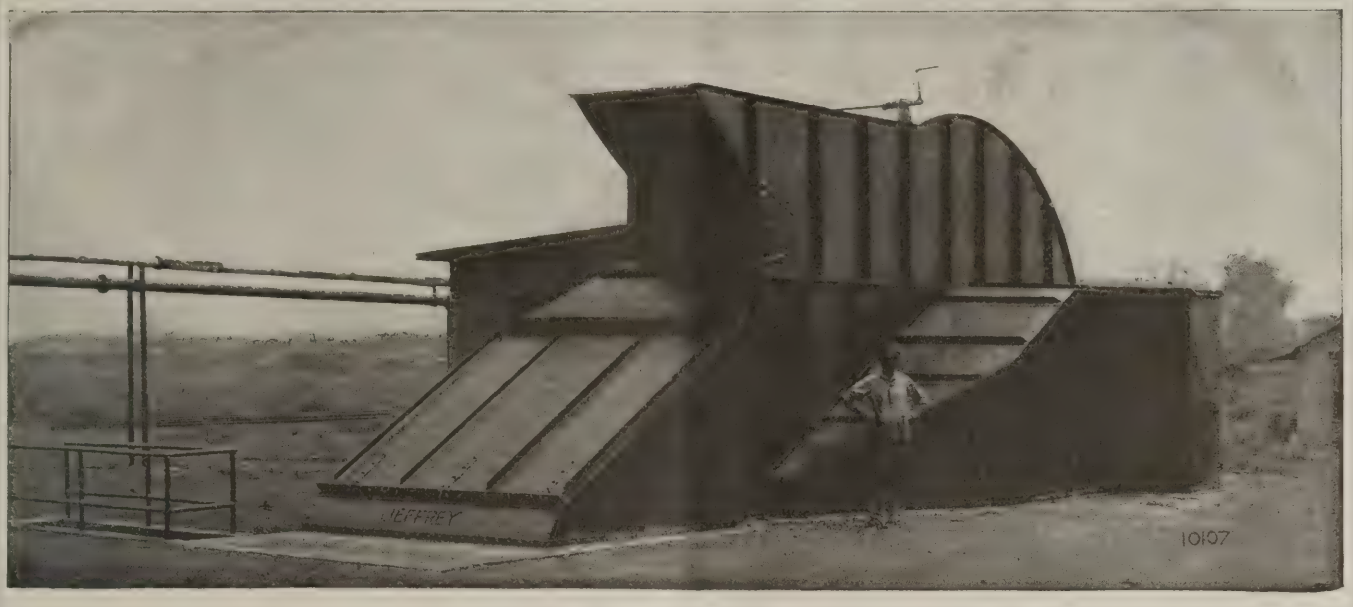
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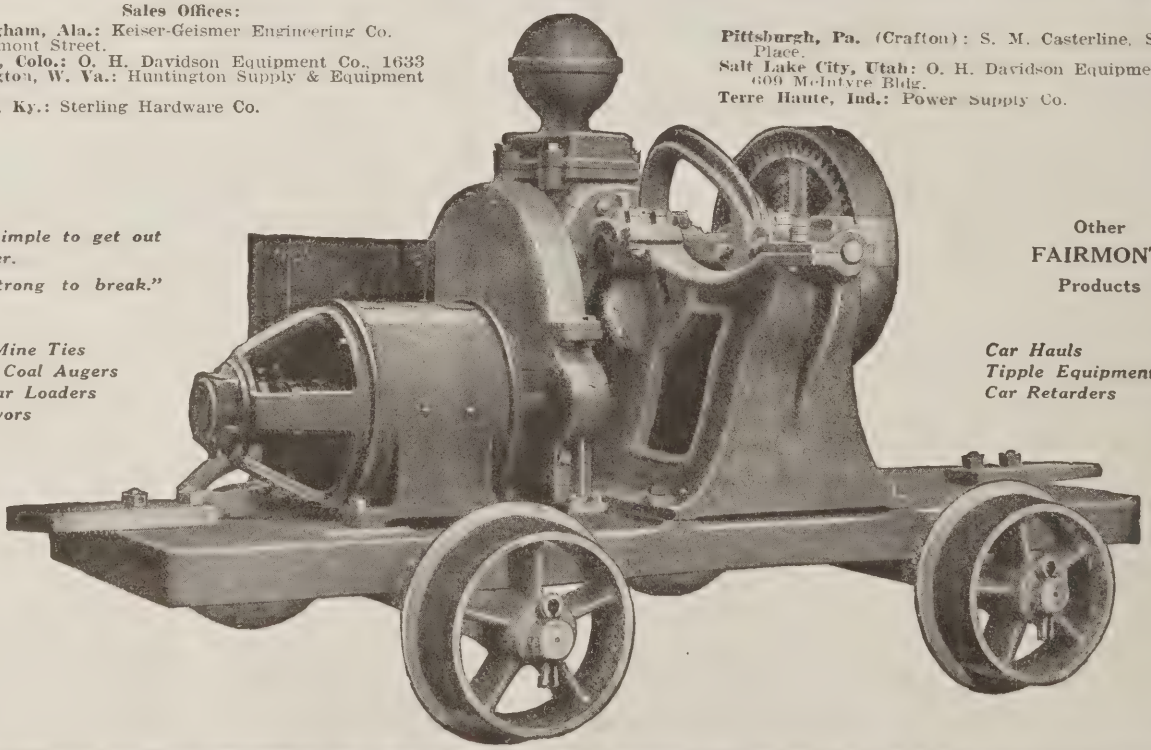
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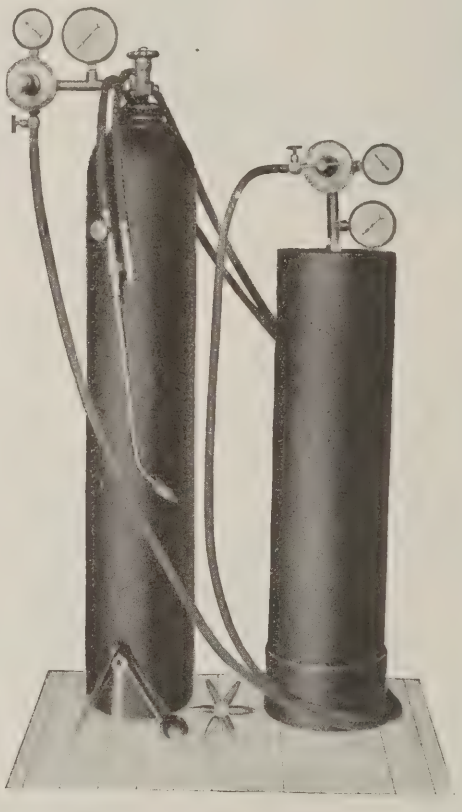
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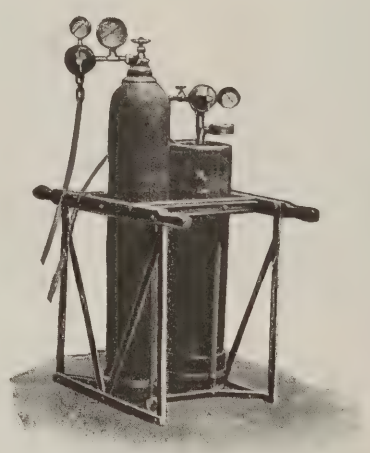
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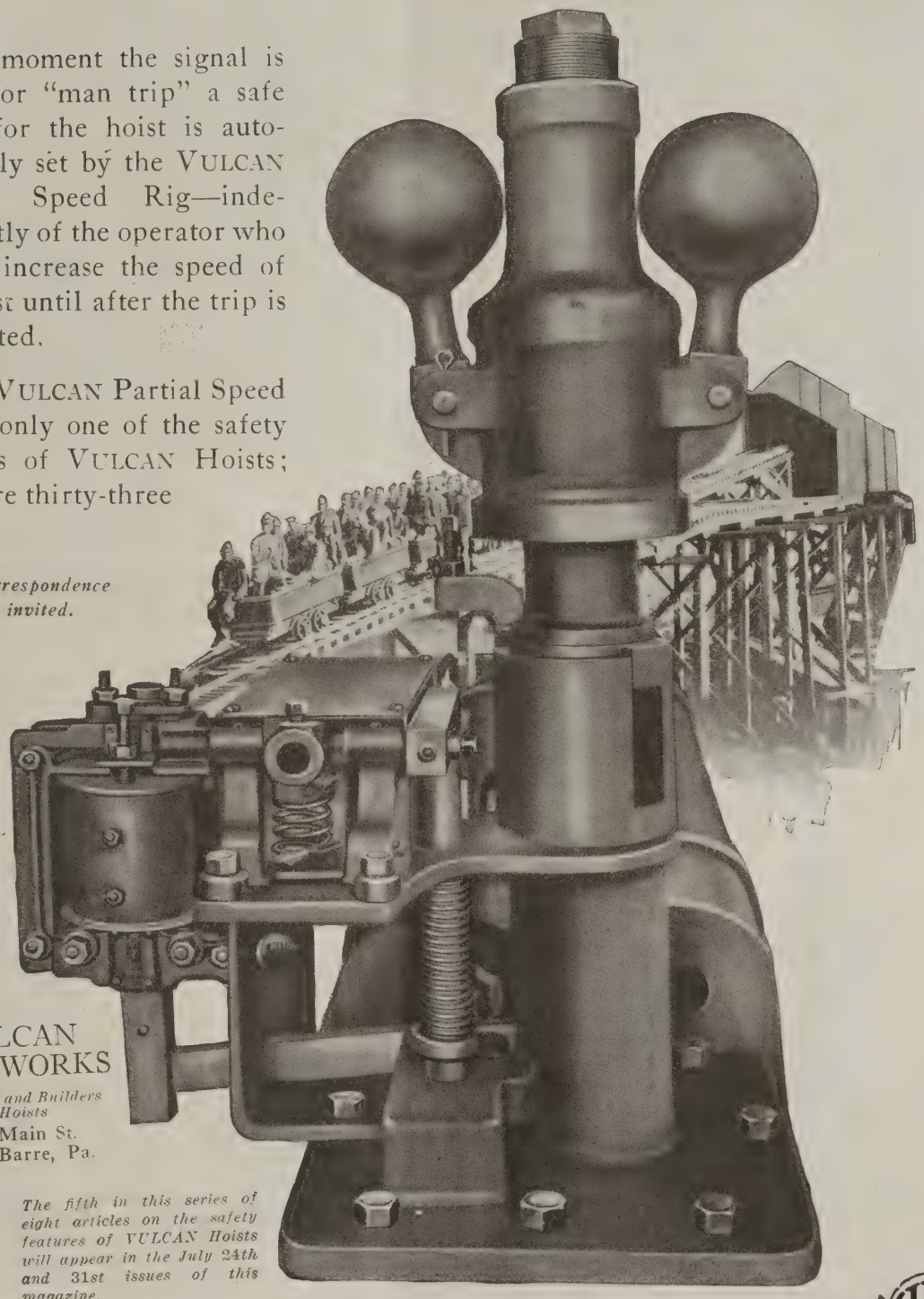
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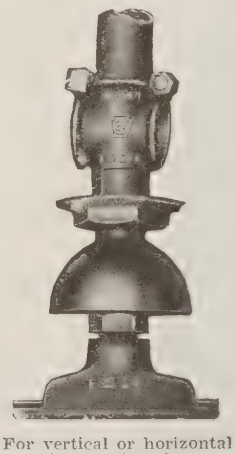
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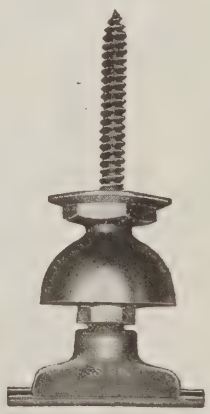
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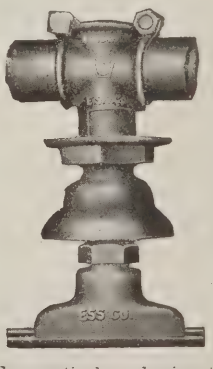
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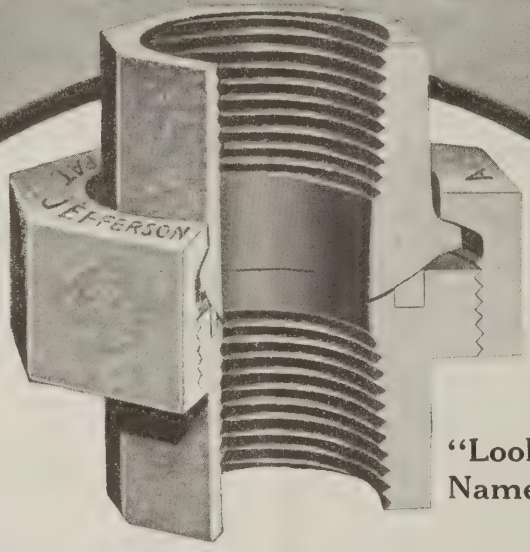
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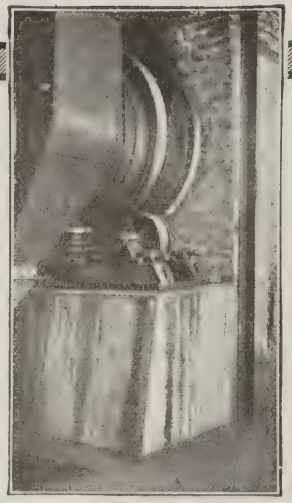
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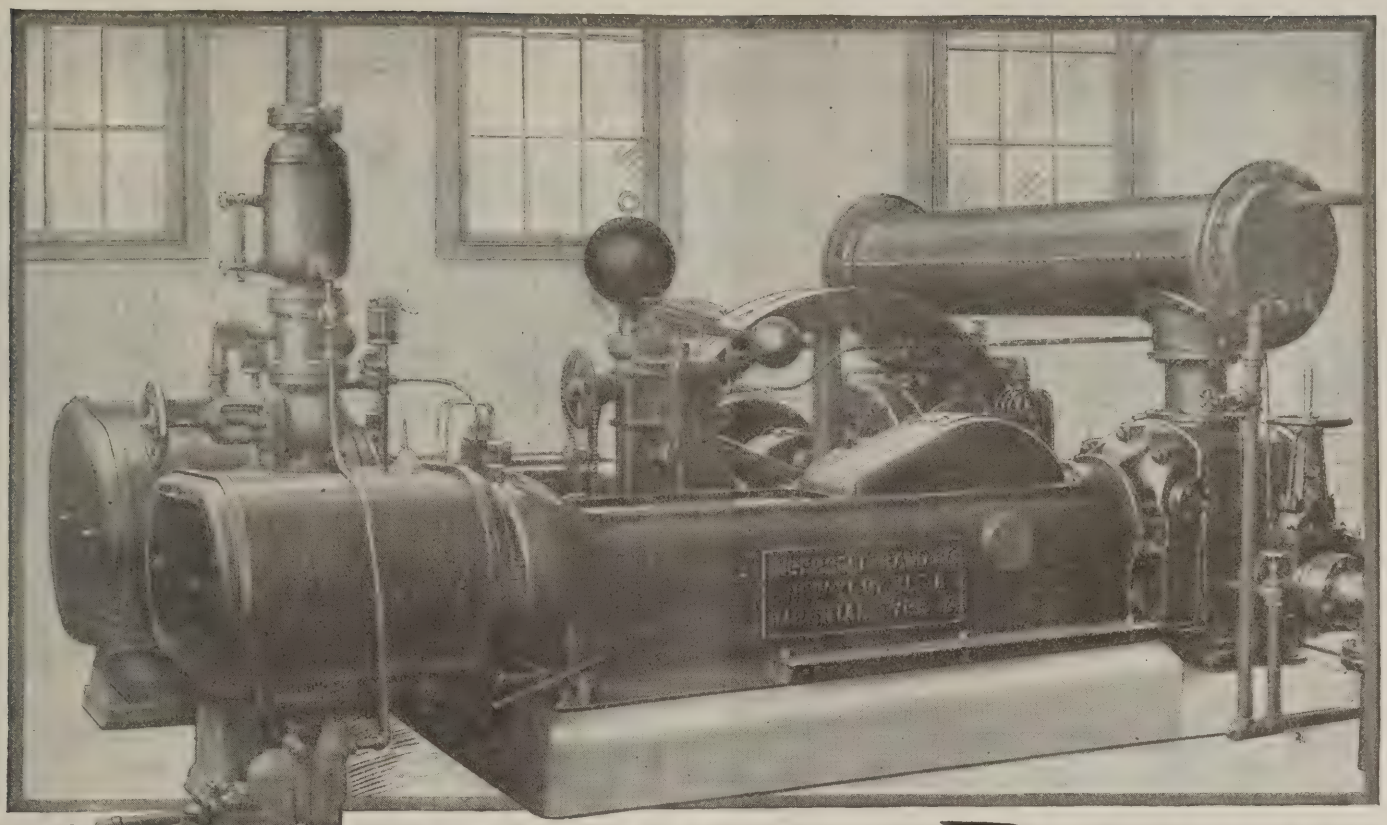
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"It can't be burned"—

was true before

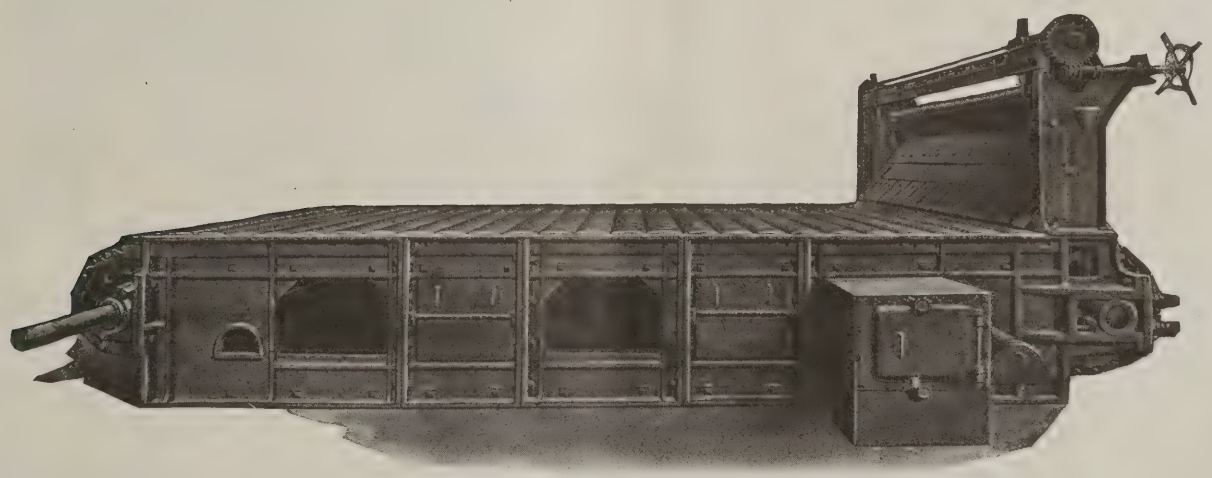
Coxe Stokers

burned it—

burned"

Coxe Stokers

"burn anything that's black" —Culm, Slush, No. 4 Buck, Bone Coal—no fuel too poor



Combustion Engineering Corporation

11 Broadway, New York City

Owners and Manufacturers of

Type "E" Stokers—for Bituminous Coal **The Grieve Grate—Hand-Firing Coxe Stokers—Anthracite Coal and Coke Breeze**

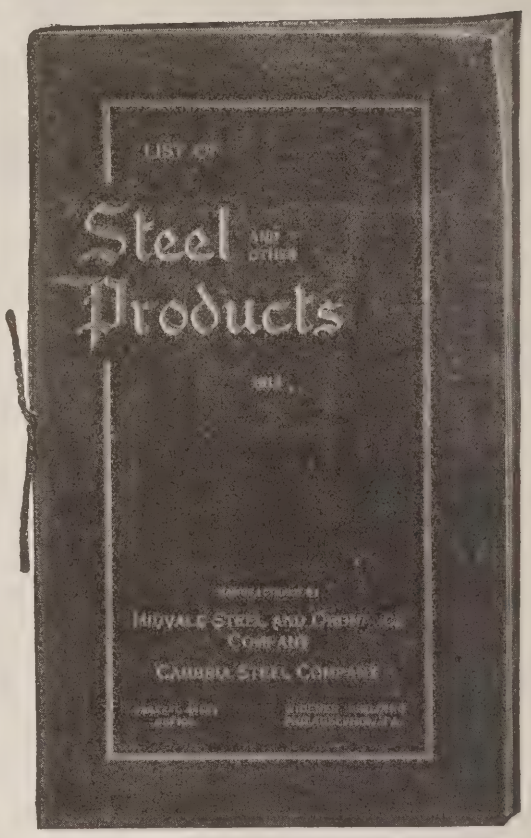
PHILADELPHIA, PA. PITTSBURGH, PA. MINNEAPOLIS, MINN. BIRMINGHAM, ALA.
HAZLETON, PA. BOSTON, MASS. CHICAGO, ILL. SEATTLE, WASH. SALT LAKE CITY, UTAH
ALBANY, N. Y. OMAHA, NEB. TAYLOR ENGINEERING CO., VANCOUVER, B. C.

CAMBRIA SLICK STEEL MINE TIES

THESE ties are primarily a mining specialty, although excellently adapted for industrial tracks where rail not heavier than sixty pounds per yard is used. Our new

LIST OF STEEL AND OTHER PRODUCTS

on the other hand, itemizes numerous specialties which, while not primarily made for mining use, are needed in and about mines at all times. We'll be very glad to send you a copy of this book and receive your inquiries.



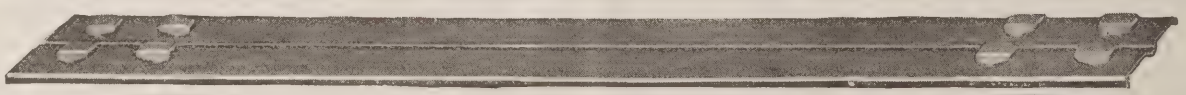
MIDVALE STEEL AND ORDNANCE COMPANY
CAMBRIA STEEL COMPANY

General Sales Office, Widener Building, Philadelphia, Pa.

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CONSOLIDATED STEEL CORPORATION, 165 Broadway, New York, is the sole exporter of our commercial products. Address all export inquiries to them.

"We Want You to Become Better Acquainted With Us" Series. Number 8-F





NO. 2 MEDIUM WEIGHT
SLICK STEEL MINE TIE

Simplicity is an important feature. This is the friction button which securely holds the rail in place and cannot be lost.

2½ Inches headroom, gained by the use of the Slick Steel Mine Tie in place of standard wooden tie.



A quarter turn of the friction button with this wrench fastens the rail in place. No lost motion. A big saving in time.



Lincoln Dynamotor

Portable Bonder and Welder



The Lincoln Dynamotor will also Repair Worn and Broken Car Equipment

Permanent Bonds Quickly installed

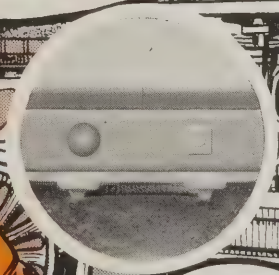
Even an unskilled man can easily and quickly install Lincoln Bonds with the Lincoln Dynamotor, but it would take a sledge-hammer and hard slogging to break them off.

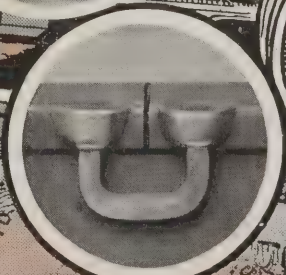
The carbon arc process used in the Lincoln Bonding System insures **every strand** being thoroughly welded to the rail.

Lincoln Bonds **stay put.**

The Lincoln Bonding Co.

CLEVELAND, OHIO



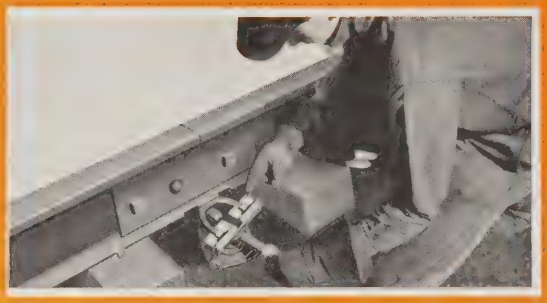


The Lincoln *Welded* Rail Bond is Quickly and Permanently attached to the Rail

OVER

Rail Bonding under Traffic

WITH THE LINCOLN DYNAMOTOR







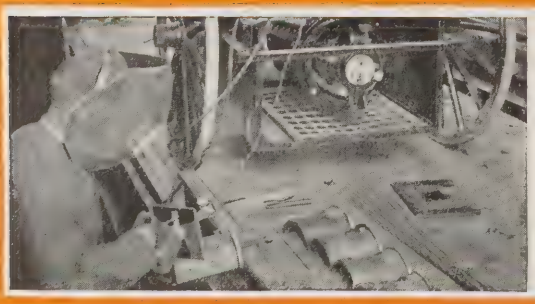
So short is the time required for welding a Lincoln Bond to the rails that coal hauling can be maintained without interruption. These photos show the method of installation.

Cars Have Just Passed. The welder places the mold holder which holds the carbon mold containing the Lincoln Bond in position under the rail, two notches having been previously cut with the arc from the bottom flange of the rail to accommodate the bond heads.

45 Seconds Later. The welding operator has welded the bond solidly to the rail by means of the carbon arc generated by the Lincoln Dynamotor. The carbon mold retains the molten metal, thus building up the head of the bond and welding it to the under side of the rail.

The Bond is Now Installed. It only remains to pull out the mold holder from underneath the rail and the trolley pole from the wire and the track is cleared.

Let us speed up your bonding and cut your resistance losses. Write us today for a demonstration of the Lincoln Dynamotor and Lincoln Bonds.



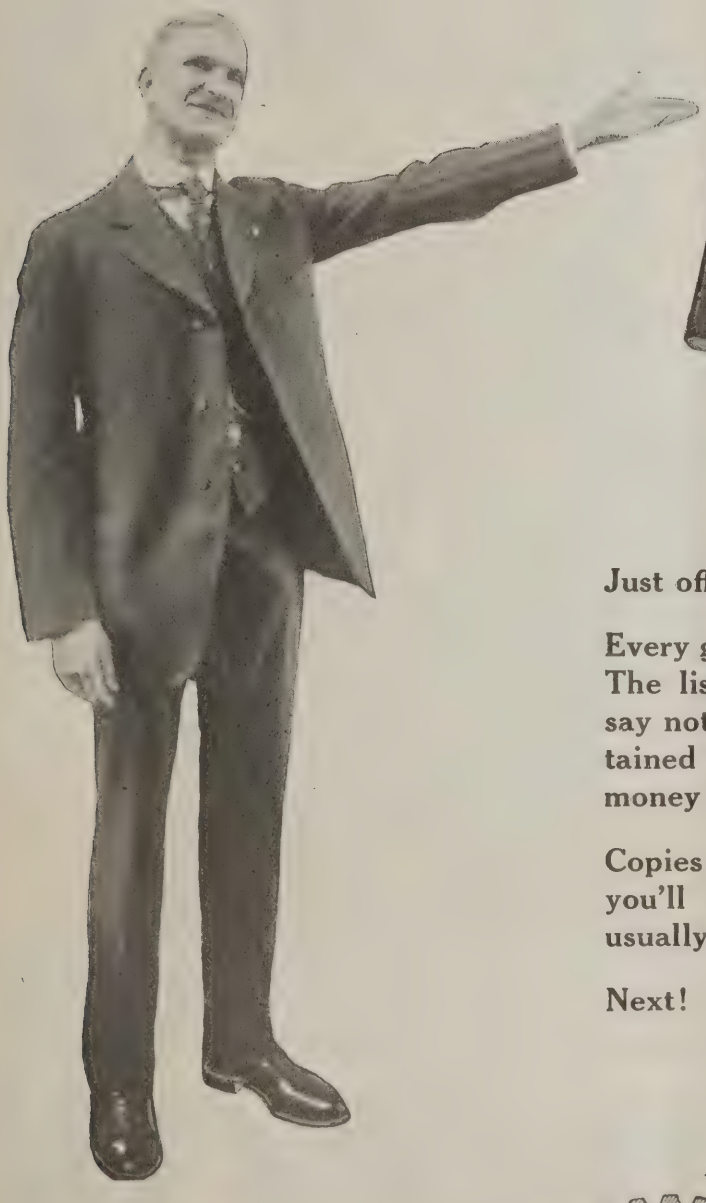
The Lincoln Dynamotor gives you a perfectly continuous and permanently welded track—it is a motor and generator in one which will do every kind of welding repair you have about the mine. Pay for it out of what it saves from your scrap heap.

The Lincoln Bonding Co., :: 636 Huron Road Cleveland, Ohio, U. S. A.

LINCOLN BONDING COMPANY, 30 Church Street, New York City.
LINCOLN BONDING CO., - - - Fisher Building, Chicago, Ill.
ELECTRICAL ENGINEERING & MFG. CO., First Nat. Bank Building. Pittsburgh, Penn.
CHATTANOOGA ARMATURE WORKS, - - Chattanooga, Tenn.
W. L. ROSE EQUIPMENT COMPANY, LaSalle Building, St. Louis, Mo.
RAILWAY TRACK WORK COMPANY, 30th and Walnut, Philadelphia Pa.

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Just off the press. Send for it, boys!

Every gear user in the country needs a copy. The list of standard stock hobs alone, to say nothing of the other priceless data contained therein, will be worth a mint of money to you this year.

Copies will be free, as long as they last. But you'll have to hurry! Good things are usually snapped up, you know.

Next!

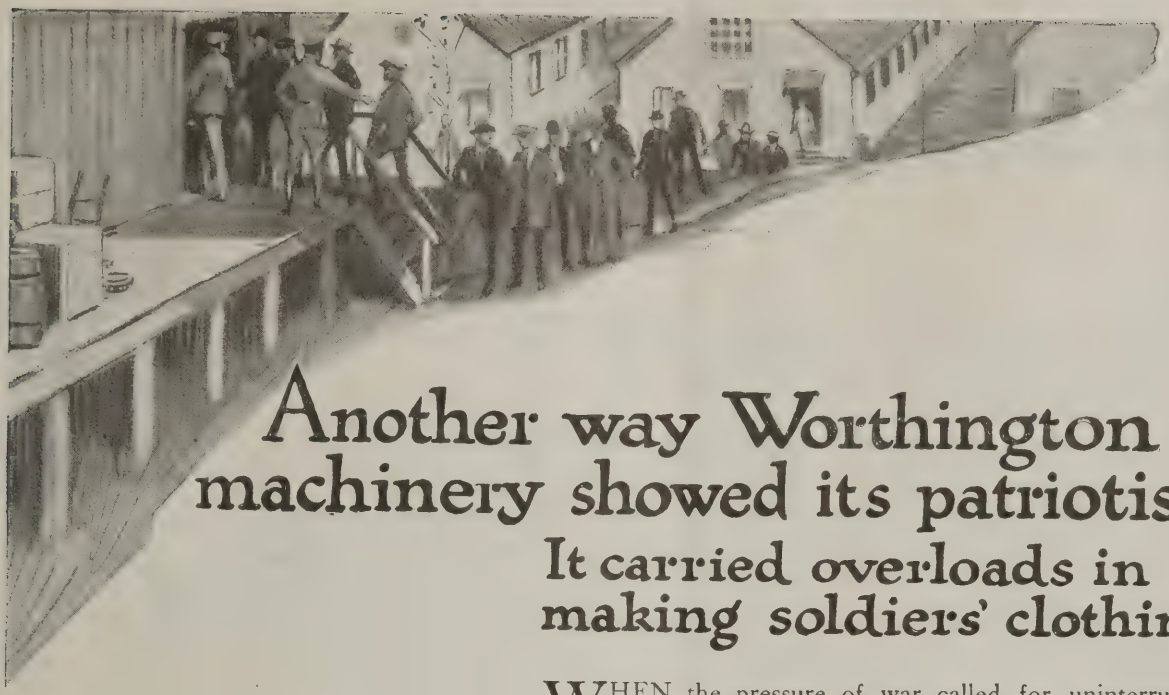
Philadelphia GEAR Works 1120-1128 Vine St. Philadelphia



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Another way Worthington machinery showed its patriotism

It carried overloads in making soldiers' clothing

WHEN the pressure of war called for uninterrupted service, Worthington equipment everywhere responded. As, for example, in the making of wearing apparel for the doughboy.

Practically everything he wore at one or more stages of its development was affected by Worthington equipment. In Lawrence, Massachusetts, for instance, Worthington Pumps lent a hand in making production records of fabrics; in a neighboring factory Worthington products played a part in making shoes worth millions; while in various other places Worthington products did their prosaic bit in the manufacture of shirts, raincoats and hats.

In the ability of Worthington equipment to meet overloads—as well as in the ability of the eight great Worthington factories to meet emergencies—lies a sure indication of what Worthington will mean in the after-war reconstruction.

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Executive Offices: 115 Broadway, New York City
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that are dependable



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Our Service Division will gladly confer with you as to what detonating supplies will give you the most economical service.



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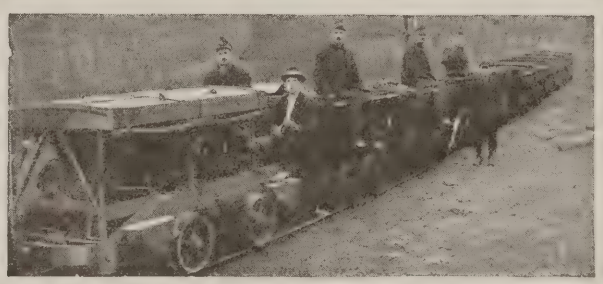
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Gasoline Locomotives



"PLYMOUTH" *Has Cut Mule-Hauling Costs Squarely in Half*





Nut-shell testimony from users of experience — the Southern Connellsville Co., Uniontown, Pa., who wrote about their PLYMOUTH'S good work after using it for nearly a year.

This Locomotive has entirely replaced horses and mules in the company's hauling, both above ground and down in the mines, and General Manager S. A. Carson tells us that—

1—Operating cost is just half that of horses and mules.

2—Doesn't require skilled operator. Uses only 5 gallons gasoline and 1 quart lubricating oil daily.

3—Average load, 8 cars, 50 bushels each. Locomotive easily makes round trip—more than 1½ miles—3 to 4 times an hour.

4—No fumes in mine; performance strictly O. K.

5—PLYMOUTH Friction Drive is efficient, durable, trouble-proof.

Tell us about *your* hauling. Full particulars gladly sent you.

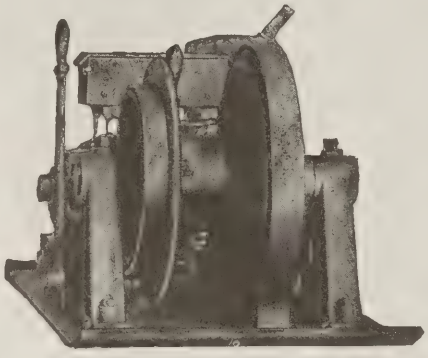
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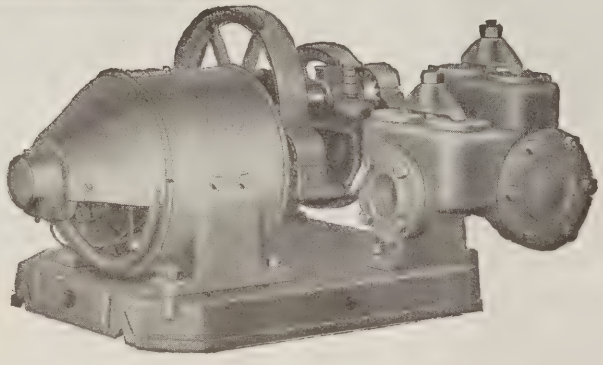
Pneumelectric
TRADE MARK

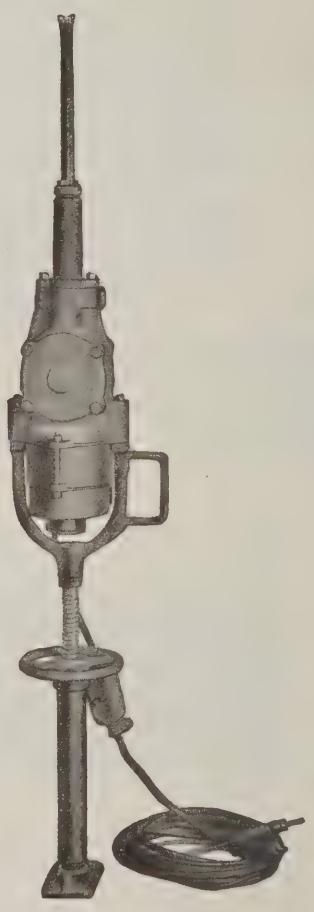
Coal Mine Equipment



An Electric Room Hoist

—portable, simple, increases speed of development, saves delays; once you have used some you will wonder how you ever got along without them.





An Electric Gathering Pump

—to collect water from local dips and sumps and pump it to central sumps or outside. Sixty gallon capacity against a 150-foot head. Simple, efficient, economical, portable.

An Electric Plugger

—for drilling hanger and guardboard holes, this little one-man machine is a wonder.

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more and more, the big coal-mining companies are standardizing on **Goodin-Reid Brattice.**

In practically every case this has come about after long-conducted tests of trial orders, have proved its superior efficiency and economy under every bratticing condition.

In one test by a company whose name we will be glad to give on request it lasted four times as long as its nearest rival.

And in addition: It is flame-proof, water-proof, mildew-proof, and air-tight.

Write for samples.



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of New York

41 Union Square West, New York — **913 Farmers Bank Bldg., Pittsburgh, Pa.**

In an airway 5 ft. wide at the top, 10 ft. wide at the bottom and 6 ft. high, the anemometer reads 280 feet per min.; what is the quantity of air passing per minute

$Q = \frac{1}{2}(5+10) \times 6 \times 280 = 12{,}600$ Cu. ft.

With a Few Simple Turns of the Crank This Problem Can Be Solved on the

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In 2 Seconds



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Offices in Principal Cities.

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☐ Arrange for a demonstration in our office on our own work.

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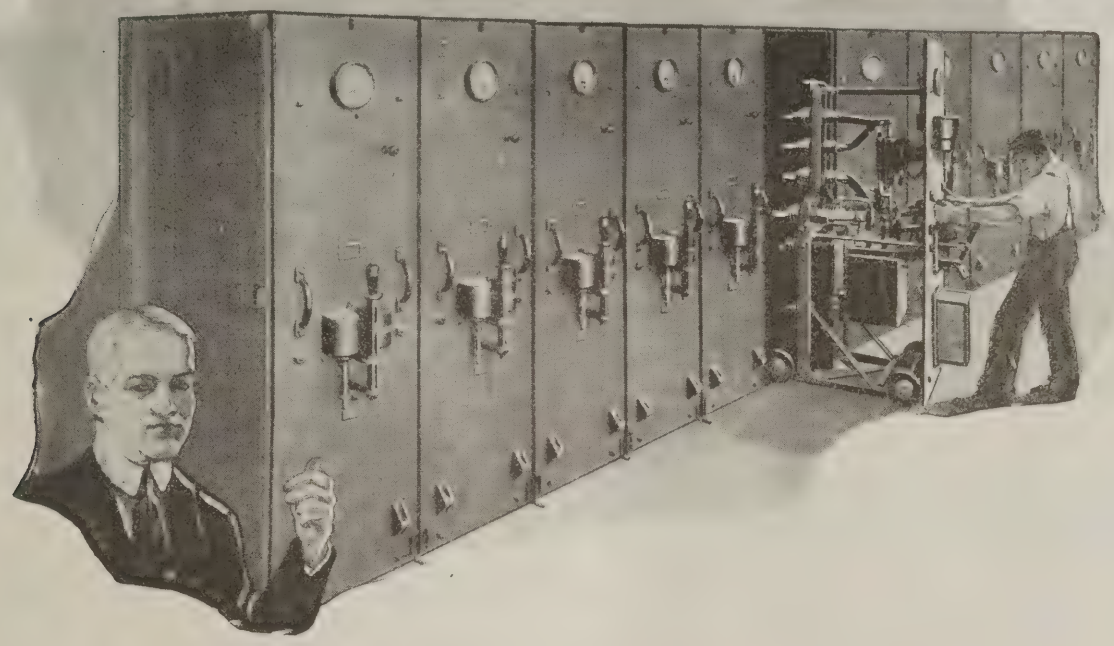
LOOKING AHEAD

Each week Coal Age is reaching a large percentage of the more progressive coal mine executives in this country. The coal mining industry is becoming more active each day. The railroads are beginning to purchase their contract coal and the other industries will soon follow. Every indication points to the fact that late summer and fall will see great activity in this field. This means the buying of vast quantities of equipment and supplies. Are you getting your share of the business this field offers you? Coal Age will place the merits of your products before the men who have the authority to buy. Now is the time to reach them.

COAL AGE

10th Ave. at 36th St., New York, N. Y.

To determine the value of any switchboard compare the service it gives with that of the ideal board



What do these facts mean to you?

The primary requirements of the ideal switchboard are uninterrupted service and personal safety at all times. A high standard of switchboard design and construction is indicated when interruptions can be made merely a matter of minutes, when personal safety is afforded at all times, when installation costs are low and when inspection is both easy and safe.

Safety at all times—Personal safety and reduced fire risk are afforded by complete enclosure of all live current-carrying parts within the steel compartment, illustrated.

Interruptions, few and short—With a spare truck of proper capacity, it is a matter of minutes to substitute for a panel in case of trouble and to maintain practically continuous service.

Simplifies extensions—Panels can be added to or taken from an existing switchboard quickly and easily.

Low installation costs—Each assembled unit is complete, thus making installation merely a matter of bolting into place and connecting electrically.

Inspection, easy and safe—All instruments, switching and protective devices, are mounted on a truck which can be withdrawn only when its equipment is dead, electrically.

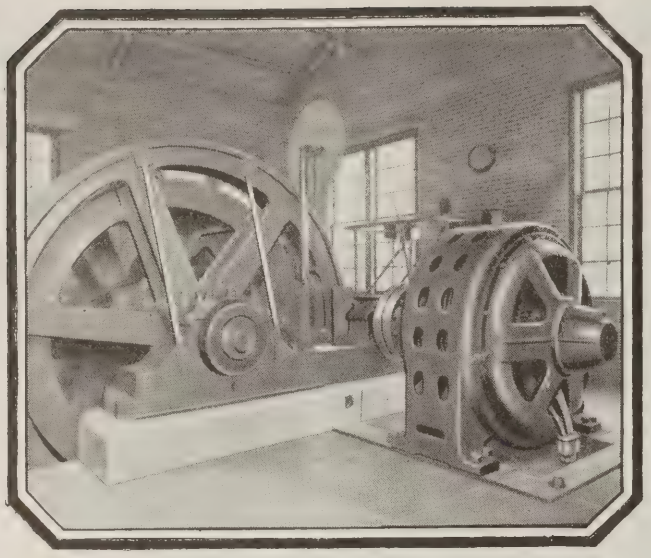
Consult the G-E Switchboard Specialist in your vicinity. Write our nearest office.

64-13

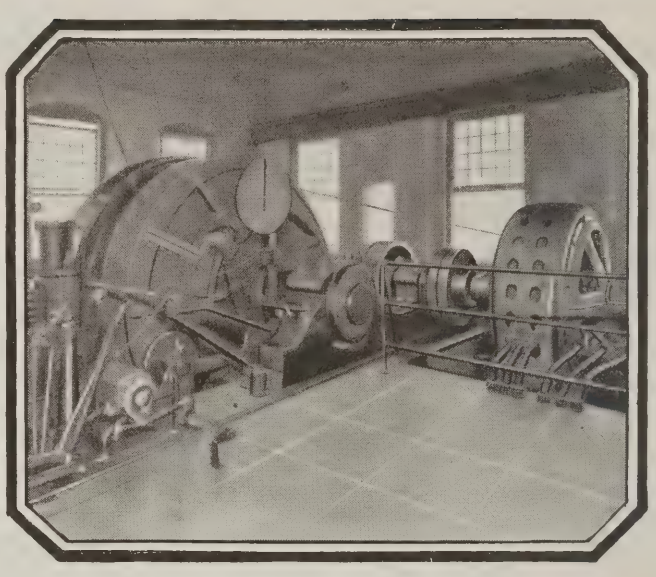
G-E Truck Type Switchboard Units

General Electric Company

General Office Schenectady, N.Y.



600 h.p. Motor driving Hoist



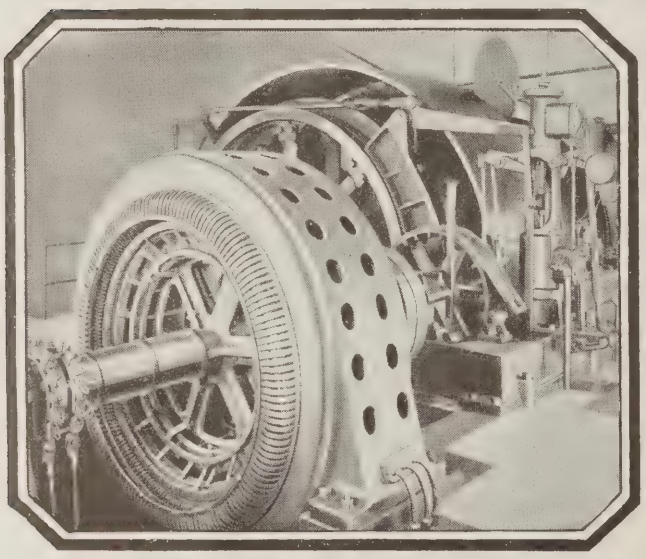
600 h.p. Motor driving Slope Hoist

More Coal Hoisted—Less Burned for Power

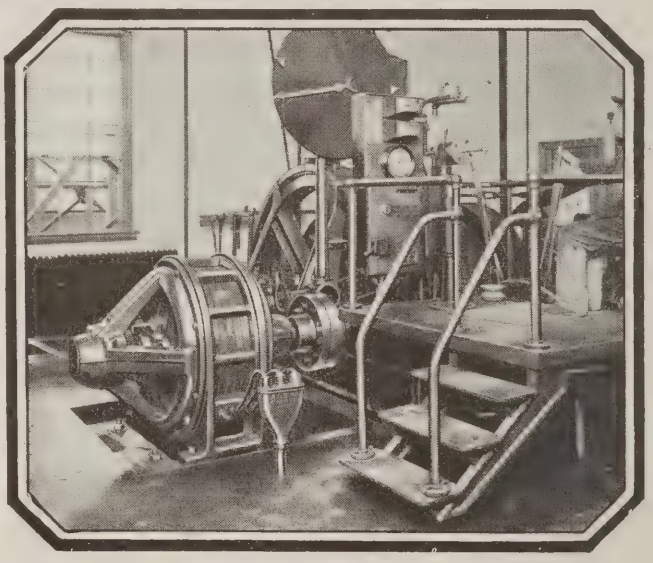
Eight times as much coal is often burned to supply steam to a small steam hoist as would be necessary to supply steam, in an efficient central power station, for the generation of electric power to operate the same hoist.

Piling up of cars at the foot of the hoist is almost unknown where electric hoists are used. The steady pull of the electric hoist greatly reduces the possibility of delays due to general upkeep, repairing ropes, shaft guides, etc.

Hoist operators are universally proud of their electric hoists and anxious to have them make a fine tonnage record.



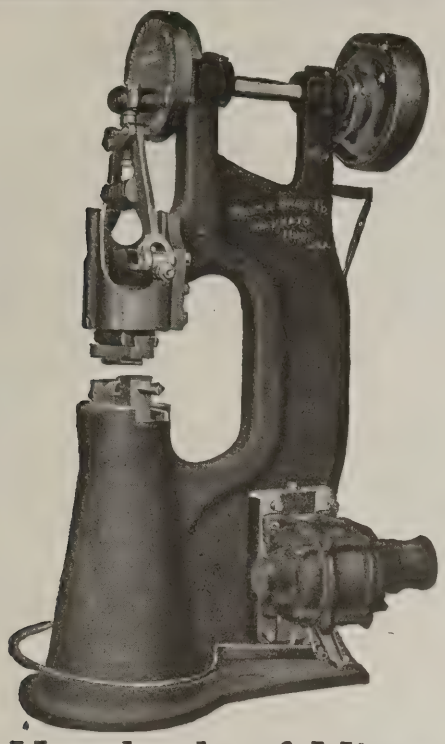
1200 h.p. Motor driving Hoist



25 h.p. Motor driving Auxiliary Hoist Motor

General Electric Company

General Office Schenectady, N.Y.

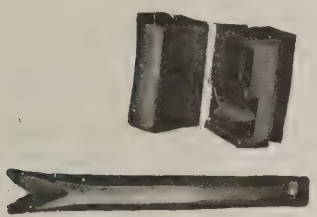


Hundreds of Mines are Using Little Giants

because forging and tool sharpening with Little Giant Power Hammers costs much less than hand work—and sharp tools, correctly formed mean increased production for your mining machines—it's a big saving all around.

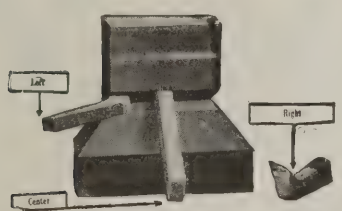
Do you know that the average annual upkeep of all Little Giant Hammers in use today is less than 2/5 of 1% of their original cost? It's a fact—and shows the high standard of Little Giant quality.

Every Little Giant Power Hammer is guaranteed forever against defective material and workmanship. Why not send for one on 30 *days' free* trial?

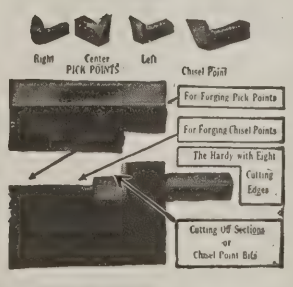


Little Giant puncher pick die.





Little Giant Combination pick point and chisel bit dies.

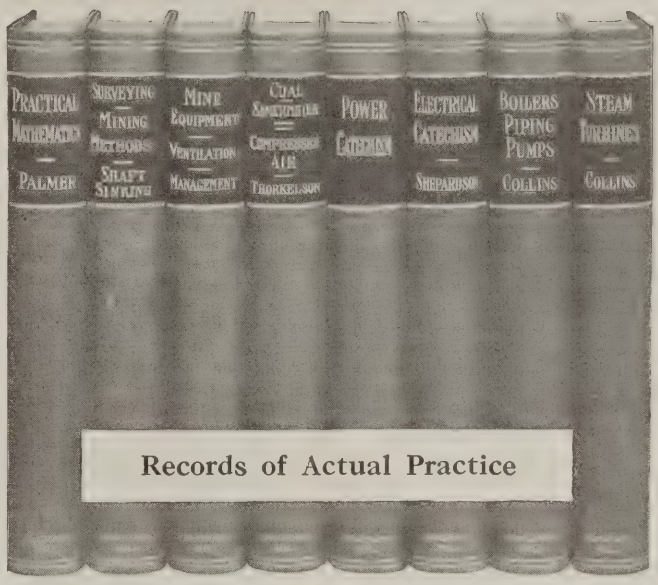


Little Giant Combination pick point and chisel bit dies.

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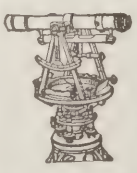


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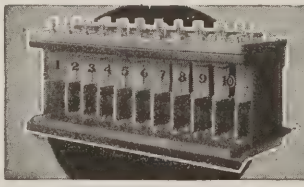
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7— 10-hp. Fairbanks-Morse, 10-B, 1200-r.p.m
3— 10-hp. Allis-Chalmers, 3K, 1730-r.p.m.
14— 7½-hp. Westinghouse, CS, elevator, 980-r.p.m.
3— 7½-hp. Crocker-Wheeler, 117-Q, 560-r.p.m.
2— 11-hp. Westinghouse CI, elevator, 1135-r.p.m.
15— 5-hp. Crocker-Wheeler, 105Q, 680-r.p.m.
10— 5-hp. Crocker-Wheeler, 113Q, 1140-r.p.m.
5— 5-hp. Westinghouse CS, 1735-r.p.m.
4— 3-hp. Crocker-Wheeler, 109Q, 1140 r.p.m.
3— 3-hp. Crocker-Wheeler, 114AQ, 690-r.p.m.
15— 3-hp. Crocker-Wheeler, 111Q, 1130-r.p.m.
5— 2-hp. Crocker-Wheeler, 111Q, 835-r.p.m.
8— 1-hp. General Electric, KT, 1800-r.p.m.
5— 1-hp. Crocker-Wheeler, 104Q, 1710-r.p.m.

General Electric, Westinghouse, Fairbanks-Morse and Crocker-Wheeler

2-PHASE, 220-440 VOLT

4— 1-hp., 1200-r.p.m
3— 1-hp., 1700-r.p.m.
2— 1-hp., 900-r.p.m.
4— 2-hp., 850-r.p.m.
5— 2-hp., 1730-r.p.m.
6— 3-hp., 850-r.p.m.
5— 3-hp., 1150-r.p.m.
5— 3-hp., 1730-r.p.m.
7— 7-hp., 1130-r.p.m.
5— 7-hp., 1720-r.p.m.
4—10-hp., 1130-r.p.m.
3—15-hp., 1130-r.p.m.
6— 15-hp., 850-r.p.m.
3— 20-hp., 1200-r.p.m.
5— 25-hp., 1150-r.p.m.
4— 25-hp., 850-r.p.m.
6— 35-hp., 900-r.p.m.
5— 40-hp., 1160-r.p.m.
10— 50-hp., 900-r.p.m.
7— 75-hp., 1160-r.p.m.
8—100-hp., 720 r.p.m.
5—125-hp., 705-r.p.m.
6—200-hp., 580-r.p.m.
5—200-hp., 870-r.p.m.

SINGLE PHASE, 110-220 VOLT

5— ¼-hp. Westinghouse, 850-r.p.m.
3— ½-hp. Ideal, 1165-r.p.m.
4— 1 -hp. Century, 1165-r.p.m.
5— 2 -hp. Century, 1750-r.p.m.
4— 2 -hp. Westinghouse, 1700-r.p.m.
3— 3 -hp. Westinghouse, 1720 r.p.m.
6— 3 -hp. Century, 1165-r.p.m.
5— 3½-hp. Century, 1165-r.p.m.
3— 7½-hp. Westinghouse, 1720-r.p.m.
2—10 -hp. Wagner, 1720-r.p.m.

D.C., 220 AND 440 VOLT

150-hp. Crocker-Wheeler, 450-r.p.m., Type CCM.
50-hp. Westinghouse, 750-r.p.m., type S.K.
40-hp. C. & C. Interpole, 955-r.p.m.
30-hp. Reliance, 730-r.p.m.
30-hp. Reliance, 1700-r.p.m.
25-hp. Westinghouse, 825-r.p.m., type S.K.
20-hp. Reliance, 1700-r.p.m., type R.G.
20-hp. General Electric, 1150-r.p.m.
15-hp. Westinghouse, 1100 r.p.m., type S.K
15-hp. General Electric, 1700-r.p.m., type R.G.
15-hp. Westinghouse, 1700-r.p.m.
10-hp. Westinghouse, 850-r.p.m., type S.K.
10-hp. General Electric, 1700-r.p.m., type R.C
10-hp. General Electric, 1150-r.p.m., type R.G
10-hp. Westinghouse, 1150-r.p.m., type SK
7½-hp. Westinghouse, 850-r.p.m., type S.K.
7½-hp. General Electric, 1150-r.p.m., type R.C
7½-hp. Westinghouse, 1700-r.p.m., type S.K.
5-hp. Westinghouse, 1800 r.p.m., type S.K.
5-hp. Westinghouse, 1200-r.p.m., type S.K.
5-hp. General Electric, 1150-r.p.m., type R.G.
5-hp. General Electric, 850-r.p.m., type S.K.
3-hp. Westinghouse, 1725-r.p.m., type G.D.
3-hp. General Electric, 1150-r.p.m., type R.G.
2-hp. Westinghouse, 1725-r.p.m., type G.D.
2-hp. Westinghouse, 1180-r.p.m., type GD

D.C., 500-VOLT

1—5-hp. Crocker-Wheeler, series, with controller for hoist, 1340-r.p.m.
1— 7½-hp. General Electric, type CVC, Interpole, 825-r.p.m.
1—10 -hp. Westinghouse, type S, 1200-r.p.m.
1—15 -hp. Westinghouse, type M, 1050-r.p.m.
1— 8 -hp. Westinghouse, type S, 900-r.p.m.

DIRECT CONNECTED UNITS 110-VOLT, D.C.

1—30-kw. Western Electric, with Buckeye steam engine.
1—35-kw. Fairbanks-Morse, with Fairbanks-Morse 2-cyclinder vertical gas engine.
1—50-kw. American Ball Generator and Steam Engine.
1—9-kw. Westinghouse, with 2-cylinder, vertical Bruce MacBeth.

250-VOLT

2—175-kw. Ridgway Dynamo & Engine Co. Generator and Steam Engine.
2—225-kw. Westinghouse Generators, with Koerting gas engines.

Also have a number of **Turbo Generator Units**, from 300-kva to 3000-kva., 480- and 2300-volt, 3-phase, 60-cycle: direct connected two- and three-phase generators with reciprocating steam and gas engines.
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1—75 k.w. 275 volts Crocker-Wheeler, 600 r.p.m. with rails and pulley.....$600

Both in first-class condition, ready for immediate shipment.

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1—75-hp. Whittier Return Tubular, 83-in. tub 12 ft. long, built 1906, 7 extra grate bars.
1—60-hp. Ames.
—50-hp.
—25 to 30-hp. Horizontal.

HOISTING ENGINES
—Lidgerwood, 8 x 6, DC., D.C.
—Lidgerwood, 18-hp. Skeleton Hoist.
1—Lidgerwood, single drum, 20-hp.
1—Lidgerwood, 30-hp., D.C., D.D.
1—American 18-hp. Skeleton Hoist.

LOCOMOTIVES
1—Bell Oil Burner, 14000 lb. on drivers, 325 lb pressure. New.
4—Vulcans, 20,000-lb. each on drivers.

STEAM SHOVELS
3—Erie, type B, ¾-yd., long dipper sticks.
6—Thew, Type O, ¾-yd. bucket, short and long dipper sticks.
1—Osgood, revolving, ¾-yd. bucket.

Steam Engines, (31 to 100 H. P.), Derricks, Buckets, Wire Rope, Dump Cars, (Std. and 36 in.), Pumps, Stacks, Tanks, Pipe, Loco Cranes, Piling, Excavator, Road Roller, Lighters (Concrete), Tug Boats, Schooner and Scrap Iron.

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SECOND-HAND ELECTRIC 220 VOLT D.C. MOTORS

	Speed
1—10 H.P. Gen. Elec.	1000
1—15 H.P. Westinghouse	900
1—20 H.P. Crocker-Wheeler	1200
1—60 H.P. Ft. Wayne, 6-pole, type MPL.	550
4—75 H.P. Northern, type L, 6-pole	450
1—75 H.P. Northern, type L, 6-pole, comp., with new extra armature	400
4— 75 H.P. Allis-Chalmers, MP, comp	325
1—100 H.P. Northern, MP, comp	500
1—125 H.P. Westinghouse, 6-pole, comp	275
3—150 H.P. Allis-Chalmers, MP, comp	650

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2—	200	Gen. Elec.	MP6	1450
	200	C & C Elec.	MP	400
	175	Westinghouse	MP	450
	150	Crocker Wheeler	150D	450
	120	Westinghouse	S13L	725
2—	100	General Electric	MP8	290
	75	Gen. Elec.	MD107	500
	60	Sprague	SB	210
	60	Bullock	.....	725
	50	C & C	MP	510
	50	Western	4P4O	450
	50	Crocker-Wheeler	CD	700
2—	50	Westg. Series	38B	450
	30	Westinghouse	SK	1700
	30	Milwaukee	B30	600
	25	C & C	TP	715
	25	Crocker-Wheeler	CM	750
6—	25	Gen. Elec.	MPH	650
	25	Crocker-Wheeler	SM	550
5—	25	Westg. Series	12A	450
4—	21	Gen. Elec. Series	52	390
2—	20	Westinghouse	S7	650
	15	Westinghouse	M	650
3—	15	Gen. Elec.	CQ	1000
2—	15	Browning	.....	1000
2—	15	O'Donnell	Elev.	750
7—	12	Diehl Series	K6	800
	10	Westinghouse	S5	800
8—	10	Westinghouse	SK	500/1500
25—	7½	Westinghouse	SK	500/1500
	7½	Westinghouse	M	900
	6	Otis Elevator	.....	1200
	6	Westinghouse	S2	1465
	5	Westinghouse	M	950
	5	Gen. Elec.	CVC	1050
	5	Peerless	.....	1400

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125-kw., 250-volt, D.C. Westinghouse, 580-r.p.m. **Generator**, with switchboard. Cost new $2250. Our price $1400.

2—75-kw., 250-volt, D.C. Crocker-Wheeler **Generators**, direct connected to Alberger Gas Engines. Cost new $12,000. Our price $4000 for both.

100-kva., 3-phase, 60-cycle, 220-volt Westinghouse, 900-r.p.m., rev. **Field Generator**, with direct connected exciter and switchboard. Cost new $2000. Our price $1250.

3-ton, 250-volt, D.C. Jeffrey, 24-in. gage **Electric Locomotive**. Cost new $2200. Our price $1200.

25-kw., 250-volt, D.C. Crocker-Wheeler **Generator**, direct connected to Alberger Natural Gas Engine. Cost new $2500. Our price $1000.

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1—850-Kw. Westinghouse, 16-pole, 90-R.P.M., dir. conn. to 26½ in. and 44¼-in. x 48-in. Allis-Chalmers C. C. engine.
1—500-Kw. Ft. Wayne, MPL, 10-pole, 90-R.P.M. dir. conn. 22-in. and 38-in. x 48-in. Bates C. C. engine.
1—75-Kw. Bullock, 6-pole, 275-R.P.M., dir. conn. to 11-in. and 18-in. x 11-in. Shepherd vertical engine.
1—60-Kw. Thompson-Ryan, 10-pole, 275-R.P.M., dir. conn. to 13-in. x 12-in. McEwen engine.

125 Volts

1—150-Kw. Crocker-Wheeler, CCD, 125-volt 8 pole, 225-R.P.M., dir. conn. to 18-in. x 17-in. Harrisburg Fleming engine.
1—50-Kw. General Electric, 120-volt, 6-pole, 275-R.P.M., dir. conn. to 13 in. x 12-in. Armington & Simms horizontal engine.
1—50-Kw. Bullock, 120/125-volt, 6-pole, 275-R.P.M., dir. conn. to 12 in. x 12-in. Payne horizontal engine.
1—30-Kw. Westinghouse, 125-volt, 352-R.P.M., dir. conn. to 9-in. x 15-in. x 9-in. Westinghouse automatic engine.
1—7-Kw. General Electric, 110-volt, 550-R.P.M., dir. conn. to 5 in. x 4½ in. General Electric marine type engine.

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Electric Driven

6—Lidgerwood Builders Hod Hoists, drums 30-in. dia. x 24-in. face x 4-in. flange, dir. geared to 52-H.P. Westinghouse variable speed motors, 220-volt, direct current.
2—Lidgerwood Builders Hod Hoists, drums 30 in. dia. x 24-in. face x 4-in. flange, dir. geared to 52-H.P. General Electric, 60-cy., 220-v. motors.
2—Meade-Morrison, single drum, drum 30-in. dia. x 24-in. face x 3 in. flange, geared to 40-H.P. Westinghouse 500-volt, D.C. motor.

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2—8¼-in. x 10 in. Flory double drum hoists, drums 27 in. dia. x 30 in. face, steam inlet 1½-in., outlet 2-in.
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1—7-in. x 10-in. O. & S., S.D., D. Cyl., drum 14-in. dia. x 21 in. face x 6 in. flange.
1—6¼-in. x 10 in. Lambert, S.D., S. Cyl., drum 18-in. dia. x 21-in. face x 5-in. flange.
1—5½-in. x 8-in. Lambert, S.D., S. Cyl., drum 9 in. dia. x 20-in. face x 6½-in. flange, with boiler.
1—5-in. x 8-in. Lidgerwood, S.D., D. Cyl., drum 14 in. dia. x 21-in. face x 6-in. flange, arranged for boiler.

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4—350-hp. Stirling, Class N, No. 16, butt joint, triple riveted, 190 lb., Foste rsuperheaters complete plant.
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1—400-hp. Stirling, butt joint, complete with superheater and stack, 160 lb.
10—500-hp. B. & W., steel header, 160 lb., oil furnaces.
3—500-hp. B. & W., steel header, 200 lb.
3—250-hp. Heine, 125-150-lb., hand fired.
1—600-hp. B. & W., 115-150-lb.
1—500-hp. B. & W., 115-150-lb.
1—400-hp. B. & W., 122-160-lb.
4—250-hp. B. & W., 150-lb.
2—150-hp. Lynne, 150-lb. allowance, vertical water tube.

D. C. UNITS

1—400-kw. Bullock, 230-volt, direct connected to Allis Chalmers, cross compound, heavy duty Corliss engine.
1—300-kw. General Electric, 250-volt, M.P. 10, direct connected at 100 rev., tandem compound, heavy duty Corliss engine.
1—300-kw. Western Electric, 240-volt, direct connected at 180 rev. to Williams valve vertical cross compound engine.
1—250-kw Western Electric, 250-volt, M.P.8, direct connected at 180 rev., Ideal tandem compound engine.
1—200-kw. Crocker-Wheeler, 250-volt, direct connected to left hand, heavy duty Corliss engine.
1—200-kw. Crocker-Wheeler, 125-volt, M.P.8, direct connected at 150 rev., 18 x 32 Corliss engine, practically new.
2—150-kw. Bullock, 250-volt, M.P.6, direct connected to Ames left hand automatic engines.
1—150-kw. Western Electric, 220-volt, direct connected at 225 rev. to Ideal Simple Automatic engine.

A. C. UNITS

1—1000-kw. General Electric, A.T.B. Alternator, 2300-volt, 120 rev., with vertical Rice & Sargeant engine.
1—600 kw. General Electric, A.T.B. Alternator, 23 0-volt, 150 rev. with vertical Rice & Sargeant engine.
2—600-kw. General Electric, H. D. Alternator, 60-cycle, 3-phase, 2300-volt, with cross compound Rice & Sargeant engines.
1—500-kw. Fort Wayne, R.F. Alternator, 60-cycle, 3-phase, 2300-volt, 120-rev., with heavy duty Hamilton Corliss engine.
1—240-kw. Stanley R. F. Alternator, 2300-volt, 125-rev., with Buckeye automatic engine.
1—170-kw. Fort Wayne, R. F. Alternator, with compound Russell engine.
1—150-kw. General Electric, A.T.B. Alternator, 225-rev., with Ideal tandem engine.

A.C., D.C. UNITS

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1—625-kva. Crocker-Wheeler Revolving Field Engine Type Alternator, 60-cycle, 3-phase, 220-440-volt, 225-rev., no engine.
2—300-kw. Westinghouse R.F. Engine Type Alternators, 25-cycle, 3-phase, 400-volt, with cross compound Hamilton Corliss engines.

TURBINES

1—15,000-kw. General Electric Horizontal Condensing Turbo-Alternator Unit, 60-cycle 3-phase, 2300-volt.
2—10,000-kw. Allis Chalmers-Parsons Turbo-Alternator Unit, 25-cycle, 3-phase, 6600-volt, 1500-r.p.m.
1—9300-kva. Westinghouse-Parsons Condensing Turbo-Alternator Unit, 60-cycle, 3-phase, 2300-volt, with jet condenser.
1—5000-kva. General Electric Condensing Turbo-Alternator Unit, 60-cycle, 3-phase, 2300-volt, 1200-r.p.m.
1—3750-kva. Westinghouse-Parsons Condensing Turbo-Alternator Unit, 60-cycle, 3-phase, 2300-volt, with jet condenser.
1—2000-kw. Westinghouse-Parsons Condensing Turbo-Alternator Unit, 60-cycle, 3-phase, 2400-volt, 1200-r.p.m.
2—2000-kw. General Electric Turbo Generator Units, 60-cycle, 3-phase, 2300-volt, 3600-r.p.m., direct connected to Curtis steam turbines for 150-lb. steam pressure.
1—1500-kw. Westinghouse-Parsons Horizontal Condensing Turbo Alternator, 60-cycle, 3-phase, 440-2300-4400-volt, complete with condenser.
2—1500-kw. Allis-Chalmers Condensing Turbo Alternator Units, 60-cycle, 3-phase, 6600-volt, with surface condensers
2—750-kw. General Electric, Type A.T.B., 60-cycle, 3-phase, 2300-volt Generator, direct connected to Form B, non-condensing Curtis 160-lb. steam pressure Turbine.
1—300-kw. Westinghouse-Parsons Condensing Turbo Alternator Unit, 60-cycle, 3-phase, 2300-volt.

FREQUENCY CHANGERS

1—1000-kw Westinghouse, 60-cycle, 3-phase, 2300-volt to 30-cycle, 6600-volt.
1—500-kw. General Electric, 60-cycle, 3-phase, 2300-4000-volt Alternator, with 700-hp., 25-cycle, 13000-volt motor.
1—500-kw. General Electric, 60-cycle, 3-phase, 2300-4100-volt Alternator, with 800-hp., 25-cycle, 9000-volt motor.
1—500-kw. General Electric, 60-cycle, 3-phase, 2300-4000-volt Generator, with 25-cycle, 3-phase, 2300-4000-volt motor.

BELTED D.C. UNITS

2—400-kw. Westinghouse, belted M.P.6, 3 bearing, 250-volt, 375-r.p.m.
150-200-250-300-kw. belted Multipolar Ge erators, with and without Corliss and automatic engines for belted drive.
Heavy Duty Corliss, automatic and four-valve Engines, ranging in size from 100 to 5000-hp. capacity.

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1—1200-hp. General Electric, 60-cycle, 3-phase, 2300-volt, 2—60-r.p.m. Synchronous damper wound Motor, with starting device. No bearings or pulley.
1—250-hp. Burke, 60-cycle, 2-phase, 2300-volt, Synchronous Slip Ring Motor, with twin, 24-in. Platt Iron Works Pump; 20 million G.P.D., 45-ft. head.
5—240-hp. General Electric, 25-cycle, 3-phase, 6600-volt, 500-r.p.m. Synchronous Motors

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1—45-ton Steam Shovel, Class 2, car length 30 ft width 9 ft ; will dump 22 ft. from center of mast 2 1/2 way 1 1/2 cu.yd. capacity.

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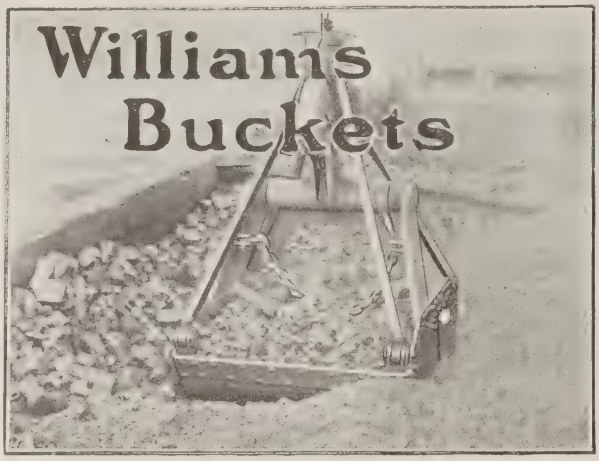
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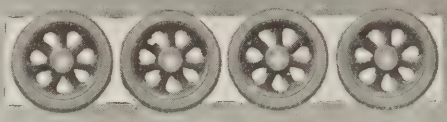
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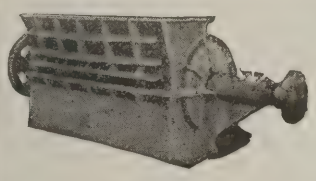
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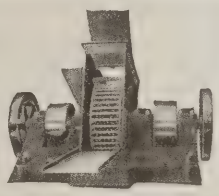
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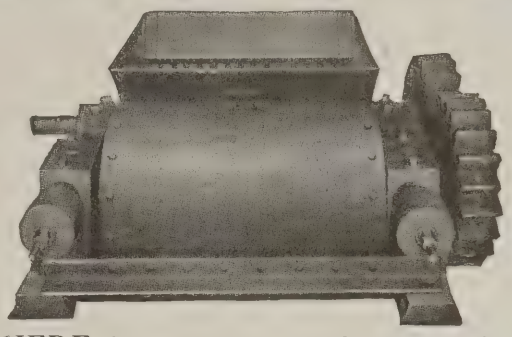
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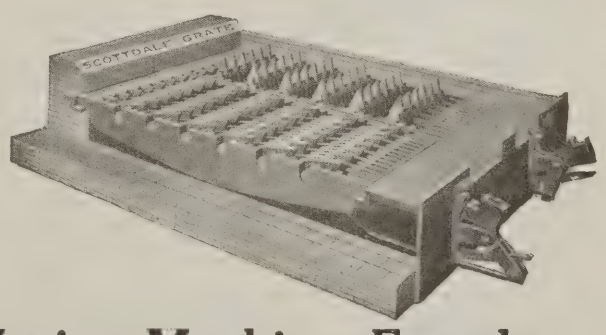
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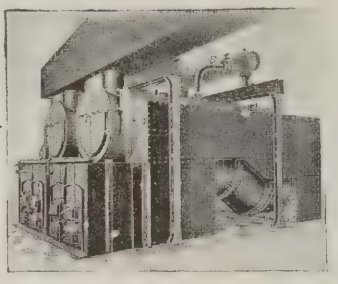
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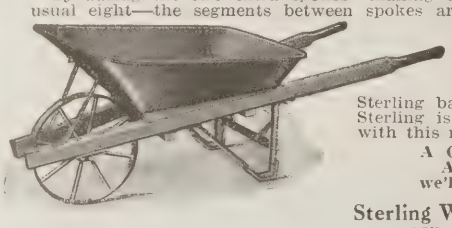
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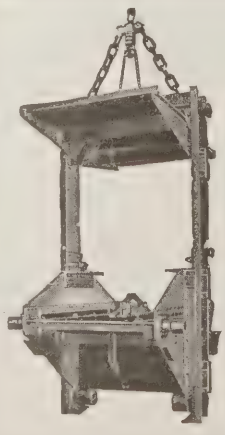
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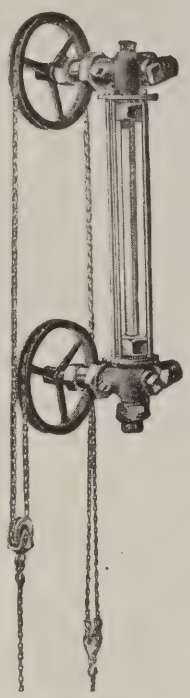
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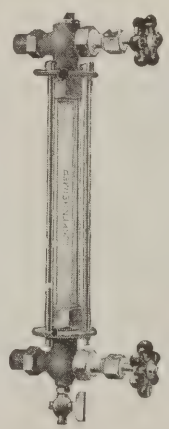
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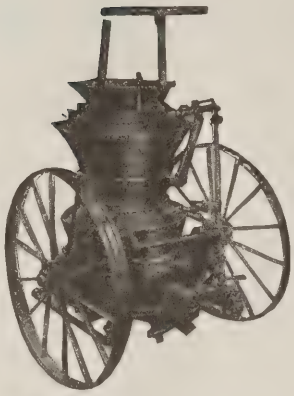
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Average		***4145*** Lb./sq.in.		***4,278,000*** Lb./sq.in.

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Among concrete engineers "2000 lb." concrete has long been standard. Note that GUNITE *averages more than twice as strong* as "standard concrete."

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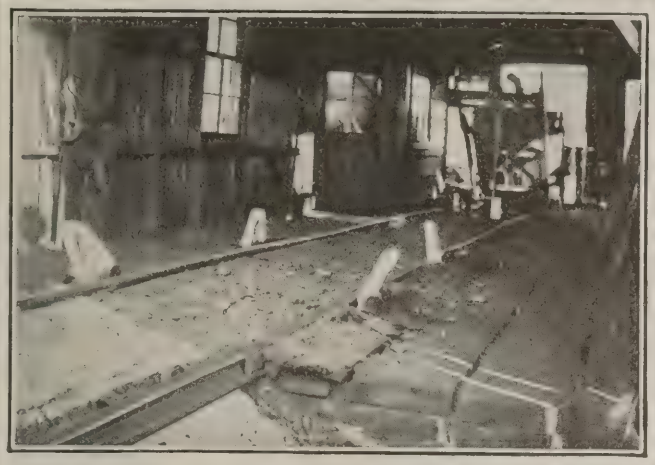
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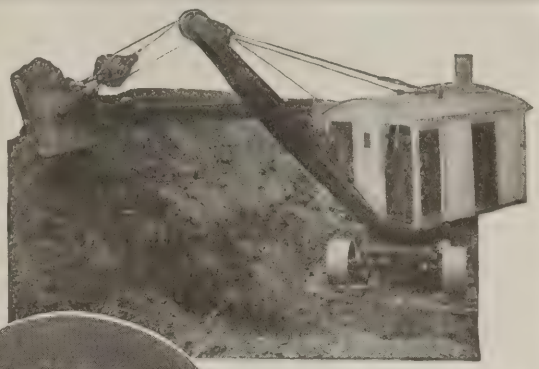
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will cage your cars with greater rapidity, more system and less expense?

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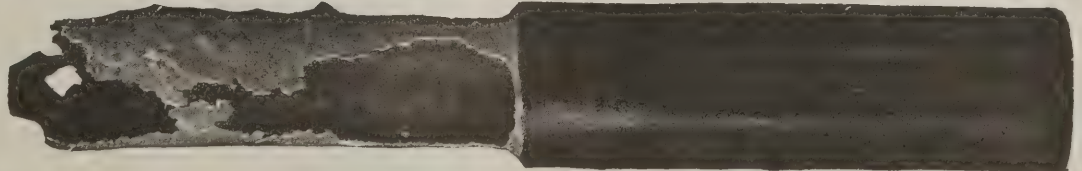
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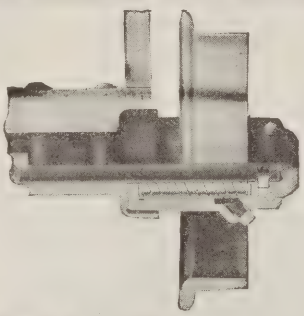
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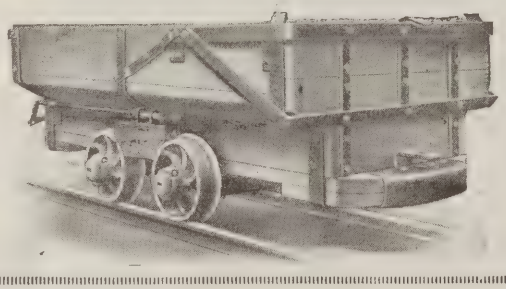


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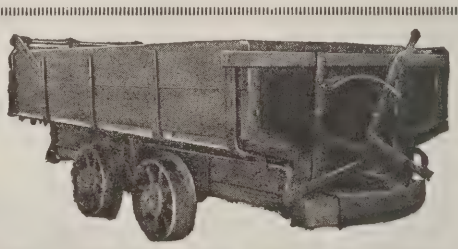
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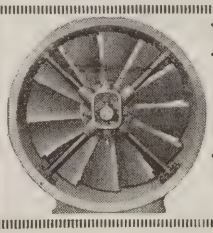
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The "Channel-Bar" truck—the cold-rolled steel floating axles with dustproof bearings—the steel plate center bumpers—make it the light-weight car that withstands the roughest treatment.

Let us give you the actual service record of the car shown above. Write now for the full details.

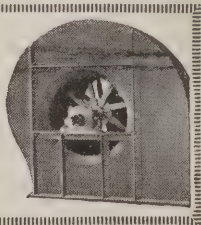
IRWIN FOUNDRY AND MINE CAR CO., Irwin Penna.



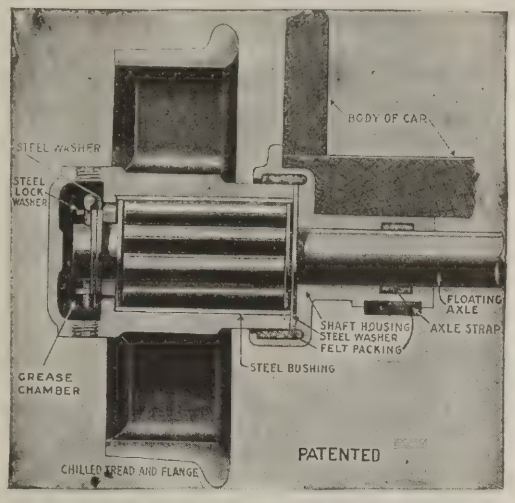


BUCKEYE BLOWER COMPANY

BUCKEYE MINE FANS—ALL SIZES
Columbus, Ohio.



Lower the Friction Loss of Your Mine Cars



OTTUMWA
Roller Bearing Car Wheels

will lessen friction and the consequent wear They operate with 50% less power and only require greasing once or twice a year. Made of carefully selected tough iron.

If you will write us the weight of car loaded, track gauge, wheel diameter and distance from center to center of axles—we'll quote prices.

Ottumwa Iron Works, Ottumwa, Iowa

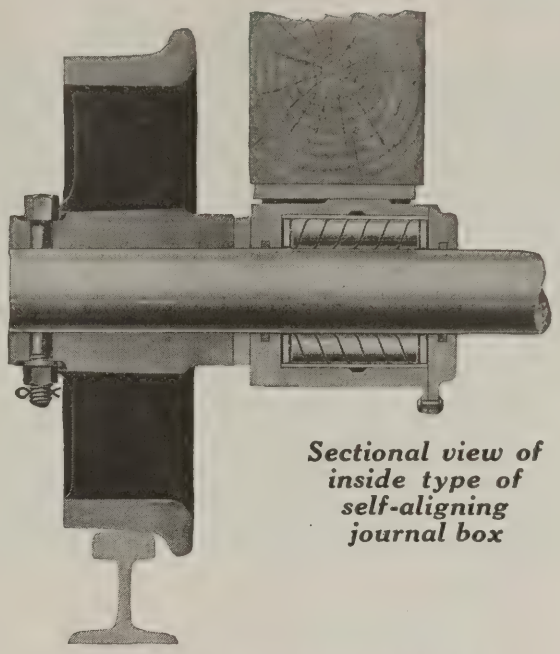
The Open Cap Truck
(Guaranteed)



IN this Truck are combined all the essentials that go to make up a first-class Mine Car Truck. It can be lubricated with either grease or oil with long service from each lubrication—is thoroughly dustproof—runs with very little friction—has a full-floating axle with visible linch pins which can be easily replaced, and is guaranteed against internal wear.

Selected by the Atlantic Refining Co. to demonstrate, at the American Mining Congress in Philadelphia, the highest development of a self-oiling wheel using their lubricant. We'll send you details.

Phillips Mine and Mill Supply Co.
Pittsburgh Penna.



Sectional view of inside type of self-aligning journal box

PROHIBITION

of excessive haulage costs has caused many successful coal operators to buy our FLEMING-HYATT self-aligning roller bearing journal boxes.

They bought them because they knew that they would save "worlds of power and lubricant" literally speaking and they would have been perfectly contented if our boxes had done that and nothing more.

But because we have been building journal boxes for mine cars for the past twenty-five years we know that they should have something else, so we built them so that they were self-aligning, just like railroad journal boxes.

The self-aligning (or ball and socket) principle takes all of the strain of the running gear of the car and greatly relieves the strains that tear the body of a car to pieces.

In addition there is just enough play to compensate for the low spots in the track and the "give" of the boxes also helps the cars to round the curves without the tremendous waste of power wherever the rigid types of trucks are used. You, as an engineer, will also appreciate that your trackage will be greatly benefited.

An engineer who is opening up a big mine equipped it with big six-ton cars with rigid running gear. He saw one of our boxes the other day and he said, "If I had known of your boxes when I bought my cars I certainly would have put them under my cars."

He was a man with railroad experience and he knew that every heavy car should have self-aligning boxes; like ours under them. We believe we will sell him hundreds of our boxes.

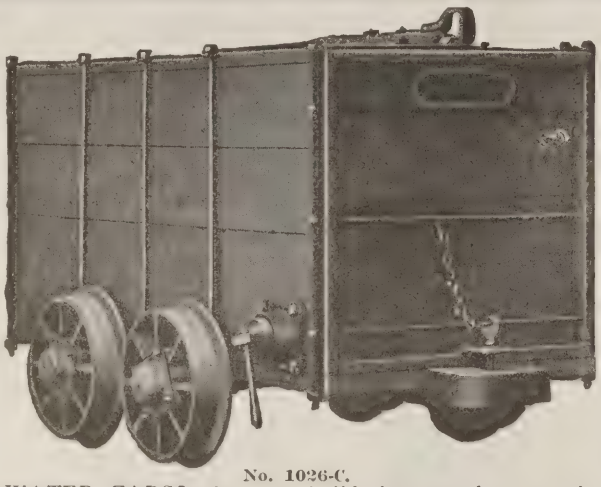
There is no need for you to go any longer with your rigid truck equipment for our FLEMING-HYATT boxes can be applied to almost any car. No matter whether inside wheels or outside wheels; 6 in. x 8 in. sill construction or flat wood or steel bottoms, we can fit our boxes to your cars.

You can still use your present wheels and the time and trouble necessary to make the change is small compared to the many advantages you would gain from their use. They are the ideal equipment for heavy mine cars but work just as nicely under the smaller cars.

Please write us today! No obligation on your part now, but you will feel obligated to us when you know how well we have solved your truck problems.

J. R. Fleming & Son Company
Incorporated
Scranton, Penna.

Manufactured and sold in Illinois, Indiana, Western Kentucky, Iowa and Missouri, by the Lincoln Steel and Forge Company, St. Louis, Missouri.



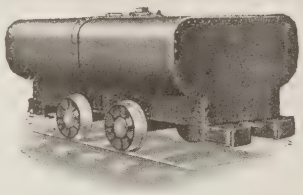
No. 1026-C.

WATER CARS?—Sure we build them, steel or wood. We just show two types here—but we can make your own particular kind. Write us today about any of your car wants. "That's all we make—Cars."

The Watt Mining Car Wheel Co.

Barnesville, Ohio, U. S. A.

LARGEST CAR BUILDERS IN THE WORLD.



No. 572-C.

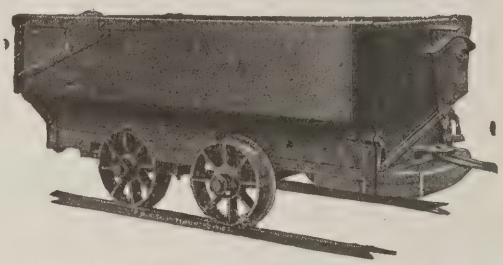
San Francisco:
N. D. Phelps,
Sheldon Bldg.

Denver:
Lindrooth, Shubart & Co.,
Boston Bldg.

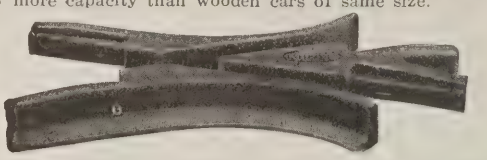
Philadelphia:
Edelen & Co.,
235 Commercial Trust Bldg.

KOPPEL

Mine Transportation Equipment



COMPOSITE COAL MINE CARS—Have Steel Body and Oak floor. They cost 60% less for maintenance and have 15% more capacity than wooden cars of same size.

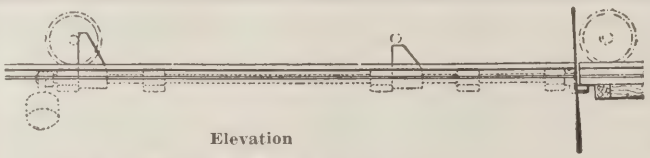


MANGANESE CAST STEEL FROGS—They are best for mines, because very strong and durable; no splice bars needed. Made to suit any rail from 12 to 40 lb.

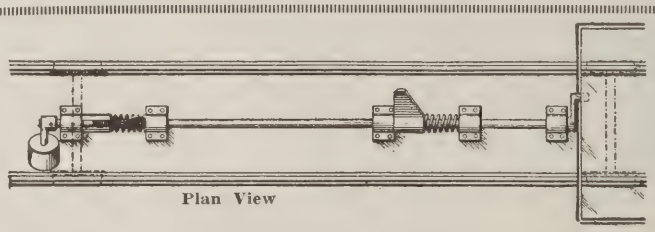
ELECTRIC LOCOMOTIVES, designed for Trolley, Storage Battery and Third-Rail Shoe Systems.

Koppel Industrial Car and Equipment Co.

Purchaser of:
Orenstein-Arthur-Koppel Company,
First German Enterprise Sold by Alien Property Custodian
Plant: Koppel, Pa.
Sales Offices:
NEW YORK PITTSBURGH CHICAGO SAN FRANCISCO



Elevation



Plan View

AUTOMATIC
Mine Car Stop and Cager

Will cage cars automatically, in 3 seconds. Simple, strong, reliable. It will not break and it cannot get out of order.

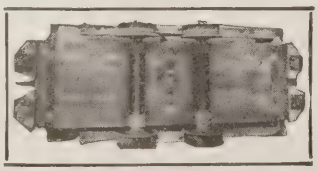
Cars cannot run into the sump when this cager is used for its action is POSITIVE and correctly timed.

Get away from the old slow hand caging methods and install instead this quick cager. The cost is less than one-third that of any other cager on the market.

Write for details.

BELLEVILLE STOVE & RANGE CO., BELLEVILLE, ILLINOIS

MINE CARS



Built not only for sale but for SERVICE. Any size or type. Plain oiled or roller bearing wheels. Large stock of materials on hand. Axles, wheels, car irons, hitchings, etc. Excellent deliveries. Reasonable prices.

Come and see us or send your specifications

John J. Irvin Company

Bellwood, Penna.

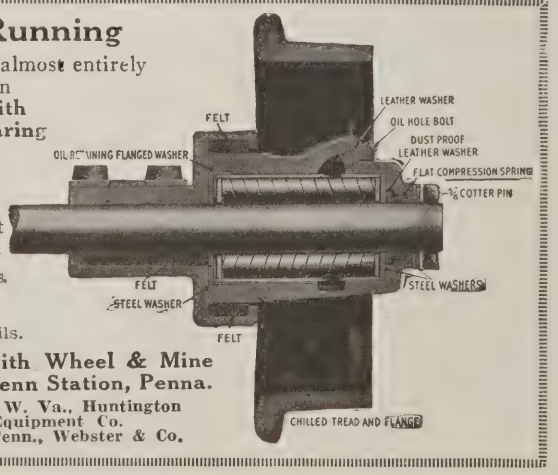
Light Running

Friction is almost entirely overcome in **Hockensmith Roller Bearing Wheels**

Completely protected against dust and water.

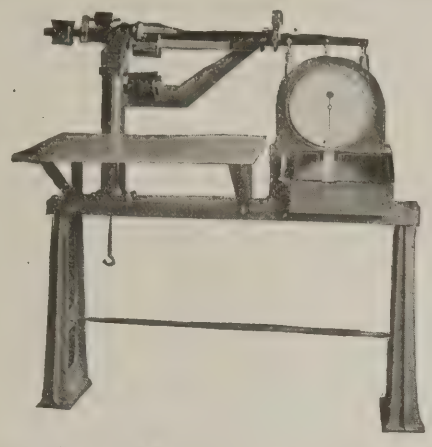
Big oil savers. Unsurpassed Durability

Ask for details.



Hockensmith Wheel & Mine Car Co., Penn Station, Penna.

Huntington, W. Va., Huntington Supply & Equipment Co.
Knoxville, Tenn., Webster & Co.



Here's a Machine That's an Income Producer

—just as much so as any other machine in your mine and tipple.

THE STREETER-AMET RECORDER

saves time in weighing—therefore money—insures you against paying for more coal than is mined—and saves you from the trouble and loss rising through weight disputes with your men.

Streeter-Amet Weighing & Recording Co.
4101-4105 Ravenswood Ave., Chicago, Ill.
You get an accurate record of every car—automatically. Write for our bulletin.

AMERICAN

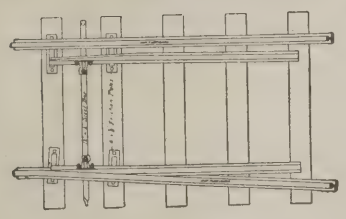


Upright Lever Parallel. Throw Switch Stand.

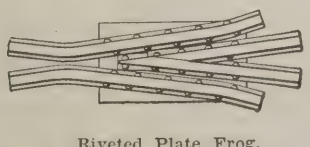
TRACK EQUIPMENT

Is built for mine service. Frogs, Switches or complete Turnouts are properly cut drilled and planed to go into place without hitch. Switch Stands, Levers and Connecting Rods are designed for safe and rapid operation. All material is the best obtainable.

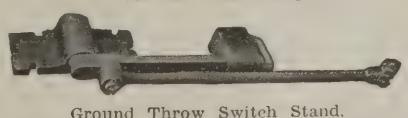
Write for details.



Split Switch.



Riveted Plate Frog.



Ground Throw Switch Stand. Rigid Rod.

American Frog & Switch Co.
Hamilton, Ohio, U. S. A.



Every Man

operating mine cars (not equipped with Hyatt Bearings) feels the need of improving the service he gets from the trucks under his mine cars.

Hyatt Roller Bearings are standard with so many mines that often his neighbor can tell him just how good Hyatt equipment is and thereby help him solve his troubles.

Also the majority of reputable mine car manufacturers will gladly furnish you their standard truck equipment with Hyatt Bearings. We suggest that you write your regular manufacturer or manufacturers and have them tell you of the success of their Hyatt trucks. They'll name you attractive prices, too.

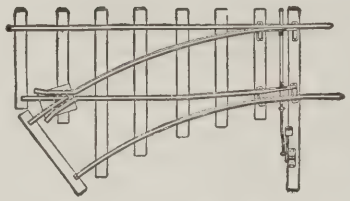
For general information (not prices) dealing with the advantages derived from the use of Hyatt equipped mine cars, we would also like to have you write us direct.

There will be no obligation on your part nor ours. Will you write us today? Please do so.

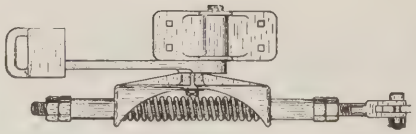
HYATT ROLLER BEARING COMPANY
INDUSTRIAL BEARINGS DIVISION
METROPOLITAN TOWER, NEW YORK

B-313

"CINCINNATI" TRACK SYSTEM



Room Turnout with
Long Arm Frog



Switch Stand with Spring
Connecting Rod. Type "ASL"

can be installed with better results and lower cost than others. Our "Cincinnati" Room turnout saves labor and material. The long frog arm reaches the switch, eliminating two rail fillers and two pairs of fish plates with bolts.

Send for our Catalogue

and learn of the many special points of excellence like the above.

If you need special assistance, let us know—our engineers are always ready to help.

THE "CINCINNATI" FROG & SWITCH COMPANY
CINCINNATI, OHIO
Established 1906

Established 1882

WEIR FROG COMPANY

LARGEST and OLDEST Company in the United States making a SPECIALTY of TRACK WORK for MINES.

COMPLETE TURNOUTS for Rooms, Tram Roads and Tipples.

PROMPT SHIPMENTS, DURABLE WORK and REASONABLE PRICES.

Let our Engineering Force help you.

CINCINNATI OHIO

WEIR TITAN FROG

Solid Titanium Steel
Complete with Bolts



Guaranteed against breakage
Not Cast Iron
"Several Times the Service" at a cheaper first cost than built-up Frogs.

THE IRONTON
STORAGE BATTERY LOCOMOTIVES

THE IRONTON ENGINE COMPANY
Ironton, Ohio

Branch Offices: 584 Union Arcade Bldg., Pittsburgh, Pa. Stock Exchange Bldg., 314 N. 4th St., St. Louis, Mo. 408 Gas & Electric Bldg., Denver, Colo. 1116 Fidelity Mutual Bldg., Philadelphia, Pa. 2615 N. 4th St., Columbus, Ohio. 1108 Fayette National Bank Bldg., Lexington, Ky. Keiser-Geismer Engineering Co., Birmingham, Ala. Canadian Representative: Chas. E. Goad Engineering Co., 105 Bond St., Toronto.



The
West Virginia Rail Co.
Manufacturers
Light Steel Rails
and Accessories
12, 16, 20, 25, 30, 35, 40, 45-lbs. per yd.
Huntington, W. Va.

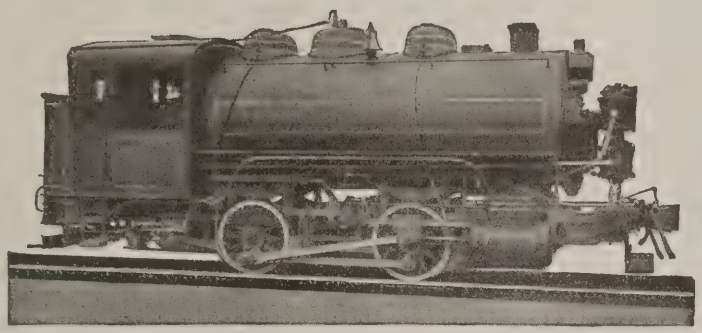




8, 12, 16, 20, 25, 30, 35, 40 lb. per yard
Splices, Spikes, Frogs and Switches

UNITED STATES RAIL CO.
CUMBERLAND, MARYLAND

PUT YOUR PROBLEM UP TO US



We are specialists in building **locomotives.** We build all types and sizes also all kinds of repair parts for locomotives and tenders.

Our experience puts us in a position to give you expert advice as to what particular type and size of locomotive is best suited to your needs.

Put your locomotive problem up to us.

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET, NEW YORK

McCormick Building, Chicago, Illinois

A. Baldwin & Company, New Orleans, La.

Dominion Express Building, Montreal, Canada

N. B. Livermore & Company, Merchants National Bank Building, San Francisco, Calif.

Northwestern Equipment Company, Northwestern Bank Building, Portland, Oregon

PRODUCE YOUR COAL AT ROCK-BOTTOM PRICES

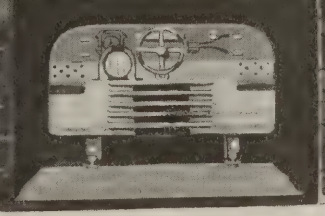


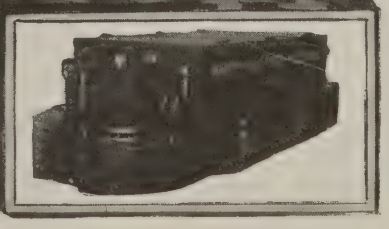
You can do this with Mancha Electric Mules because Mancha is only 32 in. high—eliminates costly "brushing"—expensive eats (Mancha eats only when it works and 50 cents a day supplies the juice). Then too it lasts longer than mules—is more efficient and unlike other mechanical equipment requires no trolley wires, cables, etc.,—Storage batteries supply the power—Ask for full details.

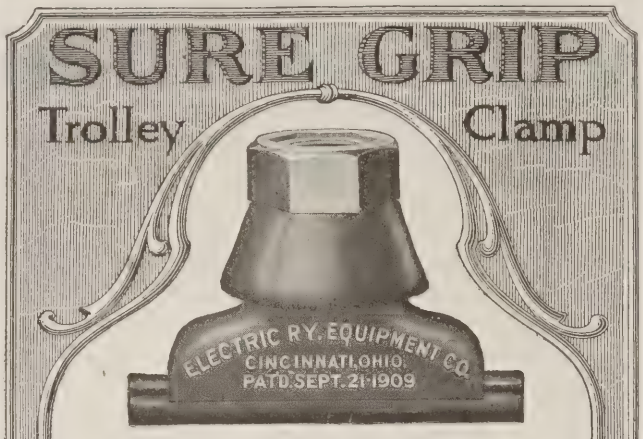
Mancha Storage Battery Locomotive Co.

1911 S. Kingshighway, St. Louis, Mo.

REPRESENTATIVES: C. B. Goodwin, 1032 Euclid Place, Huntington, W. Va. Jos. B. Noros & Co., 301 Miller Bldg., Scranton, Pa. Tri-States Machinery Co., 408-9-10 Burwell Bldg., Knoxville, Tenn. Powley & Townsley, Excelsior Life Bldg., Toronto, Canada. The Hendrie & Bolthoff Mfg. & Supply Co., 1621-39 17th Street, Denver, Colo. Chas. E. Schrand, Madera Garage, Madera, Pa.







A Chance to Save

The "Sure Grip" Trolley Clamp spells true economy in the mine.

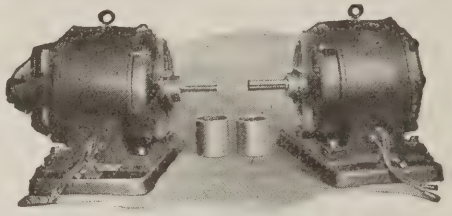
Its automatic clamping action (an exclusive feature), gives it an unbreakable grip. There are no threads exposed to corrosion —consequently it can be removed easily, and used over and over again. More than 2,000,000 in use.

Write for Catalog No. 14.

ELECTRIC RAILWAY EQUIPMENT CO.
2900 & 2911 Colerain Ave. Cincinnati, Ohio.

DIRECT CURRENT
ALTERNATING CURRENT

MOTORS



Variable or Constant Speed—¼ to 50 H.P.

UNIFRAME MOTORS are especially adapted to direct motor-driven apparatus. No changes in mounting required as dimensions of both A.C. and D.C. motors of same h.p. rating are identical. Materials and workmanship the best obtainable, all parts interchangeable. High efficiency, with low operating and maintenance costs make UNIFRAME MOTORS distinctive.

B. A. WESCHE ELECTRIC CO.
327 East Sixth Street, Cincinnati, Ohio
Eastern Sales Agent: 110 West 40th St., New York, N. Y.

Section Insulator and Switch

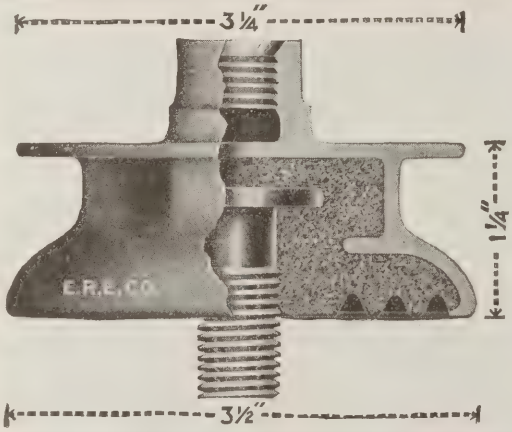
Our Combination Insulator and Switch when closed also closes the gap in the trolley line. There's no dead section and no arcing when trolley wheel passes over.



Illustrated bulletin and prices sent.

Flood City Mfg. Co.
Elder and Messenger Streets
Johnstown Penna.

Metallic
Armature and Field Coil Forms
The Comstock Mfg. Company
Wilkes-Barre, Pa., U. S. A.
Circular?



Mine Trolley Hangers

L. F. Expansion Type (Illustrated)
These Hangers have ample surface which provides against current-leakage through creepage. The Hanger shown is recommended for use in low roof mines.

Black Diamond Hangers
Type S. M. Hangers
Type E. L. Hangers
Form "A" and Universal Hangers

"SURE-GRIP" CLAMPS

Immediate Deliveries from Chicago Stock.

TROLLEY LINE MATERIAL

Wires and Cables
Mining Machine Cable
Locomotive Gath. Cable
Puncher Picks
Bits and Bit Steel
Brattice Cloth
Arm. and Field Coils
Gears and Pinions
General Supplies

ELECTRICAL MATERIAL COMPANY,
620 West Jackson Blvd., Chicago, Ill.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

Searchlight Section

NOW— is the time to offer good second-hand equipment or machinery for sale. The demand is great for good plant for immediate delivery. That's why you should advertise NOW.

NOW— or any other time, use the Searchlight Section for advertising

Agencies Wanted	Contracts Wanted	Miscellaneous Wants	Positions Wanted
Agents Wanted	Educational Courses	New Industries Wanted	Property For Sale
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Buildings For Sale	Exchanges	Patents For Sale	Representatives Wanted
Business Opportunities	For Rent Items	Patent Attorneys	Salesmen Wanted
Civil Service Opportunities	Franchises	Plants For Sale	Work Wanted
Contracts To Be Let	Industrial Sites	Positions Vacant	Etc., Etc., Etc.

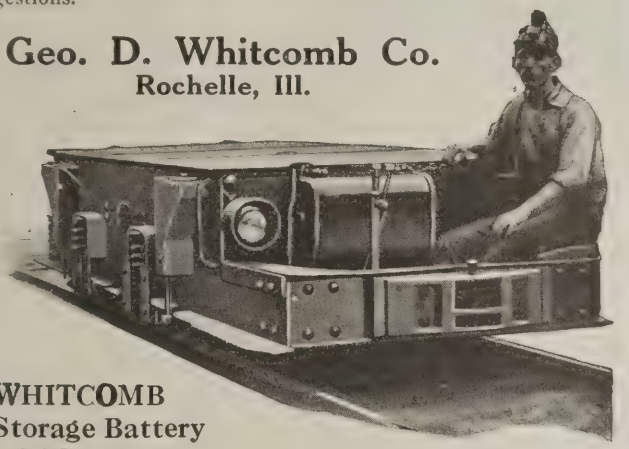
35

More than
SIX HUNDRED MINES
have installed
Whitcomb Haulage

They find that the Whitcomb system means greater tonnage output and a very material reduction in haulage costs—it will be the same in your case.

Write for some interesting mine haulage data, or ask our engineers to study your situation—we will be glad to make suggestions.

Geo. D. Whitcomb Co.
Rochelle, Ill.



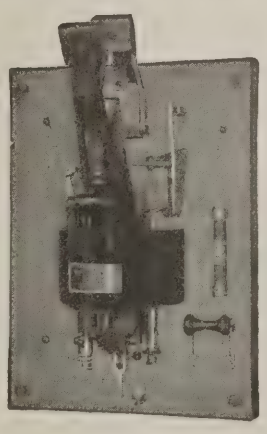
WHITCOMB
Storage Battery
LOCOMOTIVE

Are you paying an operator to stay at your substation and do what an Automatic Reclosing Circuit Breaker can do without the aid of an attendant?

The Automatic Reclosing Circuit Breaker

Stays on the job 24 hours a day. It takes no time off for vacations, holidays or strikes.

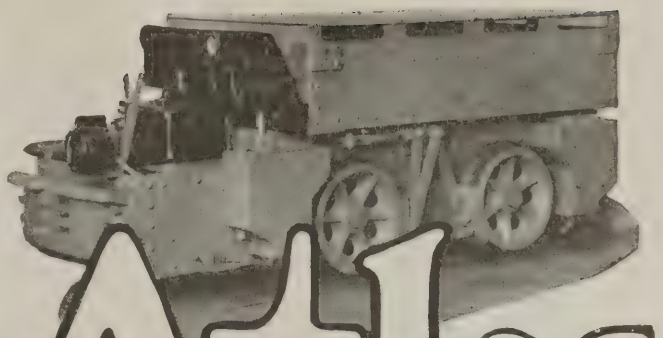
Hundreds of mines throughout the country are taking advantage of this means or reducing operating costs and eliminating unnecessary delays.



Reduces delays due to short-circuits to a minimum. No time is lost waiting for some one to close the circuit breaker or notify the operator that the circuit is clear.

The application of Automatic Reclosing Circuit Breakers to all conditions is described in Bulletin No. 302. It will pay you to get a copy.

THE AUTOMATIC RECLOSING CIRCUIT BREAKER CO.
Columbus, Ohio, U. S. A.



Atlas

Storage Battery Locomotives

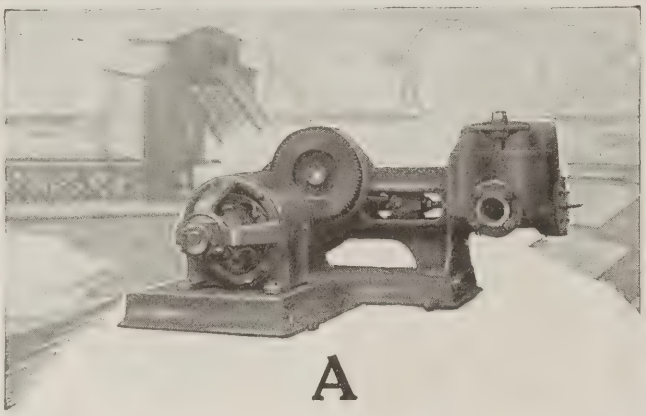
are the logical answer to a problem which concerns every Mine Manager today. How to secure, on a permanent basis, the

LOWEST-COST HAULAGE

From their beginning Atlas Storage-Battery Locomotives have been noted for strength and durability—they have never failed to give "lowest-cost haulage" wherever installed—but our latest designs embody several distinctive refinements that promote easier riding, closer control, and more economical operation.

We need representatives in many districts.

The Atlas Car Manufacturing Co.
Department O, Ivanhoe Road
Cleveland, Ohio



A Gathering Pump

The smaller sizes of the Austin Mine Pump are especially suitable for use as gathering pumps.

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All parts are quickly renewable or removable. **Loosening but one nut** exposes all the valves.

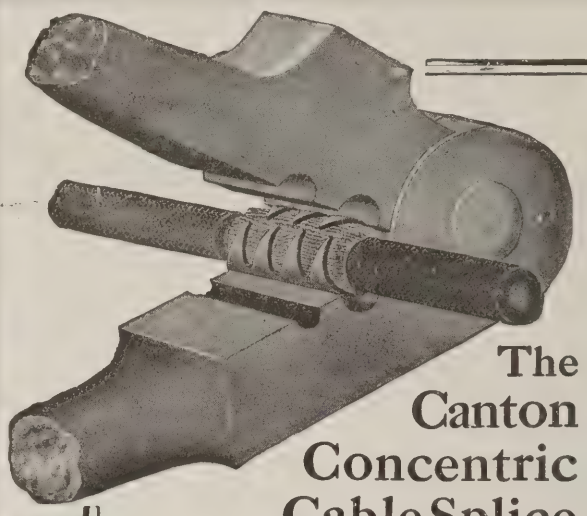
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"The Pump the Mine Man Needs"



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Splices both insulator AND conductor in such a perfectly simple manner, that it is a simply perfect cable splice.

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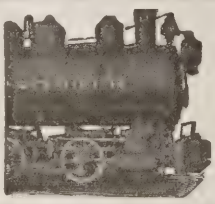
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have proved their dependability and economy over a long period of time. There is a type for every coal mine service.

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The

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10-Inch Stroke

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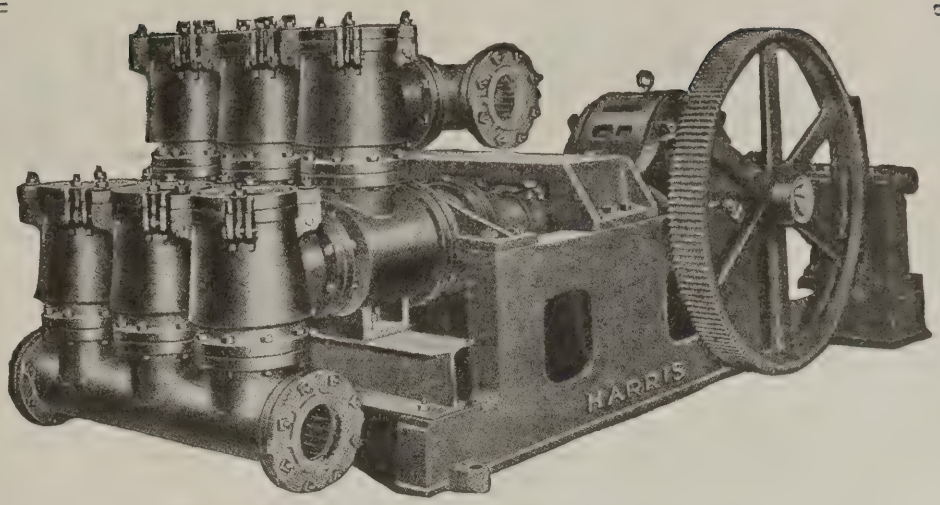


Figure 74. Capacity 300 to 500 gallons per minute.

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Connecting Rods are of very massive construction and have split bronze boxes at both ends with wedge and screw adjustment.

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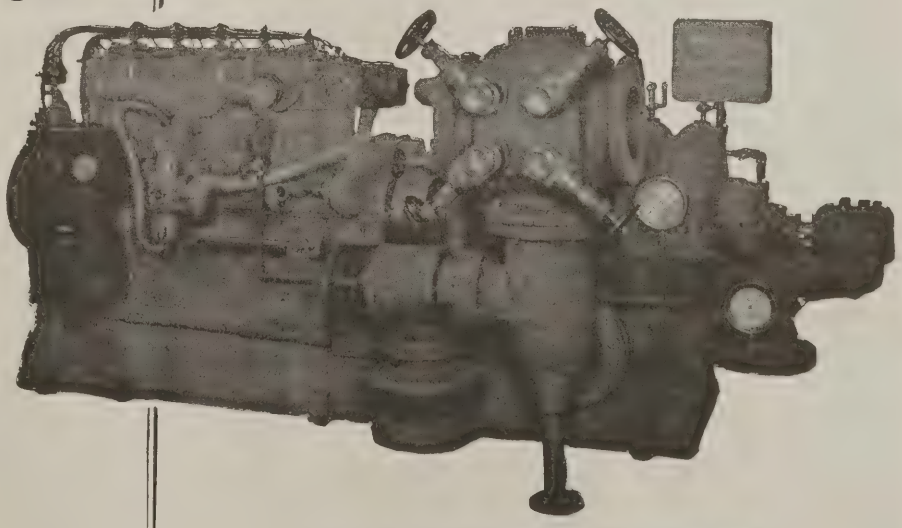
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The Lea-Courtenay Centrifugal Fire Pump has been accepted by all insurance boards.

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Manufacturers of Centrifugal Pumping Machinery

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Deming

PUMPS THE WORLD'S BEST

HAND AND POWER PUMPS FOR ALL USES

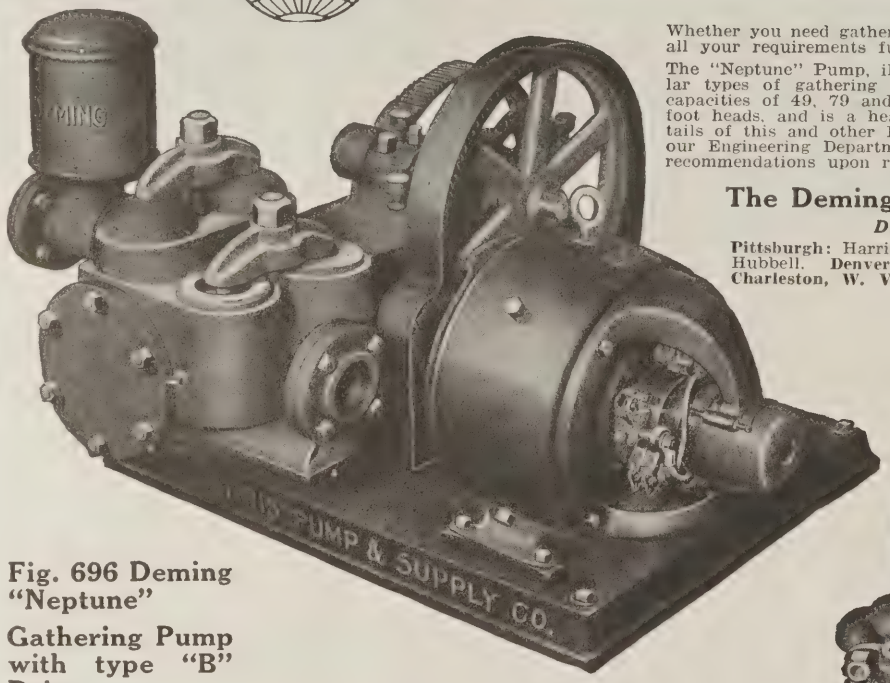


Fig. 696 Deming "Neptune" Gathering Pump with type "B" Drive

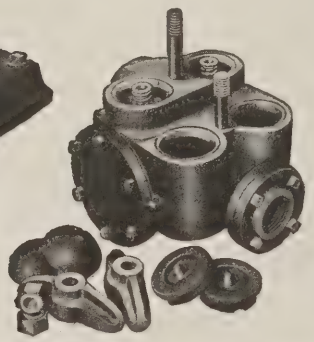
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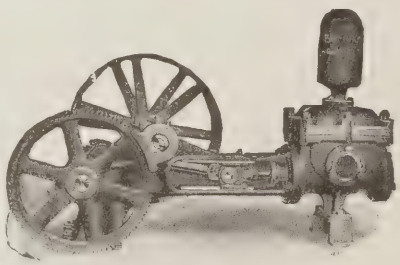
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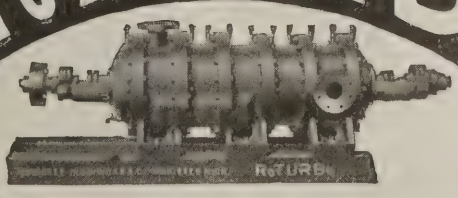
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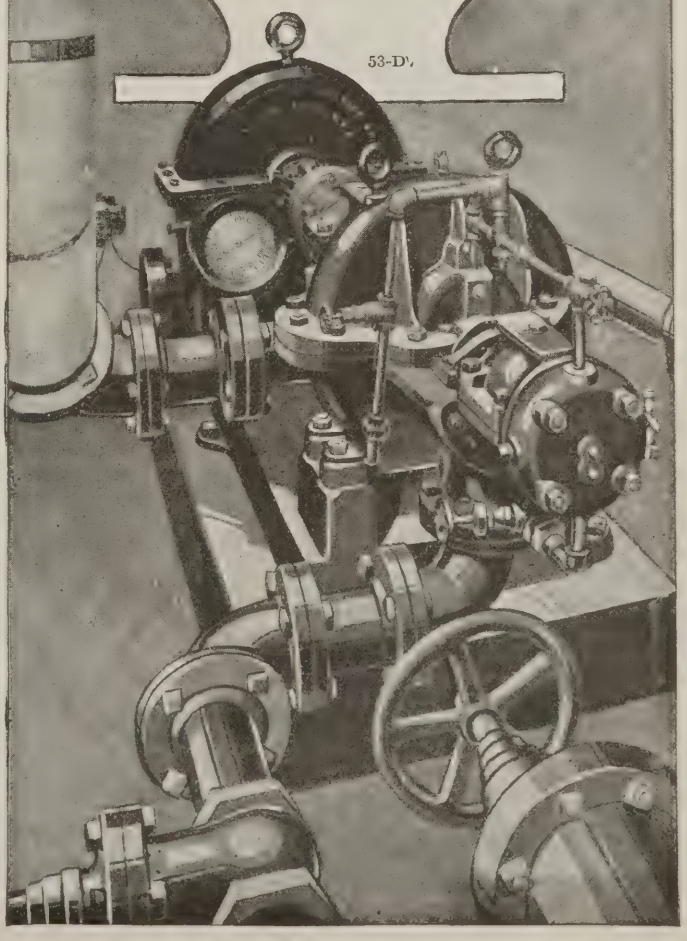
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CAMERON PUMPS

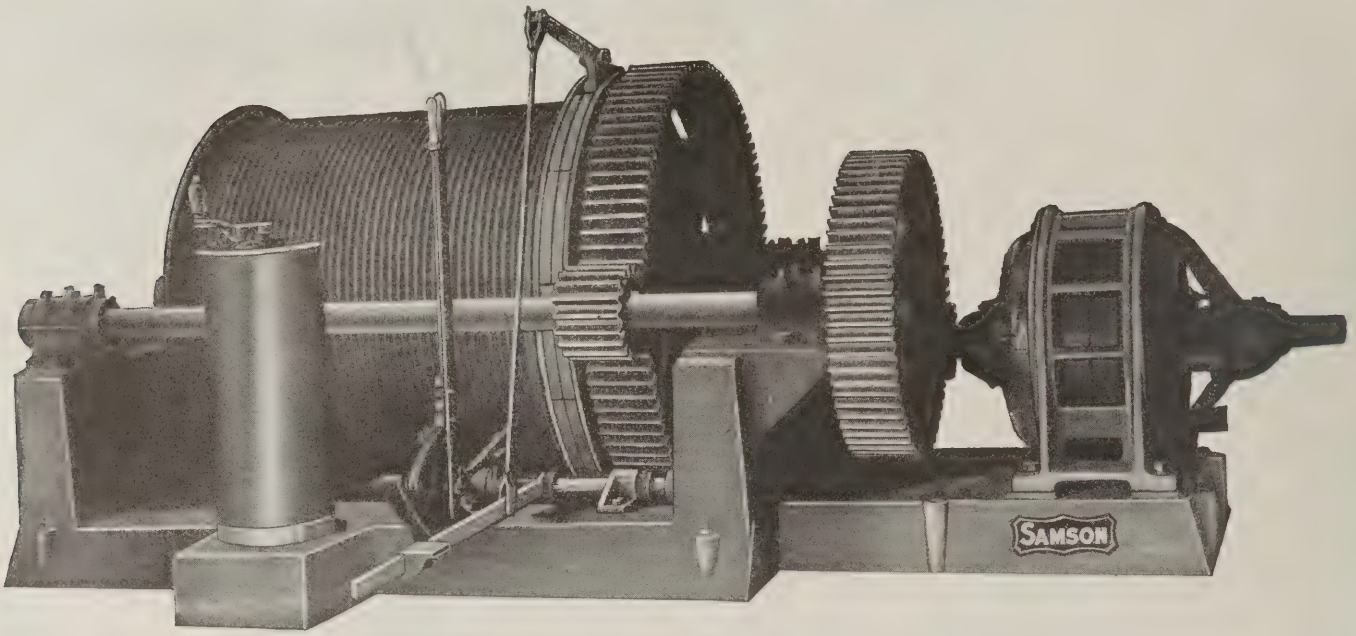
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Above cut shows one of our standard types of Rigid Drum Hoist with Post Brake.

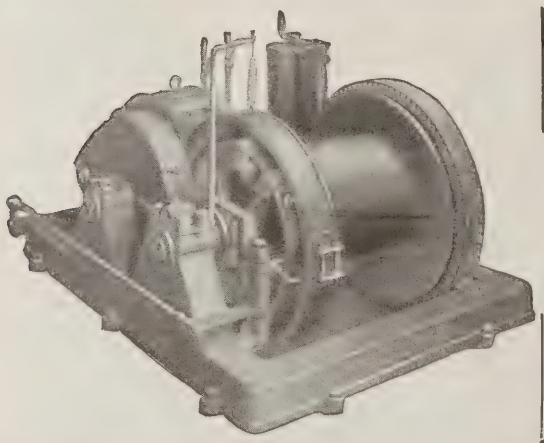
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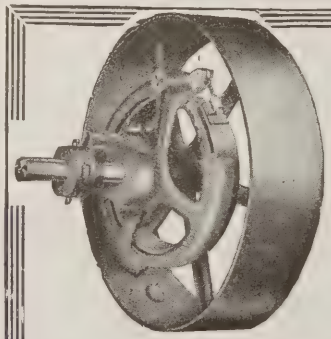
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We welcome inquiries and will supply full information on request.

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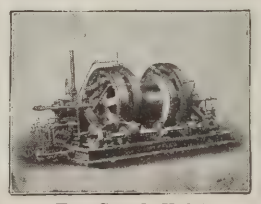
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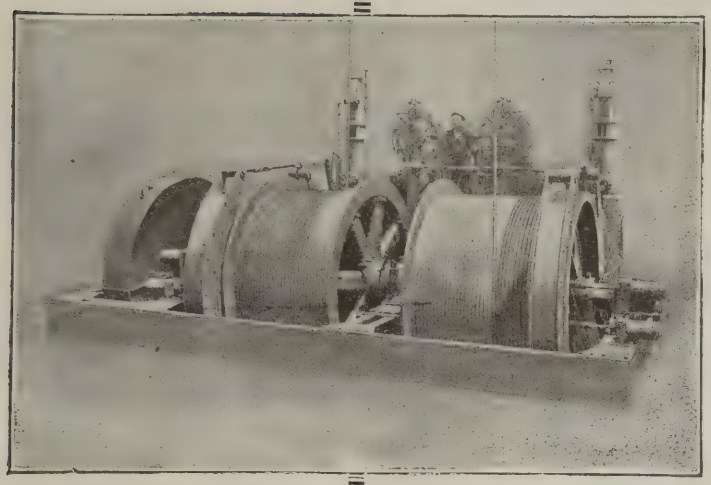


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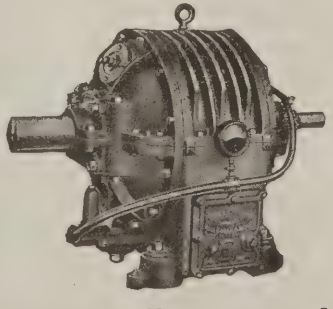
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Manufacturers of Gears and Power Transmission Machinery Since 1843
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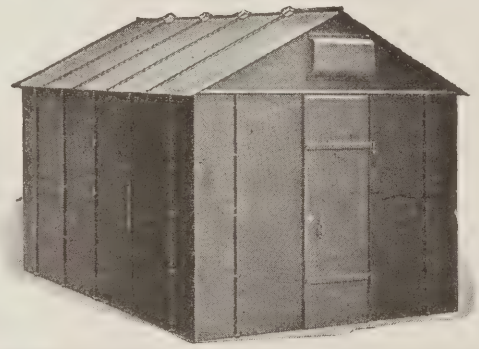
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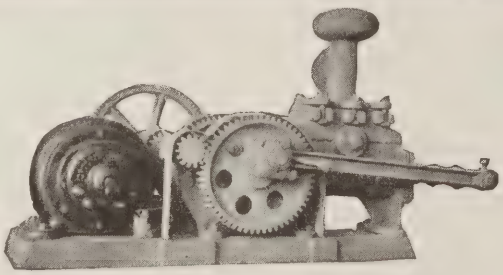
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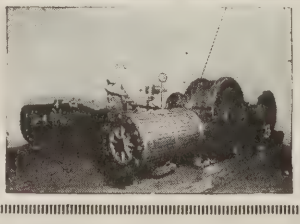
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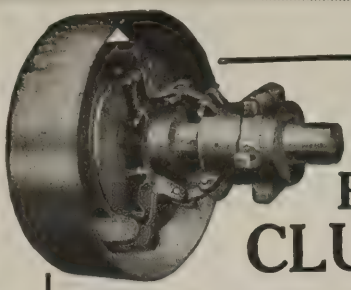
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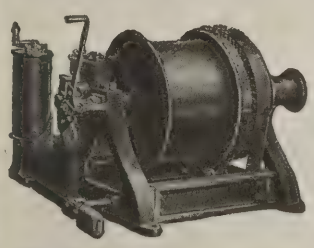
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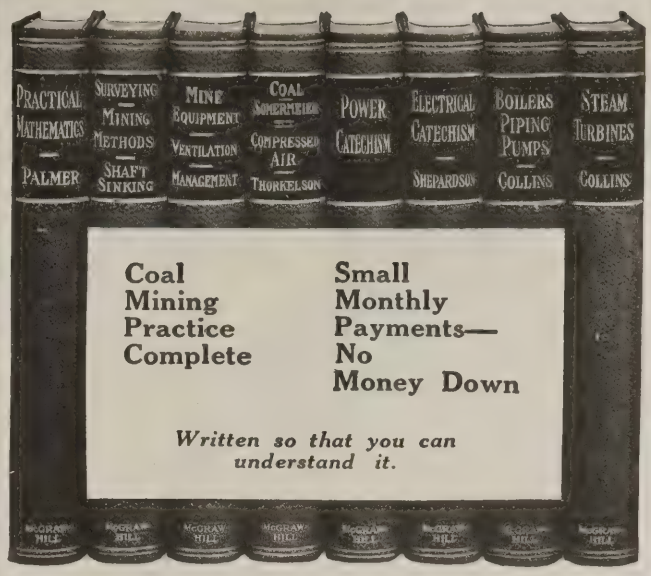
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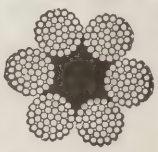
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We are always ready to put our experience at your service.

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Our New Catalog contains much useful information. Send for it.

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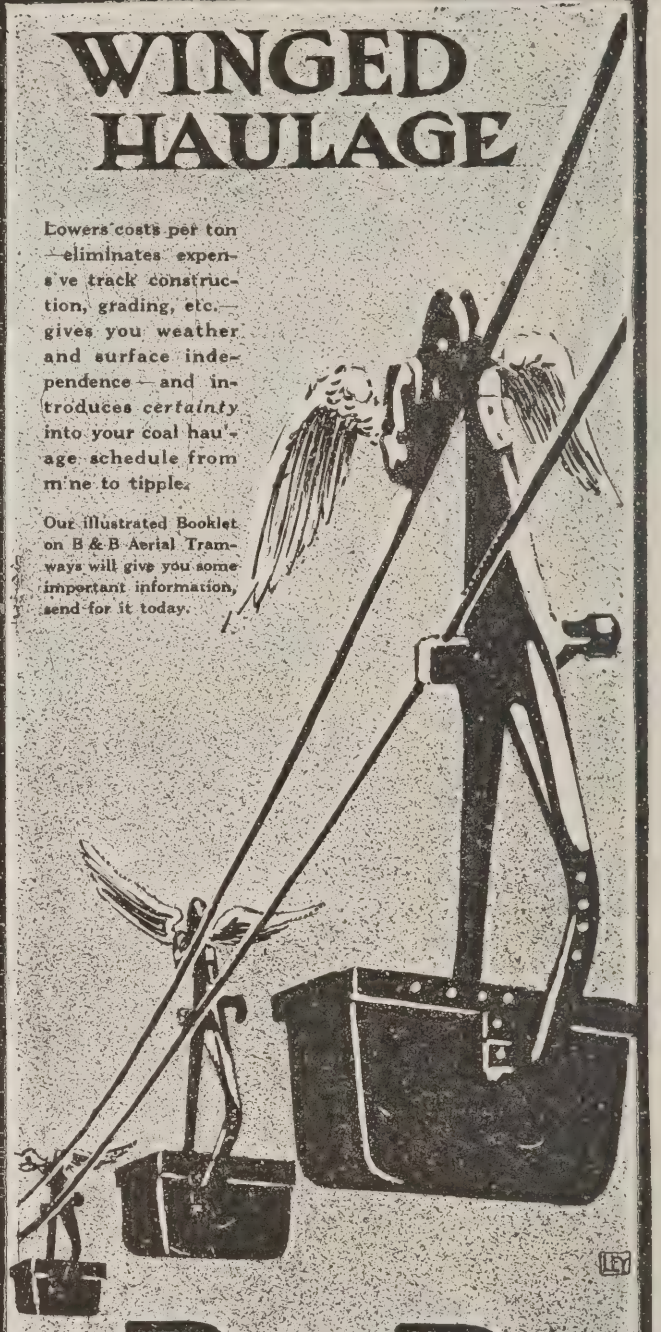
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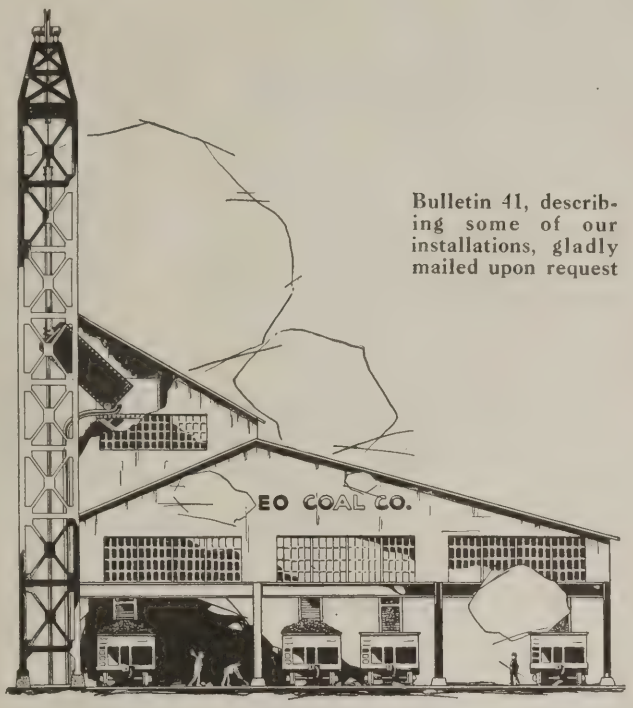
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Bulletin 41, describing some of our installations, gladly mailed upon request

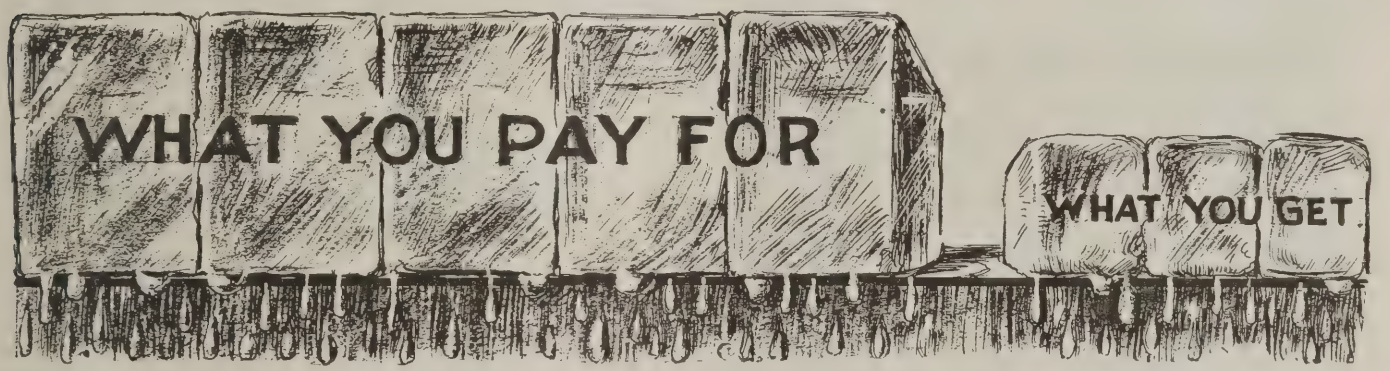
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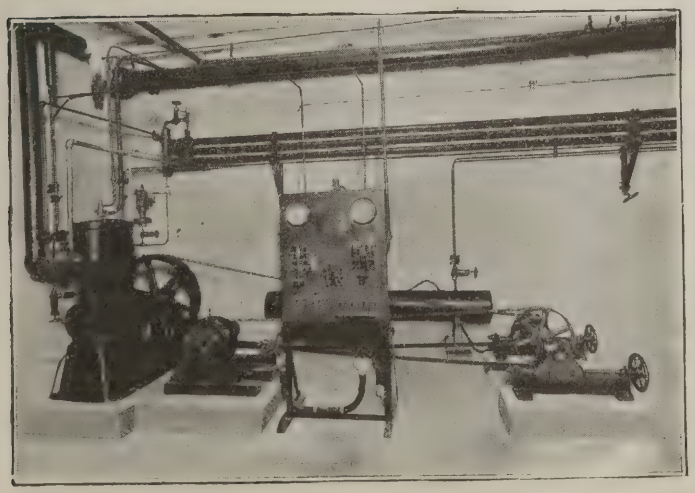
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When you buy Bartlett and Snow Tipple Equipment we want you to expect to get machinery that's better, stronger, more reliable. We want you to feel that it is going to produce clean, sized coal at a lower cost per ton.

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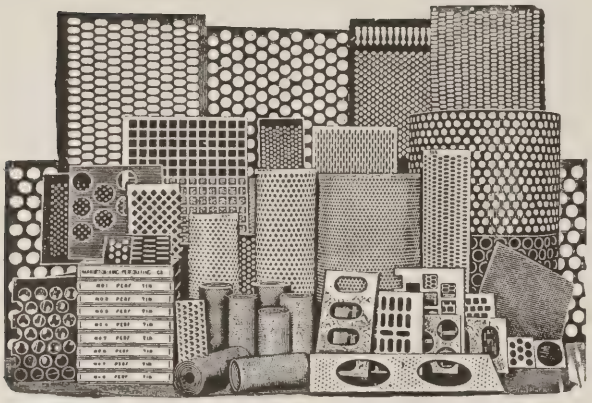
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A Classified Index of Advertisers in this Issue

For Alphabetical Index See Last Page

Acetylene Apparatus
Davis-Bournonville Co.
Milburn Co., Alex.

Angles, Beams, Channels, Etc.
Carnegie Steel Co.

Arches, Boiler
Green Engineering Co.

Armature Repair Mchry.
Electric Service Supplies Co.

Armatures and Field Coils
Chattanooga Armature Wks.
Comstock Mfg. Co., The
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Keasbey & Mattison Co.

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Green Engineering Co.

Ash Handling Machinery
Green Engineering Co.
Link-Belt Co.

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Green Engineering Co.

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Cambria Steel Co.

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Keystone Lubricating Co.

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Belts, Elevator
Goodrich Rubber Co., B. F.

Belts, Transmission
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Little Giant Co.
Sullivan Machinery Co.

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Atlas Powder Co.

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Buckeye Blower Co.
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Boiler Graphite
Dixon Crucible Co., Joseph

Boilers, Horizontal, Return Tubular
Casey-Hedges Co., The
Walsh & Weidner Boiler Co., The

Boiler Tubes
National Tube Co.

Boilers, Water Tube
Casey-Hedges Co., The
Walsh & Weidner Boiler Co., The
Wickes Boiler Co.

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Bonding Machines
Electric Ry. Improvement Co.
Lincoln Bonding Co.

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Mikesell Brothers Co.

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Wilmot Engineering Co.

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General Briquetting Co.
Malcomson Briquet Engr. Co.

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Williams Co., G. H.

Buckets, Coal Handling
Link-Belt Co.

Buckets, Elevator
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Hendrick Mfg. Co.
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Link-Belt Co.

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Ottumwa Iron Works

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Webster Mfg. Co., The

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Hyatt Roller Bearing Co.

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Morse Chain Co.

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Pyott Co.

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Sullivan Machinery Co.
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Cement-Gun Co.

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Westinghouse Elec. & Mfg. Co.

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Jeffrey Mfg. Co.

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Link-Belt Co.
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Hockensmith Mine Car Co.
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Stewart & Co., Paul
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Wilkoff Co.
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Wood & Lane
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Punxsutawney Drill & Cont. Co
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Dredging Machinery
Thew Automatic Shovel Co.

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Drills, Core
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Sullivan Machinery Co.

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Sullivan Machinery Co.

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Buckeye Blower Co.
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WHAT AND WHERE TO BUY

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General Electric Co.

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Combustion Engineering Corp.

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Connellsville Fdry. Mach. & Steel Casting Co.
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Lea-Courtney Co.
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Morris Machine Wks.
Stine, S. B.
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Dean Bros. Steam Pump Wks.
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Harris Pump & Supply Co.
Morris Machine Wks.
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Worthington Pump & Mchy. Corp.

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Cameron Steam Pump Works, A. S.
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McGowan Co., J. H.
Worthington Pump & Mchy. Corp.

Pump, Track
Worthington Pump & Mchy. Corp.

Pumps, Vacuum
Cameron Steam Pump Works, A. S.

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Electric Service Supplies Co.
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Ohio Brass Co., The
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Automatic Refrigerating Co., The

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Leschen & Sons Rope Co., A.
Macomber & Whyte Rope Co.
Moon Co., Geo. C.
Roebling's Sons Co., John A.
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Harrington & King Perforating Co
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Jeffrey Mfg. Co.
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Black Diamond Coal Mining Co.
Bunton & Bockins
Carlin Machine Co., John H.
Carrell, W. A. & Co.
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Crockwell Mine & Mill Supply Co.
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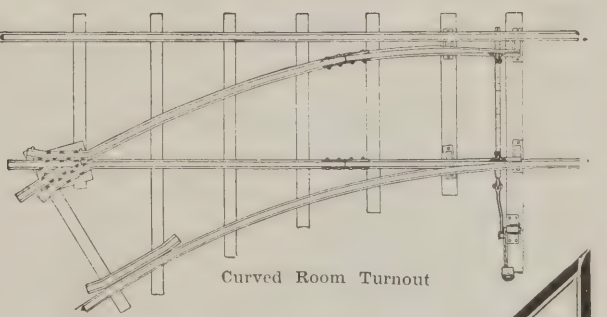


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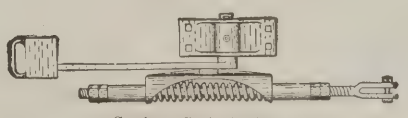
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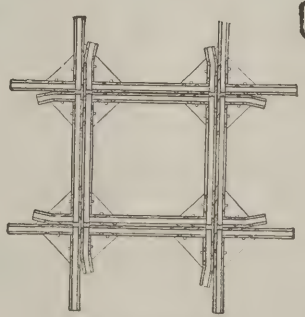
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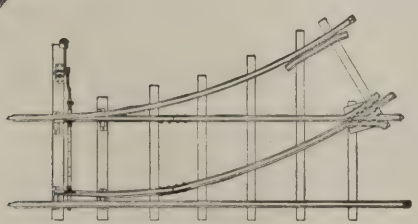
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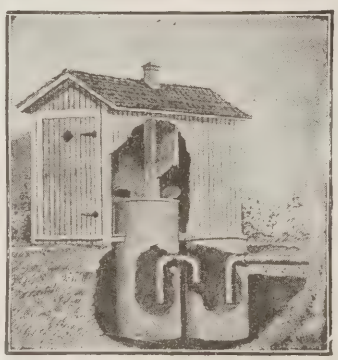
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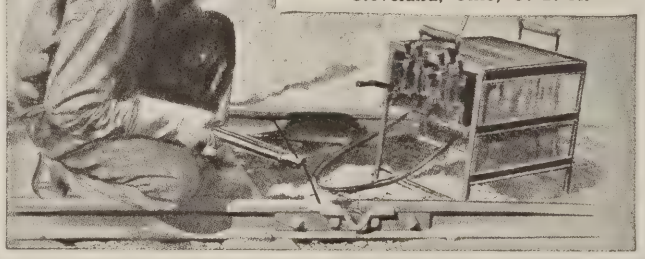
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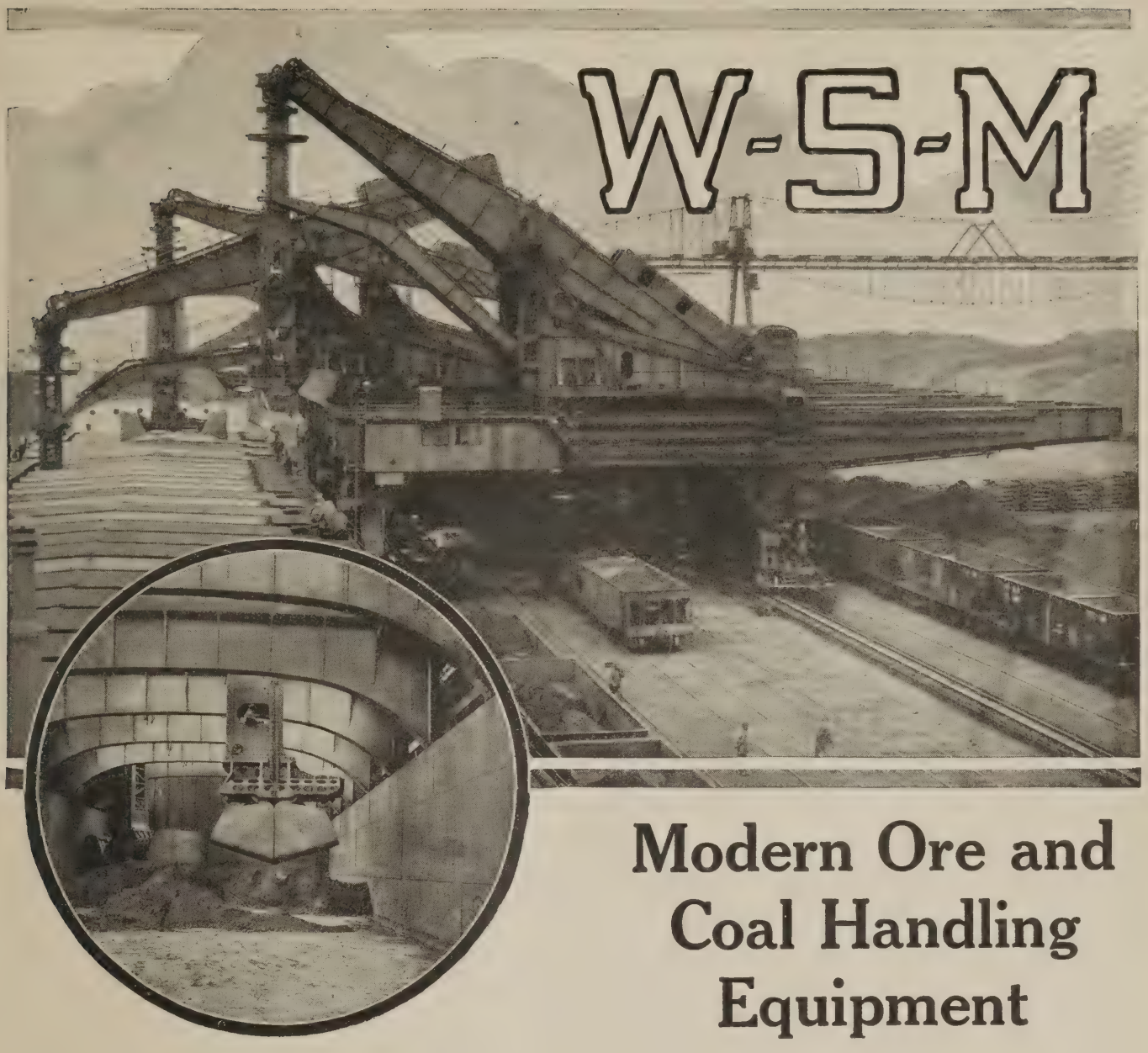
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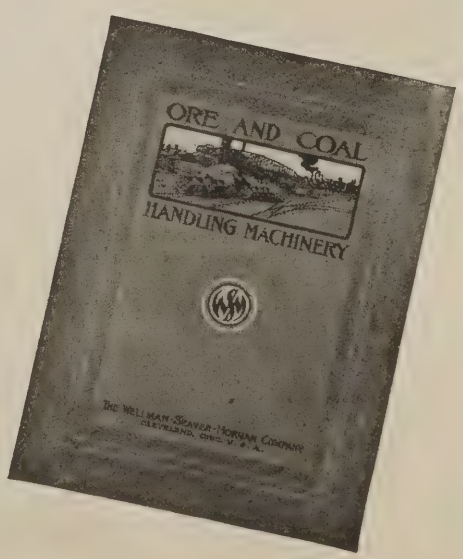
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